SEG Awards Level 2 Award and Certificates in Practical Horticulture Skills

Qualification Guidance

England
Level 2 Award - 500/9635/7
Level 2 Certificate - 500/9633/3

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Sources of Additional Information

Skills and Education Group Awards website www.skillsandeducationgroupawards.co.uk provides access to a wide variety of information.

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Specification Code, Date and Issue Number

The specification codes are: A9208-02 and C9208-02

The date of this specification is **July 2023**. The version number is **8.5**

Version	Date	Details of change
8.4	July 2022	Qualification guide created in new format
8.4	July 2022	New review date for L2 Award and L2 Certificate
8.5	July 2023	Operational end date and certification end date set for Level 2 Award and Certificate

Contents

This is a live document and as such will be updated when required. It is the responsibility of the approved centre to ensure the most up-to-date version of the Qualification Guide is in use. Any amendments will be published on our website and centres are encouraged to check this site regularly.

Qualification Summary

Level 2 Award and Certificate in Practical Horticulture Skills

Qualifications								
Level 2 Award in Practical Horticulture Skills Level 2 Certificate in Practical Horticulture Skills								
Qualification Purpose	Prepare for further learning or training and/or develop knowledge and/or skills in a subject area.							
Entry Requirements	There are no formal entry requirements							
Age Range	Pre 16		16-18	✓	18+	✓	19+	✓
Regulated	The qualifications identified above are regulated by Ofqual							
Assessment	Internal assessment, internal and external moderation							
Type of Funding Available	See FaLE (Find a learning aim)							
Grading	Pass/Fail							
Operational Start Date	01/06/2010							
Review Date	31/08/2025							
Operational End Date	**31/12/2023 All qualifications**							
Certification End date	**31/12/2024 All qualifications**							
Guided Learning (GL)	Level 2 Award - 75 Level 2 Certificate - 150							
Total Qualification Time (TQT)	Level 2 Award - 100 Level 2 Certificate - 200							
Credit Value	Level 2 Award - 10 Level 2 Certificate - 20							
Skills and Education Group Awards Sector	Land Based							
Ofqual SSA Sector	03.2 Horticulture and Forestry							
Stakeholder Support	This qualification is supported by Lantra, the Sector Skills Council for the Environmental and Land Based Sector							
Administering Office	See Skills and Education Group Awards web site							

SEG Awards Level 2 Award in Practical Horticulture Skills – Rules of Combination

Level 2 Award in Practical Horticulture Skills
Learners must achieve a minimum of 10 credits. This must include 6 credits from Group A Level 2 units. The remaining credits may be made up of any other units from Groups A or B.

Unit	Unit Number	Level	Credit Value	GLH
Group A – Level 2 Units				
Place and fix fence posts	[A/501/7043]	2	3	23
Prepare and cultivate sites ready for planting crops	[A/502/0251]	2	4	30
Select and prepare interior plant displays	[A/502/1173]	2	6	45
Establishing plants or seeds in soil	[A/502/1223]	2	4	30
Propagate plants from seed	[A/502/1500]	2	4	30
Control pest, diseases and disorders	[A/502/1514]	2	3	23
Plant nomenclature, terminology and identification	[A/502/1979]	2	5	38
Maintain and renovate artificial sports surfaces	[D/502/0419]	2	6	45
Levelling and preparing sites for landscaping	[D/502/0467]	2	4	30
Construct water features	[D/502/1215]	2	7	53
Installing drainage systems	[D/502/1229]	2	3	23
Construct and maintain paths	[D/502/1425]	2	3	30
Monitor and maintain watering systems	[D/502/1506]	2	2	15
Prepare the storage area and monitor crops during storage	[F/502/0252]	2	4	30
Establish decorative amenity areas	[F/502/0395]	2	6	45
Establishing crops or plants in growing medium	[F/502/0946]	2	4	30
Monitor and record environmental conditions for protected crops	[F/502/1496]	2	2	15
Use and maintain ride-on powered equipment	[H/502/0440]	2	3	23
Clearing horticultural and landscaping sites	[H/502/0468]	2	3	23
Identify the health and maintain the condition of general amenity turf	[H/502/1216]	2	5	38

Identify and collect plants for dispatch	[H/502/1510]	2	2	15
Transport harvested crop	[J/502/0253]	2	4	30
Maintain the appearance of decorative amenity areas	[J/502/0396]	2	7	53
Renovate and repair sports turf surfaces	[J/502/0432]	2	3	23
Merchandise plants and other relevant products	[J/502/0771]	2	6	45
Store harvested crops	[J/502/0947]	2	4	30
Prepare harvested crops	[J/502/0950]	2	3	23
Installing flag stone surfaces	[J/502/1273]	2	6	45
Transport physical resources within the work area	[J/502/1404]	2	2	15
Load and unload physical resources within the work area	[J/502/1421]	2	2	15
Maintaining plants outdoors	[J/502/1533]	2	3	23
Maintain the condition of sports turf surfaces	[K/502/0424]	2	7	53
Use and maintain non-powered and hand held powered tools and equipment	[K/502/0438]	2	3	23
Preparing ground for seeding and planting	[K/502/0990]	2	4	30
Maintaining water features	[K/502/1217]	2	4	30
Installing block surfaces	[K/502/1220]	2	6	45
Identify and report the presence of pests, diseases and disorders	[K/502/1511]	2	3	23
Maintain the health of sports turf	[L/502/0397]	2	5	38
Provide customer service when selling plants	[L/502/0772]	2	4	30
Provide nutrients to crops or plants	[L/502/0853]	2	2	15
Carry out harvesting operations	[L/502/0951]	2	4	30
Establish interior plant displays	[L/502/1176]	2	6	45
Establish propagation material	[L/502/1498]	2	3	23
Collect and prepare propagation material	[L/502/1503]	2	4	30
Maintain equipment and machines	[L/502/1520]	2	4	30
Monitor and report on the growth and development of crops and plants	[M/502/0408]	2	3	23
Installing set/cobble surfaces	[M/502/1221]	2	6	45
Prepare plants for dispatch	[H/502/1509]	2	1	8
Obtain, position and prepare growing media	[M/502/1512]	2	2	15

Use and maintain pedestrian controlled powered equipment	[R/502/0434]	2	3	23
Maintain moisture levels for crops or plants	[R/502/0854]	2	2	15
Maintain the health and appearance of interior plant displays	[R/502/1177]	2	6	45
Excavate and form foundations for fencing	[T/501/7042]	2	3	23
Install hard standing sub-layers	[T/502/1219]	2	7	53
Maintain drainage systems	[T/502/1222]	2	3	23
Installation of edge restraints	[T/502/1284]	2	7	53
Construct and maintain boundaries	[T/502/1429]	2	3	23
Preparing and transporting plants and resources	[Y/502/0466]	2	2	15
Establish and maintain artificial plant displays	[Y/502/1178]	2	6	45
Remove unwanted plant growth to maintain development	[Y/502/1214]	2	5	38
Monitoring and maintaining health and safety	[Y/501/6353]	2	3	23
Prepare and operate a tractor and attachments	[H/501/0457]	2	5	38
Group B – Optional Level 3 Units				
Establish planted areas	[D/502/0856]	3	3	19
Plan and maintain planted areas	[D/502/0498]	3	3	19
Prepare and construct new surfaces or structures	[J/502/1452]	3	5	33
Repair and maintain structures or surfaces	[F/502/1451]	3	2	13
Communicate information within the workplace	[Y/502/1195]	3	2	13

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification.

SEG Awards Level 2 Certificate in Practical Horticulture Skills – Rules of Combination

Level 2 Certificate in Practical Horticulture Skills

Learners must achieve a minimum of 20 credits. This must include 4 credits from Group A Mandatory Unit. The remaining 16 credits may be made up from one of the Groups B to G.

Unit	Unit Number	Level	Credit Value	GLH
Group A – Mandatory Unit				
Preparing ground for seeding and planting	[K/502/0990]	2	4	30
Group B – Practical Horticulture Skills				
Place and fix fence posts	[A/501/7043]	2	3	23
Prepare and cultivate sites ready for planting crops	[A/502/0251]	2	4	30
Select and prepare interior plant displays	[A/502/1173]	2	6	45
Establishing plants or seeds in soil	[A/502/1223]	2	4	30
Propagate plants from seed	[A/502/1500]	2	4	30
Control pest, diseases and disorders	[A/502/1514]	2	3	23
Plant nomenclature, terminology and identification	[A/502/1979]	2	5	38
Levelling and preparing sites for landscaping	[D/502/0467]	2	4	30
Construct water features	[D/502/1215]	2	7	53
Installing drainage systems	[D/502/1229]	2	3	23
Construct and maintain paths	[D/502/1425]	2	3	23
Monitor and maintain watering systems	[D/502/1506]	2	2	15
Prepare the storage area and monitor crops during storage	[F/502/0252]	2	4	30
Establish decorative amenity areas	[F/502/0395]	2	6	45
Establishing crops or plants in growing medium	[F/502/0946]	2	4	30
Monitor and record environmental conditions for protected crops	[F/502/1496]	2	2	15
Use and maintain ride-on powered equipment	[H/502/0440]	2	3	23
Clearing horticultural and landscaping sites	[H/502/0468]	2	3	23
Identify the health and maintain the condition of general amenity turf	[H/502/1216]	2	5	38
Transport harvested crops	[J/502/0253]	2	4	30

Maintain the appearance of decorative amenity areas	[J/502/0396]	2	7	53
Store harvested crops	[J/502/0947]	2	4	30
Prepare harvested crops	[J/502/0950]	2	3	23
Installing flagstone surfaces	[J/502/1273]	2	6	45
Transport physical resources within the work area	[J/502/1404]	2	2	15
Load and unload physical resources within the work area	[J/502/1421]	2	2	15
Maintaining plants outdoors	[J/502/1533]	2	3	23
Use and maintain non-powered and hand held powered tools and equipment	[K/502/0438]	2	3	23
Maintaining water features	[K/502/1217]	2	4	30
Installing block surfaces	[K/502/1220]	2	6	45
Identify and report the presence of pests, diseases and disorders	[K/502/1511]	2	3	23
Provide nutrients to crops or plants	[L/502/0853]	2	2	15
Carry out harvesting operations	[L/502/0951]	2	4	30
Establish interior plant displays	[L/502/1176]	2	6	45
Establish propagation material	[L/502/1498]	2	3	23
Collect and prepare propagation material	[L/502/1503]	2	4	30
Maintain equipment and machines	[L/502/1520]	2	4	30
Monitor and report on the growth and development of crops and plants	[M/502/0408]	2	3	23
Installing set/cobble surfaces	[M/502/1221]	2	6	45
Prepare plants for dispatch	[H/502/1509]	2	1	8
Obtain, position and prepare growing media	[M/502/1512]	2	2	15
Use and maintain pedestrian controlled powered equipment	[R/502/0434]	2	3	23
Maintain moisture levels for crops or plants	[R/502/0854]	2	2	15
Maintain the health and appearance of interior plant displays	[R/502/1177]	2	6	45
Excavate and form foundations for fencing	[T/501/7042]	2	3	23
Install hard standing sub-layers	[T/502/1219]	2	7	53
Maintain drainage systems	[T/502/1222]	2	3	23
Installation of edge restraints	[T/502/1284]	2	7	53
Construct and maintain boundaries	[T/502/1429]	2	3	23
Preparing and transporting plants and resources	[Y/502/0466]	2	2	15
Establish and maintain artificial plant displays	[Y/502/1178]	2	6	45
Remove unwanted plant growth to	[Y/502/1214]	2	5	38

maintain development				
Monitoring and maintaining health and safety	[Y/501/6353]	2	3	23
Prepare and operate a tractor and attachments	[H/501/0457]	2	5	38
Prepare and construct new structures or surfaces	[J/502/1452]	3	5	33
Repair and maintain structures or surfaces	[F/502/1451]	3	2	13
Carry out harvesting operations by mechanical means	[H/502/0244]	2	4	30
Promote responsible public use of the environment	[H/502/3161]	2	4	30
Use and maintain chippers and/or shredders	[T/502/0443]	2	3	23
Group C – Practical Horticulture Skills (Production Horticulture)				
Prepare and cultivate sites ready for planting crops	[A/502/0251]	2	4	30
Establishing plants or seeds in soil	[A/502/1223]	2	4	30
Propagate plants from seed	[A/502/1500]	2	4	30
Control pests, diseases and disorders	[A/502/1514]	2	3	23
Plant nomenclature, terminology and identification	[A/502/1979]	2	5	38
Installing drainage systems	[D/502/1229]	2	3	23
Construct and maintain paths	[D/502/1425]	2	3	23
Monitor and maintain watering systems	[D/502/1506]	2	2	15
Prepare the storage area and monitor crop during storage	[F/502/0252]	2	4	30
Establishing crops or plants in growing medium	[F/502/0946]	2	4	30
Monitor and record environmental conditions for protected crops	[F/502/1496]	2	2	15
Use and maintain ride-on powered equipment	[H/502/0440]	2	3	23
Clearing horticultural and landscaping sites	[H/502/0468]	2	3	23
Identify and collect plants for dispatch	[H/502/1510]	2	2	15
Transport harvested crops	[J/502/0253]	2	4	30
Merchandise plants and other relevant products	[J/502/0771]	2	6	45
Store harvested crops	[J/502/0947]	2	4	30
Prepare harvested crops	[J/502/0950]	2	3	23
Transport physical resources within the work area	[J/502/1404]	2	2	15
Load and unload physical resources	[J/502/1421]	2	2	15

within the work area				
Maintaining plants outdoors	[J/502/1533]	2	3	23
Use and maintain non-powered and hand held powered tools and equipment	[K/502/0438]	2	3	23
Identify and report the presence of pests, diseases and disorders	[K/502/1511]	2	3	23
Provide customer service when selling plants	[L/502/0772]	2	4	30
Provide nutrients to crops or plants	[L/502/0853]	2	2	15
Carry out harvesting operations	[L/502/0951]	2	4	30
Establish propagation material	[L/502/1498]	2	3	23
Collect and prepare propagation material	[L/502/1503]	2	4	30
Maintain equipment and machines	[L/502/1520]	2	4	30
Monitor and report on the growth and development of crops and plants	[M/502/0408]	2	3	23
Prepare plants for dispatch	[H/502/1509]	2	1	8
Obtain, position and prepare growing media	[M/502/1512]	2	2	15
Use and maintain pedestrian controlled powered equipment	[R/502/0434]	2	3	23
Maintain moisture levels for crops or plants	[R/502/0854]	2	2	15
Install hard standing sub-layers	[T/502/1219]	2	7	53
Maintain drainage systems	[T/502/1222]	2	3	23
Construct and maintain boundaries	[T/502/1429]	2	3	23
Preparing and transporting plants and resources	[Y/502/0466]	2	2	15
Remove unwanted plant growth to maintain development	[Y/502/1214]	2	5	38
Monitoring and maintaining health and safety	[Y/501/6353]	2	3	23
Prepare and operate a tractor and attachments	[H/501/0457]	2	5	38
Repair and maintain structures and/or surfaces	[F/502/1451]	3	2	13
Prepare and construct new structures or surfaces	[J/502/1452]	3	5	33
Carry out harvesting operations by mechanical means	[H/502/0244]	2	4	30
Promote responsible public use of the environment	[H/502/3161]	2	4	30
Use and maintain chippers and/or shredders	[T/502/0443]	2	3	23
Process payments for purchases in a retail environment	[L/503/5689]	2	4	17

Group D – Practical Horticulture Skills (Landscaping)				
Select and prepare interior plant displays	[A/502/1173]	2	6	45
Establishing plants or seeds in soil	[A/502/1223]	2	4	30
Control pest, diseases and disorders	[A/502/1514]	2	3	23
Plant nomenclature, terminology and identification	[A/502/1979]	2	5	38
Levelling and preparing sites for landscaping	[D/502/0467]	2	4	30
Construct water features	[D/502/1215]	2	7	53
Installing drainage systems	[D/502/1229]	2	3	23
Construct and maintain paths	[D/502/1425]	2	3	23
Monitor and maintain watering systems	[D/502/1506]	2	2	15
Establish decorative amenity areas	[F/502/0395]	2	6	45
Monitor and record environmental conditions for protected crops	[F/502/1496]	2	2	15
Use and maintain ride-on powered equipment	[H/502/0440]	2	3	23
Clearing horticultural and landscaping sites	[H/502/0468]	2	3	23
Identify the health and maintain the condition of general amenity turf	[H/502/1216]	2	5	38
Identify and collect plants for dispatch	[H/502/1510]	2	2	15
Maintain the appearance of decorative amenity areas	[J/502/0396]	2	7	53
Installing flag stone surfaces	[J/502/1273]	2	6	45
Transport physical resources within the work area	[J/502/1404]	2	2	15
Load and unload physical resources within the work area	[J/502/1421]	2	2	15
Maintaining plants outdoors	[J/502/1533]	2	3	23
Use and maintain non-powered and hand held powered tools and equipment	[K/502/0438]	2	3	23
Maintaining water features	[K/502/1217]	2	4	30
Installing block surfaces	[K/502/1220]	2	6	45
Identify and report the presence of pests, diseases and disorders	[K/502/1511]	2	3	23
Provide nutrients to crops or plants	[L/502/0853]	2	2	15
Establish interior plant displays	[L/502/1176]	2	6	45
Establish propagation material	[L/502/1498]	2	3	23
Collect and prepare propagation material	[L/502/1503]	2	4	30
Installing set/cobble surfaces	[M/502/1221]	2	6	45

Prepare plants for dispatch	[H/502/1509]	2	1	8
Obtain, position and prepare growing media	[M/502/1512]	2	2	15
Use and maintain pedestrian controlled powered equipment	[R/502/0434]	2	3	23
Maintain moisture levels for crops or plants	[R/502/0854]	2	2	15
Maintain the health and appearance of interior plant displays	[R/502/1177]	2	6	45
Install hard standing sub-layers	[T/502/1219]	2	7	53
Maintain drainage systems	[T/502/1222]	2	3	23
Installation of edge restraints	[T/502/1284]	2	7	53
Construct and maintain boundaries	[T/502/1429]	2	3	23
Preparing and transporting plants and resources	[Y/502/0466]	2	2	15
Establish and maintain artificial plant displays	[Y/502/1178]	2	6	45
Monitoring and maintaining health and safety	[Y/501/6353]	2	3	23
Prepare and operate a tractor and attachments	[H/501/0457]	2	5	38
Prepare and construct new structures or surfaces	[J/502/1452]	3	5	33
Repair and maintain structures or surfaces	[F/502/1451]	3	2	13
Use and maintain chippers and/or shredders	[T/502/0443]	2	3	23
Process payments for purchases in a retail environment	[L/503/5689]	2	4	17
Group E – Practical Horticulture Skills (Sports Turf Greenkeeper)				
Establishing plants or seeds in soil	[A/502/1223]	2	4	30
Use and maintain ride-on powered equipment	[H/502/0440]	2	3	23
Renovate and repair sports turf surfaces	[J/502/0432]	2	3	23
Maintain the condition of sports turf surfaces	[K/502/0424]	2	7	53
Use and maintain non-powered and hand held powered tools and equipment	[K/502/0438]	2	3	23
Maintain the health of sports turf	[L/502/0397]	2	5	38
Maintain equipment and machines	[L/502/1520]	2	4	30
Use and maintain pedestrian controlled powered equipment	[R/502/0434]	2	3	23
Monitoring and maintaining health and safety	[Y/501/6353]	2	3	23

Prepare and operate a tractor and attachments	[H/501/0457]	2	5	38
Establish and maintain effective working relationships with others	[T/502/1690]	2	2	15
Maintain and develop personal performance	[F/502/1689]	2	2	15
Group F – Practical Horticulture Skills (Sports Turf Groundsman)				
Establishing plants or seeds in soil	[A/502/1223]	2	4	30
Maintain and renovate artificial sports surfaces	[D/502/0419]	2	6	45
Renovate and repair sports turf surfaces	[J/502/0432]	2	3	23
Transport physical resources within the work area	[J/502/1404]	2	2	15
Load and unload physical resources within the work area	[J/502/1421]	2	2	15
Maintain the condition of sports turf surfaces	[K/502/0424]	2	7	53
Use and maintain non-powered and hand held powered tools and equipment	[K/502/0438]	2	3	23
Maintain the health of sports turf	[L/502/0397]	2	5	38
Maintain equipment and machines	[L/502/1520]	2	4	30
Use and maintain pedestrian controlled powered equipment	[R/502/0434]	2	3	23
Monitoring and maintaining health and safety	[Y/501/6353]	2	3	23
Establish and maintain effective working relationships with others	[T/502/1690]	2	2	15
Maintain and develop personal performance	[F/502/1689]	2	2	15
Group G – Practical Horticulture Skills (Parks, Gardens and Green Space)				
Select and prepare interior plant displays	[A/502/1173]	2	6	45
Establishing plants or seeds in soil	[A/502/1223]	2	4	30
Propagate plants from seed	[A/502/1500]	2	4	30
Control pest, diseases and disorders	[A/502/1514]	2	3	23
Plant nomenclature, terminology and identification	[A/502/1979]	2	5	38
Maintain and renovate artificial sports surfaces	[D/502/0419]	2	6	45
Installing drainage systems	[D/502/1229]	2	3	23
Construct and maintain paths	[D/502/1425]	2	3	23
Monitor and maintain watering systems	[D/502/1506]	2	2	15
Establish decorative amenity areas	[F/502/0395]	2	6	45
Establish crops or plants in growing	[F/502/0946]	2	4	30

medium				
Monitor and record environmental conditions for protected crops	[F/502/1496]	2	2	15
Use and maintain ride-on powered equipment	[H/502/0440]	2	3	23
Clearing horticultural and landscaping sites	[H/502/0468]	2	3	23
Identify the health and maintain the condition of general amenity turf	[H/502/1216]	2	5	38
Maintain the appearance of decorative amenity areas	[J/502/0396]	2	7	53
Renovate and repair sports turf surfaces	[J/502/0432]	2	3	23
Transport physical resources within the work area	[J/502/1404]	2	2	15
Load and unload physical resources within the work area	[J/502/1421]	2	2	15
Maintaining plants outdoors	[J/502/1533]	2	3	23
Maintain the condition of sports turf surfaces	[K/502/0424]	2	7	53
Use and maintain non-powered and hand held powered tools and equipment	[K/502/0438]	2	3	23
Maintaining water features	[K/502/1217]	2	4	30
Identify and report the presence of pests, diseases and disorders	[K/502/1511]	2	3	23
Maintain the health of sports turf	[L/502/0397]	2	5	38
Provide nutrients to crops or plants	[L/502/0853]	2	2	15
Establish interior plant displays	[L/502/1176]	2	6	45
Establish propagation material	[L/502/1498]	2	3	23
Collect and prepare propagation material	[L/502/1503]	2	4	30
Maintain equipment and machines	[L/502/1520]	2	4	30
Monitor and report on the growth and development of crops and plants	[M/502/0408]	2	3	23
Obtain, position and prepare growing media	[M/502/1512]	2	2	15
Use and maintain pedestrian controlled powered equipment	[R/502/0434]	2	3	23
Maintain moisture levels for crops or plants	[R/502/0854]	2	2	15
Maintain the health and appearance of interior plant displays	[R/502/1177]	2	6	45
Maintain drainage systems	[T/502/1222]	2	3	23
Construct and maintain boundaries	[T/502/1429]	2	3	23
Preparing and transporting plants and resources	[Y/502/0466]	2	2	15
Establish and maintain artificial plant displays	[Y/502/1178]	2	6	45

Remove unwanted plant growth to maintain development	[Y/502/1214]	2	5	38
Monitoring and maintaining health and safety	[Y/501/6353]	2	3	23
Prepare and operate a tractor and attachments	[H/501/0457]	2	5	38
Prepare and construct new structures or surfaces	[J/502/1452]	3	5	33
Repair and maintain structures or surfaces	[F/502/1451]	3	2	13
Promote responsible public use of the environment	[H/502/3161]	2	4	30
Use and maintain chippers and/or shredders	[T/502/0443]	2	3	23

If learners achieve credits from units of the same title (or linked titles) at more than one level, they cannot count credits achieved from both units towards the credit target of a qualification.

Introduction

These qualifications have been developed in collaboration with industry, providers and Lantra. They will enable learners to gain appropriate skills and knowledge to progress to higher levels of learning or to employment in the land based sector.

Aims

The SEG Level 2 Award and Certificate in Practical Horticulture Skills aim to

- Develop practical skills that will support those seeking a career in the horticultural industry
- Provide knowledge and understanding that could support further study within the land based sector
- Promote and encourage good working practices in relation to safety and the environment

Target Group

These qualifications are designed for those learners aged 16 or over who are currently working in the Horticulture Sector, either in paid or unpaid employment, or for learners who wish to progress into employment or further study in the sector.

Skills and Education Group Awards expects approved centres to recruit with integrity on the basis of a learner's ability to contribute to and successfully complete all the requirements of a unit/s or the full qualification.

Progression Opportunities

Learners who achieve these qualifications can progress onto further learning, into employment or begin entrepreneurial activities such as starting one's own business or gain promotion to a more senior position within existing employment.

Centres should be aware that reasonable Adjustments which may be permitted for assessment may in some instances limit a learner's progression into the sector. Centres must, therefore, inform learners of any limits their learning difficulty may impose on future progression.

Assessment

Internal assessment, external assessment, internal and external moderation. Specific requirements and restrictions may apply to individual units within qualifications. Please check unit and qualification details for specific information.

Teaching Strategies and Learning Activities

Centres should adopt a delivery approach which supports the development of all individuals. The aims and aspirations of all the learners, including those with identified special needs or learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Tutor/Assessor Requirements

Skills and Education Group Awards require those involved in the teaching and assessment process to be suitably experienced and / or qualified. Assessors should also be trained and qualified to assess or be working towards appropriate qualifications.

Those responsible for Internal Quality Assurance (IQA) must be knowledgeable of the subject/occupational area to a suitable level to carry out accurate quality assurance practices and processes.

Language

These specifications and associated assessment materials are in English only.

Unit Details

Place and Fix Fence Posts

Unit Reference	**A/501/7043**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, understanding and skills required to enable learners to place and fix fence posts under minimal direction or guidance
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.1)** ***The learner can***
1. Work safely in line with legislation and codes of practice	1.1 Work safely in line with health and safety requirements 1.2 Complete work in a manner which causes minimal disturbance to the environment 1.3 Dispose of waste and excess materials safely
2. Be able to select and prepare tools	2.1 Select and prepare tools, equipment and resources ready for use
3. Be able to prepare materials	3.1 Obtain fencing materials of specified type, material, quality and grade
4. Be able to place and fix posts	4.1 Use three of the following methods to fix posts to the specified line, level and angle • driving • bolting • casting • socketing • backfilling and consolidating

	4.2 Use recommended working practices to position and fix fence posts and gate posts 4.3 Use recommended methods for providing temporary supports to posts set in concrete or other suitable material
5. Be able to deal with difficulties	5.1 Deal with difficulties experienced during work within levels of responsibility
6. Know the relevant legislation and codes of practice	6.1 Outline the health and safety, legislation and codes of practice associated with placing and positioning of posts 6.2 Outline the hazards and risks involved in fence installation carried out at heights
7. Know how to place and fix posts	7.1 Outline the methods used for aligning and levelling posts 7.2 State the reasons for, and methods of, setting posts to allow for tensioning 7.3 Name the factors that affect the positioning and the method of fixing posts 7.4 Name the types of backfill and methods of consolidation 7.5 Outline the precautions to take to avoid distortion during tensioning process
Mapping to National Occupational Standards FE3.2	

Supporting Unit Information

A/501/7043 Place and fix fence posts - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

LO1, LO2, LO3, LO4 and LO5 are the key areas of competence for this unit

Learning Outcome 1. Work safely in line with legislation and codes of practice

1.1 Risk assessment is completed or studied and implemented work activities carried out consistently with current legislation, codes of practice and any additional requirements; Health and Safety e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Town and Country Planning, England e.g. Town and Country Planning (General Permitted Development) (Amendment) (No 2) (England) - refer to Class F Environmental Protection e.g. Environmental Protection Acts covering waste disposal, Codes of Practice e.g. Protecting our Water, Soil and Air, Working at height regulations 2005.

1.2 Work is completed in a manner which causes minimal disturbance to the environment (refer to LO6.1). Use and wastage of materials is minimised, (e.g. waste material recycled or re-used, use of sustainably sourced wood). Pollution from the site is minimised (e.g. run-off of water and suspended materials is controlled, noise levels reduced, stored (unused) material controlled). Disturbance and loss of habitat is minimised, important features (e.g. feeding or nesting areas, plants) are marked and protected. Waste is disposed of in line with legislation, codes of practice and policies; e.g. Duty of care - controlled wastes, organisations policy for handling of wastes (storage, local authority site/scheme, licensed contractor, recycle / reuse). Underground services located/identified using plans or cat-scan.

1.3 Waste and excess materials handled and disposed of safely and according to Duty of care - controlled wastes, organisations policy for handling of wastes (storage, local authority site/scheme, licensed contractor, recycle / reuse). Organic waste – reduce waste removed from cropping area (by careful selection of cop, waste material returned to the field (unless the material poses a threat to plant health e.g. diseased material and perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging

minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

Learning Outcome 2. Be able to select and prepare tools

2.1 Select and prepare tools, equipment and resources ready for use appropriate equipment and resources for this area of work is selected and made ready for use for the operation as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe. Preparation for operation as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe use. Preparation of range of equipment e.g. Marking out equipment – levels, pegs, strings (used to ensure accurate positioning) – checking as clean and not damaged, setting up and calibration of levels; Hand tools (spade, shovel, drills, hammers, chisels), checked as clean, undamaged, handled safe, sharp.

For post-holes – hand tools as above, mechanical (post-hole borers hand operated or tractor mounted, tampers) routine servicing, refuelling, Tools, equipment and resources maintained in a clean and serviceable condition throughout placing and fixing of fence posts, securely and safely stored when not in use (by monitoring, refuelling, storage, protection).

Learning Outcome 3. Be able to prepare materials

3.1 Obtain fencing materials of specified type, material, quality and grade fencing materials of specified type, material, quality and grade obtained; Obtained from own store, purchase from supplier, collected/delivered. Posts;
Types – softwood (treated or untreated), hardwood, concrete, metal, other materials
Size – range of heights, diameter, Shape – round, half-round, square, tapered
Fixings – preformed holes in posts, nails, screws, coach bolts, brackets, supports (temporary and permanent) – wood, metal, wire, other material

Learning Outcome 4. Be able to place and fix posts

4.1 Use three of the following methods to fix posts to the specified line, level and angle at least three of the following methods used to fix posts to the specified line, level and angle;
Use of lines, siting poles (to fix location), optical and laser levels (to set levels), use of plumb-lines, spirit levels (to ensure vertical components are aligned
Driving – bars for forming lead, driving by sledge hammer (or fencing mell), drivall, mechanical post-knocker
Bolting – to foundations, existing wall or fence

Casting – setting in concrete or similar material in trench or hole,
Socketing – inserting to pre-formed socket or base, fixing e.g. with wedge, screw, bolt
Backfilling and consolidating – with concrete or similar material, compacted gravel, intrinsic material (i.e. soil, subsoil)
Use of temporary or permanent support to posts. Methods; use of heavy end posts, concreting in, straining posts (internal or external), use of temporary supports, reason; to withstand tension of fence wires, to withstand sideways forces (e.g. wind, plants, livestock), to support weight (e.g. the fence, plants)

4.2 Use recommended working practices to position and fix fence posts and gate posts recommended working practices used to position and fix fence and gate posts. Work is carried out (see LO4.1 for range of activities) according to instructions, equipment is only used for purpose and in conditions recommended by manufacturer/supplier, risk assessment implemented, codes of practice and legislation complied with (refer to LO1.1), work is carried out according to plan or instructions to meet purpose and appearance.

4.3 Use recommended methods for providing temporary supports to posts set in concrete or other suitable material recommended methods used for providing temporary supports to posts set in concrete/or other suitable material; Use of wooden stays, preformed supports, wires, use of dry concrete mixes, heavy tamping use of large stones or broken building material to provide stability (refer also to LO4.1).

Learning Outcome 5. Be able to deal with difficulties

5.1 Deal with difficulties experienced during work within levels of responsibility e.g. problems with equipment or other resources (shortage of fuel, materials replaced/replenished from store). Work stopped when conditions become unfavourable or if unsafe to proceed (e.g. heavy rain, ice, machinery failure, presence of unauthorised persons on site) (refer to LO1.1 for circumstances and codes of practice), obstructions to fixing posts cleared or advice is requested on how to deal with difficulties outside level of own responsibility e.g. problems with equipment failures, need to order more materials, difficulties in meeting specifications.

LO6 and LO7 are the key area of knowledge for this unit

Learning Outcome 6. Know the relevant legislation and codes of practice

6.1 Outline the health and safety, legislation and codes of practice associated with placing and positioning of posts (refer to LO1.1)

6.2 Outline the hazards and risks involved in fence installation carried out at heights
Falls from height are the biggest cause of fatalities and a major source of

serious injury in the workplace. Hazards; any place where a person can be injured by falling from the height, additional hazards including cables, wet surfaces, health problems (e.g. vertigo).

Learning Outcome 7. Know how to place and fix posts

7.1 Outline the methods used for aligning and levelling posts; Refer to LO4.1

7.2 State the reasons for, and methods of, setting posts to allow for tensioning Refer to LO4.1

7.3 Name the factors that affect the positioning and the method of fixing posts

Design for purpose and aesthetics (e.g. to match existing)

Positioning design and usage, type of fence (e.g. wire, panel, rail), substrate (e.g. soil, rock, tarmac, concrete)

Methods driven (direct or socket), excavated hole (refer to LO7.4)

7.4 Name the types of backfill and methods of consolidation

Types intrinsic material, gravel/stone, concrete (wet or dry mix), bolted.

Consolidate using hand tools, mechanical tamper, plate compacter

7.5 Outline the precautions to take to avoid distortion during tensioning process

Check security of all posts, use only straining equipment designed for purpose, follow instructions, use of strain gauges.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 4 and 5

Delivery of these learning outcomes is by supervised practical work placing and fixing fence posts giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Learning Outcomes 6 and 7

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work placing and fixing fence posts, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Prior to, during and after completion of placing and fixing fence posts photographs or video could be taken to provide evidence of progress. Copies of packhouse or field

records can be used to provide evidence of quantity of work and of sufficiency of evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3, 4 and 5 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion

- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

ADDITIONAL INFORMATION

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a useful references in Section 9
- Local Authority web sites for Building Control Department

- BTCV Handbooks On-line www.btcv.org
- Learners should be directed to relevant publications and web sites eg.
- The Landscaper (www.landscapermagazine.com)
- DEFRA web site and publications https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998

Prepare and Cultivate Sites Ready for Planting Crops

Unit Reference	**A/502/0251**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to prepare sites for cultivation by removing debris and vegetation. The unit also covers the cultivation of sites ready for planting crops
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.3)** ***The learner can***
1. Be able to select, use and maintain equipment and tools for preparing sites	1.1 Select appropriate tools and equipment for this area of work 1.2 Use tools and equipment according to instructions 1.3 Prepare, maintain and store tools and equipment in a safe and effective working condition
2. Be able to prepare sites for cultivation and planting	2.1 Identify site to be prepared for cultivation and planning 2.2 Prepare the site by removing any waste from previous crop
3. Be able to carry out site cultivations	3.1 Carry out cultivation to achieve the required ground conditions to meet the requirements of the crop covering • correct depth • soil condition • area covered

	3.2 Report conditions of cultivation clearly and accurately to the appropriate person
4.Be able to work safely and minimise environmental damage	4.1 Work in a way which promotes health and safety, is consistent with current legislation, codes of practice and any additional requirements 4.2 Dispose of waste safely and correctly
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for preparing sites for cultivation and planting crops 5.2 Describe the methods of maintaining the equipment used 5.3 Explain the correct methods of adjusting the equipment during use
6. Know the methods for preparing sites read for cultivation	6.1 Describe the methods and reasons for preparing sites ready for cultivation
7. Understand how to cultivate sites	7.1 Explain the different methods of cultivating sites reflecting the following • previous use of the site • soil conditions • existing structures • weather conditions • the crop to be planted 7.2 Explain the ground conditions which are required for effective planting to take place e.g. depth, and soil condition 7.3 State the importance of reporting the right information required for recording purposes
8. Know the current health and safety legislation and environmental good practice	8.1 Outline the current health and safety legislation, codes of practice and any additional requirements 8.2 Describe how environmental damage can be minimised

	8.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029N Agc4.1 & 4.2	

Supporting Unit Information

A/502/0251 Prepare and cultivate sites ready for planting crops - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is carrots or similar root crop grown on a field scale. The same approach should be used for other crops.

LO1, LO2, LO3 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment and tools for preparing sites

1.1 Select appropriate tools and equipment for this area of work PPE selected and safely used, appropriate tools and equipment for this area of work selected; e.g.
PPE; waterproof clothing, steel toe-capped boots, overalls, UV Protection, gloves, hats, ear defenders. Site clearing; toppers, flail mowers, rotorvators, disc harrows, chisel ploughs, (could include mulch lifters, tractors and trailers to remove structures). Cultivation; sub-soilers, ploughs (chisel and mole-board), harrows (e.g. rotary, disc, dutch, drag), rollers, ridgers and bed formers.

1.2 Use tools and equipment according to instructions Instructions; manufacturer's / supplier's / supervisor's, (Refer to LO1.1 for range of equipment, LO2.2 and LO3.1 for range of activities). Adjustments made to the equipment during use as required:
Flail mowers – set cut height and discharge; rotorvators and rotary harrows – set gearing (to adjust tilth) and depth; disc harrows – adjust angle of cut to change depth and degree of cultivation; sub-soilers, chisel ploughs, dutch harrows – set depth; mole-board ploughs – set furrow depth, skims, coulters, furrow width; bed formers, ridgers – set depth of cultivation, gearing (tilth), formers (height of bed).

1.3 Prepare, maintain and store tools and equipment in a safe and effective working condition manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment; e.g. cleaning and checking prior to use, attaching and setting up of toppers and flail mowers, ploughs and harrows; periodic servicing of power units; Equipment cleaned and checked after use and safely returned to appropriate storage area.

Learning Outcome 2. Be able to prepare sites for cultivation and planting

2.1 Identify site to be prepared for cultivation and planting Location, size, condition relating to clearing and cultivation required.

2.2 Prepare the site by removing any waste from previous crop Removal and clearing by; flail or rotary mowers, rotorvators, disc harrows, removal by hand of frames and structures, removal of crop covers and mulches. Reasons for clearing; to reduce carryover of pests and disease in old crop material, make cultivation easier (e.g. by reducing blockages), reduce incidence of weeds.

Learning Outcome 3. Be able to carry out site cultivations

3.1 Carry out cultivation to achieve the required ground conditions to meet the requirements of the crop covering correct depth, soil condition, area covered. Cultivations and reasons e.g. subsoiling and deep chisel ploughing; to improve aeration and drainage, help downward penetration of roots, reduce compaction and plough pans. Primary cultivation (e.g. ploughing, digging); to bury crop residues, weeds and incorporate applied organic manures, improve aeration, loosen compacted soil to facilitate further operations (e.g. secondary cultivations), recycle nutrients.. Secondary cultivation (e.g. rotorvating, harrowing) ; to bury stones, break down larger clods left by primary cultivation, produce fine tilth to facilitate operation of planting and seeding equipment, give better soil contact with seeds and transplants, provide appropriate surface for subsequent operations (e.g. use of herbicides, inter-row cultivations to control weeds). Bed-forming or ridging; to facilitate planting or seeding operations and subsequent operations (e.g. weed control, harvesting).

3.2 Conditions of cultivation clearly and accurately reported to the appropriate person (e.g. supervisor, line manager or agronomist). Information; e.g. equipment and machinery maintenance reports, area prepared, variations from plan or programme, further actions required, materials used, problems encountered including machinery issues.

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which promotes health and safety, is consistent with current legislation, codes of practice and any additional requirements. Health and Safety e.g. Management of Health & Safety at Work Regulations; Environmental Protection Acts; Waste Regulations. Codes of Practice e.g. protecting our water, soil and air; Additional requirements including certification schemes, customer regulations, assured produce schemes, LOLER, PUWER, Manual Handling, StopSafe.

4.2 Dispose of waste safely and correctly Organic waste – reduce waste removed from plant maintenance area by shredding and mulching or habitats, waste plant material composted (unless the material poses a threat to plant health e.g. diseased material and perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

LO5, LO6, LO7 and LO8 are the key area of knowledge for this unit

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for preparing sites for cultivation and planting crops (refer to LO1.1).

5.2 Describe the methods of maintaining the equipment used (refer to LO1.3).

5.3 Explain the correct methods of adjusting the equipment during use (refer to LO1.2).

Learning Outcome 6. Know the methods for preparing sites ready for cultivation

6.1 Describe the methods and reasons for preparing sites ready for cultivation

Cultivations methods and reasons; (refer to LO3.1).

Learning Outcome 7. Understand how to cultivate sites

7.1 Explain the different methods of cultivating sites reflecting the following

Previous use of the site crop removal by baling and carrying off site, mowing and mulching, rotorvating, use of herbicide, compacted soils (e.g. after long term crops) require deep cultivation,

Soil conditions sandy soils requiring less tillage than heavier clay soils, cultivation in extreme wet conditions will be difficult and cause soil damage, dry conditions create dust, difficult to form good even tilth, frost will prevent cultivation, presence of debris (e.g. weeds, previous crop) will block machinery and prevent good even tilth.

Existing structures cultivations in protected areas (e.g. greenhouses , tunnels) require use of pedestrian operated machinery or compact tractors, soil moisture can be controlled to provide optimum conditions for cultivation,

structures (e.g. frames for hops or raspberries, bean sticks) will need to be cleared before cultivation.

Weather conditions impact on ground conditions e.g. wet ground will make cultivations difficult, increase soils damage; Hot dry weather will rapidly improve cultivation of wet soil but can quickly dry out soil reducing available water for crops and making cultivation difficult.

The crop to be planted adjustments to fineness and depth of tilth, firmness, beds or ridges formed, surface (refer to LO7.2 for example).

7.2 Explain the ground conditions which are required for effective planting to take place e.g. depth, and soil condition e.g. depth, and soil condition (for example crop = field scale carrots). Deep cultivated free from stones, clods, fresh manure (to allow unimpeded downward rooting); finely cultivated to allow operation of seeding equipment and close contact with seed; formed into beds or ridges to facilitate harvesting.

7.3 State the importance of reporting the right information required for recording purposes Refer to LO3.2 for range of information; Required for; legal (e.g. RIDDOR), management (e.g. further action required, repairing machinery, planning future activities).

Learning Outcome 8. Know the current health and safety legislation and environmental good practice

Outline the current health and safety legislation, codes of practice and any additional requirements (refer to LO4.1).

8.1 Describe how environmental damage can be minimised minimising soil damage, working in appropriate weather and soil conditions, avoiding run-off from erosion and roads or tracks, recycling and re-using of waste, reducing contamination and waste, recycling and composting of unwanted plant material (unless the material poses a threat to plant health e.g. diseased material and perennial weeds). Checking and accurate use of equipment.

8.2 Describe the correct methods for disposing of organic and inorganic waste (refer to LO4.2).

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4
Delivery of these learning outcomes is by supervised practical work preparing and cultivating sites ready for planting crops, giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Learning Outcomes 5, 6, 7 and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work preparing and cultivating sites ready for planting crops, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Prior to, during and after completion of work preparing and cultivating sites ready for planting crops photographs or video could be taken to provide evidence of progress. Copies of packhouse or field records can be used to provide evidence of quantity of work and of sufficiency of evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria
Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and can be assessed practically by observation or by generation of diverse evidence to demonstrate competence. These could also link to Learning Outcomes 5, 6, 7 and 8 to allow knowledge evidence to be gathered during the practical activities

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
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This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

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Additional Information

Useful sources of reference

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ - helpful guidance about environmental regulations
- The Code of Practice - Protecting our Water, Soil and Air Section 9
- Learners should be directed to relevant publications and web sites eg.
- Horticulture Week (www.hortweek.com)
- DEFRA web site and publications https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998

Select and Prepare Interior Plant Displays

Unit Reference	**A/502/1173**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to select and prepare natural interior plant displays The learner will be able to select, handle and transport the necessary materials and will ensure displays have the required visual impact The use of equipment and chemicals must meet the requirements of legislation and relevant codes of practice
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to select, use and maintain equipment for establishing interior plant displays	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to establish interior plant displays	2.1 Establish customer requirements for the display 2.2 Select plants and materials for the display that meet these requirements Plants • plants • tropical • temperate • shade lovers • sun lovers

	Materials • nutrients • containers • irrigation systems • growing medium 2.3 Check the plants and materials are in a condition fit for use 2.4 Prepare the plants and materials according to requirements 2.5 Return unused plants and materials to storage
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to set up interior plant displays	4.1 Describe how to establish the customer's requirements for the display and why this is important 4.2 Describe the principles underpinning effective interior plant displays 4.3 Describe the different types of plants used in interior displays • tropical • temperate • shade lovers • sun lovers 4.4 Describe how to select plant and materials appropriate to different types of interior displays and sites 4.5 Describe the different containers and growing mediums for displays and ensure they are fit for purpose 4.6 Describe how to prepare materials for plant displays Materials • nutrients

	• containers • irrigation systems • growing medium 4.7 Describe how to handle and transport the plants and materials safely and efficiently 4.8 Describe how to position features and grouping of plants in a way which is appropriate to them, the environment and the intended visual impact 4.9 State how to make sure support methods are consistent with the display and the health and vigour of the plants 4.10 State why it is important that the site is reinstated to the client's satisfaction and how to judge whether this has been done
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for establishing interior plant displays 5.2 Describe methods of maintaining the equipment in a fit state for use
6. Know the relevant health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL8.1	

Supporting Unit Information

A/502/1173 Select and prepare interior plant displays - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment for establishing interior plant displays

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, gloves. CE marked. Tools and equipment selected e.g. hand fork / trowel, watering can, trickle / drip feed system, scissors / small secateurs, plant containers, baskets, pots, supports

1.2&3 Use equipment according to instructions equipment used only for the operation and in situations as detailed by the manufacturers / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. small secateurs - blades sharpened. Use e.g. do not cut above recommended thickness or twist secateurs when cutting. Maintenance e.g. clean blades after use to remove sap, oil blades and mechanism. Storage e.g. shadow board - check return, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager.

Learning Outcome 2. Be able to establish interior plant displays

2.1 Establish customer requirements for the display Customer requirements for display established: Refer to LO4.1. Display specified covering e.g. purpose of display, room (s) / area (s) covered, types of plants as groups defined in LO2.2 and any specific requirements, types of stands / furniture / containers to hold display, type of display - floor based / hanging / water.

2.2 Select plants and materials for the display that meet these requirements Refer to LO4.3 and 4.6.

2.3 Check the plants and materials are in a condition fit for use plants. Appearance e.g. presence of dead / discoloured / spotted leaves, broken stems / buds, unwanted growth, dust on leaves. Poor health e.g. straggly or stunted growth, insect infestations, weeds, disorders. Physical e.g. shape, height,

foliage density, proximity of flowering. Materials e.g. nutrients in use by date, properly stored - ingress of water, sachets intact.

2.4 Prepare the plants and materials according to requirements Plants. Acclimatised if necessary for conditions in customer's premises. Health and wellbeing of plant attended to (should be ongoing maintenance activity) e.g. minor feeding, watering or light deficiencies corrected, if root bound re-potted, weeds removed, insects treated. Grooming e.g. leaves dusted and polished, poor straggly growth pruned / pinched out, dead / discoloured growth or broken stems removed. Materials - refer to LO4.6.

2.5 Return unused plants and materials to storage Unused plants and materials returned to storage. Unused plants unpacked from journey home, checked for security of planting / staking and any insect passengers, re-acclimatised to storage area if necessary. Materials e.g. trickle feed system components stored in boxes with like components, labelled so easily found at next job.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable, risk assessment and additional requirements.

3.2 Carry out work in a manner which minimises environmental damage e.g. trickle feeders used with timer to conserve water, use of natural rather than artificial light, recycling / reuse.

3.3 Dispose of waste safely and correctly Waste e.g. organic - green or inorganic - worn out containers, watering tubing. Correctly - refer to LO6.3. Safely e.g. PPE, safe lifting.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to set up interior plant displays

4.1 Describe how to establish the customer's requirements for the display and why this is important Customers known requirements stated. Options, possibilities and costs, length of life discussed leading to clarification of customer decisions and specification of display. Importance - customers buy in to specification, easier to achieve customer satisfaction.

4.2 Describe the principles underpinning effective interior plant displays Cover at least unity, balance, emphasis, proportion, rhythm or sequence, simplicity e.g. emphasis - by selection and positioning of visually strong feature creates point of focus that draws the interest / eye to that feature in a given room or area.

4.3 Describe the different types of plants used in interior displays (may not be compatible

- **tropical** e.g. medinilla, philodendron, beaucarnea
- **temperate** e.g. begonia, exacum
- **shade lovers** e.g. aspidistra, dracaena
- **sun lovers** e.g. hibiscus rosa-sinensis, jasminum

4.4 Describe how to select plant and materials appropriate to different types of interior displays and sites purpose of the display / specification defines many aspects of plant and material selection. Some aspects left to creativity of interior plant display specialist who will select for e.g. colour, form and texture, contrasting or complementary foliage / flowers / containers, to satisfy principles listed in LO4.2. Needs of plants will also determine selection of container size/ type, types of compost / fertiliser e.g. proprietary for cacti.

4.5 Describe the different containers and growing mediums for displays and ensure they are fit for purpose Containers e.g. shape / colour / size / materials / floor or table standing / hanging. Growing mediums e.g. loam based or peat based composts. Replacements for peat based composts e.g. coir and pulverised bark. Specialist mediums e.g. cacti / orchids. Hydroculture - inert mediums. Fit for purpose e.g. loam based compost contains / retains more nutrients and has better water holding properties than peat based.

4.6 Describe how to prepare materials for plant displays containers, irrigation systems, and growing medium for plant displays e.g. containers cleaned, polished, labels removed and if appropriate base fill and compost added prior to transport to customer site.

4.7 Describe how to handle and transport the plants and materials safely and efficiently

Plants

- **Handled** e.g. care not to bruise stem / leaves / roots, protected from cold or damage by wrapping, picked up in pot or with root ball supported, care of spines / prickles
- **Transported** e.g. tall plants secured and lying on sides, in cold weather vehicle heated before plants loaded, avoid sun beating down on plants through windows, overheating of plants, wind chill or drying, wind whipping through leaves, transport moist - ferns or dry - cacti as plants require, wrapped in / cushioned by newspaper, plastic to retain moisture, proprietary sleeves / boxes
- **Safely** e.g. cover roots to protect from drying / damage, in cold weather plants fully covered to avoid exposure, timing of handling / transport to avoid heat of midday
- **Efficiently** e.g. bare root rather than potted to save space, rapid move on arrival at display site, clearly label wrapped plants, use transport pallets for pots, boxes

Materials

- **Handled** e.g. using appropriate PPE - gloves and dust mask for nutrients, correct manual handling, aids used - sack barrow / trolley, carefully place materials and avoid heavy handling such as throwing, dropping
- **Transported** e.g. loaded, secured and driven to avoid internal movement / crushing of load, equipment parts packed in separate clearly labelled containers
- **Safely** e.g. chips or breakage avoided by padding, careful placement, clearly labelled
- **Efficiently** e.g. in separate stackable water tight containers, unfilled plant containers stacked inside each other and resting on widest base, parts that fit together loaded together, compartmentalisation

4.8 Describe how to position features and grouping of plants in a way which is appropriate to them, the environment and the intended visual impact e.g. placement and grouping to satisfy the design principles. In LO4.2. Position individual plants to meet their environmental needs. Plant types with compatible environmental needs grouped and positioned together for ease in meeting needs / maintenance e.g. Tropical plants such as philodendrons and dracaenas prefer a warm area, light shade to moderate brightness and a humid atmosphere. Plants should be positioned to support and enhance the performance of adjacent plants e.g. shade loving placed below tall plants.

4.9 State how to make sure support methods are consistent with the display and the health and vigour of the plants e.g. compatibility of size with pot / container and plant. Type and degree of support needed e.g. moss pillar for plants with aerial roots or bamboo tripod to encourage climbers. Aesthetics e.g. visibility and appearance of support against plant. Health and vigour e.g. prevention of undesirable trailing / spreading modes of growth that might encourage disease / detract from display, correct size to support continuing growth, insert carefully - avoid root damage.

4.10 State why it is important that the site is reinstated to the client's satisfaction and how to judge whether this has been done e.g. to fully meet specification, reputation, likelihood of ongoing maintenance work, health and safety - not leaving tripping hazards. Judge client's satisfaction on completion using formal methods such as check against specification, questionnaire, checklist tick off and customer's verbal response and body language.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for establishing interior plant displays refer to LO1.1.

5.2 Describe methods of maintaining the equipment in a fit state for use refer to LO1.2&3.

Learning Outcome 6. Know the relevant health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Environmental Protection e.g. Environmental Protection Acts covering waste disposal.

6.2 Describe how environmental damage can be minimised refer to examples in LO3.2.

6.3 Describe the correct methods for disposing of organic and inorganic waste duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. Refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised selection and preparation of interior plant displays giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after completion of preparation work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of the selection and preparation activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/positioning and grouping plans
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance on environmental regulations

Establishing Plants or Seeds in Soil

Unit Title	**A/502/1223**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, understanding and skills required to plant and establish plants and or seeds in soil. The learner will also provide aftercare to meet specifications for newly established plants or seeds
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.1)** ***The learner can***
1. Be able to select, use and maintain equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition throughout
2. Be able to select and transport plants and or seeds	2.1 Select plants and or seeds as requested 2.2 Identify a representative sample of plants 2.3 Handle, prepare and transport plants and seeds in a way that maintains their health and condition
3. Be able to establish plants and or seeds in soil	3.1 Position and plant the plants and or seeds according to instructions/drawings 3.2 Provide aftercare to meet the planting specifications

4. Be able to work safely and minimise environmental damage	4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 4.2 Dispose of waste safely and correctly
5. Know the requirements for establishing healthy plants	5.1 Describe how to prepare seeds and or plants in a way that is appropriate to the plant and conditions 5.2 State what pH is and how to test for it 5.3 Explain the importance of timing and seasonality on planting to encourage establishment and growth 5.4 Describe how to handle and transport plants in a way which minimises damage and maintains health 5.5 Explain the importance of planting seeds and or plants to the correct depth and position 5.6 Describe the aftercare needed to meet planting specifications covering: provision of water, nutrients, protection, support and initial pruning or cutting 5.7 Describe the different types of backfill materials relevant to different types of plants and situations 5.8 Describe the range of protection methods which may be used for different plants e.g. anti-desiccants, tree guards and shelters 5.9 Identify the types of records required and explain the importance of accurate record keeping
6. Know how to deal with damage and pollution	6.1 State the correct methods of dealing with accidental damage and pollution 6.2 Describe how to minimise damage and unnecessary waste when working
7. Know the types of equipment required and how to maintain them	7.1 Describe the equipment which will be necessary for establishing plants and seeds in soil

	7.2 Describe methods of maintaining the equipment ready for use
8. Know the current health and safety legislation and environmental good practice	8.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work
Mapping to National Occupational Standards 029NL 2.2	

Supporting Unit Information

A/502/1223 Establishing plants or seeds in soil - Level 2

Indicative Content

Note 1: Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2, LO3 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1 Select appropriate equipment for this area of work e.g. steel toe-capped boots, face masks, gloves. CE marked. Tools and equipment selected e.g. fork, trowel, stakes / **support, cloches**

1.2&3 Use equipment according to instructions/ Prepare, maintain and store equipment in a safe and effective working condition throughout Equipment used only for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe: Preparation, e.g. spade blade cleaned. Use e.g. push tread with sole of foot to avoid slippage / scrapping achilles tendon area. Maintenance e.g. clean / oil after use, wooden handle rub with linseed oil. Storage e.g. securely hanging from handle, blade down, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO7.2.

Learning Outcome 2. Be able to select and transport plants and or seeds

2.1 Select plants and or seeds as requested e.g. healthy, no broken parts and seeds within sowing date, stored correctly

2.2 Identify a representative sample of plants e.g. suitable for location, type / shape of bed, sunny or shady, planting plan

2.3 Handle, prepare and transport plants and seeds in a way that maintains their health and condition e.g. without damaging stem, roots or leaves or dropping seeds. Prepared e.g. hardened off before planting or soaking roots /seeds. Transported e.g. prevent roots drying out, seeds cool and dry in transit.

Learning Outcome 3. Be able to establish plants and or seeds in soil

3.1 Position and plant the plants and or seeds according to instructions/drawings e.g. planting plan, group sizes and make up

3.2 Provide aftercare to meet the planting specifications e.g. provide water, nutrients, staking, and protection.

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO8.1

4.2 Dispose of waste safely and correctly waste e.g. organic - green or inorganic - stones, plastic bags. Correctly: Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. Safely e.g. PPE, safe lifting, care with perennial / invasive weeds.

LO5, LO6, LO7 and LO8 are the key areas of knowledge for this unit

Learning Outcome 5. Know the requirements for establishing healthy plants

5.1 Describe how to prepare seeds and or plants in a way that is appropriate to the plant and conditions Refer to LO2.3 for examples

5.2 State what pH is and how to test for it how to take / prepare soil sample for pH testing - acidity / alkalinity of soil.

5.3 Explain the importance of timing and seasonality on planting to encourage establishment and growth e.g. related to soil type - spring planting on clay soils or autumn planting on light soils. Need to over-winter. Timing to provide flower display / vegetables when required and avoid frosts.

5.4 Describe how to handle and transport plants in a way which minimises damage and maintains health Refer to LO2.3 for examples.

5.5 Explain the importance of planting seeds and or plants to the correct depth and position Depth of plants / seeds e.g. correct depth for germination, normal, deep planting, and different requirements grafted plants. Position e.g. according to seed / plant growth and aesthetic requirements.

5.6 Describe the aftercare needed to meet planting specifications covering: provision of water, nutrients, protection, support and initial pruning or cutting Aftercare to cover water, nutrients, protection, support and initial pruning or cutting e.g. Water - timing, frequency, amount and method of application.

5.7 Describe the different types of backfill materials relevant to different types of plants and situations Backfill: Materials e.g. Organic such as leaf mould, shredded material, types of animal manure - horse, pig or cattle manure. Situations e.g. use mushroom compost for chalky soils (alkaline) or vegetable gardens. Bulbs in heavy soils e.g. backfill with grit first to ensure drainage.

5.8 Describe the range of protection methods which may be used for different plants e.g. anti-desiccants, tree guards and shelters Protection methods e.g. shelters such as cloches protect seedlings from frost, glass protection for alpines against winter damp, wire netting to protect fruit bushes from birds.

5.9 Identify the types of records required and explain the importance of accurate record keeping Types e.g. diary, planting plans, labels. Label information e.g. date of planting, name / type of plant - half hardy, height / span. Importance e.g. learning, improving effectiveness, remembering tasks, scheduling.

Learning Outcome 6. Know how to deal with damage and pollution

6.1 State the correct methods of dealing with accidental damage and pollution e.g. artificial fertilisers spilt on plant leaves/lawn, brush/wash off immediately, spread of ragwort seeds from pulled flower - care in pulling, bag any flower heads that are seeding and burn in bags.

6.2 Describe how to minimise damage and unnecessary waste when working e.g. by using walking boards, working in appropriate weather conditions, alternatives to peat, care not to spread perennial weeds e.g. couch grass Minimise unnecessary waste e.g. waste audit, re-use / recycling, water at correct time.

Learning Outcome 7. Know the types of equipment required and how to maintain them

7.1 Describe the equipment which will be necessary for establishing plants and seeds in soil refer to LO1.1

7.2 Describe methods of maintaining the equipment ready for use refer to LO1.3

Learning Outcome 8. Know the current health and safety legislation and environmental good practice

8.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations.

Environmental Protection e.g. Environmental Protection Acts covering waste disposal. Codes of Practice e.g. Protecting our Water, Soil and Air, Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species. Additional requirements e.g. Tractors - Safe Stop, ensure tetanus vaccination up to date

TEACHING STRATEGIES AND LEARNING ACTIVITIES

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised establishment of plants or seeds giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of establishment work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 5, 6, 7, and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of plant / seed establishment activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and competence can be

assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6, 7 and 8 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
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- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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Useful sources of reference

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Propagate Plants from Seed

Unit Reference	**A/502/1500**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required for propagating plants from seed. It covers the preparation of materials and the process of seed sowing and the aftercare required
Learning Outcomes (1 to 10) ***The learner will***	**Assessment Criteria (1.1 to 10.1)** ***The learner can***
1. Be able to select, use and maintain relevant equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to relevant legislation and manufacturer's instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to prepare materials and sow seed	2.1 Use the required seed and growing materials 2.2 Carry out the preparations and seed sowing at the correct time 2.3 Prepare the growing medium in accordance with instructions 2.4 Handle seeds in a way which minimised damage 2.5 Sow seed evenly and accurately in accordance with instructions

3. Be able to provide aftercare for seedlings	3.1 Provide at least two forms of aftercare in accordance with instructions • humidity control • temperature control • pricking out • weed control • pest or rodent control 3.2 Monitor the seedlings during germination 3.3 Remove and hygienically dispose of unwanted seedlings
4. Be able to maintain accurate records	4.1 Provide clear and accurate information for recording purposes
5. Be able to work safely and minimise environmental damage	5.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 5.2 Carry out work in a manner which minimises environmental damage 5.3 Dispose of waste safely and correctly
6. Know how to prepare materials and sow seed	6.1 State the timing when operations should take place 6.2 State the quantities of seed and growing medium required 6.3 Describe the different methods for preparing seed covering •soaking •priming •temperature treatments •scarification 6.4 Describe the types of growing medium and the methods of preparation 6.5 Describe the methods of handling seed 6.6 State why it is necessary to evenly distribute seed and the correct depth of sowing

7. Know how to provide aftercare for seedlings	7.1 Describe the factors affecting the rate and percentage of Germination 7.2 Describe all the types of aftercare required and their purpose covering • humidity control • temperature control • pricking out • weed control • pest or rodent control 7.3 State the crop health problems that can occur during propagation
8. Know relevant health and safety legislation and environmental good practice	8.1 Outline the current health and safety legislation, codes of practice and any additional requirements 8.2 Describe how environmental damage can be minimised 8.3 Describe the correct methods for disposing of waste 8.4 State the importance of good hygiene in propagation areas
9. Know the types of equipment required and how to maintain them	9.1 Describe the equipment which will be required for the activity 9.2 Describe the methods of maintaining the range of equipment
10. Know how to maintain accurate records	10.1 Identify the types of records required and explain the importance of accurate record keeping
Mapping to National Occupational Standards 029NCU73.1,2	

Supporting Unit Information

A/502/1500 Propagate plants from seed - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Note 2 - The example used in this indicative content is lettuce sown in modules for transplanting. The same approach should be used for other crops.

LO1, LO2, LO3, LO4 and LO5 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain relevant equipment

Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, dust masks, ear defenders. Tools and equipment selected and used (refer LO9.1 for range of equipment.

1.1 Use equipment according to relevant legislation and manufacturer's instructions Equipment used only for the operation and in situations as detailed by the manufacturers / suppliers / supervisor's instructions, current legislation and codes of practice; (refer LO9.2).

1.2 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment (refer LO9.2).

Learning Outcome 2. Be able to prepare materials and sow seed

2.1 Use the required seed and growing materials Seeds and growing medium used as required by cropping programme (Refer to LO6.2 and LO6.4).

2.2 Carry out the preparations and seed sowing at the correct time Seeding area and equipment (manual or automatic), set up and calibrating as required. Refer to LO6.1 for timing; Refer to LO6.2 for rates, Refer to LO6.3 for preparation of seed.

2.3 Prepare the growing medium in accordance with instructions Growing medium prepared as instructed (See LO6.4).

2.4 Handle seeds in a way which minimised damage Seeds handled in a way to minimise damage.

2.5 Sow seed evenly and accurately in accordance with instructions Sow seed at rate as instructed by supervisor or as required by cropping programme.

Learning Outcome 3. Be able to provide aftercare for seedlings

3.1 Provide at least two forms of aftercare in accordance with instructions aftercare is provided as required by (two from)

- humidity control
- temperature control
- pricking out
- weed control
- pest or rodent control

3.2 Monitor the seedlings during germination routine monitoring is carried out by checking of germinating crop; temperature, water, incidence of pests or disease, weeds, damage by rodents, crop disorders, state of crop and actions required as result of changes to the crop or cropping programme (refer to LO7.1 and 7.3).

3.3 Remove and hygienically dispose of unwanted seedlings Seedlings that are damaged by pest, disease, disorder, damage are identified and removed (individual plant, group of plants or container/batch as required). Removal from the growing area, Plant material to compost heap; burnt or waste contactor if disease represents threat to production process. (Refer to LO8.3).

Learning Outcome 4. Be able to maintain accurate records

4.1 Provide clear and accurate information for recording purposes sowing and after care is recorded or reported (refer to LO10.1).

Learning Outcome 5. Be able to work safely and minimise environmental damage

5.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirement risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO8.1.

5.2 Carry out work in a manner which minimises environmental damage (Refer to LO8.1).

5.3 Dispose of waste safely and correctly (Refer to LO8.3).

LO6, LO7, LO8, LO9 and LO10 are the key area of knowledge for this unit.

Learning Outcome 6. Know how to prepare materials and sow seed

6.1 State the timing when operations should take place Time as required by cropping programme/production requirements, instruction from supervisor.

6.2 State the quantities of seed and growing medium required Seed rates and growing medium as required for cropping programme/production requirements, instruction from supervisor (refer to LO2.1. LO6.4).

6.3 Describe the different methods for preparing seed covering Seed preparation by

- **Soaking** (hot soak, cold soak, long or short term, softening of seed coat, removal of chemicals)
- **Priming** (pre-germination, separation, drying or pre-soaking)
- **Temperature treatments** (heat treatment to reduce disease incidence, cold and cold/warm moist treatments to break dormancy)
- **Scarification** (nicking, chipping, abrasion with sand/grit, hot water, acid dip)

6.4 Describe the types of growing medium and the methods of preparation Growing medium as required by cropping programme

Types mixed on site, bought growing medium, (bulk or bags), ingredients including peat, green waste, wood products, coir, other composted material, other bulky materials including sand, grit, perlite, vermiculite, clay, loam; lime and fertilizer content; additives such as wetting agents and pesticides; water content.

Preparation by weighing out or measuring ingredients for growing medium, weighing out or measuring additives to bought in growing medium (water, fertilizer, pesticides), mixing, using mixer/elevator to break up lumps and improve aeration, adjusting moisture content, mix or agitate growing medium to appropriate condition; Filling containers or cell trays with growing medium (manually or by machine), levelling and compaction as required by cropping programme and appropriate to growing medium.

6.5 Describe the methods of handling seed Handling seed to avoid loss and reduced viability; keeping seed packs in safe, dry area prior to use, mixing seed with inert material to aid sowing if required; keeping seeds dry and safe from spillage or contamination in the work area, loading sowing equipment safely avoiding spillage as instructed by supervisor or manufacturer; monitoring operation of equipment, returning unused seed safely to container after operation, returning to safe storage.

6.6 State why it is necessary to evenly distribute seed and the correct depth of sowing Need to achieve rate as required by cropping programme; Seed rate and accuracy; seeds per cell, positioning in cell (depth, location), seeds per area or length of row.

Uneven distribution giving less than optimum growing conditions, too thin – wasting space and reducing population, too close – increase disease risk, etiolation, competition for nutrient and water, difficulties in follow-up operations.

Sowing too shallow – excessive or very rapid drying out, instability, exposure to pests; too deep – slow/delayed emergence, lack of light/oxygen, inability to germinate.

Learning Outcome 7. Know how to provide aftercare for seedlings

7.1 Describe the factors affecting the rate and percentage of germination Rate of germination affected by moisture level, temperature, oxygen availability, type of seed, absence of light, exposure to light, nutrient Percentage germination depending on viability of seed (seed type, age, storage condition); condition of growing medium – moisture, tilth/particle size, nutrient status, incidence of pests and diseases (from soil, seed and air).

7.2 Describe all the types of aftercare required and their purpose covering

- **Humidity** control by watering before or after sowing, use of germinating room, covering with fleece, plastic sheeting or other material, watering during and after germination. Removal of cover or removal from the germinating room as required. Ventilation of the growing area
- **Temperature** control by use of; germinating room, environmental control of the growing area or greenhouse, (heating, ventilation), shading, use of crop covers (fleece, plastic or other material
- **Pricking out**; applicable only to crops grown in protected areas; by hand or mechanically; pricking out of seedlings or plugs into cell trays, pots and other containers; mechanical pricking out of plugs for crops grown in trays or in plugs.
- **Weed control** use of sterile growing media, ground preparation, sterilised seed beds, stale seed beds, pre-emergence herbicides, post-emergence herbicides, hand weeding and hoeing, mechanical weeding and inter-row cultivation, flame weeders
- **Pest or rodent control** pest control by barriers and screens, use of pesticides and deterrents, trapping, natural predators and biological control

7.3 State the crop health problems that can occur during propagation Crop health problems during propagation; soil, seed and airborne diseases; water related problems, drying out, water logging; nutrient deficit, nutrient toxicity; competition from weed, attack by pests (vertebrate and invertebrate).

Learning Outcome 8. Know relevant health and safety legislation and environmental good practice

8.1 Outline the current health and safety legislation, codes of practice and any additional requirements Health and Safety e.g. Management of Health and Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling, Stop Safe.

8.2 Describe how environmental damage can be minimised by carefully planning site access, working in appropriate weather conditions, care not to

allow run-off into controlled waters, minimising spillage and loss of growing materials, seed and other materials, managing unused containers, checking and accurate use of watering equipment, use of pesticides in accordance with legal requirements, Environment Agency requirements and recommendations.

8.3 Describe the correct methods for disposing of waste Organic waste – reduce spillage and contamination of growing medium, unwanted plant material and growing medium is composted. (Unless it represents threat to the production e.g. diseases, perennial weeds).
Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; cartons or cardboard waste recycled or disposed of in appropriate container, wastage of containers minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

8.4 State the importance of good hygiene in propagation areas leading to reduced incidence of pests and disease, less loss or damage to crops, greater consistence and quality of seedling, improved output from propagation unit, better working conditions.

Learning Outcome 9. Know the types of equipment required and how to maintain them

9.1 Describe the equipment which will be required for the activity Sowing in containers - compost mixers, tray fillers, seeders (vacuum, mechanical), lifting and carrying equipment and transport aids, germinating rooms and growing areas, watering equipment (manual and automatic), facility to protect from loss of moisture, protection from pests including rodents. Sowing in beds and open ground – ground and bed preparation equipment (cultivators, harrows, rollers, bed formers), seed sowing equipment (hand driven or tractor mounted drills; vacuum, belt, cell wheel; precision, random, broadcast).

9.2 Describe the methods of maintaining the range of equipment preparation and maintenance of tools / equipment; e.g. cleaning and checking prior to use, setting up and calibration of seeding equipment, checking and lubrication of lifting and carrying equipment and transport aids. Germinating and growing facility cleaned and checked before and after use. Watering equipment checked, cleaned and calibrated before use. Watering and other equipment and tools cleaned and checked after use and safely returned to appropriate storage area.

Learning Outcome 10. Know how to maintain accurate records

10.1 Identify the types of records required and explain the importance of accurate record keeping recording or reporting on preparation, sowing and after care; date, time, growing medium used, containers used, seed used, treatments (including use of pesticides); location of sown containers, growing conditions, germination date/time, monitoring visits, temperature, humidity, problems

encountered, action taken. Reporting verbally, by written note or electronically to appropriate person, recording in written or electronic format.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 4, and 5 Delivery of these learning outcomes is by supervised practical propagation by seed giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of propagation by seed photographs or video could be taken to provide evidence of progress. Copies of propagation or monitoring records can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 6, 7, 8, 9, and 10 Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of propagation by seed, propagation records and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications *(*http://www.defra.gov.uk/hort/index.htm*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9
- Learners should be directed to relevant publications and web sites eg.
- Horticulture Week (www.hortweek.com*)*
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- The Complete Book of the Greenhouse by Ian G. Walls, et al / Paperback / Published 1996
- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- Nursery Stock Manual: Grower Manual 1 by Keith Lamb, et al / Paperback / Published 1995
- The Compost Book by David Taylor, et al / Hardcover / Published 1994
- A Handbook for Horticultural Students by Peter Dawson
- Soil Science and Management by Edward J. Plaster
- The Commercial Greenhouse by James William Boodley
- Vegetable Brassicas and Related Crucifers by G.R. Dixon and M.H. Dickson
- Greenhouse Operation and Management by Paul Nelson
- Farm Horticulture by George W. Wood
- Farm Machinery (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684

Control Pests, Diseases and Disorders

Unit Reference	**A/502/1514**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to control pests diseases and disorders The learner must hold the relevant certificate of competence in pesticides if handling chemicals
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.2)** ***The learner can***
1. Be able to assist with controlling pests, diseases and disorders	1.1 Confirm the control methods to be used with the appropriate person 1.2 Handle all materials carefully, safely and efficiently in accordance with instructions and organisational policy 1.3 Assist with applying control methods in a way which minimises the risks to non-target species and the environment covering 1.4 Report any problems if they arise during pest, disease and disorder control to the appropriate person without delay 1.5 Provide clear and accurate information for recording purposes
2. Be able to select, use and maintain relevant equipment	2.1 Select appropriate equipment for this area of work

	2.2 Use equipment according to relevant legislation and manufacturer's instructions including personal protective equipment 2.3 Prepare, maintain and store equipment in a safe and effective working condition
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to assist with controlling pests, diseases and disorders	4.1 Outline the health and safety risks in controlling pests, diseases and disorders 4.2 Describe the safe handling and effective use of materials equipment and chemicals and relevant codes of practice 4.3 Describe the dangers and emergency treatments associated with the use of chemicals 4.4 Describe control methods covering all the following • chemical • biological • cultural 4.5 Describe the types of problems which may occur and to whom they should be reported 4.6 Identify the types of records required and explain the importance of accurate record keeping
5. Know relevant health and safety legislation and environmental good practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements, including control of hazardous substances and environmental legislation 5.2 Describe how environmental damage can be minimised

	5.3 Describe the correct methods for disposing of waste
6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be required for the activity 6.2 Describe the methods of maintaining the range of equipment
Mapping to National Occupational Standards O29NCU78.2	

Supporting Unit Information

A/502/1514 Control pests, diseases and disorders – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learner Outcome 1. Be able to assist with controlling pests, diseases and disorders

1.1 Confirm the control methods to be used with the appropriate person The method of control is confirmed with supervisor, agronomist or manager; e.g. crop, material, method, rate to be used (refer to 4.6 and LO5.1). Confirmation by verbal message confirmed by response, written or electronically.

1.2 Handle all materials carefully, safely and efficiently in accordance with instructions and organisational policy (Refer to LO4.1 and LO4.2).

1.3 Assist with applying control methods in a way which minimises the risks to non-target species and the environment covering action taken to assist with applying control methods (refer to LO4.4) in a way which minimises risks to non-target species and the environment (refer LO5.2.

1.4 Report any problems if they arise during pest, disease and disorder control to the appropriate person without delay (Refer to LO4.5).

1.5 Provide clear and accurate information for recording purposes (See LO4.6) Record; material used/remaining, crop treated, area, date, time. Recorded by: log book, recording sheet, electronically.

Learner Outcome 2. Be able to select, use and maintain relevant equipment

2.1 Select appropriate equipment for this area of work PPE – waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats. Protective clothing and other equipment used as specified in Code of Practice for Using Plant Protection Products, Equipment;
Pesticide application – knapsack, trolley mounted, vehicle mounted or trailed, High volume, reduced volume, controlled droplet applicators, air assisted, fog generators.
Other control measures; secateurs/knives, traps (sticky, spring, pheromone), barriers, crop covers, deterrents.

2.2 Use equipment according to relevant legislation and manufacturer's instructions including personal protective equipment tools and equipment

are only used for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe including the Code of Practice for Using Plant Protection Products.

2.3 Prepare, maintain and store equipment in a safe and effective working condition Tools and equipment are made ready for use as detailed by the manufacturers / suppliers / supervisor's instructions, current legislation and codes of practice for safe including the Code of Practice for Using Plant Protection Products.

Preparation e.g. calibration, checking for leaks

Maintenance e.g. cleaning, sharpening and oiling, routine (check oil levels, grease) and periodic (change oil) as recommended by the manufacturer.

Storage e.g. safe and secure in accordance with manufacturer's instructions and current legislation. Maintain records e.g. maintenance and repairs. Report faults to line manager.

Learner Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO5.1.

3.2 Carry out work in a manner which minimises environmental damage See LO5.2 for details.

3.3 Dispose of waste safely and correctly waste disposed of correctly and safely. See LO5.3.

LO4, LO5 and LO6 are the key area of knowledge for this unit

Learner Outcome 4. Know how to assist with controlling pests, diseases and disorders

4.1 Outline the health and safety risks in controlling pests, diseases and disorders Pesticide application; exposure to pesticides during mixing, application and cleaning, exposure through skin contact, inhalation and ingestion. All measures; exposure to pesticides applied to cropped areas, operating in working areas, risk of contact with machinery or equipment, exposure to heat, cold, UV.

4.2 Describe the safe handling and effective use of materials equipment and chemicals and relevant codes of practice pesticide application; handling and use of pesticide only according to manufacturer's label instructions, COSHH and Code of Practice for Using Plant Protection Products.

4.3 Describe the dangers and emergency treatments associated with the use of chemicals Dangers; Exposure to pesticides during mixing, application and cleaning, exposure through skin contact, inhalation, ingestion;
Action in event of exposure – stop work, remove source of contamination, wash affected area to prevent further contamination, follow instructions on label, call for medical help, provide copy of label to medical services.
Code of Practice for Using Plant Protection Products for specific information and label instructions.

4.4 Describe control methods covering all the following

- **Chemical** Application by – Ground based high/low volume, fogs, mists and smokes, fumigants, dusts, granules, pellets and baits; use of hand-held or vehicle mounted applicators, seed treatments, dips and drenches, applications near water, use of aircraft, use within integrated pest management programmes
- **Biological** use of one organism to control another; examples - Examples for protected crops, Aphidoletes and aphidius for control of aphid, encarsia for control of whitefly, nematodes for control of vine weevil, cats for controlling rodents
- **Cultural** choice of variety, timing of sowings and planting, choice of irrigation system, management of nutrient and water to promote healthy growth, reducing stress to reduce impact of pest/disease attack, management of temperature, ventilation and humidity, integrated pest management programmes, use of barriers and covers.
- **Describe the types of problems which may occur and to whom they should be reported to;** changes to weather, wind or crop conditions, spillages, shortages, equipment malfunction. Report to; supervisor, manager, Reporting by; face to face, telephone, electronic
- **Identify the types of records required and explain the importance of accurate record keeping** Record; material used/remaining, crop treated, area, date, time. Recorded by: log book, recording sheet, electronically. Use of records; to check effectiveness of controls, identify problems in controls, to analyse changes in the crops, aid future managing of the crop.

Learner Outcome 5. Know relevant health and safety legislation and environmental good practice

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements, including control of hazardous substances and environmental legislation Current legislation e.g. Health and Safety at work Act 1974, PUWER, LOLER, COSHH Regulations, Environmental Protection 1990, and Controlled Waste Regulations 1992, COPs as applicable including Code of Practice for Using Plant Protection Products and additional requirements such as pesticide application regulations, customer regulations, environmental

health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling, Stop Safe.

5.2 Describe how environmental damage can be minimised Pesticide applications only -used as part of integrated programme, using biological and cultural control to reduce pesticide use, organic systems, pesticides used only as specified in Code of Practice for Using Plant Protection Products, COSHH, label instructions, customer regulations, environmental health requirements, assured produce schemes, certification.

All measures - by carefully planning site access, care not to allow run-off into controlled waters, minimising spillage materials, managing used containers, checking and accurate use of equipment.

5.3 Describe the correct methods for disposing of waste Pesticide containers, unused pesticide, washings disposed of according to pesticide regulations, label instructions, Code of Practice for Using Plant Protection Products, and other legislation/regulations.

Waste disposal. Organic waste – reduce waste removed from plant area, unwanted plant material composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed.

Learner Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be required for the activity pesticide application; knapsack, trolley mounted, vehicle mounted or trailed, High volume, reduced volume, controlled droplet applicators, air assisted, fog generators. Other control measures; secateurs/knives, traps (sticky, spring, pheromone), barriers, crop covers, deterrents.

6.2 Describe the methods of maintaining the range of equipment use of pesticides; protective clothing and other equipment checked as being fit for use as specified in Code of Practice for Using Plant Protection Products, COSHH, label instructions, manufacturer's / supplier's / supervisor's instructions. Application equipment calibrated as required by Code of Practice for Using Plant Protection Products; protective clothing and application equipment cleaned followed use as specified in Code of Practice for Using Plant Protection Products, COSHH, label instructions, manufacturer's / supplier's instruction; safely returned to appropriate storage area. Other control measures; Tools and equipment e.g. cutting equipment (knives, secateurs) checked prior to use as required by manufacturer's / supplier's / supervisor's instructions Equipment cleaned and checked after use and safely returned to appropriate storage area.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by work assisting with controlling pests, diseases and disorders giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of work assisting with controlling pests, diseases and disorders photographs or video could be taken to provide evidence of progress. Copies of application records can be used to provide evidence of quantity and range of work and of sufficiency of evidence.

Learning Outcomes 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work assisting with controlling pests, diseases and disorders, application records and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence.

These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.
Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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Additional Information

Useful sources of reference

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  *DEFRA web site and publications (*http://www.defra.gov.uk/hort/index.htm*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9
- Local Authority web sites for Building Control and Conservation Area matters
- Learners should be directed to relevant publications and web sites eg.
- Horticulture Week (www.hortweek.com*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals* by R. Wills, et al / Paperback / Published 1998
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *Nursery Stock Manual: Grower Manual 1* by Keith Lamb, et al / Paperback / Published 1995
- *The Compost Book* by David Taylor, et al / Hardcover / Published 1994
- *A Handbook for Horticultural Students* by Peter Dawson
- *Cutting Propagation* by James L. Gibson and John M. Dole
- *Vegetable Diseases* by Steven Koike, Peter Gladders and Albert Paulus
- *Soil Science and Management* by Edward J. Plaster
- *The Commercial Greenhouse* by James William Boodley
- *Practical Woody Plant Propagation for Nursery Growers* by Bruce Macdonald
- *Vegetable Brassicas and Related Crucifers* by G.R. Dixon and M.H. Dickson
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood

Plant Nomenclature, Terminology and Identification

Unit Reference	**A/502/1979**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**38**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to identify and botanically name a range of plants using the correct terminology and format
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.1)** ***The learner can***
1. Understand the terminology used in the naming of plants	1.1 Define the terms, family, genus, species, cultivar, variety and hybrid using the bi-nominal system 1.2 Explain the purpose and importance of botanical names and discuss why botanical names are reclassified 1.3 Explain how descriptive botanical names can aid identification e.g. nana and pendula 1.4 Define terms relating to plants characteristics • monocotyledons • dicotyledons • evergreen • deciduous • hardy • tender 1.5 Define terms relating to plant lifecycles e.g. • annuals • biennials • herbaceous perennials • woody perennial

2. Understand how the parts of plants can aid identification	2.1 Explain how a plant's characteristics aid identification 2.2 Explain how plant anatomy and plant morphology aid identification e.g. • flowers • seeds and fruit • stems • leaves • roots • habit
3. Identify and name plants using botanical names	3.1 Use a range of reference materials to aid identification of plants 3.2 Use a plant's characteristics to aid identification e.g. • habit • leaves • stems • flowers • buds 3.3 Identify and botanically name a total of 60 plants (from the following categories) • annuals and short-lived perennials • houseplants • herbaceous perennials • trees and shrubs • grasses • food crops • weeds 3.4 Use the correct format when writing botanical names
4. Be able to work safely and minimise environmental damage	4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements
Mapping to National Occupational Standards O29NPH14	

Supporting Unit Information

A/502/1979 Plant nomenclature, terminology and identification - Level 2

Indicative Content

Note 1: Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1 and LO2 are the key areas of knowledge for this unit

Learning Outcome 1. Understand the terminology used in naming plants

1.1 Define the terms family, genus, species, cultivar variety and hybrid using the bi-nomial system the name of a species comprises two names (hence bi-nomial). The name of the genus is first and often conveys information on e.g. ecological preferences and distribution. The epithet is the second name and captures a particular quality of the species - refer to LO1.3. Terms such as family, genus, species, cultivar, variety and hybrid are defined in a number of reference sources e.g. refer to RHS web site or books - see Useful sources of reference below. Also refer to LO2.1.

1.2 Explain the purpose and importance of botanical names and discuss why botanical names are reclassified

Purpose provision of single name for each species that can be recognised in any country / language.

Importance provides a system to standardise and regulate names. Gives useful information about the relationship between and characteristics of plants. It is more effective to use botanical name when researching plants on internet / books or when ordering plants because e.g. some plants do not have common names, others may have several common names or the same common name is given to different plants.

1.3 Re-classification transfer of plants into different genus. All botanical names have authors. Sometimes same plant given different names by different authors - name given by first author preserved. Consequences - inconvenient, confusing.

1.4 Explain how descriptive botanical names can aid identification e.g. nana and pendula The specific epithet often helps in describing the plant e.g. indicates colour, whether it is from the arctic or alpine conditions, has an unpleasant smell etc. For example, nana indicates small and pendula indicates hanging.

1.4&5 Define terms relating to plants characteristics/Define terms relating to plant lifecycles Terms are defined in a number of places e.g. refer to RHS sources - web site or books - see Useful sources of reference below.

Learning Outcome 2. Understand how the parts of plants can aid identification

2.1 Explain how a plant's characteristics aid identification Identification aids

Type e.g. annuals, biennials and perennials.

Habit e.g. erect, ascending, spreading, prostrate.

Morphological characteristics e.g. flower / seeds / fruit, roots, stems and leaves***.*** Combinations of these help to classify the plant into its family, genus and species

Family some common characteristics such as petal number or flower arrangement but homogeneity within families varies. Categorisation into a family helps progress identification, giving a number of genera from which to select

Genus (plural genera) grouping of species that often have a number of common characteristics. Within a genus individual species will differ by one or more key characteristics e.g. within genus, flower type, petal arrangement and colour may be very similar with two different species being distinguished by sepals that are half the length of the petals in one and full length in the other. Species is the basic unit of plant classification. Refer to LO1.1.

2.2 Explain how plant anatomy and plant morphology aid identification

- **Anatomy** study of plant structures internal arrangement - often now investigated at the cellular level and overlaps with morphology
- **Morphology** comparison of external construction of plants and generally more useful for field / garden identification, for example:
- **Flowers** e.g. structure and detail sepals, petals, stamens, carpels - splitting carpels down into ovary, style and stigma may need dissection / magnification
- **Seeds and fruit** e.g. individual seed shape, size and profile, carried in pods, capsules, shells numbers differ, dry or fleshed,
- **Stems** e.g. shape, glabrous or hairy, woody, bark structure, branch pattern
- **Leaves** e.g. shape, margins, base shape and attachment to stem, arrangement
- **Roots** e.g. fibrous or fleshy tap roots, structure and direction of development.
- **Habit** e.g. erect, spreading, prostrate

These are the key areas of competence for this unit

Learning Outcome 3. Identify and name plants using botanical names

3.1 Use a range of reference materials to aid identification of plants e.g. internet sources and reference books with photographs / pictures / drawings of plants, wall charts if available, personal notes / photographs

3.2 Use a plant's characteristics to aid identification Refer to LO 2.2.e.g. Cytisus scoparius (Common broom)

- **Habit** height to 2.5m, erect, many branched, spineless
- **Leaves** ternate, short stalked lower petiolate
- **Stems** 5 ridged, long, straight, green, glabrous
- **Flowers** deep yellow, 20mm, calyx usually glabrous
- **Buds** flower 1-2 in lateral groups on young twigs

3.3 Identify and botanically name a total of 60 plants 60 plants identified and botanically named. Plants accessed in each of categories specified by the assessment criteria, identified with assistance of reference materials and botanical names written according to convention e.g. *Centranthus ruber* - refer to LO3.4

- **Annuals** e.g. *Psylliostachys suworowii* (Statice) Short lived perennials e.g. *Digitalis purpurea* (Foxglove)
- **Houseplants** e.g. *Mammillaria bocasana* (Powder Puff cactus)
- **Herbaceous perennials** e.g. *Lysimachia punctata* (Garden loosestrife)
- **Trees** e.g. *Liriodendron tulipifera* (Tulip tree) shrubs e.g. *Kalmia latifolia* (Calico bush)
- **Grasses** e.g. *Lagurus ovatus* (Hare's-tail grass)
- **Food crops** e.g. *Lactuca sativa* (Lettuce)
- **Weeds** e.g. *Convolvulus arvensis* (Field bindweed)

3.4 Use the correct format when writing botanical names the name of the genus is first and starts with a capital letter. The epithet which follows is lower case and both are printed in italics e.g. *Syringa vulgaris* (Lilac). If hand written underlined - Syringa vulgaris. Once established in text this abbreviates to *S. Vulgaris.* Subspecies is abbreviated to subsp. and written e.g. *Rhodanthe chlorocephala* subsp. *Rosea.* Variety is abbreviated to var. and written e.g. *Lilium pyrenaicum* var. rubrum. Form is represented by f. and written e.g. *Crocus sieberi* subsp. s*ublimis* f. *Tricolor.* Hybrids are indicated by a multiplication sign and written e.g. *Mentha x piperita.* Cultivar names added to botanical or generic name, single quotation marks enclose, normal text e.g. *Erigeron glaucus* 'Elstead Pink'.

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements

Identification activities carried out consistently with current legislation e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Wildlife and Countryside Act, Habitats Directive Codes of Practice e.g. Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species Risk assessment e.g. considering aspects such as gaining access to plants, prickles, irritant hairs or poisonous parts, stinging insects or using VDU's to research for plant identification Additional requirements such as vaccination against tetanus, precautions against Weil's disease - waterproof gloves/hygiene or exposure to the sun - sun block.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 3 and 4
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised plant identification and naming giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

During identification activities photographs or video could be taken to provide evidence of how decisions on identification were made.

Learning Outcomes 1 and 2
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of identification activities, witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 3 and 4 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 1 and 2 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/identification notes and drawings
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- http://www.rhs.org.uk/rhsplantfinder/plantnaming.asp - The Royal Horticultural Society web site at has a section on the naming of plants
- Royal Horticultural Society books - Encyclopaedia of Plants and Flowers
- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Natural England web site http://www.naturalengland.org.uk/ has information about countryside protection schemes and land management for the benefit of wildlife, landscape. Also licences and enforcement
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Maintain and Renovate Artificial Sports Surfaces

Unit Reference	**D/502/0419**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	The aim of this unit is to provide the learner with the ability to demonstrate the knowledge and skills required to maintain and renovate artificial/synthetic playing surfaces to ensure they are safe and meet the required standards for the sport
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to select, use and maintain equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to maintain and renovate the condition of artificial sports surfaces	2.1 Clear and prepare the surface for maintenance 2.2 Carry out four of the operations listed below to maintain the quality and appearance of the surface suitable for the sport • brushing • luting • top dressing • weed control • moss/algae control • frost protection • marking out • irrigation • renovation (damage repair)

	• contamination removal 2.3 Identify and report any conditions that affect the playing quality of one type of surface
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know the maintenance and renovation requirements of artificial sports surfaces	4.1 Describe the different methods of maintenance for each type of surface • hard porous water bound • filled synthetic • non-filled synthetic 4.2 Describe how surface and weather conditions affect maintenance and renovation operations 4.3 Describe how to prepare the surface before carrying out maintenance and renovation operations 4.4 Describe all methods and techniques listed below which are used to maintain and renovate surfaces and perimeters • brushing • luting • top dressing • weed control • moss/algae control • frost protection • marking out • irrigation • renovation (damage repair) • contamination removal 4.5 State the standard of playing quality and appearance that has to be achieved for the sport
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for maintaining and renovating artificial sports surfaces

	5.2 Describe methods of maintaining the equipment ready for use
6. Know the current health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL7.1, 2	

Supporting Unit Information

D/502/0419 Maintain and renovate artificial sports surfaces - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Note – 2 Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the assessment criteria number listed e.g. LO 1.3.

One surface has been selected as an example for this unit – sand filled synthetic fibre, but there are many types and variations used.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1 Select appropriate equipment for this area of work appropriate equipment selected e.g. power unit, attachments, (brush, lute, roller, top dresser, drag mat, sweeper/collector), herbicide applicator, repair kit, marker. PPE selected e.g. steel toe-capped boots, ear defenders, pesticide protection, and any additional requirements. Selection to be according to current legislation and codes of practice e.g. CE quality mark.

1.2 Use equipment according to manufacturer's instructions and legal requirements Use equipment only for the operation and in situations as detailed by the manufacturer's /supplier's /supervisor's instructions, current legislation and codes of practice.

1.3 Prepare, maintain and store equipment in a safe and effective working condition Preparation for use e.g. pre start and safety checks, fit mounted equipment safely and securely. Maintenance e.g. cleaning, routine (check oil levels, grease) and periodic (change oil) as recommended by the manufacturer. Store equipment e.g. safe and secure in accordance with manufacturer's instructions and current legislation (pesticide applicators). Maintain records e.g. maintenance and repairs. Report faults to line manager.

Learning Outcome 2. Be able to maintain and renovate the condition of artificial sports surfaces

2.1 Clear and prepare the surface for maintenance e.g. remove surface rubbish (cans, leaves, paper), sports equipment and prevent user access.

2.2 Carry out four of the operations listed below to maintain the quality and appearance of the surface suitable for the sport

- Brushing e.g. correct bristles, pressure and direction of work.
- Luting e.g. correct pressure to level lumps/depressions.
- Top dressing e.g. to top up to correct levels as designated by provider.
- Weed control e.g. hand/mechanical and/or chemical methods.
- Moss/algae control e.g. mechanical or chemical method.
- Frost protection e.g. apply appropriate material or cover.
- Marking out (if not inlaid) e.g. appropriate marker and material, correct dimensions and true lines.
- Irrigation e.g. automatic/hand systems to appropriate moisture content.
- Renovation (damage repair) e.g. appropriate material to surface and levels.
- Contamination removal e.g. solvent for chewing gum.

2.3 Identify and report any conditions that affect the playing quality of one type of surface (sand filled synthetic fibre) and report condition, in which the playing quality of the surface may be impaired, to your supervisor or facility manager e.g. level of fill material, presence of surface debris, quality of marking.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety of self and others, PPE used refer to LO 1.1, manufacturer's instructions and guidance followed, risk assessments followed and any additional requirements. Refer to LO 1.2 & 1.3.

3.2 Carry out work in a manner which minimises environmental damage e.g. use of skilled staff, minimum use of powered Equipment, pesticide code of practice followed, avoid pollution of drains, minimize waste, non-spillage of petroleum products.

3.3 Dispose of waste safely and correctly as required by legislation e.g. pesticide/marker washings, containers, packaging, organic – twigs, green vegetation or inorganic - metal, mineral materials, refer to LO 6.3.

LO4, LO5 and LO6 are the key areas of knowledge for this unit.

Learning Outcome 4. Know the maintenance and renovation requirements of artificial sports surfaces

4.1 Describe the different methods of maintenance for each type of surface as recommended by supplier/installer and Sport Ruling Body

- Hard porous water bound e.g. "Red Gra".
- Filled synthetic e.g. needle punch carpet.
- Non-filled synthetic e.g. tufted

4.2 Describe how surface and weather conditions affect maintenance and renovation operations e.g. water-logged, dry, covered in snow, frozen surface.

4.3 Describe how to prepare the surface before carrying out maintenance and renovation operations e.g. removal of surface contamination / sports equipment, moisture content.

4.4 Describe all methods and techniques listed below which are used to maintain and renovate surfaces and perimeters refer to LO 2.2.

4.5 State the standard of playing quality and appearance that has to be achieved for the sport e.g. evenness of surface as detailed by the activity Sport Ruling Body and facility manager.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for maintaining and renovating artificial sports surfaces refer to LO 1.1.

5.2 Describe methods of maintaining the equipment ready for use refer to LO 1.2 & 1.3.

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. management of health and safety and safety at work.

- Risk assessments e.g. working practices.
- Codes of Practice e.g. pesticide application, use of equipment.
- Exposure records e.g. noise, vibration, pesticides.
- COSHH Regulations e.g. risk assessment and use, fuel.
- Hazardous Waste Regulations e.g. waste.
- Storage e.g. pesticides, fuels, materials.
- PPE e.g. safety boots, ear defenders, protective clothing.
- Environmental Protection Acts e.g. environmental protection.
- RIDDOR e.g. reporting requirements.
- PUWER e.g. use of plant and equipment.
- LOLER e.g. lifting operations and lifting equipment.

Any additional requirements

6.2 Describe how environmental damage can be minimised refer to LO 3.1 & 3.2.

6.3 Describe the correct methods for disposing of organic and inorganic waste Disposal of waste to current waste storage and disposal legislation e.g. pesticide Regulations, COSHH. Organic waste leaves and green growth e.g. compost. Inorganic mineral/metal/glass waste e.g. recycle. Other methods e.g. specialist contractor (skip), Local Authority arrangements.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO) 1, 2, and 3

Delivery of these learning outcomes is by supervised practical work activities giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Learners not holding statutory qualifications to use equipment and materials to be supervised by person who is qualified to do so.

Prior to, during and after completion of activities, photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 4, 5 and 6

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

NB The equipment that 16 year old learners are able to use is governed by the current regulations. Tutors will need to be aware of this, and adapt learning programmes accordingly. 16 year old learners may have to learn through observation rather than practical experience where they cannot use specific equipment.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9
- Institute of Groundsmanship http://www.iog.org

Levelling and Preparing Sites for Landscaping

Unit Reference	**D/502/0467**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to level and preparing sites for landscaping. The unit does not cover the skills and knowledge required for using specialist equipment
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Be able to select, use and maintain equipment for levelling and preparing sites	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instruction 1.3 Prepare, maintain and store equipment in a safe and effective working condition throughout
2. Be able to level and prepare sites for landscaping	2.1 Position reference marks correctly and according to specification 2.2 Position contours, levels and excavations within specified tolerances 2.3 Reinstate the site to specified levels 2.4 Keep working area clean according to client requirements 2.5 Complete work according to the agreed schedule and specification

3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation and codes of practice 3.2 Carry our work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know the importance of site preparation for landscaping	4.1 Describe the importance of levelling and preparing sites effectively for all of • green-field • urban derelict • reclaimed land • existing gardens 4.2 Describe the importance of position reference marks relating to site specification 4.3 Describe the procedures on a range of contrasting sites covering; green-field, urban, derelict, re-claimed and existing site 4.4 State the importance of working within specified tolerances 4.5 State the types of damage which may occur to services and how to minimise this 4.6 Explain why it is important to complete work to agreed schedule and specification
5. Know how to reinstate the ground to the required level	5.1 Describe how to reinstate ground to specified levels and why this is important 5.2 State why it is important to clear debris effectively, safely, tidily and legally
6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be necessary for levelling and preparing sites for landscaping 6.2 Describe methods of maintaining the equipment ready for use

7. Know the current health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements which apply to this area of work 7.2 Describe how environmental damage can be minimised 7.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029NL1.2	

Supporting Unit Information

D/502/0467 Levelling and preparing sites for landscaping – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is block paving.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment for levelling and preparing sites.

1.1 Select appropriate equipment for this area of work to include: steel toe-capped boots, gloves, face mask. Tools and equipment correctly selected and used for block paving to include: spades, shovels, rakes, wheelbarrows, tractor and trailer, mini-digger, CAT scan, mixer, vibrating plate, string lines, pegs, spirit level, laser level, staff and levelling board.

1.2 Use equipment according to instruction to include: C.A.T scan used to check sites for water, gas and electricity pipes. String lines, pegs, spirit level, laser level and staff to set up datum pegs and levels. Shovels, rakes and wheelbarrows and mini-digger used for digging out and levelling ground according to datum pegs. Tractor and trailer to transport tools, equipment and materials to and from site. Mixer for concrete to bed in and haunch edge restraints and vibrating plate for compacting hardcore and for final pass on laid blocks on completion. All work to be carried out to Supervisor and Manufacturers' instructions as well as current legislation and codes of practice.

1.3 Prepare, maintain and store equipment in a safe and effective working condition throughout to include pre-start checks and Stop Safe. All tools and equipment to have pre-start checks and are to be cleaned, checked and locked away after use. All materials to be protected with sheeting from adverse weather as necessary. Refer to LO1.1 and LO1.2 for examples.

Learning Outcome 2. Be able to level and prepare sites for landscaping

2.1 Position reference marks correctly and according to specification to include: marks on pegs relating to finished ground levels 150mm below the D.P.C and to correspond with sand and hardcore layers after compaction and to show manhole covers and drainage systems.

2.2 Position contours, levels and excavations within specified tolerances to include the following: pegs showing depth of foundations and to mark out drainage to include: paving drainage systems such as channels into the surface of the block paving with a 1:100 fall to pipe surface water into waste systems or use a soak-away and foundations to correct depth below finished levels with a suitable fall to remove water to the soak-away.

2.3 Reinstate the site to specified levels to include: finished surfaces to be flush with surrounding areas to avoid hollows and trip hazards and to ensure that all water drains away from the site effectively.

2.4 Keep working area clean according to client requirements to include: sites are left clean, tidy and presentable immediately after construction or maintenance to comply with customer requirements, health and safety, landscape specification and quality standard of work.

2.5 Complete work according to the agreed schedule and specification to include: Work completed on time to avoid penalties and foundations are constructed securely to include suitable drainage systems where necessary and block paving for paths and drives laid on a 50mm of sand on a 100mm of hardcore e.g. M.O.T type 1 hardcore or crush and run. Install suitable block or bull-nosed edge restraints to contain block surfaces. Install a geo-textile membrane between the hardcore and the sand to prevent perennial weeds. This work must be to specified tolerances to comply with the specification and to ensure the surface meets requirements.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation and codes of practice to include: Health and Safety, Environmental Protection legislation including Waste Acts and COP's such as soil, water and air and additional requirements such as customer regulations, environmental health requirements as well as LOLER, PUWER, Manual Handling and Stop Safe.

3.2 Carry our work in a manner which minimises environmental damage to include: carefully planning site access such as the removal and delivery of materials, working in correct weather conditions and not allowing run off from chemicals or waste products into water courses in line with Environmental Agency guidelines.

3.3 Dispose of waste safely and correctly to include: organic wastes such as soil which can be stored and then re-used; vegetation that can be composted; wood that can be chipped. Inorganic wastes such as empty sealant containers that should be put in a skip, mortar and blocks which can be re-used as hardcore if appropriate or disposed of into a skip or taken to a local authority waste disposal unit.

Learning Outcome 4. Know the importance of site preparation for landscaping

4.1 Describe the importance of levelling and preparing sites effectively for all of the following

- **Green-field** clear vegetation and weeds and strip off topsoil and store in a suitable place away from contamination and the importance of storing topsoil and subsoil separately
- **Urban derelict** removal of bricks and rubble and the importance of locating underground services with a CAT scan and the identification of possible asbestos where an approved contractor will need to be brought in for safe disposal
- **Reclaimed land** removal of rubbish and location of possible underground services using a CAT scan as well as the importance of identifying hazards such as the presence of methane gas
- **Existing gardens** gaining access to the site, location of stored materials, taping off the site to prevent public entry, re-locating plants and topsoil, identification of underground services using CAT scan and disposal of waste before the importance of re-structuring the existing site using topsoil, plants, turf and hard landscape materials

4.2 Describe the importance of positioning reference marks relating to site specification to include: depth of hardcore, sand and blocks to the finished levels and marking out different patterns within the project as well as manhole covers and positions of underground pipes. Refer to LO2.1 for further details.

4.3 Describe the procedures on a range of contrasting sites covering; green-field, urban, derelict, re-claimed and existing site to include: checking for Local Authority planning permission and tree preservation orders; if site is designated or protected by being within a Conservation Area; Protection of a listed building, historical artefact or Scheduled Ancient Monument; Site of Special Scientific Interest or Nature Reserve. Check with Environmental Agency regarding protection of water courses; bat roosts and endangered species such as the Great Crested Newt or Water Vole. Refer to LO4.1 for details.

4.4 State the importance of working within specified tolerances Refer to LO2.2 and LO2.5 for details.

4.5 State the types of damage which may occur to services and how to minimise this to include: Dealing with site problems such as: broken water, gas or electricity pipes by contacting the service provider; dealing with soft spots when excavating and installing sub-bases by digging out the soft spot and adding hardcore, 100mm at a time and compacting before building up the layers to that of the foundations; storage of landscape materials and waste where there is limited access and lack of space by timing the deliveries of materials and removal of skips from site; and dealing with damage and pollution by

repairing the damage and reporting the pollution to a line manager. Refer to LO1.2 for further details.

4.6 Explain why it is important to complete work to agreed schedule and specification. Refer to LO2.5 for details.

Learning Outcome 5. Know how to reinstate the ground to the required level

5.1 Describe how to reinstate ground to specified levels and why this is important Refer to LO2.3 for details.

5.2 State why it is important to clear debris effectively, safely, tidily and legally Refer to LO2.4 for details.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be necessary for levelling and preparing sites for landscaping Refer to LO1.1 for details.

6.2 Describe methods of maintaining the equipment ready for use Refer to LO1.3 for details.

Learning Outcome 7. Know the current health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements which apply to this area of work. Refer to LO3.1 for details.

7.2 Describe how environmental damage can be minimised Refer to LO3.2 for details

7.3 Describe the correct methods for disposing of organic and inorganic waste Refer to LO3.3 for details.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3

Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical construction of site clearance giving learners the opportunity, first to practice the various tasks involved

and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of construction work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5, 6 and 7
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of construction work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment
This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications

- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority web sites for Building Control Department
- The Department for Environment, Food and Rural Affairs web site http://www.defra.gov.uk/ has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice: Protecting our Water, Soil and Air has a useful list of references in Section 9.

Construct Water Features

Unit Reference	**D/502/1215**
Level	**2**
Credit Value	**7**
Guided Learning Hours	**53**
Unit Summary	The aim of this unit is to provide the knowledge and skills, required to construct water features such as ponds, streams, fountains and waterfalls
Learning Outcomes (1 to 9) ***The learner will***	**Assessment Criteria (1.1 to 9.3)** ***The learner can***
1. Be able to prepare the site	1.1 Prepare the site ready for the construction of water features
2. Be able to construct more than one type of water feature	2.1 Construct at least two of the water features listed below according to the specification: • streams • fountains • water falls • ponds 2.2 Take the appropriate action if problems arise during the work 2.3 Check the water feature on completion of work to make sure it is safe and fit for purpose 2.4 Make sure the site is clear of unwanted materials and fit for purpose
3. Be able to select, use and maintain a selection	3.1 Select and install all of the following equipment: • pumps

of tools and equipment for constructing water features	• filters • electrical supply 3.2 Select appropriate equipment for this area of work 3.3 Use equipment according to relevant legislation and manufacturer's instructions 3.4 Prepare, maintain and store equipment in a safe and effective working condition
4. Be able to work safely and minimise environmental damage	4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 4.2 Carry out work in a manner which minimises environmental damage 4.3 Dispose of waste safely and correctly
5. Know the importance of the specification when constructing water features	5.1 Describe how to interpret specifications and the importance of following the specification 5.2 Describe the requirements of the following water features and how to finish these so that they meet the specification: • streams • fountains • water falls • ponds 5.3 Describe how to interpret specifications and the importance of following the specification
6. Know how to deal with problems during construction	6.1 Describe the problems which may arise, including those caused by accidental damage, pollution and difficulties with specification 6.2 State how to minimise problems and the appropriate action to take if problems occur 6.3 State the potential conflicts between this work and conserving the natural environment

7. Know how to use a range of materials	7.1 Describe how to use all of the following materials correctly • plastic ridged liners • flexible liners • concrete • rocks
8. Know the types of equipment required and how to maintain them	8.1 Describe the equipment which will be required for the activity 8.2 Describe the methods of maintaining the range of equipment used
9. Know the current health and safety legislation and environmental good practice	9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work including the use of 240v mains supply 9.2 Describe how environmental damage can be minimised 9.3 Describe the correct methods for disposing of waste
Mapping to National Occupational Standards O29NL28.1	

Supporting Unit Information

D/502/1215 Construct water features - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2, LO3 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Be able to prepare the site

1.1 Prepare the site ready for the construction of water features Site risk assessment studied and implemented. CAT scan for underground services. Water feature marked out, cut out if necessary.

Learning Outcome 2. Be able to construct more than one type of water feature

2.1 Construct at least two of the water features listed below according to the specification Two water features constructed, efficiently and safely to specification: Pond e.g. mark out, level, dig and contour, sand or quilt, lay liner, fill with water, finish edges, plant. Specifications worked to / met.

2.2 Take the appropriate action if problems arise during the work Problems prevented or solved e.g. remove sharp stones from base.

2.3 Check the water feature on completion of work to make sure it is safe and fit for purpose Completed water feature safe e.g. no unstable flags around edge pond. Fit for purpose e.g. sounds tranquil, pumps work.

2.4 Make sure the site is clear of unwanted materials and fit for purpose Site cleared e.g. spoil / tripping hazards / liner materials removed. Site fit for purpose e.g. left safe, aesthetically pleasing, good habitat for wildlife.

Learning Outcome 3. Be able to select, use and maintain a selection of tools and equipment for constructing water features

3.1 Select and install all of the following equipment Filters e.g. submerged or external, mechanical or biological, size for flow, site to disguise and for ease of cleaning, connect to pump**.** Electrical supply - work carried out by Building Regulations - Part P qualified electrician OR Local Authority Building Control Department notified in advance - may lead to a Local Authority check of work followed by certification by Part P qualified electrician. Wiring done to current edition of Wiring Regulations.

3.2 Select appropriate equipment for this area of work PPE selected and safely used e.g. gloves, overalls, and steel toe-capped boots. CE marked. Tools and equipment selected e.g. spade, hawk and trowel, drill, spirit level, pond liner.

3.3&4 Use equipment according to relevant legislation and manufacturer's instructions / Prepare, maintain and store equipment in a safe and effective working condition

Equipment used only for the operation and in situations as detailed by the manufacturers / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation, e.g. spade blade cleaned. Use e.g. push tread with sole of foot to avoid slippage / scrapping Achilles tendon area. Maintenance e.g. clean / oil after use, wooden handle rub with linseed oil. Storage e.g. securely hanging from handle, blade down, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO8.2.

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO9.1.

4.2 Carry out work in a manner which minimises environmental damage e.g. by carefully planning site access, working in appropriate weather conditions, recycling / reuse - stone for waterfalls, stream course.

4.3 Dispose of waste safely and correctly Waste e.g. organic - green or inorganic - building waste, sub-soil. Correctly - refer to LO 9.3. Safely e.g. PPE, safe lifting.

LO5, LO6, LO7, LO8 and LO9 are the key areas of knowledge for this unit

Learning Outcome 5. Know the importance of the specification when constructing water features

5.1&2 Describe how to interpret specifications and the importance of following the specification Working with actual specifications interpret e.g. structural requirements, terms used, diagrams, measurements, materials, finish required, industry standards worked to applicable to (i) streams, (ii) fountains, (iii) water falls, (iv) ponds. Importance of following specification e.g. customer requirements, industry standards.

5.3 Describe how to interpret specifications and the importance of following the specification e.g. Flexible or preformed pond liners. Relationship to plan use e.g. wildlife ponds or formal ponds.

Learning Outcome 6. Know how to deal with problems during construction

6.1 Describe the problems which may arise, including those caused by: accidental damage, pollution and difficulties with specification accidental damage e.g. puncture of flexible pond lining - repair puncture. Pollution e.g. toxic lime seepage - coat render. Difficulties with specification e.g. clarify.

6.2 State how to minimise problems and the appropriate action to take if problems occur Minimise problems e.g. planning, acknowledge own weak areas - skills / understanding. Appropriate action e.g. consult with supervisor / others / internet / references, negotiate modification to specification.

6.3 State the potential conflicts between this work and conserving the natural environment Conflicts e.g. usage of water especially in times of shortage, energy use for pumps and lights.

Learning Outcome 7. Know how to use a range of materials

7.1 Describe how to use all of the following materials correctly e.g. concrete used for shell of pool - if waterproofing compound added to mixture render concrete and coat with bitumen or polyurethane compound. Different grades of concrete for different projects.

Learning Outcome 8. Know the types of equipment required and how to maintain them

8.1 Describe the equipment which will be required for the activity refer to LO3.2.

8.2 Describe the methods of maintaining the range of equipment used hammer drill e.g. keep drill bits sharp, clean using mild soap and damp cloth, handles free of grease, no breaks in wire - follow manufacturer's instructions.

Learning Outcome 9. Know the current health and safety legislation and environmental good practice

9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work including the use of 240v mains supply e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations, Electricity at Work Regulations. Environmental Protection e.g. Environmental Protection Acts covering waste disposal. Codes of Practice e.g. Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species. Additional requirements including Building Regulations - Part P qualification / notification of Local Authority. BS Wiring Regulations. Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers.

9.2 Describe how environmental damage can be minimised refer to examples in LO4.2.

9.3 Describe the correct methods for disposing of waste Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor - refer to LO4.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4

Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical construction of at least two types of water feature giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of construction work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 5, 6, 7, 8 and 9

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of construction work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

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All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6, 7, 8 and 9 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

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- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
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- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Installing Drainage Systems

Unit Reference	**D/502/1229**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the skills, knowledge and understanding to install drainage systems under minimal direction or guidance. The learner will be required to select and use hand tools, powered equipment and materials correctly, competently and safely and to decide the appropriate timing of operations, the work methods to be used and to check the results and correct any faults
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to install drainage systems	1.1 Position reference marks according to specification 1.2 Install drainage system to specification: • sub surface systems • surface channels • sustainable drainage systems 1.3 Adopt practices to minimise damage to existing structures and services 1.4 Restore surface to near original condition
2. Be able to select, use and maintain equipment for installing drainage	2.1 Select appropriate equipment for this area of work 2.2 Use equipment according to instructions

	2.3 Prepare, maintain and store equipment in a safe and effective working condition
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly 3.4 Describe the safety aspects of working in trenches
4. Know the principles of drain installation	4.1 Explain why soil drainage is beneficial for plant growth 4.2 State the importance of setting accurate levels and falls 4.3 Describe why the type, size, depth and spacing of drainage pipes/tiles, varies with the soil texture
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for installing drainage 5.2 Describe methods of maintaining the equipment in a fit state for use
6. Know the current health and safety legislation and environmental practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL15.1	

Supporting Unit Information

D/502/1229 Installing drainage systems – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to install drainage systems

1.1 Position reference marks according to specification Reference marks; datum points, existing features (e.g. buildings, plants, services), position, height/depth, gradients; marked by fixed pegs, line marking on surface, laser, optical levels, lines, boards.

1.2 Install drainage system to specification

- Sub surface systems: rigid plastic pipe, perforated plastic pipe, concrete pipe, gravel backfill, French drains, to included jointing, inspection chambers, sediment traps, outfalls to waterways,
- Surface channels; gulleys, channels, preformed or formed on site, to include grids and traps,
- Sustainable drainage systems; paving, gravels and permeable membranes, attenuation ponds and pits, swales.

1.3 Adopt practices to minimise damage to existing structures and services Planning of installation to avoid existing features, use of plans, maps and scanning equipment to locate features, identification and marking of existing features (refer to LO1.1), marking of installed features on site, monitoring of operations on site, removing of features (e.g. furniture, gates, plants, turf), use of plans and cat scan to identify and avoid underground services (e.g. electricity, gas, water, phone lines, sewage).

1.4 Restore surface to near original condition Backfilling, (e.g. with soil or other intrinsic material, gravel then soil, gravel only) levelling, compacting, replacing surface (e.g. gravel, tarmac, concrete, turf), replanting of plants (including subsequent aftercare), replacing items removed from site (refer to LO1.3) use material to match existing,

Learning Outcome 2. Be able to select, use and maintain equipment for installing drainage

2.1 Select appropriate equipment for this area of work PPE e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, hats, eye and ear protection;

Marking and measuring equipment e.g. laser levels, optical levels, spirit levels, tape measures, optical measures. Excavation equipment; hand tools (e.g. spades, shovels, trenching spade, pick axe, mattock, wheelbarrow), tractor mounted back hoe and excavators, 360 excavator, trenchless drainers. Backfilling equipment; scrapers, compactors, levels. Miscellaneous equipment e.g. cultivators and scrapers for site clearance, transport equipment (e.g. tractor and trailer – flat or tipper), turf strippers, pruning equipment CAT Scanners, pesticide equipment for site clearance or subsequent care of plants.

2.2 Use equipment according to instructions

Equipment only used only in appropriate conditions (e.g. avoiding frost, snow, heavy rain or muddy conditions especially on sloping sites) and for approved purpose, use of skilled and appropriately trained operatives, monitoring during operations.

2.3 Prepare, maintain and store equipment in a safe and effective working condition. Refer to LO2.1 for range of equipment. Methods of maintaining the equipment to include:

Daily checking and cleaning as required of all equipment to avoid contamination of the harvested product; lubrication of machinery as directed by manufacturer; periodic servicing of power units; checking equipment is clean during operation (to reduce contamination of other resources or the environment (e.g. roads and other parts of the site) checking and cleaning all equipment after use to ensure readiness for next operation. All equipment and machinery returned to safe and secure storage (e.g. secure yard, building or covered area).

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements

Work activities carried out consistently with current legislation, codes of practice and any additional requirements, which apply to this area of work. Risk assessment is carried out or studied and implemented. Health and Safety e.g. Management of Health and Safety at Work Regulations; Environmental Protection Acts; Waste Regulations, Code of Practice for Using Plant Protection Products, and other legislation/regulations. Additional requirements including customer and site regulations, Codes of practice and relevant legislation (e.g. LOLER, PUWER, Manual Handling, Stop Safe).

Additional requirements Contact Local Authority e.g. if working within a Conservation Area or close to a local Nature Reserve or other designated area, Environment Agency notifications for activities affecting controlled water e.g. outfalls from drainage systems, Additional requirements for working safely

in trenches or confined spaces (e.g. Construction (Health, Safety and Welfare) Regulations 1996).

3.2 Carry out work in a manner which minimises environmental damage Avoid pollution by run-off of water or and sediments to controlled water from working areas, drains or storage areas by use of bunds, attenuation pools and lagoons to retain water, avoiding working in adverse conditions, use of permeable surfaces, in event of run-off take steps at a local level to contain pollution, notify appropriate bodies e.g. Environment Agency. Minimise use of non-sustainable materials e.g. quarried minerals by checking source of all materials, reducing usage and wastage of all materials, recycle and re-use.

3.3 Dispose of waste safely and correctly Organic waste – reduce waste removed from plant maintenance area by shredding and mulching or habitats, waste plant material composted (unless the material poses a threat to plant health e.g. diseased material and perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

3.4 Describe the safety aspects of working in trenches Risk involved in working in trenches; collapse of sides causing damage to equipment and harm to person working in trench, risk to vehicles near trenches, risk of people falling in open trenches. Action – assessment of risk, temporary supports used to support excavations to prevent slippage and instability especially for deep trenches, soft or unstable soils/materials, wet conditions, or sites near to traffic; maintaining suitable access and egress, barriers around open trenches, use of trenchless drainage equipment.

LO4, LO5 and LO6 are the key area of knowledge for this unit

Learning Outcome 4. Know the principles of drain installation

4.1 Explain why soil drainage is beneficial for plant growth Benefits of drainage; lower water table, reduced risk of root damage due to water-logging (absence of oxygen to root system), improved aeration of lower levels of soil, better deep penetration of roots, reduced risk of surface flooding, reduce soil damage by erosion and compaction by machinery.

4.2 State the importance of setting accurate levels and falls Levels; to achieve adequate depth of all drains (avoids damage by vehicles, cultivations or frost), better function of the system, appropriate height of outfall to provide clear flow, reducing backing-up in flood conditions (increases risk of sedimentation).

Gradients; essential to achieve correct depth of drains and outfall, gradient needed to maintain flow, constant gradient needed to reduce risk of sedimentation in the pipes.

4.3 Describe why the type, size, depth and spacing of drainage pipes/tiles varies with the soil texture Soil texture determines permeability of the soil (horizontally and vertically), lowering of water table is greatest along the line of the drain, reducing with distance from pipe, deep pipes will drain a wider strip; Heavy soils with low permeability will require closer spacing, deeper drains and mole drains to improve performance; Unstable sandy or organic soils will require rigid pipes to avoid undulations, Fast draining soils (e.g. sands) are likely to need greater capacity that clays.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for installing drainage (refer to LO2.1)

5.2 Describe methods of maintaining the equipment in a fit state for use (refer to LO2.3)

Learning Outcome 6. Know the current health and safety legislation and environmental practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements (refer to LO3.1)

6.2 Describe how environmental damage can be minimised (refer to LO3.2)

6.3 Describe correct methods for disposing of organic and inorganic waste (refer to LO3.3)

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3

Delivery of these learning outcomes is by supervised practical work installing drainage systems giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of work installing drainage systems photographs or video could be taken to provide evidence of progress. Copies of plans or records can be used to provide evidence of quantity of work and of sufficiency of evidence.

Learning Outcomes 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work preparing and transporting plants and resources, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers

- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.
All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
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- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9
- HSE information sheet Construction Information Sheet No 8 (Revision 1).
- Local Authority web sites for Building Control Department

- Learners should be directed to relevant publications and web sites eg.
- Horticulture Week (www.hortweek.com)
- The Landscaper (www.landscapermagazine.com)
- *DEFRA web site and publications (*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *A Handbook for Horticultural Students* by Peter Dawson
- *The Commercial Greenhouse* by James William Boodley
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood

Construct and Maintain Paths

Unit Reference	**D/502/1425**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to construct and maintain paths using both fluid components and hard components
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to construct and maintain paths	1.1 Keep the route and dimensions of the path within tolerances specified for the site 1.2 Lay and support surface materials correctly and securely 1.3 Ensure drainage is effective 1.4 Lay paths efficiently, effectively and securely using both • fluid component • hard component 1.5 Carry out maintenance of the path efficiently, effectively and securely using both • fluid component • hard component 1.6 Ensure the appearance and condition of path is fit for purpose following construction or maintenance

2.Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 2.2 Carry out work in a manner which minimises environmental damage 2.3 Dispose of waste safely and correctly
3. Be able to select, use and maintain relevant equipment	3.1 Select and use equipment according to instructions 3.2 Prepare, maintain and store equipment in a safe and effective working condition throughout
4. Know how to construct and maintain paths	4.1 Describe the standards of construction for different types of paths 4.2 State the advantages and disadvantages of different types of paths and situations in which they are appropriate • fluid components • hard components 4.3 Describe construction methods required and how to ensure routes and dimensions are within agreed tolerances 4.4 Describe the principles of drainage for paths and how to ensure its effectiveness 4.5 Describe the potential hazards presented by services on site and how to avoid these 4.6 Describe the type of problems that may occur and the actions required
5. Know the types of equipment required and how to maintain them	5.1 Describe the methods of maintaining the range of equipment used
6.Know relevant health and safety legislation	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements

and environmental good practice	6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and in organic waste
Mapping to National Occupational Standards O29NCU19.2	

Supporting Unit Information

D/502/1425 Construct and maintain paths – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content are fences, walls and hard surfaces.

LO1, LO2 and LO3 are the key areas of competence for this unit.

Learning Outcome 1. Be able to construct and maintain paths

1.1 Keep the route and dimensions of the path within tolerances specified for the site Route dimensions and tolerances for the specified site must include: Site accurately marked out for construction and fenced off from public as necessary having safe entrances and exits for deliveries of materials and collection of waste. C.A.T scan used to check sites for water, gas and electricity. Excavated to correct levels on datum pegs.

1.2 Lay and support surface materials correctly and securely Foundations installed at the correct depth and width for structure or surface e.g. concrete or M.O.T type 1 hardcore. Install suitable edge restraints to contain landscape surfaces. Install a geo-textile membrane on top of the hardcore to prevent perennial weeds.

1.3 Ensure drainage is effective Ensuring drainage is effective to include: Installing drainage systems such as channels piped into waste systems or soak-away and foundations to correct depth below finished levels with a suitable fall to remove surface water to the drainage system.

1.4 Lay paths efficiently, effectively and securely to include:

- **Rigid (Hard)** paving Concrete drives for vehicular access at 100-150mm depth; Concrete paths for pedestrian access at 75mm depth; concrete slabs for paths and patios laid on a 50mm of mortar to be butt jointed or pointed up with 10mm of mortar.
- **Flexible (Fluid)** paving Block paving for paths and drives laid on a 50mm of sand; Gravel for paths, drives and car parks to be laid on a geo-textile membrane

1.5 Carry out maintenance of the path efficiently, effectively and securely Maintenance of paths to include: re-pointing and sealing of slabs; applying a systemic or residual herbicide to remove weeds on hard surfaces; replacing broken blocks or slabs on hard surfaces and power washing hard surfaces such as slabs, block paving and concrete and resealing block paving using sand and a proprietary sealant.

1.6 Ensure the appearance and condition of path is fit for purpose following construction or maintenance Sites are left clean, tidy and presentable immediately after construction or maintenance.

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection legislation including Waste Acts and COP's such as soil, water and air and additional requirements such as customer regulations, environmental health requirements as well as LOLER, PUWER, Manual Handling and Stop Safe.

2.2 Carry out work in a manner which minimises environmental damage Minimise environmental damage by carefully planning site access such as the removal and delivery of materials, working in correct weather conditions and not allowing run off from chemicals or waste products into water courses in line with Environmental Agency guidelines.

2.3 Dispose of waste safely and correctly to include: organic wastes such as soil which can be stored and then re-used; vegetation that can be composted; wood that can be chipped. Inorganic wastes such as mortar, broken slabs, concrete and bricks which can be re-used as hardcore if appropriate or disposed of into a skip.

Learning Outcome 3. Be able to select use and maintain relevant equipment

3.1 Select and use equipment according to instructions PPE selected and safely used e.g. steel toe-capped boots, gloves, and face mask. Tools and equipment correctly selected and used e.g. spades, shovels, rakes, wheelbarrows, tractor and trailer, mini-digger, CAT scan, mixer, vibrating plate and cut off saw.

3.2 Prepare, maintain and store equipment in a safe and effective working condition throughout Use equipment according to legislation including: risk assessments studied and implemented, pre-start checks on machines and used in accordance with manufacturer, supervisor and relevant legislation e.g. Abrasive wheels certificate for changing blade on cut-off saw, Manual Handling,

PUWER and Stop Safe. Maintain equipment including: Post-use checks on machines and hand tools including cleaning and storing away securely under lock and key. Re-charge batteries on CAT scan.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to construct and maintain paths

4.1 Describe the standards of construction for different types of paths Refer to LO1.4 for examples.

4.2 State the advantages and disadvantages of different types of paths and situations in which they are appropriate to include: Hard Components: Concrete is very durable and hard wearing but can be unattractive and needs expansion joints on long drives. Concrete slabs are attractive as there are a wide variety of colours and textures available for patios but they can sink over time and are not suitable for vehicular access. Fluid Components: Gravel is a cheaper option for car parks and paths with a wide variety of colours but cannot be used on sloping ground and levels need to be topped up. Block paving is attractive on drives and paths as there are a number of different patterns and colours to choose from and is ideal for vehicular paving but a great deal of skill is needed to lay it properly.

4.3 Describe construction methods required and how to ensure routes and dimensions are within agreed tolerances Refer to LO1.1 and LO1.4 for examples.

4.4 Describe the principles of drainage for paths and how to ensure its effectiveness Refer to LO1.3 for examples.

4.5 Describe the potential hazards presented by services on site and how to avoid these Dangers of underground services to include: use of CAT scan; reference to site plans to detect gas, water and electricity pipes and the dangers of pressure and explosion.

4.6 Describe the type of problems that may occur and the actions required Dealing with problems and actions required to include: Bad weather – protect work partially completed together with materials such as bags of cement and disconnect any electrical appliances. Accident – stop work, report to Supervisor and cordon off area giving First Aid treatment if needed and then risk assess the area before work recommences. Accidental damage and pollution – report to supervisor and then try and contain. Refer to LO4.5 for further examples.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the methods of maintaining the range of equipment used Refer to LO3.1 and LO3.2 for examples.

Learning Outcome 6. Know the relevant health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements. Refer to LO2.1 for examples.

6.2 Describe how environmental damage can be minimised How environmental damage can be minimised. Refer to LO2.2 for examples.

6.3 Describe the correct methods for disposing of organic and inorganic waste Refer to LO2.3 for examples.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3

Delivery of these learning outcomes is by supervised practical work of clearing, excavating and levelling sites before constructing various hard landscape surfaces. This unit also includes the maintenance of surfaces. All candidates need to be observed carrying out the above tasks competently to demonstrate achievement of the assessment criteria.

Learning Outcomes 4, 5 and 6

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work such as selection, maintenance and storage of tools, machinery and equipment. Evidence can be gathered by answering oral or written questions or by assignments which could then be cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6, and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
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- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice: Protecting our Water, Soil and Air has a useful list of references in Section 9.

Monitor and Maintain Watering Systems

Unit Reference	**D/502/1506**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to monitor and maintain watering systems. This includes irrigation equipment and water supplies
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.1)** ***The learner can***
1. Be able to monitor and maintain watering systems	1.1 Confirm the supply of water to the crop is suitable for the crop and in accordance with instructions 1.2 Recognise the need for adjustments to watering systems in accordance with instructions 1.3 Provide clear and accurate information for recording purposes
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 2.2 Carry out work in a manner which minimises environmental damage
3. Be able to select, use and maintain relevant equipment	3.2 Select appropriate equipment for this area of work 3.2 Use equipment according to relevant legislation and manufacturer's instructions

	3.3 Prepare, maintain and store equipment in a safe and effective working condition
4. Know how monitor and maintain watering systems	4.1 Describe systems for supplying water to crops 4.2 State how to check that the supply of water to crops is suitable 4.3 State the types of adjustments to the watering system which are necessary for both irrigations systems and water supply 4.4 State the problems which may occur in the delivery of water to crops and how these should be resolved
5. Know relevant health and safety legislation and environmental good practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements 5.2 Describe how environmental damage can be minimised 5.3 Describe the correct methods for disposing of waste
6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be required for the activity 6.2 Describe the methods of maintaining the range of equipment
7. Know how to maintain accurate records	7.1 Identify the types of records required and explain the importance of accurate record keeping
Mapping to National Occupational Standards 029NCU77.2	

Supporting Unit Information

D/502/1506 Monitor and maintain watering systems – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

LO1, LO2, and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to monitor and maintain watering systems

1.1 Confirm the supply of water to the crop is suitable for the crop and in accordance with instructions water supplied to crop as appropriate; Refer to LO4.1 and LO4.2

1.2 Recognise the need for adjustments to watering systems in accordance with instructions Adjustments to watering systems made as required Refer to LO4.3 for detail.

1.3 Provide clear and accurate information for recording purposes report to supervisor or manager or by record (Refer to LO7.1) to include problems encountered (Refer to LO4.4).

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO5.1.

2.2 Carry out work in a manner which minimises environmental damage e.g. care not to allow run-off into controlled waters, minimising spillage and loss of water, checking and accurate use of irrigation systems, ensuring no leaks, efficient use of water to avoid run-off.

Learning Outcome 3. Be able to select, use and maintain relevant equipment

3.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots and gloves. Equipment selected and used e.g. – automatic and manual irrigation systems, fixed/mobile,

drip, overhead, capillary, hosepipes and watering cans; (equipment for applying nutrient).

3.2 Use equipment according to relevant legislation and manufacturer's instructions Manufacturer's / supplier's / supervisor's instructions followed for use of irrigation equipment. Refer to LO3.1, LO6.1 and LO6.2.

3.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of equipment.

LO4, LO5 LO6 and LO7 are the key area of knowledge for this unit

Learning Outcome 4. Know how monitor and maintain watering systems

4.1 Describe systems for supplying water to crops Source – mains, river or other watercourse, reservoir (on-stream or off-stream), tank, surface/roof water collection, drainage from nursery, bore hole or aquifer);
Distribution; fixed, mobile, rigid, flexible application; automatic and manual irrigation systems, fixed/mobile, drip, overhead (outdoor and indoor), capillary, flood, hosepipes and watering cans; (equipment for applying nutrient) .

4.2 State how to check that the supply of water to crops is suitable Checking the water supply; Quality – physical (checking filters, observation, thermometer/temperature probe, sampling and testing for impurities. Quantity – pressure gauge, observation/measuring of levels, calibration.

4.3 State the types of adjustments to the watering system which are necessary for both irrigations systems and water supply Adjustments to the watering system which are necessary. For irrigations systems - choice of system (overhead, capillary, hosepipe, can, mist, flood), timing (frequency, length of application) Pressure (requirements of system, volume of application, droplet size). For water supply - choice of supply (mains, river or other watercourse, reservoir (on-stream or off-stream), tank, surface/roof water collection, drainage from nursery, bore hole or aquifer); timing (frequency and length of application) Pressure (requirements of system, volume of application).

4.4 State the problems which may occur in the delivery of water to crops and how these should be resolved Problems which may occur in the delivery of water to crops; Loss of supply; resolved by monitoring of the supply, availability of alternatives, rationing of supplies, avoidance of wastage. Loss of pressure, interruption to the supply; resolved by monitoring of the supply, availability of alternatives, rationing of supplies, avoidance of wastage, maintenance of pumping equipment , stand-by facility. Pollution (particles, biological threats to crops, chemical impurity); resolved by monitoring of the supply, availability of alternatives, filtering systems to remove physical pollution, UV to combat threats to plant health, addition of chemicals to balance impurities.

Learning Outcome 5. Know relevant health and safety legislation and environmental good practice

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health and Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification LOLER, PUWER, Manual Handling, advice and requirements of Environment Agency.

5.2 Describe how environmental damage can be minimised recycling and re-using of water, reducing wastage through leaks, managing irrigation systems to avoid run-off and contamination of controlled water, avoiding overhead irrigation (reducing evaporation loss), use of drip, flood and sub-irrigation to direct water to site of use.

5.3 Describe the correct methods for disposing of waste Organic waste – not applicable Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; maintenance of systems to extend life useful life, old equipment recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be required for the activity Water supply/source; mains, river or other watercourse, reservoir (on-stream or off-stream), tank, surface/roof water collection, drainage from nursery, bore hole or aquifer. Watering systems; overhead, capillary, hosepipe, can, mist, flood. Control equipment; manual (taps, valves) automatic (solenoids, timers, sequencers, computer based)

6.2 Describe the methods of maintaining the range of equipment Manufacturer's / supplier's / supervisor's instructions followed for use of equipment, cleaning, checking and calibration of irrigation (and liquid feeding equipment), Cleaning and checking after use and safely returning to appropriate storage area.

Learning Outcome 7. Know how to maintain accurate records

7.1 Identify the types of records required and explain the importance of accurate record keeping Types of record; crop; source of water, water used, significant changes to the supply, time of application, duration/quantity of application; changes within the crop; recorded or reported manually or electronically. Use of records; to check effectiveness of watering, identify

problems in controls, to analyse changes in the crops, reduce water use, aid future managing of the crop.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by supervised practical work monitoring and maintaining watering equipment giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of practical work monitoring and maintaining watering equipment photographs or video could be taken to provide evidence of progress. Copies of watering record can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 4, 5, 6, and 7
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of practical work monitoring and maintaining watering equipment, watering records and witness testimony, answering oral or written questions referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.
Minimum requirements when assessing this unit

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- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- The Landscaper (www.landscapermagazine.com)
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *Nursery Stock Manual: Grower Manual 1* by Keith Lamb, et al / Paperback / Published 1995
- *A Handbook for Horticultural Students* by Peter Dawson
- *Soil Science and Management* by Edward J. Plaster
- *The Commercial Greenhouse* by James William Boodley
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood
- *Farm Machinery* (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684

Prepare the Storage Area and Monitor Crops during Storage

Unit Reference	**F/502/0252**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the skills and knowledge required for the preparation, storage and monitoring of crops. Types of crops may be grass, arable crops, vegetables, fruit or plants. Therefore the unit is also applicable to crops that are being stored for livestock consumption, as well as crops that are for sale
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.1)** ***The learner can***
1. Be able to prepare the storage area	1.1 Prepare the storage area as instructed • cleaning the area • making the layout suitable 1.2 Minimise the risk of contamination by pests as instructed
2. Be able to store the harvested crop	2.1 Arrange crops in the storage area in accordance with instructions 2.2 Use equipment safely and correctly, mechanical or manual 2.3 Leave the storage area in a secure and safe condition
	3.1 Conduct two routine inspections of the storage area and the crop and report this back to the

3. Monitor the condition of the storage area and crops	appropriate person. Inspections to be carried out should be for all of • pests • environmental conditions • crop condition 3.2 Maintain the security of the crop and storage premises 3.3 Complete monitoring records as instructed
4. Be able to work safely and minimise environmental damage	4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements
5. Know how to prepare and monitor the condition of harvested crops	5.1 State the reasons for preparing the storage area 5.2 State the reasons for storing and arranging crops in storage areas 5.3 Describe the signs of common pests (rodents, insects and birds) and the measures which may be taken to minimise the risk of damage 5.4 Describe methods of conducting routine inspections and the reasons for carrying them out covering • environmental conditions • condition of the crop 5.5 Describe common forms of damage to crops and storage facilities immediate and long term
6. Know the relevant health and safety legislation and environmental practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work
Mapping to National Occupational Standards 029N AgC8.1, 8.2	

Supporting Unit Information

F/502/0252 Prepare the storage area and monitor crops during storage - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is hardy nursery outdoor stock grown in containers. The same approach should be used for other crops.

LO1, LO2, LO3 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Be able to prepare the storage area

1.1 Prepare the storage area as instructed Instruction by; supervisor, line manager, client.

- **Cleaning the area** e.g. by removal of previous crop and containers, removal of pests, diseases and other contaminating material (e.g. weeds, dust, water), replacement of filters and scrubbers, ventilation to remove moisture.
- **Layout made suitable** e.g. by removal of machinery and equipment obstructing the store or access, setting up of shelving, racking, pallets, erection of barriers, walls, ducting, insulation, elevators, monitoring equipment.

1.2 Minimise the risk of contamination by pests as instructed Instruction by; supervisor, line manager, client (e.g.)
Rodents; signs – presence of droppings, gnawing of stems or roots; action – rodent-proof storage, trapping, poisons and baits
Insects; signs – physical presence of insect, damage to leaves, stems or roots, detritus on plants; action – monitoring and removal of infested material, checking of material put into store, good hygiene in the store, screens and fleeces
Birds; signs – physical presence, droppings on plants or in area, damage to crops; actions – enclosed storage, screens and fleeces over crop, deterrents.

Learning Outcome 2. Be able to store the harvested crop

2.1 Arrange crops in the storage area in accordance with instructions Instruction by; supervisor, line manager, client. Arranging crops to; allow access for adding or removing crop, monitoring of crop, ventilation, managing the crop (e.g. watering or damping down).

2.2 Use equipment safely and correctly, mechanical or manual PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV protection, gloves, aprons, hats, including safety helmets, gas monitoring equipment. Facility, tools and equipment (manual and mechanical) maintained, selected and used according to manufacturer's / supplier's / supervisor's instructions.

Equipment; (e.g. hand tools - brushes, shovels, thermometers; machinery – fork-lift trucks, elevators, power washers, vacuum, cleaners, access ladders, facility – barns, enclosed sheds, insulated stores, controlled atmosphere stores, cooling and ventilating machinery).

2.3 Leave the storage area in a secure and safe condition Storage area left in a secure and safe condition (refer to LO3.2). Doors and vents closed and locked as required.

Crop, storage boxes, pallets, racking is safe, stable. Machinery and equipment is stored safely and securely away from risk of damage. Necessary signage is in place.

Learning Outcome 3. Monitor the condition of the storage area and crops

3.1 Conduct two routine inspections of the storage area and the crop and report this back to the appropriate person. Inspections to be carried out should be for all of Two routine inspections of the storage area and the crop conducted and findings (see below) reported back to the appropriate person (e.g. supervisor, store manager, sales person). Inspections carried out should be for all of following: - Pests, Environmental conditions, Crop condition

Pests (refer to LO1.2).

Environmental conditions Reasons – to ensure conditions in store are best for the crop, avoiding degradation of the crop in store; methods – routine visits to the store, use of environmental monitoring equipment (e.g. max/min thermometer, hygrometer), computerised monitoring (with or without automatic control).

Condition of the crop reasons – check for pests (refer to LO1.2) and diseases (e.g. fungal rots, botrytis), look for degradation of the crop (drying out, wilting, and loss of leaf colour); methods – routine visits, monitoring and recording, environmental monitoring (see above).

3.2 Maintain the security of the crop and storage premises e.g. closing and locking of doors and vents, content of store monitored, records maintained (see also LO3.3).

3.3 Complete monitoring records as instructed e.g. environmental and crop conditions (refer to LO3.1), crop in and out, maintenance records, pest and disease incidence, recording by written record or electronically by PC, Laptop or hand-held device.

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements
Risk assessment carried out or studied and implemented. Work activities carried out consistently with current legislation, codes of practice and any additional requirements. Health and Safety e.g. Management of Health & Safety at Work Regulations; Environmental Protection Acts; Waste Regulations. Additional requirements including customer regulations, environmental health requirements, certification and assured produce schemes, LOLER, PUWER, Manual Handling, and Stop Safe.

LO5 and LO6 are the key area of knowledge for this unit

Learning Outcome 5. Know how to prepare and monitor the condition of harvested crops

5.1 State the reasons for preparing the storage area (refer to LO1.1)
Reasons; hygiene (e.g. removal of pests, diseases, contaminated material) to prevent contamination and degradation of crop, increase storage life, reduce wastage in store, maintain quality in store
Setting up; to allow for adding or removing crop, people or vehicles, maintenance of storage facility and monitoring equipment, managing the crop (e.g. watering or damping down, drainage, washing down), increased efficiency/use of storage facility, reduced running costs.

5.2 State the reasons for storing and arranging crops in storage areas accumulate orders for customers or delivery, make best use of labour for lifting orders, avoiding lifting in adverse conditions (e.g. frost, high winds, extreme heat, heavy rain/snow) or when labour not available (weekends, holidays, other work on the nursery), protect the crop against adverse weather conditions (e.g. frost, high winds, extreme heat)

5.3 Describe the signs of common pests (rodents, insects and birds) and the measures which may be taken to minimise the risk of damage (refer to LO1.2)

5.4 Describe methods of conducting routine inspections and the reasons for carrying them out

- **Environmental conditions** reasons – to ensure conditions in store are best for the crop, avoiding degradation of the crop in store; methods – routine visits to the store, use of environmental monitoring equipment (e.g. max/min thermometer, hygrometer), computerised monitoring (with or without automatic control).
- **Condition of the crop**; reasons – check for pests (refer to LO5.3) and diseases, look for degradation of the crop (drying out, wilting, loss of leaf colour); methods – routine visits, monitoring and recording, environmental monitoring (see above).

5.5 Describe common forms of damage to crops and storage Crops; immediate – pest damage (refer to LO1.2), disease damage (refer to LO3.1) drying out, water damage, physical damage from vehicles, people or poor stacking or handling; long term – drying out, loss of plant condition (leaf colour, loss of flowers/buds), pests and diseases
Storage facility; immediate – damage by vehicles, people, water, weather (e.g. frost, snow, wind); long term – damage by pests or disease (e.g. rodents, dry rot), failure of monitoring equipment.

Learning Outcome 6. Know the relevant health and safety legislation and environmental practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work (refer to LO4.1).

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4
Delivery of these learning outcomes is by supervised practical work preparing the storage area and monitoring crops during storage, giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Learning Outcomes 5, and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work carrying out preparing the storage area and monitoring crops during storage, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Prior to, during and after completion of work preparing the storage area and monitoring crops during storage photographs or video could be taken to provide evidence of progress. Copies of packhouse or field records can be used to provide evidence of quantity of work and of sufficiency of evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 4 and 4 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects

- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.
All evidence must be clearly signposted and made available for the external moderator upon request.
All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ - helpful guidance about environmental regulations
- The Code of Practice - Protecting our Water, Soil and Air Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com)

- DEFRA web site and publications (https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs)
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals by R. Wills, et al / Paperback / Published 1998
- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- A Handbook for Horticultural Students by Peter Dawson
- Greenhouse Operation and Management by Paul Nelson
- Farm Horticulture by George W. Wood
- Farm Machinery (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684
- Profitable Farm Mechanization by Claude Culpin ISBN-13: 9780258969847

Establish Decorative Amenity Areas

Unit Reference	**F/502/0395**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	The aim of this unit is to provide the learner with the ability to demonstrate the knowledge and skills required to establish decorative amenity areas using a range of materials and plants
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to select, use and maintain relevant equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to establish three different types of decorative area	2.1 Select materials and plants that are suitable for each type of display 2.2 Handle and transport materials and plants efficiently, effectively and safely 2.3 Group and position plants and containers to achieve an attractive effect 2.4 Carry out planting to correct depth, spacing and consolidation

	2.5 Use supports where required, that maintain the plants' growth, appearance and visual impact 2.6 Provide initial aftercare e.g. watering in
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to establish decorative areas	4.1 State what needs to be considered when selecting and using all of the following materials • plant material • containers • supports • growing media 4.2 Describe how to transport and handle the materials and plants efficiently, effectively and safely 4.3 Explain why plants and containers are grouped and positioned to achieve an attractive effect throughout the life of the display for all of the following displays • formal bedding • wall shrubs • climbers • mixed borders • hanging baskets • other containers 4.4 Explain how a range of supports are used to maintain and enhance growth and appearance
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for establishing decorative areas 5.2 Describe methods of maintaining the equipment in ready for use
6. Know the current health and safety legislation and	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work

environmental good practice	6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL4.1	

Supporting Unit Information

F/502/0395 Establish decorative amenity areas - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain relevant equipment

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, gloves. CE marked. Tools and equipment selected e.g. fork, spade, rake, trowel, brush, stakes / support, cloches.

1.2&3 Use equipment according to manufacturer's instructions and legal requirements/ Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe: Preparation, e.g. spade blade cleaned. Use e.g. push tread with sole of foot to avoid slippage / scrapping achilles tendon area. Maintenance e.g. clean /oil after use, wooden handle rub with linseed oil. Storage e.g. securely hanging from handle, blade down, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO5.2.

Learning Outcome 2. Be able to establish three different types of decorative area

Types of decorative area e.g. beds for annual flowers / perennials / roses / herbs, ferns wildflowers etc., displays of climbing plants, lawns, container display on patio, hanging baskets.

2.1 Select materials and plants that are suitable for each type of display e.g. perennial border select stakes, supports and plants that are compatible with the type of display intended, heights, spread, foliage and flower colours.

2.2 Handle and transport materials and plants efficiently, effectively and safely. Efficiently e.g. boxes, bags or containers packed to maximise number carried without damage such as crushing or bruising. **Effectively** e.g. well packed, sacking around root ball, large leaves loosely tied, care not to expose to frost or high temperatures. **Safely** e.g. load secure, not too heavy, safe lifting and safe to carry, route selected carefully.

2.3 Group and position plants and containers to achieve an attractive effect e.g. plants grouped with harmonising or contrasting flowers, foliage, heights. Plants and containers positioned to planting plan, instructions or by eye

2.4 Carry out planting to correct depth, spacing and consolidation e.g. top of rootball level with soil or different requirements such as roses where cover union of rootstock and scion, spacing to allow for healthy spread without leaving gaps, consolidation to ensure roots are in contact with soil and eliminate air pockets.

2.5 Use supports where required, that maintain the plants' growth, appearance and visual impact Supports used effectively e.g. stakes, trellis

2.6 Provide initial aftercare e.g. watering in, protection from pests such as rabbits or slugs.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO6.1.

3.2 Carry out work in a manner which minimises environmental damage e.g. by working in appropriate weather conditions, recycling / reuse, good practices for managing soils / fertiliser use, alternatives to peat.

3.3 Dispose of waste safely and correctly Waste e.g. organic - green or inorganic -stones / plastic bags. Correctly - refer to LO6.3. Safely e.g. PPE, safe lifting.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to establish decorative areas

State what needs to be considered when selecting and using all of the following materials e.g. containers - selection for size, shape, materials, colour, position and use consider plant types, drainage, watering, feeding.

4.1 Describe how to transport and handle the materials and plants efficiently, effectively and safely - refer to LO2.2.

4.2 Explain why plants and containers are grouped and positioned to achieve an attractive effect throughout the life of the display for all of the following displays Grouping and positioning: Aesthetic reasons e.g. complimentary foliage or flower colours, ensuring that these catch the eye. Practical reasons e.g. watering, feeding and spraying. Benefits of plant proximity e.g. humidity and shade.

4.3 Explain how a range of supports are used to maintain and enhance growth and appearance Range of supports e.g. for climbing or heavy flowered plants, shrubs and trees. Enable and sustain upward growth,

enhancing appearance by framing, presentation of flowers against surface / foliage or maintaining stems / flowers in an upright position.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for establishing decorative areas refer to LO1.1.

5.2 Describe methods of maintaining the equipment in ready for use e.g. ATV - check oil, oil filter and screen, air filter, tyre pressures / wheel condition - follow manufacturer's instructions and schedules. Waste oil - refer to LO6.3.

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Environmental Protection e.g. Environmental Protection Acts covering waste disposal. Codes of Practice e.g. protecting our Water, Soil and Air, Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species. Additional requirements e.g. ATV's - Safe Stop, ensure tetanus vaccination up to date.

6.2 Describe how environmental damage can be minimised Minimising environmental damage - refer to examples in LO3.2

6.3 Describe the correct methods for disposing of organic and inorganic waste Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste such as oil / filters from maintenance ATV's. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. If quantities justify check. Environment Agency procedures regarding hazardous waste e.g. oil**.** Refer to LO3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3 Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised establishment of decorative amenity areas giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of establishment work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 5, 6, 7, and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of amenity area establishment activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.
The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks

- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

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Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
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- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc

- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Establishing Crops or Plants in Growing Medium

Unit Reference	**F/502/0946**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to establish crops and plants in growing medium. This unit covers setting out crops and plants in the appropriate growing mediums at the current time according to production requirements
Learning Outcomes (1 to 9) ***The learner will***	**Assessment Criteria (1.1 to 9.3)** ***The learner can***
1. Know how to prepare for setting out crops or plants	1.1 Describe how to prepare the growing media for planting 1.2 Describe the types of growing media and their relationship to the crop/plant growth and development 1.3 State the indicators used to identify plant material that is unsuitable for planting
2. Know how to set out crops or plants	2.1 Describe the methods of preparing plant material for planting 2.2 Describe how production requirements influence planting operations 2.3 State how the correct spacing, depth, orientation and firmness of crops/plants differ according to the production requirements

	2.4 Describe the correct handling methods for crops and plants to maintain quality
3. Know how to establish crops/plants	3.1 Describe the methods of establishing crops and plants 3.2 Describe the types of pests, diseases, weeds and environmental conditions which may affect production 3.3 Describe the types of protection used for pests, disease, weeds and environmental conditions 3.4 State the crops or plant requirements for nutrients and moisture in order to establish successfully
4. Know the types of equipment required and how to maintain them	4.1 Describe the equipment which will be necessary for establishing crops and plants 4.2 Describe methods of maintaining the equipment ready for use
5. Know the current health and safety legislation and environmental good practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 5.2 Describe the correct methods for disposing of organic and inorganic waste
6. Be able to set out crops or plants	6.1 Prepare the growing medium ready for planting 6.2 Identify and reject plant material which is unsuitable for planting 6.3 Position the plants or crop in the growing medium in accordance with requirements 6.4 Handle plants or crop in a way which optimises growth and development and minimises damage
7. Be able to establish crops or plants	7.1 Use a suitable method of establishing the crops or plants 7.2 Apply suitable protection to the crops or plants

8. Be able to select, use and maintain equipment	8.1 Select appropriate equipment for this area of work 8.2 Use equipment according to instructions 8.3 Prepare, maintain and store equipment in a safe and effective working condition throughout
9. Be able to work safely and minimise environmental damage	9.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 9.2 Dispose of waste safely and correctly 9.3 Provide accurate information for recording purposes

Mapping to National Occupational Standards
029NPH 2.1,2.2

Supporting Unit Information

F/502/0946 Establishing crops or plants in growing medium - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is brassica crops grown in soil outdoors. The same approach could be used for crops grown in soil under protection or in growing media in pots, trays or other containers.

LO1, LO2, LO3, LO4 and LO5 are the key area of knowledge for this unit

Learning Outcome 1. Know how to prepare for setting out crops or plants

1.1 Describe how to prepare the growing media for planting Subsoiling, ploughing (mole board or chisel), use of power harrows, use of non-powered harrows, rollers and crumblers, bed formers, ridgers, addition of organic manures, application of limes and inorganic fertilizers, pre-planting herbicide, irrigation.

1.2 Describe the types of growing media and their relationship to the crop/plant growth and development Types of growing media; range of soil types – clay, loamy, sandy, silty, organic. Properties affecting crop/plant growth and development; nutrient and moisture status and retention, drainage, ease of tillage, rate of warming.

1.3 State the indicators used to identify plant material that is unsuitable for planting growth state of the plants (too small, too large, presence of flowers), plant health (colour of leaves or stems, presence of pests, diseases or disorders, vigour of growth, trueness to type, modules or growing medium too wet or too dry.

Learning Outcome 2. Know how to set out crops or plants

2.1 Describe the methods of preparing plant material for planting watering, application of fertilizer, application of pesticide, pulling and boxing or bunching of bed grown plants, lifting of containers or trays from propagation area, loading to transport to planting area, protection during storage and transport.

2.2 Describe how production requirements influence planting operations location, timing (season, day, time of day), preparation of growing medium (see LO1.2), and type of growing medium.

2.3 State how the correct spacing, depth, orientation and firmness of crops/plants differ according to the production requirements (difference according to the production requirements); Spacing and orientation - variation with plant type (e.g. cabbage, sprouts) time of year, production system (organic, low input or non-organic), post-planting treatment and equipment to be used; Depth – variation with propagation method (Modules or bare-root, type of module) weather conditions (Wet, dry, windy); firmness – variation with plant type, type of growing medium, condition of growing medium, season.

2.4 Describe the correct handling methods for crops and plants to maintain quality methods of preparation (refer to LO2.1), use of appropriate containers, short-term storage in propagation area and planting area and during transport (protection from heat, wind, rain, pests, damage), timing and effectiveness of planting operations, maintenance of planting equipment, post planting treatments.

Learning Outcome 3. Know how to establish crops/plants

3.1 Describe the methods of establishing crops and plants planting of modular and bare-rooted plants, planting by hand using trowel or dibber, machine planting of bare-roots, automatic and semi-automatic module planters.

3.2 Describe the types of pests, diseases, weeds and environmental conditions which may affect production

- **Pests** Cabbage root fly – root damage, loss of vigour, wilting, eventual death of plant
  Aphid – sap suckers, reduce vigour, disfigurement by honey dew and black fungus, risk of virus transmission
  Large and small white butterfly – leaf damage, loss of photosynthetic potential, contamination by detritus
  Slugs - leaf damage – loss of photosynthetic potential, contamination by detritus; root damage – loss of vigour, wilting; stem damage – loss of translocation secondary infections in damaged tissue
  Rabbit, pigeon – grazing of leaves, reducing photosynthesis, reduced value of leaf crops, destruction of young plant
- **Diseases** Mildews – grey appearance of leaves, loss of vigour, damage to curds of cauliflower
  Club-root – swollen and distorted roots, loss of vigour, wilting
  Damping off (wirestem) – darkened constricted area of stem near ground level, reduced translocation, instability and toppling , loss of vigour, destruction of young plant
  Disorders:
  Boron deficiency – browning of core of stem, hollowing of stem, breakdown of tissue to foul smelling fluid
  Whiptail – leaf blades turn thin and narrow, only midrib left,

Blindness – loss of growing point,, diseases, weeds and environmental conditions which may affect production

- **Weeds** Range of weeds including annual (e.g. redshank, polygonums, chickweeds, mayweeds, charlock) perennials (docks, dandelions, couch) other crops (rape, potatoes)
- **Environmental Conditions** Extremes of wet and dry, frost, cold, high temperatures, wind (including wind-blown soil and salt winds), rain, hail, snow, erosion by wind or water, combinations of factors

3.3 Describe the types of protection used for pests, disease, weeds and environmental conditions Chemical Application by – Ground based high/low volume, fogs, mists and smokes, fumigants, dusts, granules, pellets and baits; use of hand-held or vehicle mounted applicators, seed treatments, dips and drenches, applications near water, use of aircraft, use within integrated pest management programmes.

Biological use of one organism to control another; - e.g. the use of *Bacillus thuringiensis* for control of caterpillars.

Cultural choice of variety, timing of sowings and planting, choice of irrigation system, management of nutrient and water to promote healthy growth, reducing stress to reduce impact of pest/disease attack, management of temperature, ventilation and humidity, integrated pest management programmes, use of barriers and covers.

Weed control by use of herbicides (pre-planting, selective post-planting), by hand cultivation (hoeing or weeding), by inter-row machine cultivation (tines, brush) Flame weeders

Environmental protection by use of wind-breaks and hedges, choice of site, timing, irrigation, use of crop covers.

3.4 State the crops or plant requirements for nutrients and moisture in order to establish successfully Requirements for nutrients and moisture in order to establish successfully;

Nutrient; levels of N, P, K and trace elements, pH status, dependant on crop type, soil type, season. Moisture; condition of transplants, moisture content of soil for preparation of suitable tilth, moisture level at planting (dependant on weather conditions), moisture sensitive growth-stages.

Learning Outcome 4. Know the types of equipment required and how to maintain them

4.1 Describe the equipment which will be necessary for establishing crops and plants

PPE – refer to LO8.1. Soil preparation equipment (refer to LO1.1) – subsoilers, ploughs (mole board or chisel), power harrows, non-powered harrows, rollers and crumblers, bed formers, ridgers, organic manure spreaders, lime and inorganic fertilizer spreaders, pesticide application equipment, irrigation equipment. Establishing crops and plants (refer to LO3.1); trowel or dibber,

machine for planting of bare-roots, automatic and semi-automatic module planters. Transporting of plants – tractors and off-road vehicles with or without trailer, transport boxes.

4.2 Describe methods of maintaining the equipment ready for use daily checking and cleaning as required of all equipment to ensure effective operation, lubrications of machinery as directed by manufacturer, periodic servicing of power units; checking and cleaning all equipment after use to ensure readiness for next operation.

Learning Outcome 5. Know the current health and safety legislation and environmental good practice

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling, Stop Safe.

5.2 Describe the correct methods for disposing of organic and inorganic waste Organic waste – reduce waste removed from propagation area, unwanted plant material returned to growing area or composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of containers minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

LO6, LO7, LO8 and LO9 are the key areas of competence for this unit

Learning Outcome 6. Be able to set out crops or plants

6.1 Prepare the growing medium ready for planting (refer to LO1.1).

6.2 Identify and reject plant material which is unsuitable for planting (Refer to LO1.3 for reasons for rejection).

6.3 Position the plants or crop in the growing medium in accordance with requirements (refer to LO2.2 & LO2.3).

6.4 Handle plants or crop in a way which optimises growth and development and minimises damage (refer to LO2.4).

Learning Outcome 7. Be able to establish crops or plants

7.1 Use a suitable method of establishing the crops or plants refer to LO2.3 for establishment criteria.

7.2 Apply suitable protection to the crops or plants refer to LO3.3 for methods of protection and LO3.2 for problems likely to occur.

Learning Outcome 8. Be able to select, use and maintain equipment

8.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats.
Tools and equipment selected and used Refer to LO4.1 for examples

8.2 Use equipment according to instructions Manufacturer's / supplier's / supervisor's instructions followed for use of tools / equipment (Refer to LO4.1 for range of equipment).

8.3 Prepare, maintain and store equipment in a safe and effective working condition throughout Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment; See LO4.2 for detail of activities.

Learning Outcome 9. Be able to work safely and minimise environmental damage

9.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO5.1.

9.2 Dispose of waste safely and correctly see LO5.2.

9.3 Provide accurate information for recording purposes records of preparation, planting and establishment kept or reported as required; Recording, activities carried out, quantity, timing, problems encountered; Reported in person face to face or by telephone, or recording by written notes or approved recording form or electronically as required by the organisation.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 4 and 5
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of preparation of growing media and establishing plants or crops, planting and other records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Learning Outcomes 6, 7, 8 and 9
Delivery of these learning outcomes is by supervised practical preparation of growing media and establishing plants or crops giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of the work photographs or video could be taken to provide evidence of progress. Copies of planting and other records can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised competently and appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence

- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- *Horticulture Week* (www.hortweek.com*)*
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- The Complete Book of the Greenhouse by Ian G. Walls, et al / Paperback / Published 1996
- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- Nursery Stock Manual: Grower Manual 1 by Keith Lamb, et al / Paperback / Published 1995
- The Compost Book by David Taylor, et al / Hardcover / Published 1994
- A Handbook for Horticultural Students by Peter Dawson
- Cutting Propagation by James L. Gibson and John M. Dole
- Soil Science and Management by Edward J. Plaster
- The Commercial Greenhouse by James William Boodley
- Practical Woody Plant Propagation for Nursery Growers by Bruce Macdonald
- Vegetable Brassicas and Related Crucifers by G.R. Dixon and M.H. Dickson
- Greenhouse Operation and Management by Paul Nelson
- Farm Horticulture by George W. Wood
- Farm Machinery (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684
- Profitable Farm Mechanization by Claude Culpin ISBN-13: 9780258969847

Monitor and Record Environmental Conditions for Protected Crops

Unit Reference	**F/502/1496**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to monitor and record the environmental conditions for protected crops. It covers monitoring the temperature, humidity, ventilation, light and shade
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.1)** ***The learner can***
1. Be able to monitor and record environmental conditions for protected crops	1.1 Monitor two of the following environmental conditions in accordance with instructions • temperature • humidity • ventilation • light and shade 1.2 Accurately identify the need for adjustments to environmental conditions and report promptly to the appropriate person 1.3 Provide clear and accurate information for recording purposes
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements

	2.2 Carry out work in a manner which minimises environmental damage
3. Know how to monitor and record environmental conditions for protected crops	3.1 Describe the different environmental conditions for crops 3.2 Describe the use of computers and other equipment for monitoring environmental conditions 3.3 State the environmental conditions which require adjustment and the actions to take • temperature • humidity • ventilation • light and shade
4. Know relevant health and safety legislation and environmental good practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements 4.2 Describe how environmental damage can be minimised
5. Know how to maintain accurate records	5.1 Identify the types of records required and explain the importance of accurate record keeping
Mapping to National Occupational Standards 029NCU77.1	

Supporting Unit Information

F/502/1496 Monitor and record environmental conditions for protected crops - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1 and LO2 are the key areas of competence for this unit

Learning Outcome 1. Be able to monitor and record environmental conditions for protected crops

1.1 Monitor two of the following environmental conditions in accordance with instructions Refer to LO3.3 for detail

- Temperature
- Humidity
- Ventilation
- Light and shade

1.2 Accurately identify the need for adjustments to environmental conditions and report promptly to the appropriate person
Temperature/humidity in the crop being outside range for crop required by cropping programme, changes in response to external factors (outside temperature, wind speed, cloud cover, time of day) that will require changes to be made
Reporting in person, by telephone or electronically.

1.3 Provide clear and accurate information for recording purposes (refer to LO5.1)

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements risk assessment studied and implemented. Work activities carried out consistently with current legislation (refer to LO4.1).

2.2 Carry out work in a manner which minimises environmental damage (refer to LO4.2).

LO3, LO4 and LO5 are the key area of knowledge for this unit

Learning Outcome 3. Know how to monitor and record environmental conditions for protected crops

3.1 Describe the different environmental conditions for crops temperature, humidity, ventilation, light/shade; crop requirements as shown in crop programmes or instructions, environmental conditions for maximum/optimum growth, disease and pest managements, management of flowering; variations to programmes – with time of day, stage of crop, season, for specific purposes as instructed.

3.2 Describe the use of computers and other equipment for monitoring environmental conditions use of computers and other equipment for monitoring environmental conditions;
Manually read equipment; thermometers, hygrometers, light meters, wind speed and direction indicators, automatic monitoring by aspirated screens, temperature and humidity sensors, wind speed and direction indicators, light meters recorded to print-out or electronically recorded. Computer based environmental control systems.

3.3 State the environmental conditions which require adjustment and the actions to take environmental conditions which require adjustment and the actions to take:
For a stated crop (e.g.- poinsettia for Christmas market)

- Temperature; target/ideal or achieved, limits, propagation temperature, growing temperature day/night, packing and transport
- Humidity; target/ideal or achieved, limits, propagation, growing temperature day/night, impact of humidity on pest and disease
- Ventilation; combination with i) and ii) to achieve best growing conditions
- Light and shade; as required to improve photosynthesis, changes to incident heat from sunlight, protection from low night temperatures.

Learning Outcome 4. Know relevant health and safety legislation and environmental good practice

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health and Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling.

4.2 Describe how environmental damage can be minimised environmental damage minimised by careful management of environment in protected areas to reduce use of heating, use of ventilation to reduce disease incidence in the crop (minimising need for use of pesticides), use of screens to reduce heat loss from cropping area.

Learning Outcome 5. Know how to maintain accurate records

5.1 Identify the types of records required and explain the importance of accurate record keeping recording of environmental data; internal and external temperature, maximum and minimum, changes with time; humidity, light levels, wind speed and direction, incident light levels.
Records of settings and condition of equipment, heating (on/off, water temp, levels of settings) position of ventilators, movement of screens.
Manual reading of data, recorded as written report or electronically, electronic data read as on-screen display or print-out.
Use of records; to check effectiveness of equipment, identify problems in controls, to analyse changes in the crops, reduce fuel use, reduce incidence of pest and disease, aid future managing of the crop.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of harvesting, harvesting records and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Learning Outcomes 5, 6, and 7
Delivery of these learning outcomes is by supervised practical harvesting work giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.
Prior to, during and after completion of harvesting photographs or video could be taken to provide evidence of progress. Copies of harvest record can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
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- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
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- *Soil Science and Management* by Edward J. Plaster
- *The Commercial Greenhouse* by James William Boodley
- *Practical Woody Plant Propagation for Nursery Growers* by Bruce Macdonald
- *Greenhouse Operation and Management* by Paul Nelson

- *Farm Horticulture* by George W. Wood

Use and Maintain Ride-On Powered Equipment

Unit Reference	**H/502/0440**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to use and maintain ride-on powered equipment
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.2)** ***The learner can***
1. Be able to set up, use and maintain ride-on powered equipment	1.1 Ensure that the ride-on powered equipment is safe and in good working order 1.2 Select and use the correct personal protective clothing and equipment 1.3 Set up and use ride-on powered equipment in accordance with the manufacturer's instructions and legal requirements 1.4 Maintain chippers and/or shredders in accordance with manufacturer's instructions 1.5 Identify any problems with the ride-on powered equipment and take appropriate action 1.6 Clean and store the equipment correctly after use
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements

	2.2 Carry out work in a manner which minimises environmental damage 2.3 Dispose of waste safely and correctly
3. Know how to use and maintain ride-on powered equipment	3.1 Describe methods of checking and maintaining the equipment ready for use covering • correct pre-use checks • correct start-up procedure • use appropriate work method • correct stopping procedure • correct post-use maintenance • reporting problems to the appropriate person 3.2 List the main hazards and risks associated with using the ride-on powered equipment and state appropriate action 3.3 Explain the importance of operating equipment in line with manufacturers' instructions 3.4 Describe the types of problems that may occur with the equipment and how to deal with each of these appropriately
4. Knowing the operational principles of powered equipment	4.1 Describe the operating differences between two and four- stroke engines 4.2 Describe the principles of operating lines of drive – clutch, v-belts, chains 4.3 Describe the basic differences between a petrol and diesel engine
5. Know the current health and safety legislation and environmental good practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements 5.2 Describe how environmental damage can be minimised
Mapping to National Occupational Standards O29NL27.1, 2	

Supporting Unit Information

H/502/0440 Use and maintain ride-on powered equipment - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Learning Outcome number on the left e.g. LO1.3.

The example of ride-on powered equipment in this case will be a ride on mower. Activities for other tools or equipment need to follow this example.

LO1 and LO2 are the key areas of competence for this unit

Learning Outcome 1. Be able to set up, use and maintain ride-on powered equipment

1.1 Ensure that the ride-on powered equipment is safe and in good working order check that the ride-on powered equipment is safe and not damaged in any way such as brakes, lights, cutters etc. Undertake PUWER check. Undertake a Dynamic Risk Assessment (DRA).

1.2 Select and use the correct personal protective clothing and equipment correct PPE worn including e.g. Safety boots (free from mud or oil) ear defenders, eye protection, non-slip gloves, overalls, high visibility clothing etc. Report any faults identified on relevant documentation to the person in charge.

1.3 Set up and use ride-on powered equipment in accordance with the manufacturer's instructions and legal requirements undertake a Site Specific Risk Assessment. Use the ride-on powered equipment in a safe manner and following manufactures' Instructions. Consider weather conditions and ground conditions such as degree of slopes and ground conditions such as wet ground, on site hazards which need to be identified and if possible removed. Ensure signage is in place to prevent unauthorised access to site.

1.4 Maintain chippers and/or shredders in accordance with manufacturer's instructions Regular checks of ride-on powered equipment to ensure it is fully efficient. E.g. if ride-on powered equipment becomes unsafe to use take out of service and report to the appropriate person in charge.

1.5 Identify any problems with the ride-on powered equipment and take appropriate action refer to LO1.4 above and report any faults identified on relevant documentation.

1.6 Clean and store the equipment correctly after use ensure all ride-on equipment used on site are left in clean and serviceable conditions and are stored in correct place. E.g. has protective cover on (if applicable). Is wiped clean and wiped with oily rag or sprayed with WD40 or similar protective film to

prevent rusting, deterioration etc. Clean all excess grass cuttings off. Adopt Safe Stop principles, remove key and park safely and securely.

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable and additional requirements. Ensure correct PPE selected and used in safe manner) Safety boots, overalls, gloves, ear and eye protections, high visibility clothing. Ensure site is secure and free from any unauthorised access. Signage in place whilst work being undertaken. Communications systems in place. Ensure correct manual handling techniques adopted. Safe working distances adhered to. Cross reference to L.O.5.

2.2 Carry out work in a manner which minimises environmental damage Target species only to be removed. Consider any protected species and any SSSI or SAC requirements at the site. Be able to identify invasive species e.g. Japanese Knot weed, Giant Hogweed and Himalayan Balsam.

2.3 Dispose of waste safely and correctly i.e. Identify organic and inorganic waste and dispose of in correct manner in designated areas. Note the importance of L.O. 2.2 with reference to disposal of invasive species. E.g. Cut Hemlock left on site is poisonous to both humans and livestock as are many others of these invasive species. (Note also disposal of waste generated from ride-on powered equipment such as spill mats following refuelling or oily rags etc).

LO3, LO4 and LO5 are the key areas of knowledge for this unit

Learning Outcome 3. Know how to use and maintain ride-on powered equipment

3.1 Describe methods of checking and maintaining the equipment ready for use covering explain correct use of ride-on powered equipment- refer to manufacturer's instructions. Explain the need for pre-use checks. Refer to LO1 PUWER checks. Correct start up procedures (on flat surface, neutral gear, handbrake on etc). Describe appropriate work method (grass cutting and removal and disposal of waste). Describe Safe Stop method. Describe changing the spark plug. Describe who to report any problems to (Supervisor, person in charge).

3.2 List the main hazards and risks associated with using the ride-on powered equipment and state appropriate action be able to identify and list hazards associated with using equipment. E.g. Undertake Dynamic Risk Assessment take into account ground conditions, weather conditions, unauthorised access to site, livestock present, slips, trips, falls. Poisonous

vegetation. Cuts, sprains etc. Hand Arm Vibration Syndrome- HAVS will need to be considered along with whole body vibration syndrome on a ride-on powered mower). Manual handling techniques will also need to be considered and safe methods explained.

3.3 Explain the importance of operating equipment in line with manufacturers' instructions describe the importance of operating ride-on equipment in line with manufactures' instructions (e.g. the importance of understanding operating on slopes, speed, no unauthorised passengers.

3.4 Describe the types of problems that may occur with the equipment and how to deal with each of these appropriately e.g. runs out of fuel, electrical failure, blocked cutters, brake failure. If becomes unsafe to use take out of service and report to appropriate person .If using ride-on powered equipment refer to manufactures recommended time usage.

Learning Outcome 4. Know the operating principals of powered equipment

4.1 Describe the operating differences between two and four-stroke engines e.g. fuel mixes as per manufactures' instruction. Note: Fuel mixing –failure to mix correctly will result in oiling up of the spark plug, loss of power, excessive fumes, overheating or possible engine seizure.

4.2 Describe the principles of operating lines drive-clutch, (refer to operators manual) and belts, chains (refer to operators manuals and consider guarding of moving parts.

4.3 Describe basic differences between petrol and diesel engine (refer to cold/warm starts, performance levels etc).

Learning Outcome 5. Know the current health and safety legislation and good environmental practise Cross reference to L.O. 2.

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements Health and Safety e.g. Management of Health & Safety at Work Regulations. Environmental Protection e.g. Environmental Protection Acts Waste e.g. Hazardous Waste Regulations. Codes of Practice e.g. protecting our Water, Soil and Air. Additional requirements including Local Authority permissions e.g. planning permission and Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers. PUWER, Correct signage, Directional signs in place, Work area isolated and no unauthorised access. Identify hazards and take appropriate actions.

5.2 Describe how environmental damage can be minimised e.g. only remove identified vegetation; consider status of Site SSSI, SAC or similar, safe removal of any waste etc. Don't operate if damage to ground is occurring and evident.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1, 2
Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in using and maintaining non-powered and hand held powered tools and equipment and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 3 ,4 and 5
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, and 2 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 3, 4 and 5 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9.
- The leaflet from HSE Books Tractor Action ISBN 0 7176 2711X. Gives advice on ride-on powered equipment such as mowers and grass cutting machinery.
- **SAFE STOP**
  - Make sure the handbrake is fully applied
  - Make sure all controls and equipment are left safe
  - Stop the Engine
  - Remove the key
- The Provision and Use of Work Equipment Regulations PUWER. All plant or equipment used at work, either in the office or in the field, comes under PUWER.

Clearing Horticultural and Landscaping Sites

Unit Reference	**H/502/0468**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to clear sites of unwanted materials and debris prior to landscaping and/or planting crops
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to clear sites effectively	1.1 Locate the correct site for clearing and confirm what is to be cleared 1.2 Ensure the site is safe and secure for the work to be conducted
2. Be able to select, use and maintain equipment for clearing horticultural and landscaping sites	2.1 Select appropriate equipment for this area of work 2.2 Use equipment according to instructions 2.3 Prepare, maintain and store equipment in a safe and effective working condition throughout
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly

4. Know the appropriate methods for site clearance.	4.1 Describe the main differences in working on the types of sites listed, green-field, reclaimed, urban derelict and existing sites 4.2 State why it is important to confirm what should be cleared 4.3 Describe the different clearing methods that can be used
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for clearing horticultural and landscaping sites 5.2 Describe methods of maintaining the equipment ready for use
6. Know the current health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work. 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029NL1.1 and PH 1.1	

Supporting Unit Information

H/502/0468 Clearing horticultural and landscaping sites - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to clear sites effectively

1.1 Locate the correct site for clearing and confirm what is to be cleared Site of clearance correctly located materials to be cleared identified and confirmed.

1.2 Ensure the site is safe and secure for the work to be conducted Site safe e.g. site risk assessment studied and implemented Site secured e.g. fencing, CAT scan for underground services, hazard warning signs.

Learning Outcome 2. Be able to select, use and maintain equipment for clearing horticultural and landscaping sites

2.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. hard hats, steel toe-capped boots, high visibility gear, gloves. CE marked. Tools and **equipment selected e.g. mattock, 180 degree excavator, and wheelbarrow.**

2.2&3 Use equipment according to instructions equipment used only for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe preparation e.g. mattock brought to site disassembled, head threaded down haft, seated tightly by dropping haft onto hard surface. Use e.g. do not lift too high. Maintenance e.g. clean and oil head. Storage e.g. do not store with head attached or able to fall, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO5.2.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO6.1.

3.2 Carry out work in a manner which minimises environmental damage e.g. by carefully planning site access, working in appropriate weather conditions, care not to discharge pollutants into controlled waters.

3.3 Dispose of waste safely and correctly Waste disposed of correctly and safely: Waste e.g. organic - green or inorganic - building, asbestos, metal, batteries, sharps, fly tipped waste, sub-soil, and top-soil. Correctly - refer to LO6.3. Safely e.g. PPE, hygiene, safe lifting.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know the appropriate methods for site clearance

4.1&3 Describe the main differences in working on the types of sites listed, green-field, reclaimed, urban derelict and existing sites / Describe the different clearing methods that can be used differences in working to clear sites stem from previous activities and impact they have had on land:

- Green-field sites - waste scrub land e.g. brush and small trees, abandoned cars, fly-tipped rubbish - use bow saws, brush cutters, tractors and trailers

Note: In each of the next 3 examples need to CAT scan for underground services

- Reclaimed land - quarries e.g. stored topsoil, stone embankments, roads compacted by heavy lorries - bulldozers, backhoes, excavators, lorries
- Urban derelict - redundant factory e.g. structure, underground services, asbestos risk, concrete / tarmac - use heavy machinery, excavators, dump trucks
- Existing sites - restructure of existing site e.g. flag stones, dry stone walling, plants and trees - use hand tools, tractor and fore-end loader, trailer

4.2 State why it is important to confirm what should be cleared e.g. affects methods used, possibilities for recycling / reuse, hazards, access requirements and any permissions needed.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for clearing horticultural and landscaping sites refer to LO's 2.1 & 4.3

5.2 Describe methods of maintaining the equipment ready for use Tractor e.g. check oil, water, air cleaner, tyre pressures, greasing according to manufacturer's instructions and schedules. Waste oil - refer to LO7.3.

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations,

Provision and Use of Work Equipment Regulations. Environmental Protection e.g. Environmental Protection Acts covering waste disposal and environmental permitting. Codes of Practice e.g. protecting our Water, Soil and Air. Additional requirements including Local Authority permissions e.g. planning permission and also check if site is designated or protected by being within a Conservation Area, curtilage of a listed building, Scheduled Ancient Monument, Site of Special Scientific Interest, Nature Reserve. Trees - check for tree preservation orders. Environment Agency - environmental permitting, hazardous waste and other notifications e.g. activities affecting watercourses, groundwater, aquifers.

6.2 Describe how environmental damage can be minimised - refer to examples in LO3.2

6.3 Describe the correct methods for disposing of organic and inorganic waste duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste such as oil / filters from maintenance Tractors. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. Check Environment Agency procedures regarding hazardous waste from clearing sites e.g. asbestos, batteries, waste oil - refer to LO3.3

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3

Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical clearance work giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of practical clearance work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5 and 6

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of clearance work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks
- Witness statements

- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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Additional Information

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Identify the Health and Maintain the Condition of General Amenity Turf

Unit Reference	**H/502/1216**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**38**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to maintain turf so it can be used for its intended purpose
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.3)** ***The learner can***
1. Be able to select, use and maintain equipment for identifying the health and maintaining the condition of general amenity turf	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Identify the health of general amenity turf	2.1 Inspect turf and relate condition to specification. 2.2 Identify poor health of turf 2.3 Use appropriate methods to deal with four of the following threats to turf health • pests • diseases • disorders • unfavourable conditions • competing growth

3. Maintain the condition of amenity turf	3.1 Check the turf is in an appropriate condition for maintenance 3.2 Maintain the turf so that it can be used for its intended purpose and looks attractive using all of the following methods • mowing • edging • feeding • watering • top dressing • repair 3.3 Leave the site clean and tidy 3.4 Identify and report hazards
4. Be able to work safely and minimise environmental damage	4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 4.2 Carry out work in a manner which minimises environmental damage 4.3 Dispose of organic and inorganic waste safely and correctly
5. Know how to maintain the health of turf	5.1 State the importance of checking turf regularly and what this means for a range of species 5.2 Describe how to identify a range of turf conditions and the threats to turf health covering • pests • diseases • disorders • unfavourable conditions • competing growth 5.3 Describe appropriate and effective methods of dealing with threats to turf health for a range of species covering • physical • chemical • cultural

	• irrigation 5.4 Describe the different watering regimes for different types of turf 5.5 Describe the types and explain the effects of different fertilisers and nutrients (top dressing and liquid) on turf
6 Know the impacts of mowing on sward condition	6.1 Describe how climate and soil conditions affect turf growth and its need for maintenance 6.2 Describe how to identify when the height of grass and finish of edges meets specification 6.3 Describe the effects of boxing off and leaving grass cuttings in situ 6.4 Describe the methods used to maintain turf so it can be used for its intended purpose covering • mowing • edging • feeding • watering • top dressing • repair 6.5 List methods for disposal of grass cuttings to avoid environmental pollution 6.6 Describe importance of cleaning and securely storing tools and equipment
7. Know the types of equipment required and how to maintain them	7.1 Describe the equipment which will be necessary for identifying the health and maintaining the condition of general amenity turf 7.2 Describe methods of maintaining the equipment in a fit state for use
8. Know the current health and safety legislation and environmental good practice	8.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 8.2 Describe how environmental damage can be minimised

	8.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL3.1, 3.2	

Supporting Unit Information

H/502/1216. Identify the health and maintain the condition of general amenity turf - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then the assessment criteria number listed e.g. LO 1.3.

Note 2 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Where naming of weeds, pests and diseases is required, either the common or botanical name will be acceptable.

LO1, LO2, LO3 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1 Select appropriate equipment for this area of work e.g. mowers (cylinder, rotary, nylon cord), scarifier, aerator with a range of tines, top dresser, fertiliser applier, pesticide applier, irrigation equipment, roller, transport vehicle, hand tools (edging shears, fork, brush, switch). PPE selected and used e.g. steel toe-capped boots, ear defenders, gloves, protective clothing and any additional requirements. Selection to be according to current legislation and codes of practice e.g. CE quality standard.

1.2 Use equipment according to instructions use only for the operation and in situations as detailed by the manufacturer and in accordance with the manufacturer's / supplier's / supervisor's instructions, trained to competence level or closely supervised to current legislation and codes of practice.

1.3 Prepare, maintain and store equipment in a safe and effective working condition e.g. pre start safety checks, set cutters on cylinder mower/depth of scarification. Maintenance e.g. cleaning, routine (check oil level, grease), and periodic (change oil) as required by manufacturer. Range e.g. hand tools, mechanical equipment, power units. Store equipment e.g. safe and secure in accordance with the manufacturer's instructions, guidance and current legislation (pesticide applicators). Report faults e.g. to line manager**.** Maintain records e.g. maintenance and repair.

Learning Outcome 2. Identify the health of general amenity turf

2.1 Inspect turf and relate condition to specification e.g. visual, findings compared with client requirements.

2.2 Identify poor health of turf e.g. weak growth, presence of debilitating organisms (weeds, pests, and disease), unfavourable conditions, debris, and surface damage.

2.3 Use appropriate methods to deal with 4 of the following threats to turf health

- **Pests** – Trapping e.g. moles; Chemical e.g. leather jacket; Cultural e.g. worms.
- **Diseases** - Cultural e.g. pH; Mechanical e.g. remove dew; Chemical e.g. spray.
- **Disorders** – Thatch e.g. scarification...
- **Unfavourable conditions** - Compaction e.g. aeration.
- **Competing growth** – Weeds e.g. remove, treat chemically. Chemicals applied safely according to current legislation and code of practice, manufacturer's instructions and guidance. Applied only in appropriate weather and soil conditions to targeted species and area by hand or using appropriate powered or hydraulic equipment. Equipment refer to LO1.2. PPE used as required by current legislation and code of practice refer to LO1.1, manufacturer's instructions and guidance.

Learning outcome 3. Maintain the condition of amenity turf

3.1 Check turf is in appropriate condition for maintenance e.g. free from debris, not in use, surface free from water/frost/snow.

3.2 Maintain turf for use and appearance using all of the following methods

- Mowing e.g. maintain the length of growth as specified, visually pleasing.
- Edging e.g. provide clear sharp edges to perimeter of area.
- Feeding e.g. apply nutrients to maintain healthy growth.
- Watering e.g. apply water to maintain soil moisture levels and turgidity of grass.
- Top dressing e.g. apply appropriate material to maintain surface levels or provide soil exchange.
- Repair e.g. by re-seeding, plugging or turfing.

3.3 Leave site clean and tidy e.g. competence of staff, equipment and unused materials returned to store, disposal of waste safely and correctly according to current legislation and codes of practice refer to LO4.3.

3.4 Identify and report hazards to line manager e.g. surface debris, presence of users and animals, unsafe equipment, inappropriate conditions.

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. health and safety of self and others, wear/use PPE (refer to LO 1.1),

manufacturer's instructions and guidance followed, risk assessment followed and any additional requirements. Refer to LO1.2.

4.2 Carry out work in a manner which minimises environmental damage e.g. use of skilled staff, minimum use of powered equipment, soil conditions (not too wet/dry), weather conditions (not too wet/windy), care when working near underground services (CAT scan), minimize damage to tree roots, avoid pollution of water and drains, non-spillage of petroleum products, apply pesticides only to targeted species.

4.3 Dispose of organic and inorganic waste safely and correctly e.g. grass clippings twigs. Inorganic waste e.g. containers, packaging (fertiliser bags), mineral material (glass, metal). Refer to LO8.3.

LO5, LO6, LO7 and LO8 are the key areas of knowledge for this unit

Learning Outcome 5. Know how to maintain the health of turf

5.1 State the importance of checking turf regularly and what this means for a range of species e.g. maintain turf in good condition checking for pests, diseases, disorders, unfavourable conditions, competing growth, weak grass growth Effect on range of species e.g. grass health stimulated by irrigation/fertilising, competing growth (weeds, moss) removed, pests and diseases controlled.

5.2 Describe how to identify a range of turf conditions and the threats to turf health covering

- **Pest's** e.g. visual weak growth of grasses may relate to root damage, worm casts.
- **Diseases** e.g. visual appearance, technical manual, agronomy identification.
- **Disorders** e.g. irrigation penetration impaired.
- **Unfavourable conditions** e.g. poor drainage, slow growth.
- **Competing growth** e.g. visual presence of creeping species.

5.3 Describe appropriate and effective methods of dealing with threats to turf health for a range of species covering

- **Physical** e.g. Removal of weeds by hand/mechanical means (clover); Aeration with hand tools/powered equipment e.g. improve drainage, relieve compaction; Scarification e.g. reduce thatch.
- **Chemical** applied in powder or liquid form e.g. control of weeds, pests, diseases.

Cultural e.g. change to lower pH (reduce worm activity); Removal of clippings reduce thatch build up.

- **Irrigation** by hand held, portable or fixed equipment e.g. apply water to prevent loss of turgidity, effective rolling.

5.4 Describe the different watering regimes for different types of turf- hand held e.g. for small areas; Movable equipment e.g. for general use; Pop ups e.g. for larger areas.

5.5 Describe the types and explain the effects of different fertilisers and nutrients (top dressing and liquid) on turf e.g. granular, powder, liquid, quick release, slow release. Nutrient content e.g. summer/autumn/winter use, major and minor elements. Effect e.g. on growth, health of grass, hardiness, incidence of diseases.

Learning Outcome 6. Know the impacts of mowing on sward condition

6.1 Describe how climate and soil conditions affect turf growth and its need for maintenance e.g. weather conditions - drought (reduction on mowing frequency, raise cutting height, difficult to aerate, ineffective rolling); Cold conditions (growth slows and reduces cutting frequency), Warm conditions (growth and frequency increase); Precipitation - waterlogged soil (affects weight of equipment used, access for operations); Snow/ice (low growth, movement causes damage to grass blades and inaccessible for equipment, disease presence).

6.2 Describe how to identify when the height of grass and finish of edges meets specification e.g. compare results to client requirements

6.3 Describe the effects of boxing off and leaving grass cuttings in situ e.g. removal of nutrients, minimize thatch increase, reduce spread of moss/weeds/diseases, and maintains speed of surface. Leaving cuttings in situ e.g. increase in thatch, spread moss / weeds / diseases; return of nutrients, protect against drought.

6.4 Describe the methods used to maintain turf so it can be used for its intended purpose covering

- Mowing – Type of mower cutting action e.g. scissor, flail, rotary; Height of cut
- Removal/non-removal of clippings; Frequency of cut e.g. maintain quality as specified
- Edging e.g. hand shears, half-moon edger, mechanical
- Feeding e.g. application of fertiliser in solid or liquid form by hand/pedestrian/mounted equipment
- Watering e.g. apply water with hand/portable or fixed equipment
- Top dressing e.g. apply by hand/pedestrian/mounted equipment
- Repair e.g. cultivate soil prior to re-seeding/turfing, plugging

6.5 List methods for disposal of grass cuttings to avoid environmental pollution List methods for disposal of grass cuttings e.g. composting as described by current codes of practice, soil mulch, return to surface, specialist contractor, Local Authority arrangements.

6.6 Describe importance of cleaning and securely storing tools and equipment e.g. maintain effectiveness, prevent wear, availability, to protect from weather, prevent theft/damage/ danger to others. Refer to LO1.3.

Learning Outcome 7. Know the types of equipment required and how to maintain them

7.1 Describe the equipment which will be necessary for identifying the health and maintaining the condition of general amenity turf e.g. soil corer, pH test kit, nutrient test kit, reference books. Equipment refer to 1.1.
7.2 Describe methods of maintaining the equipment in a fit state for use maintaining equipment refer to LO1.3.

Learning Outcome 8. Know the current health and safety legislation and environmental good practice

8.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work Health and Safety at Work etc Act 1974 e.g. management of health and safety and safety at work.

- Risk assessments e.g. working practices.
- Codes of practice e.g. pesticide application and use of equipment.
- Exposure records e.g. noise, vibration, pesticides.
- COSHH Regulations e.g. risk assessment and use.
- Hazardous Waste Regulations e.g. disposal of waste.
- Storage e.g. pesticides, fuel, materials.
- PPE e.g. safety boots, ear defenders, protective clothing.
- Environmental Protection Act e.g. environmental protection.
- Water Pollution Act e.g. water pollution/protection.
- RIDDOR e.g. reporting requirements.
- PUWER e.g. use of plant and equipment.
- LOLER e.g. lifting operations and lifting equipment.

Any additional requirements.

8.2 Describe how environmental damage can be minimised refer to LO 4.2.
8.3 Describe the correct methods for disposing of organic and inorganic waste Disposal of waste to current waste storage and disposal legislation e.g. Pesticide Regulations, COSHH. Organic green waste – grass clippings, leaves e.g. composting. Inorganic waste - mineral waste/glass/metal e.g. recycle. Other methods e.g. specialist contractor (skip), Local Authority arrangements.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO) 1, 2, 3 and 4
Delivery of these learning outcomes is by supervised practical work activities giving learners the opportunity, first to practice the various tasks involved and then to be

observed correctly doing each task to demonstrate achievement of the assessment criteria.

Learners not holding statutory qualifications to use equipment and materials, to be supervised by person who is qualified to do so.

Prior to, during and after completion of activities, photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 5, 6, 7 and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
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This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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- Institute of Groundsmanship http://www.iog.org

- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Identify and Collect Plants for Dispatch

Unit Reference	**H/502/1510**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to identify and collect plants for dispatch by making sure the plants are of a suitable condition to meet customer requirements There is separate unit relating to plant identification
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.2)** ***The learner can***
1. Be able to identify and collect plants for dispatch	1.1 Identify the plants which are to be collected and check their condition against customer requirements 1.2 Correctly handle and transport plants in a manner which maintains quality and minimises damage 1.3 Identify any problems during the collection of plants and take the appropriate action as necessary 1.4 Make sure the collection of the plants takes place within the appropriate timescales and in accordance with customer requirements 1.5 Provide clear and accurate information for recording purpose
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements

	2.2 Carry out work in a manner which minimises environmental damage 2.3 Dispose of waste safely and correctly
3. Be able to select, use and maintain relevant equipment	3.1 Select appropriate equipment for this area of work 3.2 Use equipment according to relevant legislation and manufacturer's instructions 3.3 Prepare, maintain and store equipment in a safe and effective working condition
4. Know how to identify and collect plants for dispatch	4.1 Describe species or varieties of plants produced by enterprises and how to recognise them 4.2 State sources of information in relation to different species or varieties of plants 4.3 Describe how to check customer requirements 4.4 Describe conditions which indicate the plant(s) is not suitable for customer requirements and why it is important to recognise these conditions 4.5 Describe methods of maintaining the quality of the plant(s) during handling and transportation 4.6 Describe methods for transporting the plants on site 4.7 Suggest problems which may arise during the collection of plants and what actions to take 4.8 Identify the types of records required and explain the importance of accurate record keeping
5. Know relevant health and safety legislation and environmental good practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements 5.2 Describe how environmental damage can be minimised

	5.3 Describe the correct methods for disposing of waste.
6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be required for the activity 6.2 Describe the methods of maintaining the range of equipment
Mapping to National Occupational Standards O29NCU79.1	

Supporting Unit Information

Unit HC064-C2 Identify and collect plants for dispatch - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Note 2 - The example used in this indicative content is hardy outdoor nursery stock. The same approach should be used for other crops.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to identify and collect plants for dispatch

1.1 Identify the plants which are to be collected and check their condition against customer requirements plants which are to be collected are identified and their condition checked against customer requirements (refer to LO4.3).

1.2 Correctly handle and transport plants in a manner which maintains quality and minimises damage plants handled and transported in correct manner which maintains quality and minimises damage. (Refer to LO4.5 and LO4.6).

1.3 Identify any problems during the collection of plants and take the appropriate action as necessary (refer to LO4.4) during the collection of plants are identified and appropriate action taken as necessary (refer to LO4.7).

1.4 Make sure the collection of the plants takes place within the appropriate timescales and in accordance with customer requirements actions taken to make sure collection of the plants takes place within the appropriate timescales and in accordance with customer requirements (refer to LO4.3).

1.5 Provide clear and accurate information for recording purposes clear and accurate information provided for recording purposes (refer to LO4.8).

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO5.1.

2.2 Carry out work in a manner which minimises environmental damage (refer to LO5.2).

2.3 Dispose of waste safely and correctly see LO5.3.

Learning Outcome 3. Be able to select, use and maintain relevant equipment

3.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats. Tools and equipment selected and used Refer to LO6.1 for examples.

3.2 Use equipment according to relevant legislation and manufacturer's instructions Tools and equipment are only used for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe including the Code of Practice for Using Plant Protection Products (Refer to LO6.1 for range of equipment; LO6.2 for procedures).

3.3 Prepare, maintain and store equipment in a safe and effective working condition manufacturer's / supplier's / supervisor's instructions followed for preparation, maintenance and storage of tools / equipment (See LO4 for detail of activities, LO6.2 for procedures).

LO4, LO5 and LO6 are the key area of knowledge for this unit

Learning Outcome 4. Know how to identify and collect plants for dispatch

4.1 Describe species or varieties of plants produced by enterprises and how to recognise them. Species or varieties produced; identifying plants on nursery, propagation lists, growing programmes, stock lists, sales lists or catalogues. Recognised by; plant recognition and knowledge, plant labelling, batch or bed.

4.2 State sources of information in relation to different species or varieties of plants; plant label, bed label, barcode, databases, books, internet.

4.3 Describe how to check customer requirements; customer, order number, number and type of plants, type of containers or carry trays needed, time/day required. Information from; order or picking list, verbal instruction, electronic source. Checking by; marking off on list (written), hand-held keypad, barcode reader.

4.4 Describe conditions which indicate the plant(s) is not suitable for customer requirements and why it is important to recognise these conditions Conditions; indicated by label or monitoring report, colour of leaf, flower or fruit, shape or size of plant, too dry or too wet, presence of pest, disease or disorder, presence of unwanted growth (weeds, unwanted branches, buds, flowers or fruit). Recognition by; labelling, previous reports, observation of condition of plants.

4.5 Describe methods of maintaining the quality of the plant(s) during handling and transportation Methods of maintaining quality of plants; use of skilled staff, uniformity of crop, appropriate spacing and access routes, picking

from edges, use of carry-trays and crates, use of appropriate lifting and carrying equipment, care with use of lifting and carrying equipment, covering of plants in transit, protection from wind, sun and cold, securing with straps or wrapping, good maintenance of roads and access ways.

4.6 Describe methods for transporting the plants on site methods of transporting; hand trolleys and carts, lifting and carrying aids, tractors, road vehicles and ATVs with or without trailer/s, specialist nursery trailers (trains).

4.7 Suggest problems which may arise during the collection of plants and what actions to take problems; plants not meeting customer or other standards (type, colour, shape, size, and container), insufficient plants, problems with or failure of equipment, plants over or under watered, contamination by weeds, unwanted growth, and other materials. **Actions**; take correction action (e.g. watering, pruning), report to supervisor or sales person, discuss with customer, substitution, deferral, acquisition from another source.

4.8 Identify the types of records required and explain the importance of accurate record keeping records required; customer, order number, number and type of plants, containers or carry trays used, storage location, labelled, changes or substitutions, other notes. Recorded or reported to supervisor, sales person, and customer. Recorded or reported by handwritten list, checking off on order form or picking list, other format required by organisation. Recorded electronically; hand-held key pad, barcode scanner, PC or laptop. Importance; notify order ready to collect/deliver, get order collected/delivered, recording stock levels available for sale.

Learning Outcome 5. Know relevant health and safety legislation and environmental good practice

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements Health and Safety e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, assured produce schemes, certification, LOLER, PUWER, Manual Handling, StopSafe.

5.2 Describe how environmental damage can be minimised avoiding run-off from erosion and roads or tracks, recycling and reusing packing material and containers, control of unused packing material, disposal of unwanted plant material.

5.3 Describe the correct methods for disposing of waste Organic waste – reduce waste removed from plant area, unwanted plant material composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate

container; inorganic waste is carefully controlled until disposed of through licensed.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be required for the activity range of machinery for selecting and collecting hardy outdoor nursery stock. For transport; hand trolley or other transport aid, vehicles (tractor, ATV, road vehicle) trailers including nursery trains. Electronic recording equipment (key pads and barcode scanners).

6.2 Describe the methods of maintaining the range of equipment daily checking as required of all equipment to ensure efficiency of use, cleaning as required of all equipment to avoid contamination of the product, lubrications of machinery as directed by manufacturer, periodic servicing of power units. Cleaning, protection from weather and calibration of electronic equipment, charging of batteries, downloading of data.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by supervised practical work identifying and collecting plants for dispatch giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of work identifying and collecting plants for dispatch photographs or video could be taken to provide evidence of progress. Copies of harvest record can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work identifying and collecting plants for dispatch, copies of orders, picking lists or reporting forms and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Method of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects

- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.
All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996

- *Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals* by R. Wills, et al / Paperback / Published 1998
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *Nursery Stock Manual: Grower Manual 1* by Keith Lamb, et al / Paperback / Published 1995
- *A Handbook for Horticultural Students* by Peter Dawson
- *The Commercial Greenhouse* by James William Boodley
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood

Transport Harvested Crop

Unit Reference	**J/502/0253**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to transport at least one type of harvested crop e.g. combinable crops, root crops, grass, vegetables, fruit and plants
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.2)** ***The learner can***
1. Be able to transport at least one type of harvested crop	1.1 Load and transport at least one of the harvested crops below safely, securely and in a manner which protects them from damage and contamination • combinable crops • root crops • grass/forage • vegetables • fruit • plants 1.2 Monitor the harvested crops during transit
2. Be able to select, use and maintain equipment for transporting harvested crops	2.1 Select and use appropriate equipment for this area of work according to instructions 2.2 Prepare, maintain and store equipment in a safe and effective working condition
	3.1 Work in a way which maintains health and safety and is consistent with current

3. Be able to work safely and minimise environmental damage	legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage
4. Know the methods of operating equipment and transporting harvested crops	4.1 Describe the correct methods of operating transportation equipment to minimis e damage to harvested crop 4.2 Describe ways of securing products and equipment for transit in order to maintain safety and minimise damage 4.3 Explain the methods of protecting harvested crops and equipment from adverse weather conditions
5. Know how to maintain the equipment	5.1 Describe methods of maintaining the equipment in a fit state for use
6. Know the current health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 6.2 Describe how environmental damage can be minimised
Mapping to National Occupational Standards 029N Agc14.1	

Supporting Unit Information

J/502/0253 Transport harvested crop - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is field scale cauliflowers. The same approach should be used for other crops.

LO1, LO2 and LO3 are the key areas of competence for this unit
LO4, LO5 and LO6 are the key area of knowledge for this unit

Learning Outcome 1. Be able to transport at least one type of harvested crop

1.1 Load and transport at least one of the harvested crops below safely, securely and in a manner which protects them from damage and contamination.

- Combinable crops
- Root crops
- Grass/forage
- Vegetables
- Fruit
- Plants

For example crop (cauliflowers) Use and select appropriate equipment (e.g. tractors, trailers – covered or open, ATVs, fork lifts, road vehicles, pallets and bulk boxes) Equipment only used only in appropriate conditions (e.g. avoiding frost, snow, heavy rain or muddy conditions especially on sloping sites) and for approved purpose, use of skilled and appropriately trained operatives, monitoring, securing loads during transportation, protection from adverse conditions (e.g. wet, cold, wind, heat) and contamination (e.g. mud, rain, other materials), timely transport to avoid extending time before storage, delivery or sale.

Harvested crops and equipment loaded to transport by; hand lifting of individual crates (to include avoiding lifting excessive weights or heights), use of elevators/conveyors, use of all-terrain loaders for pallets or crates, by use of harvesting rigs, equipment loaded by hand or attached to tractor or other vehicle

Harvested crops and equipment secured for transit in order to maintain safety

and minimise damage; use of crates with solid sides, wrapping of pallet loads with film or netting, use of rigid sided vehicles, use of curtain sided vehicles, use of sheets, ropes and straps or nets to secure load, equipment secured to tractor or other vehicle.

Harvested crops and equipment protected from adverse weather conditions; by wrapping of pallet loads with film, use of enclosed rigid sided vehicles, use of enclosed curtain sided vehicles, avoidance of adverse conditions (e.g. frost, extreme heat), frequent and rapid transport to protected area (e.g. packhouse, covered storage area, enclosed road vehicle), equipment protected by covering or sheeting if required.

1.2 Monitor the harvested crops during transit (refer to LO1.1).

Learning Outcome 2. Be able to select, use and maintain equipment for transporting harvested crops

2.1 Appropriate equipment for this area of work is selected and used according to instructions PPE e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, hats, eye and ear protection; Refer to LO1.1 for range of equipment.

Equipment only used only in appropriate conditions and for approved purpose

2.2 Equipment is prepared, maintained and stored in a safe and effective working condition. Refer to LO2.1 for range of equipment. Methods of maintaining the equipment including; daily checking and cleaning as required of all equipment to avoid contamination of the harvested product; lubrication of machinery as directed by manufacturer; periodic servicing of power units; checking and cleaning all equipment after use to ensure readiness for next operation. All equipment and machinery returned to safe and secure storage (e.g. secure yard, building or covered area).

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements risk assessment carried out or studied and implemented. Work activities carried out consistently with current legislation, codes of practice and any additional requirements, which apply to this area of work; Health and Safety e.g. Management of Health & Safety at Work Regulations; Environmental Protection Acts; Waste Regulations. Additional requirements including customer regulations, environmental health requirements and certification and assured produce schemes, LOLER, PUWER, Manual Handling, Stop Safe.

3.2 Carry out work in a manner which minimises environmental damage methods including; preventing soil damage, erosion and run-off from access

routes and crop areas by use of appropriate equipment (e.g. track-laying vehicles, transfer to road only vehicles) and avoiding adverse conditions (e.g. heavy rain, mud, frost or snow) avoiding leaving mud on highway (e.g. by use of farm roads, transfer of load to road-only vehicles, wheel washing or removal by scraping or brushing of mud on highway), minimising waste material removed from cropping area (waste returned to field), washing and cleaning equipment to avoid pollution of controlled waters, collecting of washing water in lagoons (re-use or returning to waterway after cleaning), control of unused packaging and wrapping, disposal of unwanted packaging and plant material, compliance with Environment Agency requirements and advice, staff training.

Learning Outcome 4. Know the methods of operating equipment and transporting harvested crops

4.1 Describe the correct methods of operating transportation equipment to minimise damage to harvested crop (refer to LO1.1 for range of methods).

4.2 Describe ways of securing products and equipment for transit in order to maintain safety and minimise damage (refer to LO1.1 for range of methods).

4.3 Explain the methods of protecting harvested crops and equipment from adverse weather conditions (refer to LO1.1 for range of methods).

Learning Outcome 5. Know how to maintain then equipment

5.1 Describe methods of maintaining the equipment in a fit state for use (refer to LO2.2 for methods of maintenance).

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work (refer to LO3.1for range of legislation and regulations).

6.2 Describe how environmental damage can be minimised (refer to LO3.2 for methods of minimising damage.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3,
Delivery of these learning outcomes is by supervised practical work transporting harvested crops giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of preparation work photographs or video could be taken to provide evidence of progress. Copies of packhouse or field records can be used to provide evidence of quantity of work and of sufficiency of evidence.

Learning Outcomes 4, 5, and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of transporting of harvested crops, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

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Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Maintain the Appearance of Decorative Amenity Areas

Unit Reference	**J/502/0396**
Level	**2**
Credit Value	**7**
Guided Learning Hours	**53**
Unit Summary	The aim of this unit is to provide the learner with the ability to demonstrate the knowledge and skills required to maintain the appearance of decorative amenity areas and identify pests, weeds and diseases
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Be able to select, use and maintain relevant equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to maintain the appearance of three different types of decorative area	2.1 Water and feed the plants in a way that is appropriate to them and their environment 2.2 Replace missing, damaged or displaced plants to maintain the visual impact of the area 2.3 Remove unwanted plant material to maintain the visual impact 2.4 Train and support plants where required to maintain the overall effect and the health and vigour of plants

	2.5 Leave the area clean and tidy
3. Be able to identify and control weeds, pests and diseases	3.1 Identify weeds, pests and diseases and use one of the following control methods • physical • chemical • cultural
4. Be able to work safely and minimise environmental damage	4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 4.2 Carry out work in a manner which minimises environmental damage 4.3 Dispose of waste safely and correctly
5. Know why it's important to maintain decorative areas	5.1 Describe how to maintain the appearance of decorative horticultural areas covering all of the following • formal bedding • hanging baskets • other containers • mixed borders • wall shrubs • climbers 5.2 Explain the reasons for feeding and providing moisture for plants in decorative amenity areas 5.3 Identify and describe five pests, five diseases, two disorders and their symptoms 5.4 Identify and name 15 weeds common to decorative amenity areas 5.5 Describe how to select and use control methods for weeds, pests and diseases appropriate to the area being maintained 5.6 Explain why unwanted plant material is removed
6. Know the types of equipment required	

and how to maintain them	6.1 Describe the equipment which will be necessary for maintaining the appearance of decorative amenity areas 6.2 Describe methods of maintaining the equipment ready for use
7. Know the current health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 7.2 Describe how environmental damage can be minimised 7.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL4.2	

Supporting Unit Information

J/502/0396 Maintain the appearance of decorative amenity areas - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2, LO3 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain relevant equipment

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, gloves. CE marked. Tools and equipment selected e.g. fork, hoe, secateurs, shears, brush, sprayer, watering equipment, leaf blower, ATV and trailer.

1.2&3 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. secateurs blades sharpened. Use e.g. do not cut above recommended thickness or twist secateurs when cutting. Maintenance e.g. clean blades after use to remove sap, oil blades and mechanism. Storage e.g. hanging up in dry area, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO6.2.

Learning Outcome 2. Be able to maintain the appearance of three different types of decorative area

2.1 Water and feed the plants in a way that is appropriate to them and their environment e.g. timing, frequency, amount and methods of application related to stage of growth, plant's needs and tolerances, environmental effects such as soil type, weather conditions, type of bed or container.

2.2 Replace missing, damaged or displaced plants to maintain the visual impact of the area method e.g. removal of shrub or climber, planting, staking / support and aftercare. Replacement decisions e.g. like for like replacement or alternatives, matching /contrasting foliage and / or flower colours.

2.3 Remove unwanted plant material to maintain the visual impact Unwanted plant material removed e.g. pinching, trimming, cutting of excess growth, diseased or broken leaves / stems, dead-heading e.g. fuchsias pinch off behind flower.

2.4 Train and support plants where required to maintain the overall effect and the health and vigour of plants support e.g. stakes for heavy flowered plants. Training e.g. trellis or wall training to support sideward or fan growth. Aesthetic affects e.g. framing, presentation of flowers against surface / foliage or maintaining stems / flowers in the desired position to achieve overall effect. Fixing of training and support and securing plants without causing harm or restriction of growth.

2.5 Leave the area clean and tidy e.g. all tools, empty bags, dead plant material cleared, stakes and watering systems unobtrusive, walking surfaces swept.

Learning Outcome 3. Be able to identify and control weeds, pests and diseases

3.1 Identify weeds, pests and diseases and use one of the following control methods Refer to LO5.3 and 5.4. Control methods used safely and effectively.

- **Physical** - hoeing and digging e.g. dig out stinging nettles.
- **Chemical** e.g. aphids - systemic insecticide.
- **Cultural** e.g. fungal diseases - good hygiene such as pruning infected parts and disposing of waste materials by burning (not on compost heap)

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO7.1.

4.2 Carry out work in a manner which minimises environmental damage Work in appropriate weather conditions, recycling/reuse, good practices for managing water e.g. watering systems - long stemmed rotating sprinklers for beds and borders with timers to help conserve water.

4.3 Dispose of waste safely and correctly Waste disposed of correctly and safely: Waste e.g. organic - green or inorganic stones, twine, plastic bags. Correctly - refer to LO7.3. Safely e.g. PPE, safe lifting.

LO5, LO6 and LO7 are the key areas of knowledge for this unit

Learning Outcome 5. Know why it is important to maintain decorative areas

5.1 Describe how to maintain the appearance of decorative horticultural areas covering all of the following

- formal bedding

- hanging baskets
- other containers
- mixed borders
- wall shrubs
- climbers

and including for each e.g. watering, nutrient requirements, pruning, trimming, deadheading, removal of dead / diseased materials or unwanted growth, weeding, replacement, staking / support, dealing with pests, diseases, disorders.

5.2 Explain the reasons for feeding and providing moisture for plants in decorative amenity areas function in plant of N P K and trace elements / water, how plant obtains these, how supplies are depleted and consequences e.g. water is essential for transport of substances (nutrients and gases), lack will lead to wilting and set-backs, flowers not presented to best advantage.

5.3 Identify and describe five pests, five diseases, two disorders and their symptoms Pests e.g. earwigs - eaten and ragged young leaves or petals of flowers. Diseases e.g. grey mould - fluffy grey fungal growth on flowers / leaves leading to death of part. Disorders e.g. water logging - yellow leaves and plants wilt.

5.4 Identify and name 15 weeds common to decorative amenity areas Common weeds. Annual weeds e.g. groundsel, ivy-leaved speedwell, chickweed. Perennial weeds e.g. perennial stinging nettle, broadleaved dock, creeping thistle.

5.5 Describe how to select and use control methods for weeds, pests and diseases appropriate to the area being maintained e.g. from non-chemical / biological / chemical controls. Factors to consider e.g. environmental friendliness - effects on natural predators, ground water etc, application methods, specific / blanket control, least powerful and costly option that is effective. Usage. Read and follow instructions, protective clothing and safe handling /storage, application rates, timing e.g. do not apply weed killers before rain, target plants / area treated to minimum necessary for effective control. Keep accurate records.

5.6 Explain why unwanted plant material is removed. Practical e.g. prevent shading / smothering, competition for water / nutrients, weakened plants more susceptible to disease. Aesthetic reasons e.g. enhance display. Prevention of disease spread e.g. grey mould.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be necessary for maintaining the appearance of decorative amenity areas - refer to LO1.1

6.2 Describe methods of maintaining the equipment ready for use maintenance: ATV e.g. check oil, oil filter and screen, air filter, tyre pressures /

wheel condition - follow manufacturer's instructions and schedules. Waste oil - refer to LO7.3.

Learning Outcome 7. Know the current health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Environmental Protection e.g. Environmental Protection Acts covering waste disposal Codes of Practice e.g. Protecting our Water, Soil and Air, Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species. Additional requirements e.g. ATV's - Safe Stop, do not use hose or sprinklers during prolonged drought, ensure tetanus vaccination up to date.

7.2 Describe how environmental damage can be minimised - refer to examples in LO4.2.

7.3 Describe the correct methods for disposing of organic and inorganic waste waste disposal: Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste such as oil / filters from maintenance ATV's. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. If quantities justify check. Environment Agency procedures regarding hazardous waste e.g. oil**.** Refer to LO4.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4

Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised maintenance of decorative amenity areas giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of maintenance work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 5, 6 and 7

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of maintenance activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.
The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers

- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.

- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Renovate and Repair Sports Turf Surfaces

Unit Reference	**J/502/0432**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	This unit will provide the learner with the knowledge and skills required to present sports turf surfaces so that they meet the requirements of a sport and a particular event. It also covers repairing and renovating the surface following play
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to select, use and maintain equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to renovate and repair sports turf surfaces	2.1 Inspect surfaces as requested to assess the need for renovation and repair 2.2 Select renovation and repair methods that are appropriate to the damage and the type of sports surface 2.3 Prepare the surface and use three of the selected renovation and repair methods safely and correctly: • over-seeding • patching or plugging • forking up

	• top dressing • divotting 2.4 Reinstate the surface so that it meets the requirements of the sport and the standard of the event
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to renovate and repair	4.1 Describe the importance of thorough and appropriate preparation prior to renovation and repair 4.2 Describe how to select the appropriate renovation and repair method according to degree of damage and the surface itself covering • over-seeding • patching or plugging • forking up • top dressing • divotting 4.3 Explain why it is important to renovate and repair surfaces promptly to the required standard and the consequences of not doing so 4.4 Describe how to inspect surfaces to assess the need for renovation and repair 4.5 Describe the standard of surface expected covering all the following • speed • surface response to a ball, animal or player • moisture content • grass cover • degree of consolidation • trueness

	4.6 Describe how to ensure that the surface meets the requirements of the sport and the standard for the event
5 Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for renovating and repairing sports surfaces 5.2 Describe methods of maintaining the equipment ready for use
6 Know the current health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL6.2	

Supporting Unit Information

J/502/0432 Renovate and repair sports turf surfaces - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the assessment criteria number listed e.g. LO 1.3.

Note 2 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

One surface has been selected as an example for this unit – football pitch, but there are many types of sports turf surface which require individual turf treatment.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1 Select appropriate equipment for this area of work e.g. cylinder mower, scarifyer, aerator (with assorted tines), pesticide applicator, fertiliser/top dressing applicator, roller, chain harrow, brush, fork, half-moon cutter. PPE selected e.g. steel toe-capped boots, ear defenders, gloves, protective clothing. Selection to be according to current legislation and codes of practice e.g. CE quality standard.

1.2 Use equipment according to manufacturer's instructions and legal requirements Use equipment and PPE only for the operation and in situations as detailed by the manufacturer and in accordance with the manufacturers/supplier's/supervisor's instructions, current legislation and codes of practice.

1.3 Prepare, maintain and store equipment in a safe and effective working condition e.g. pre start checks, set cutters on cylinder mower, fit correct aerating tines, as detailed by the manufacturer. Maintenance of tools and equipment e.g. cleaning, routine (check oil level, grease), and periodic (change oil) as recommended by the manufacturer. Range e.g. hand tools, mechanical equipment, power units. Store equipment e.g. safe and secure in accordance with the manufacturer's instructions, guidance and current legislation (pesticide applicator). Maintain records e.g. maintenance and repairs. Report faults e.g. to line manager.

Learning Outcome 2. Be able to renovate and repair sports turf surfaces

2.1 Inspect surfaces as requested to assess the need for renovation and repair e.g. visual inspection of pitch and compare to specified requirements - for pre/mid/end of season, evidence of bare areas, quality of grass growth,

presence - of (divots, wet areas, depressions), check soil structure/moisture/nutrient content.

2.2 Select renovation and repair method appropriate to size of damaged area and reinstate to standard required renovation e.g. mid-season by seeding or turfing, end of season renovation – cultivation, renewal of surface by seeding or turfing. Repair e.g. replace loose divots, top-dress damaged areas (re-seed if required), and aerate to relieve compaction.

2.3 Prepare the surface and use three of the methods below to renovate and repair

- **Over seeding** e.g. cultivate soil to prepare seed bed to worn area by hand or using mechanical equipment and apply appropriate grass seed mixture.
- **Patching or plugging** e.g. cut out damaged area and cultivate ready to receive new patch of turf or for very small areas plug and fit new growth.
- **Forking up** e.g. lifting depressed/damaged area to surrounding levels.
- **Top-dressing** e.g. apply material and work in to reinstate levels required.
- **Divotting** e.g. replace divots and firm in to damaged area to match surrounding levels.

Carry out selected three methods to the standard required with all work undertaken in a safe manner using tools/equipment and PPE according to current legislation and codes of practice. Waste and surplus materials to be disposed of according to current waste regulation requirements refer to LO 6.3.

2.4 Reinstate the surface so that it meets the requirements of the sport and the standard of the event e.g. work to be of the quality required for the level of play being undertaken and in order that the activity will not be impaired or user disadvantaged to the Sport's Governing Body requirements.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. health and safety of self and others, PPE used (refer to LO 1.1), manufacturer's instructions and guidance followed, risk assessment followed and any additional requirements refer to LO 1.2 and 1.3

3.2 Carry out work in a manner which minimises environmental damage e.g. use skilled staff, minimum use of powered equipment, soil conditions (not too wet/dry), weather conditions (not too wet/windy), care when working near underground services (CAT scan), avoid pollution of drains, apply pesticides only to targeted species, minimum waste, non-spillage of petroleum products and any additional requirements.

3.3 Dispose of waste safely and correctly refer to LO 6.3.

LO4, LO5 and LO6 are the key areas of knowledge for this unit.

Learning Outcome 4. Know how to maintain the health of sports turf

4.1 Describe the importance of thorough and appropriate preparation prior to renovation and repair e.g. correct tools and equipment selected (refer to LO 1.1), materials available (top-dressing, seed, turf), avoid disruption to user, carried out with optimum conditions and without delay, provide optimum conditions for growth.

4.2 Describe how to select appropriate methods refer to LO 2.1, 2.2 and 2.3

4.3 Describe how to select the appropriate renovation and repair method according to degree of damage and the surface itself covering e.g. minimise and prevent escalation of damage, visual acceptance, allow use to continue, meet required standard. Consequences of delay e.g. use may have to stop, quality of surface below specification, remedial action take longer to carry out, material costs may increase.

4.4 Describe how to inspect surfaces to assess the need for renovation and repair to LO 2.1

4.5 Describe the standard of surface expected covering all the following

- **Speed** e.g. consistency.
- **Surface response to a ball, animal or player** e.g. shear strength, bounce of ball, ball response.
- **Moisture content** e.g. appropriate for run of ball, maintains turgidity in grasses, allow effective rolling.
- **Grass cover** e.g. even length of growth, even cover with no bare patches, desired species, wear tolerant, visually acceptable.
- **Degree of consolidation** e.g. sufficient for run of ball, give required ball bounce, minimize depressions, water able to percolate, aeration of soil not impeded.
- **Trueness** e.g. determinable trajectory of ball, regular bounce of ball.

4.6 Describe how to ensure that the surface meets the requirements of the sport and the standard for the event e.g. competent staff, quality of materials used, maintained to sport governing body/client requirements, equipment maintained and prepared correctly, good quality materials used, apply pesticides/ fertilisers as recommended, work with optimum soil and weather conditions.

Learning Outcome 5. Know the types of equipment required and how to maintain them

Describe the equipment which will be necessary for renovating and repairing sports surfaces refer to LO 1.1

5.1 Describe methods of maintaining the equipment ready for use refer to LO 1.3.

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work

Health and Safety at Work etc Act 1974 e.g. management of health and safety and safety at work.

- Risk assessments e.g. working practices.
- Codes of practice e.g. pesticide application and use of equipment.
- Exposure records e.g. noise, vibration, pesticides.
- COSHH Regulations e.g. risk assessment and use.
- Hazardous Waste Regulations e.g. disposal of waste.
- Storage e.g. pesticides, fuel, materials.
- PPE e.g. safety boots, ear defenders, protective clothing.
- Environmental Protection Act e.g. environmental protection.
- Water Pollution Act e.g. water pollution/protection.
- RIDDOR e.g. reporting requirements.
- PUWER e.g. use of plant and equipment.
- LOLER e.g. lifting operations and lifting equipment.

Any additional requirements.

6.2 Describe how environmental damage can be minimised refer to LO 3.

6.3 Describe the correct methods for disposing of organic and inorganic waste e.g. Pesticide Regulations, COSHH. Organic green waste – grass clippings, leaves e.g. composting. Inorganic waste - e.g. mineral matter/glass/metal e.g. recycle. Other methods e.g. specialist contractor (skip), Local Authority arrangements.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1, 2, and 3

Delivery of these learning outcomes is by supervised practical work activities giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of activities, photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 4, 5 and 6

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work activities and

witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

NB The equipment that 16 year old learners are able to use is governed by the current regulations. Tutors will need to be aware of this, and adapt learning programmes accordingly. 16 year old learners may have to learn through observation rather than practical experience where they cannot use specific equipment.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements

- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Institute of Groundsmanship http://www.iog.org
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc

- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Merchandise Plants and Other Relevant Products

Unit Reference	**J/502/0771**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to merchandise plants and other relevant products in retail nurseries or garden centres
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.7)** ***The learner can***
1. Know how to merchandise plants and other products	1.1 Outline how to present plants and relevant products (e.g. growing media, containers, plant feed etc) for best effect 1.2 Explain the importance of location and hot and cold spots 1.3 Describe the different ways plants are sold e.g. root wrap and containers 1.4 Outline the merchandising systems of display 1.5 Describe how other sales can be linked to plant purchases 1.6 Outline the principles of stock rotation 1.7 Outline the value of point of sale material and the range available
	2.1 Display plants and relevant products (e.g. growing media, containers, plant feed etc) effectively to maximise sales

2. Be able to merchandise plants and other products	2.2 Use point of sale materials and labels effectively 2.3 Promote linked sales
3. Know how to maintain the condition of plants for sale	3.1 Explain how to check and maintain the condition of plants and products covering the following types of plants: • trees and shrubs • bedding plants • herbaceous perennials • bulbs 3.2 Describe the appropriate method of reporting signs of pests, diseases or other disorders and who to
4. Be able to maintain plants ready for sale	4.1 Maintain optimum conditions for the plants as far as possible within the available facilities 4.2 Provide any necessary supplies of food and water to maintain the condition of the plants and remove weeds and suckers 4.3 Check the condition of plants and relevant products to maintain their saleable value 4.4 Identify any plants or products that should be removed and take the appropriate action 4.5 Report signs of pests, disease or other disorders to the appropriate person 4.6 Care for incoming plants and implement an appropriate stock rotation plan 4.7 Monitor the development of new plants against the stock rotation plan and take the appropriate action if there are any problems
Mapping to National Occupational Standards O29NPH15.1	

Supporting Unit Information

J/502/0771 Merchandise plants and other relevant products - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Note 2 - LO's moved out of sequence to fit competence / knowledge.

LO1 and LO3 are the key areas of knowledge for this unit.

LO2 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Know how to merchandise plants and other products

1.1 Outline how to present plants and relevant products (e.g. growing media, containers, plant feed etc) for best effect Plants e.g. attractive and eye-catching presentation at all times managed to express quality and freshness with displays changing frequently to retain customer interest. Plants grouped e.g. by size / height, variety, colour matching or contrast, density. Product e.g. front facings filled with accessible products grouped by function / purpose, sizes / quantities, types / brands. Keep displays of plants or products looking full at all times, well organised and clean. Descriptions / instructions / prices / linked sales clearly displayed.

1.2 Explain the importance of location and hot and cold spots e.g. logical and easily remembered sequence / locations of products with accessible / prominent locations designated for most profitable items in each range. Importance of hot / cold spots e.g. volume of customers and sales. Types of plants / products to place in hot or cold spots.

1.3 Describe the different ways plants are sold e.g. root wrap and containers For each method of sale describe how the customer receives the plant e.g. plugs in modular trays, strips, paper or mock terracotta pots, bare root or root wrapped, containers.

1.4 Outline the merchandising systems of display: Types of merchandising display e.g. tiered stands, compact stands, outdoor racks and hanging basket stands. Advantages e.g. hanging basket stands can be placed to make best use of sales areas and present baskets attractively within easy reach of the customer. Placing e.g. indoors / outdoors, close to access routes into and out of store, orientation of facings.

1.5 Describe how other sales can be linked to plant purchases. Main and linked products e.g. bedding plant display linked with watering cans, compost and feeding products. Consider timing / seasonality and siting of linked displays, access and directions.

1.6 Outline the principles of stock rotation Principles of stock rotation. Type of recording system and its uses e.g. to check movement rate of plants and products, security, provision of plant / product knowledge and length of life information. Associated documentation. Rotation periods and storage methods / conditions for different plants and products. Segregation of unhealthy / damaged product and hygiene. Efficient movement of plants / products. Safe handling / lifting and use of machinery.

1.7 Outline the value of point of sale material and the range available Value of point of sale material and range available. Range e.g. materials for receipt of money / credit cards / customer loyalty cards, scanning of purchases with individual bar codes, packing and carrying purchases. Value e.g. real time monitoring of sales and stock (feeding back to stock rotation system). Application of customer loyalty schemes and monitoring and reporting on trends / buying patterns.

Learning Outcome 2. Be able to merchandise plants and other products

2.1 Display plants and relevant products (e.g. growing media, containers, plant feed etc) effectively to maximise sales Displays checked e.g. for fullness, tidiness, misplaced products, damage, correct and clear labelling. Plant displays checked e.g. plants groomed, fertilised and watered. Checking schedules e.g. daily / weekly to maintain high standard of presentation

2.2 Use point of sale materials and labels effectively e.g. to attract attention or to help customers to quickly identify plants or products that meet their needs and expectations.

2.3 Clear and attractive labelling / identification of customer needs e.g. purchase for self or gift, pricing and special offers, descriptions, reasons to buy, usage instructions and tips. Siting e.g. displayed where they can be quickly and easily accessed and read.

2.4 Promote linked sales Linked sales promotion correctly sited, set up and signposted with main product and compatible linked products attractively displayed and easily accessible.

Learning Outcome 3. Know how to maintain the condition of plants for sale

2.1 Explain how to check and maintain the condition of plants and products covering the following types of plants

- **trees and shrubs**
- **bedding plants**
- **herbaceous perennials**
- **bulbs**

E.g. bedding plants - check colour of leaves, freedom from pests, and absence of sun scorch or extended growth from too much shade. Maintain condition by following organisation procedures for type if available e.g. providing correct environment, watering, feeding etc. Active management e.g. of outdoor display

racks by rotating trays of plugs to allow access to sunshine or shade. Refer to LO's 4.1 to 4.5.

2.2 Describe the appropriate method of reporting signs of pests, diseases or other disorders and who to follow organisation procedures for method, urgency of reporting and who to report to. Reporting methods - types of verbal, paper based or electronic systems. Link to stock rotation system. Refer to LO4.5.

Learning Outcome 4. Be able to maintain plants ready for sale

4.1 Maintain optimum conditions for the plants as far as possible within the available facilities environmental e.g. light, temperature, air flow. Watering and feeding e.g. correct amounts and frequency of provision. Damage, disease, pests, weeds, moss, disorders e.g. acted upon or promptly reported. Hygiene e.g. dead plants, leaves, stems etc removed. Measures taken to reduce ethylene production and sensitivity of plants to ethylene e.g. cool temperatures maintained by shading over retail area and facilitating air movement.

4.2 Provide any necessary supplies of food and water to maintain the condition of the plants and remove weeds and suckers water e.g. need of plants tested. Sufficient water provided by correct method for plant types and care taken not to damage plants (allow enough time). Timing of provision e.g. plant needs satisfied in relation to environment, foliage allowed to dry before handling by customers and before nightfall to prevent diseases.

4.3 Fertiliser. Check with supplier if slow release fertiliser already included and if not e.g. top dress with slow release fertiliser or use tablets. Weeds and suckers removed e.g. to maintain appearance and prevent competition for water and nutrients. Methods e.g. pots or containers weeded and suckers removed by pinching or cutting.

4.4 Check the condition of plants and relevant products to maintain their saleable value e.g. to maintain fresh, attractive, accessible display and in plants avoid production of ethylene and build-up of disease. Plants checked with exacting attention to removal of broken stems, leaves and flowers and signs of pests, diseases or disorders. Products checked for disarrangement, breakages, damage to packaging.

4.5 Identify any plants or products that should be removed and take the appropriate action e.g. wilted, sun damaged or diseased plants or fertiliser / compost bags with holes. Method e.g. procedure followed to segregate / dispose of product and inform supervisor. Correct frequency of checking and cleaning up to minimise opportunities for pest or disease spread.

4.6 Report signs of pests, disease or other disorders to the appropriate person signs e.g. pests - sticky honey-dewed leaves aphids or scale insects, disease - fluffy grey fungal growth on flowers / leaves - grey mould, yellow leaves - waterlogged soil or deficiencies e.g. phosphate. Reported to appropriate person using correct procedure.

4.7 Care for incoming plants and implement an appropriate stock rotation plan Care on arrival e.g. boxes opened to let plants breathe / heat dissipate, condition of plants checked for damage or disease, removed from packing carefully without causing damage and provided with water , groomed to remove broken / dead material or compost adhering to leaves. Stock rotation plan implemented. Records made as required - manual or electronic control systems e.g. number, type and state of plants delivered.

4.8 Monitor the development of new plants against the stock rotation plan and take the appropriate action if there are any problems nominal dates of entry into display / storage / locations and specific requirements of batches recorded on control system. Development of batches recorded against nominal dates/ profiles / management information. Action taken to address problems e.g. batch development moderated by raising or lowering temperature or adjusting day length. Unsightly /old or dying plants removed from the display, disposed of with due regard for hygiene and possibility of contamination of incoming stock, recorded on stock rotation system.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcome 1

Delivery of this learning outcome is by assessment of competence for those who have experience in this area of work or by supervised merchandising activities giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of merchandise displays photographs or video could be taken to provide evidence of progress.

Learning Outcome 2

Delivery of this learning outcome is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of the preparation and checking of merchandise displays and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

NB The equipment that 16 year old learners are able to use is governed by the current regulations. Tutors will need to be aware of this, and adapt

learning programmes accordingly. 16 year old learners may have to learn through observation rather than practical experience where they cannot use specific equipment.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.
All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 2 and 4 can be assessed practically by observation or by generation of diverse evidence. This could also link to Learning Outcomes 1 and 3 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment

- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards website).

Store Harvested Crops

Unit Reference	**J/502/0947**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to store harvested crops ensuring that crop quality is maintained during storage
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.2)** ***The learner can***
1. Know how to store harvested crops	1.1 Describe the storage requirements of harvested crops 1.2 Describe the types of storage disorders and how to identify them 1.3 Explain how and why problems with crop storage should be reported 1.4 Describe the levels of hygiene which are required and suitable for the storage of the harvested crop 1.5 Identify the types of records required and the importance of accurate record keeping 1.6 Describe the possible effects of storage on crop quality
2. Know the types of equipment/facilities required and how to maintain them	2.1 Describe the equipment/facilities which will be necessary for storing harvested crops

	2.2 Describe methods of maintaining the equipment/facilities ready for use
3. Know the current health and safety legislation and environmental good practice	3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work
4. Be able to select, use and maintain equipment	4.1 Select appropriate equipment for this area of work 4.2 Use equipment according to manufacturer's instructions and legal requirements 4.3 Prepare, maintain and store equipment in a safe and effective working condition
5. Be able to store harvested crops	5.1 Maintain suitable levels of hygiene throughout the storage of the crop 5.2 Identify storage disorders through routine inspections 5.3 Ensure crop quality is maintained throughout storage 5.4 Store the crop in accordance with production requirements and/or customer requirements 5.5 Provide clear and accurate records for recording purposes
6. Be able to work safely and minimise environmental damage	6.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 6.2 Carry out work in a manner which minimises environmental damage
Mapping to National Occupational Standards O29NPH4.2	

Supporting Unit Information

J/502/0947 Store harvested crops - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is apples. The same approach should be used for other crops.

LO1, LO2 and LO3 are the key area of knowledge for this unit

LO4, LO5 and LO6 are the key areas of competence for this unit

Learning Outcome 1. Know how to store harvested crops

1.1 Describe the storage requirements of harvested crops Appropriate selection of crop for maturity/ripeness, quality, size/weight, freedom from damage (mechanical, pest, disease); Freedom from contamination; Storage facility to provide control of temperature, moisture content, gas levels; protection from contamination, pests, diseases and environmental variation.

1.2 Describe the types of storage disorders and how to identify them Loss of quality (flavour, colour, skin texture), loss of moisture, breakdown of crop tissue (internal or external), breakdown by pathogen, physical damage by pests (vertebrates, invertebrates)
Identification by routine inspection of crop and monitoring of storage environment.

1.3 Explain how and why problems with crop storage should be reported verbally (face to face, telephone), written or electronic report. Recording by written report or electronically.
Need for reporting; progressive nature of storage problems, need to manipulate storage environment, impact of shortened storage life on production and marketing process.

1.4 Describe the levels of hygiene which are required and suitable for the storage of the harvested crop Levels to minimise advent of problems during storage of crop; to meet legal requirements and health regulations, assured quality schemes and certification; reducing contamination by screening of crops to be stored; removal of soil, weeds and damaged plant material; checking stored crops for damaged or decaying crops material.

1.5 Identify the types of records required and the importance of accurate record keeping crops in, crops out, temperature, CO_2 and O_2 content, levels of other gases, moisture content, inspection dates, and outcome of inspection including changes within the stored crop. Recording by written report or electronically as required by the organisation.

1.6 Describe the possible effects of storage on crop quality Reduction of quality (flavour, colour, skin texture), reduction of yield by moisture loss, damage to crop by pest or pathogen, higher grade-out after storage; Total crop loss.

Learning Outcome 2. Know the types of equipment/facilities required and how to maintain them

2.1 Describe the equipment/facilities which will be necessary for storing harvested crops buildings or structures, insulation, ventilation (passive or forced), drainage, access (personnel, crop, handling equipment); equipment for monitoring and recording (manually or electronically), temperature, moisture level, gas content; Handling equipment, conveyors and elevators, fork lifts and hand trucks.

2.2 Describe methods of maintaining the equipment/facilities ready for use daily checking as required and lubrication of machinery as directed by manufacturer of handling equipment and plant; Periodic servicing of power units; Checking and cleaning facility and equipment after use to ensure readiness for next operation. Routine checking of buildings (damage to structure or insulation, build-up of dust/soil/ leaves in gutters and drains); Monitoring of operation of plant, checking and lubrication of doors, ventilators.

Learning Outcome 3. Know the current health and safety legislation and environmental good practice

3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification LOLER, PUWER, Manual Handling, Stop Safe.

Learning Outcome 4. Be able to select, use and maintain equipment

4.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof or chill proof clothing, steel toe-capped boots, gloves, hats. Tools and equipment selected and used Refer to LO2.1.

4.2 Use equipment according to manufacturer's instructions and legal requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO3.1.

4.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of equipment and facility; Refer to LO2.2.

Learning Outcome 5. Be able to store harvested crops

5.1 Maintain suitable levels of hygiene throughout the storage of the crop refer to LO1.4 for methods.

5.2 Identify storage disorders through routine inspections Carry out routine inspection and monitoring of stored crop and storage environment. Identity problems within the stored crop; storage disorders; loss of quality (flavour, colour, skin texture), loss of moisture, breakdown of crop tissue (internal or external), breakdown by pathogen, physical damage by pests (vertebrates, invertebrates).

5.3 Ensure crop quality is maintained throughout storage removal of soil, weeds and damaged plant material; checking stored crops for damaged or decaying crops material; monitoring and manipulating the crops in store (refer to LO1.1, LO1.4, and LO1.5).

5.4 Store the crop in accordance with production requirements and/or customer requirements appropriate storage conditions selected as set out in crop production requirements; Routine monitoring carried out; Crop storage environment manipulated; Refer to LO1.1.

5.5 Provide clear and accurate records for recording purposes Records for storage kept (Refer to LO1.5) or reported verbally (face to face, telephone) supported by written note, written or electronic report as required by organisation.

Learning Outcome 6. Be able to work safely and minimise environmental damage

6.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO3.1.

6.2 Carry out work in a manner which minimises environmental damage e.g. by carefully planning site access, working in appropriate weather conditions, care not to allow run-off into controlled waters, monitoring of use, reducing opening of doors, monitoring performance of plant and equipment,

protecting insulations and ventilation equipment, compliance with Environment Agency requirements and advice.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of storing crops, storage records and witness testimony, answering oral or written questions, or report referenced to the knowledge evidence.

Learning Outcomes 4, 5, and 6
Delivery of these learning outcomes is by supervised practical work storing crops, monitoring storage and keeping storage records giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of storage photographs or video could be taken to provide evidence of progress. Copies of storage records can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence.

These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

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Additional Information

Useful sources of reference

- The Health and Safety Executive website http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information website http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- The Complete Book of the Greenhouse by Ian G. Walls, et al / Paperback / Published 1996
- Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals by R. Wills, et al / Paperback / Published 1998
- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- Nursery Stock Manual: Grower Manual 1 by Keith Lamb, et al / Paperback / Published 1995
- A Handbook for Horticultural Students by Peter Dawson
- The Commercial Greenhouse by James William Boodley
- Practical Woody Plant Propagation for Nursery Growers by Bruce Macdonald
- Vegetable Brassicas and Related Crucifers by G.R. Dixon and M.H. Dickson
- Greenhouse Operation and Management by Paul Nelson
- Farm Horticulture by George W. Wood
- Farm Machinery (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684
- Profitable Farm Mechanization by Claude Culpin ISBN-13: 9780258969847

Prepare Harvested Crops

Unit Reference	**J/502/0950**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, and skills required to prepare harvested crops according to production and/or customer requirements
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Know how to prepare harvested crops	1.1 Describe all the preparation methods for the harvested crops • handling • grading • packing or labelling • cleaning • drying 1.2 List the reasons why harvested produce may not be of a suitable quality and how this is identified 1.3 Describe the levels of hygiene which are suitable to the type of crop and production requirements 1.4 State why customer specifications are important 1.5 Describe why it is important to maintain hygiene and how this is achieved 1.6 Describe the relevant methods for storing produce prior to dispatch

	1.7 State the types of records required and the importance of accurate record keeping
2. Know the types of equipment required and how to maintain them	2.1 Describe the equipment which will be necessary for preparing harvested crops 2.2 Describe methods of maintaining the equipment ready for use
3. Know the current health and safety legislation and environmental good practice	3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 3.2 Describe how environmental damage can be minimised 3.3 Describe the correct methods for disposing of organic and inorganic waste
4. Be able to select, use and maintain equipment	4.1 Select appropriate equipment for this area of work 4.2 Use equipment according to manufacturer's instructions and legal requirements 4.3 Prepare, maintain and store equipment in a safe and effective working condition
5. Be able to prepare harvested crops	5.1 Use at least two of the methods of preparing the harvested crop in accordance with production requirements • handling • grading • packing or labelling • cleaning • drying 5.2 Identify and remove harvested produce which does not meet production or customer requirements 5.3 Maintain suitable levels of hygiene throughout the preparation of the crop

	5.4 Prepare the harvested crop for transfer to the customer and storage 5.5 Store the crop in accordance with production and/or customer requirements 5.6 Provide clear and accurate information for recording purposes
6. Be able to work safely and minimise environmental damage	6.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 6.2 Carry out work in a manner which minimises environmental damage 6.3 Dispose of waste safely and correctly
Mapping to National Occupational Standards O29NPH 4.2	

Supporting Unit Information

J/502/0950 Prepare harvested crops - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is lettuce. The same approach should be used for other crops.

LO1, LO2, and LO3 are the key area of knowledge for this unit

Learning Outcome 1. Know how to prepare harvested crops

1.1 Describe all the preparation methods for the harvested crops handling of crop for storage, cooling or selling to include manual or mechanically aided lifting, carrying and moving of individual units or boxes; stacking, wrapping and moving of unit loads by machine or manually aided; Grading for size, weight and quality; Over wrapping; Packing in a range of containers for direct sales and transport to other outlet. Labelling to legal standards, for direct sales or to meet customer specification, manual labels and barcodes; washing by immersion; cooling by vacuum or ice bank; refrigerated transport. For other crops washing by water jets or brushing and drying by use of heat or ambient air would need to be included.

1.2 List the reasons why harvested produce may not be of a suitable quality and how this is identified Produce unsuitable as not meeting customer or storage requirements; being too small or too large, too light or too heavy, damaged or contaminated. Identification by weighing or sizing, by machine or manually, visual checking.

1.3 Describe the levels of hygiene which are suitable to the type of crop and production requirements hygiene levels determined by absence of contamination by foreign matter or residues; levels as required to meet legal standards including health and safety legislation, customer specifications, assured quality scheme or environmental health requirements for packhouse activities

1.4 State why customer specifications are important range of specifications to ensure quality, meeting legal requirements and customer satisfaction. Failure to comply with range of specification resulting in rejection of crops by purchaser or

reduced life in storage, loss of income and custom; prohibition, prosecution and penalty.

1.5 Describe why it is important to maintain hygiene and how this is achieved Hygiene levels to meet customer, health and safety, assured quality scheme and environmental health requirements. Hygiene activities and responsibilities include routine cleaning of facilities, equipment and protective clothing, training for all staff, care for stored materials; monitoring of procedures and maintaining records.

1.6 Describe the relevant methods for storing produce prior to dispatch short term storage; ambient or refrigerated, protection by covering or wrapping, palletising or other unit packs.
Medium term in refrigerated storage for crops awaiting collection or delivery in containers or unit loads.

1.7 State the types of records required and the importance of accurate record keeping Records kept of movement of produce from field to customer or storage, grade-out from quality management or sizing; quality control including timing, temperature, condition; hygiene procedures. Records required for legal requirements, quality assurance schemes and as required by organisation for recording, monitoring and planning purposes. Recording manually or electronically.

Learning Outcome 2. Know the types of equipment required and how to maintain them

2.1 Describe the equipment which will be necessary for preparing harvested crops Field based machinery for aiding harvest, transporting, sorting by size or weight, wrapping, packing, weighing, labelling. Packhouse based machinery for moving individual items, containers or unit loads, cleaning, sorting by size or weight, wrapping, packing, weighing, labelling. Cooling and storage equipment including ice bank and vacuum coolers, ambient and refrigerated stores and storage areas; refrigerated transport.

2.2 Describe methods of maintaining the equipment ready for use daily checking and cleaning as required of all equipment to avoid contamination of the harvested product; lubrication of machinery as directed by manufacturer; periodic servicing of power units; sharpening of cutting equipment; checking and cleaning all equipment after use to ensure readiness for next operation

Learning Outcome 3. Know the current health and safety legislation and environmental good practice

3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Management of Health & Safety at Work Regulations; Environmental Protection Acts; Waste Regulations. Additional requirements including customer

regulations, environmental health requirements and assured produce schemes, LOLER, PUWER, Manual Handling, and StopSafe.

3.2 Describe how environmental damage can be minimised preventing run-off from packing areas and washing and cleaning equipment to avoid pollution of controlled waters. Control of unused packaging, disposal of unwanted packaging and plant material, compliance with Environment Agency requirements and advice.

3.3 Describe the correct methods for disposing of organic and inorganic waste organic waste – reduce waste removed from harvest area, plant material returned to crop area (unless material jeopardised crop production e.g. diseased material or perennial weeds) or composted. Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor

LO4, LO5 and LO6 are the key areas of competence for this unit

Learning Outcome 4. Be able to select, use and maintain equipment

4.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats.
Tools and equipment selected and used Refer to LO2.1

4.2 Use equipment according to manufacturer's instructions and legal requirements Manufacturer's / supplier's / supervisor's instructions followed for use of tools / equipment

4.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment. Equipment and tools cleaned and checked after use and safely returned to appropriate storage area. Refer to LO2.1 and LO 2.2.

Learning Outcome 5. Be able to prepare harvested crops

5.1 Use at least two of the methods of preparing the harvested crop in accordance with production requirements crop handled for storage, cooling or selling as identified in LO1.1. Crops other than lettuce could include washing by water jets or brushing and drying by use of heat or ambient air.

5.2 Identify and remove harvested produce which does not meet production or customer requirements Refer to LO1.2

5.3 Maintain suitable levels of hygiene throughout the preparation of the crop hygiene levels in crop maintained by use of appropriate PPE or clothing, cleaning and maintenance of tools and equipment and avoiding contamination by soil, weeds and damaged plant material during operation. Refer to LO1.3.

5.4 Prepare the harvested crop for transfer to the customer and storage transportation by hand, hand trolley, off-road vehicle (with or without trailer); road vehicle. Refer to LO1.6.

5.5 Store the crop in accordance with production and/or customer requirements crop stored during transport, delays in the handling process, awaiting collection or delivery and prior to sale; Refer to LO1.6. For other crops long-term storage using refrigerated transport, cold stores and controlled atmosphere stores will need to be considered.

5.6 Provide clear and accurate information for recording purposes handling of harvested crop recorded or reported to supervisor or appropriate person; reported in person face to face or by telephone, or recorded by written notes or record sheet or electronically as required by the organisation; Refer to LO1.7.

Learning Outcome 6. Be able to work safely and minimise environmental damage

6.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation. See LO3.1.

6.2 Carry out work in a manner which minimises environmental damage environmental damage minimised; refer to LO3.2.

6.3 Dispose of waste safely and correctly Refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3,
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of preparing of harvested crops, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Learning Outcomes 4, 5, and 6
Delivery of these learning outcomes is by supervised practical work preparing harvested crops giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of preparation work photographs or video could be taken to provide evidence of progress. Copies of packhouse or field packing records can be used to provide evidence of quantity of work and of sufficiency of evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

It is important that practical assessment activities are supervised appropriately. This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised competently and appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers

- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
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This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

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Useful sources of reference

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*

- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites e.g.

- Horticulture Week (www.hortweek.com*)*
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- The Complete Book of the Greenhouse by Ian G. Walls, et al / Paperback / Published 1996
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- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- Nursery Stock Manual: Grower Manual *1* by Keith Lamb, et al / Paperback / Published 1995
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- Farm Horticulture by George W. Wood
- Farm Machinery (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684
- Profitable Farm Mechanisation by Claude Culpin ISBN-13: 9780258969847

Installing Flagstone Surfaces

Unit Reference	**J/502/1273**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit will provide the learner with the skills and knowledge required when installing flagstone surfaces. It is designed to give a basic understanding of the materials, tools and techniques used by operatives to install both temporary and permanent hard surfaces
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Be able to select, use and maintain equipment for installing flagstone surfaces	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to install flagstone surfaces	2.1 Set-out for line and level 2.2 Construct a suitable restraining edge 2.3 Lay flagstones by hand to a suitable pattern 2.4 Check laid flagstones for alignment 2.5 Cut-in flagstones to required standard and compact flagstones

	2.6 Check completed surface for compliance with specifications and standards and rectify any problems if necessary 2.7 Fill joints and re-compact 2.8 Protect working areas effectively against weather and use until they are in a suitable condition 2.9 Leave the site safe, tidy and suitable for intended use 2.10 Maintain effective working relations with relevant people throughout
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to prepare for installing flagstone surfaces	4.1 State the weather conditions that are appropriate for installation 4.2 Describe and identify the range of flagstones available, including permeable flagstone systems, and their suitable applications 4.3 Describe how to calculate the number of packs of flagstones required
5. Know how to install flagstone surfaces	5.1 Describe how to measure to ensure work is within tolerances 5.2 State how falls, lines and levels are determined and set out 5.3 Explain the importance of robust edge restraints 5.4 State how flagstones should be stored on site, how they are delivered to the laying face, and how they are positioned for the laying operative

	5.5 Describe the range of flagstone patterns commonly used on site, their relative strengths and weaknesses, and how they are established 5.6 State the importance of mixing and randomising flagstones from three or more packs prior to laying 5.7 Describe how areas are continuously checked for compliance to line, level, joint width and flagstone competence during the laying process 5.8 Show how cutting-in is achieved, following the principles of minimum flagstone size and inboard cutting techniques 5.9 State the importance of using the correct jointing material and its role in the performance of the completed surface 5.10 Describe techniques used for dry and wet grouting 5.11 Describe the importance of final compliance checks
6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be necessary for installing flagstone surfaces 6.2 Describe methods of maintaining the equipment ready for use 6.3 Explain the importance of dust-suppression and RPE when using a cut-off saw
7. Know the current health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 7.2 Describe how environmental damage can be minimised 7.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029NL30.3,4	

Supporting Unit Information

J/502/1273 Installing flagstone surfaces - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment for installing flagstone surfaces

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. gloves, overalls and steel toe-capped boots. Use of power saw e.g. protective goggles, RPE to required grade, ear defenders. CE marked. Tools / equipment selected e.g. pegs, spirit level, shovel, lump hammer**,** wheelbarrow block splitter, power saw, vibrating plate compactor, and trowel.

1.2&3 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition
Equipment used only for the operation and in situations as detailed by the manufacturers / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation, e.g. shovel blade cleaned. Use e.g. care to match load weight to personal capability when lifting. Maintenance e.g. clean / oil after use, wooden handle rub with linseed oil. Storage e.g. securely hanging from handle, blade down, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO6.2.

Learning Outcome 2. Be able to install flagstone surfaces

2.1 Set-out for line and level Line and level accurately set out: Line, e.g. shape, features, obstacles corners. Level, e.g. set out with marked pegs, straightedge and spirit level, excavation; hardcore and / or sharp sand laid and compacted to level and slope.

2.2 Construct a suitable restraining edge e.g. suitable for purpose, appropriately bedded in and jointed. To correct line and drainage fall.

2.3 Lay flagstones by hand to a suitable pattern Dry run e.g. to check fit, design, flags to be cut for edges and inboard cutting. Type of base e.g. sand, mortar - continuous or spot. Bedding flags e.g. handling and moving into place, tamping down, check and adjust level. Use of spacers.

2.4 Check laid flagstones for alignment e.g. of joints, level flags in one direction and slope towards drainage in other.

2.5 Cut-in flagstones to required standard and compact flagstones e.g. marking cut-outs, correct and safe use of cutting equipment. Compacted e.g. cut-outs appropriately bedded and tamped.

2.6 Check completed surface for compliance with specifications and standards and rectify any problems if necessary e.g. specifications - area, pattern, slope to drainage; standards - depth below damp-proof course. Problems rectified e.g. wobbly flags repacked to fill voids, low flags raised.

2.7 Fill joints and re-compact e.g. appropriate fill used, timing, and method of firming.

2.8 Protect working areas effectively against weather and use until they are in a suitable condition method and duration of protection e.g. cold weather cover with sacking, taped off to prevent access.

2.9 Leave the site safe, tidy and suitable for intended use Safe e.g. correction of unstable flags. Tidy e.g. mortar, grout or sand brushed off. Intended use e.g. meets specification.

2.10 Maintain effective working relations with relevant people throughout Communication e.g. polite and respectful and keeping people informed. Respect for e.g. staff, property and grounds. Attitude to work e.g. keep promises, turn up on time, work to agreed plans and to acceptable standard, tidy up afterwards.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO7.1.

3.2 Carry out work in a manner which minimises environmental damage e.g. leave space around trees, care not to damage roots or grassed areas, damp down cutting dust and use of back board, half depth cuts, use of existing bases

3.3 Dispose of waste safely and correctly Waste e.g. organic - green or inorganic - stones, broken slabs, excess mortar, and sub-soil. Correctly - refer to LO7.3. Safely e.g. PPE, safe lifting.

LO4, LO5, LO6 and LO7 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to prepare for installing flagstone surfaces

4.1 State the weather conditions that are appropriate for installation Weather conditions e.g. for working, working life and curing rate of mortar, jointing.

4.2 Describe and identify the range of flagstones available, including permeable flagstone systems, and their suitable applications Range e.g. shapes, textures, weathered. Materials e.g. natural or reconstituted stone. Applications e.g. patios, paths.

4.3 Describe how to calculate the number of packs of flagstones required Calculate number of flagstones required e.g. from number per row times number of rows or detailed too-scale plan if design complex or computer assisted design (CAD). Factor in wastage from cutting.

Learning Outcome 5. Know how to install flagstone surfaces

5.1 Describe how to measure to ensure work is within tolerances Measuring e.g. twice, carefully first time, confirm before cutting. Factor in joint width. Describe ways of marking. Also identify and measure against any tolerances in specification e.g. height of damp-proof course above flags, slope of patio.

5.2 State how falls, lines and levels are determined and set out how to use marked pegs, straightedge, and spirit level. Fall e.g. mark pegs at progressively greater distances from top. Level e.g. all pegs marked at same distance from top of pegs. Lines e.g. with pegs / string, dry sand.

5.3 Explain the importance of robust edge restraints Important to prevent movement of flagstones and to delineate the soil in a bed / grass of a lawn from the stone area.

5.4 State how flagstones should be stored on site, how they are delivered to the laying face, and how they are positioned for the laying operative Storage of flagstones: How stacked and safety. Moved to site e.g. individually and laid flat on top of previously laid stones. Laid e.g. flag edge walked to position and lowered from vertical so edge butts in closely to edge of previously laid flag. Lower across narrowest dimension if rectangular flags.

5.5 Describe the range of flagstone patterns commonly used on site, their relative strengths and weaknesses, and how they are established e.g. grid, spaced out grid, random. Strengths and weaknesses e.g. random - more interesting/natural looking but more difficult to plan and lay out. Establishing random layout e.g. ensure four corners do not meet.

5.6 State the importance of mixing and randomising flagstones from three or more packs prior to laying where same colour / texture chosen important to prevent patchy appearance if these differ between packs.

5.7 Describe how areas are continuously checked for compliance to line, level, joint width and flagstone competence during the laying process line, e.g. checked against adjacent stones. Level e.g. check level in one direction with slope in other checked using spirit level. Joint width e.g. using spacers, pegs. Flagstone competence checked e.g. unstable or if too low lift and add mortar or sand, re-tamp.

5.8 Show how cutting-in is achieved, following the principles of minimum flagstone size and inboard cutting techniques principles e.g. competence and strength versus laying pattern. Techniques to avoid using pieces less than one third flagstone size e.g. turn rectangular flags through 90 degrees.

5.9 State the importance of using the correct jointing material and its role in the performance of the completed surface correct jointing material: Maximising interlock e.g. importance of sand grain size and shape. Different materials for different width joints. Effect of unsuitable sand in weakening strength of paving.

5.10 Describe techniques used for dry and wet grouting Mix to use, method of application, cleaning the surface, appropriate weather conditions. E.g. dry mix 1:3 cement: sand, brush mix in dry, brush flags clean and spray with water, dry conditions.

5.11 Describe the importance of final compliance checks Importance e.g. health and safety aspects, specification met, designer and customer satisfied.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be necessary for installing flagstone surfaces types of equipment - refer to LO1.1 Maintenance - refer to LO 1.2.

6.2 Describe methods of maintaining the equipment ready for use importance of dust suppression and RPE when using a cut-off saw: Health and Safety.

6.3 Explain the importance of dust-suppression and RPE when using a cut-off saw Executive (HSE) guidance vacuum or water suppression systems. RPE essential - prevent breathing in respirable crystalline silica (RCS) and diseases e.g. silicosis.

Learning Outcome 7. Know the current health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations. Environmental Protection e.g. Environmental Protection Acts covering waste disposal. Codes of Practice e.g. protecting our Water, Soil and Air. Additional requirements e.g. check with Local Authority on requirements on paving over manhole covers / run-off to foul water drains, position of services / need for CAT scan if digging. HSE publication - Time to clear the air - protect your lungs when using cut off saws. Check grade of RPE e.g. FFP3 filtering face pieces.

7.2 Describe how environmental damage can be minimised Minimising environmental damage - refer to examples in LO3.2.

7.3 Describe the correct methods for disposing of organic and inorganic waste Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. Refer to LO4.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised installation of flagstone surfaces giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of flagstone installation photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5, 6 and 7
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of installation activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/paving plans
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority web sites for Building Control Department
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Transport Physical Resources within the Work Area

Unit Reference	**J/502/1404**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to transport physical resources within the work area. The type of physical resources and methods of transportation can be applied to a number of environments
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.1)** ***The learner can***
1. Be able to transport physical resources within the work area	1.1 Transport resources using powered or manual transportation equipment 1.2 Minimise damage to the resources and environment during manoeuvres and transit 1.3 Ensure that load is secure and protected from contamination and adverse weather conditions 1.4 Monitor load during transit and take action if required 1.5 Provide clear and accurate information for recording purposes
2. Be able to select, use and maintain relevant equipment	2.1 Select appropriate equipment for this area of work 2.2 Use equipment according to relevant legislation

	2.3 Prepare, maintain and store equipment in a safe and effective working condition
3. Be able to work safely and minimise environmental damage	3.1. Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements
4. Know how to transport physical resources within the work area	4.1 Describe the ways of handling transportation equipment to minimise damage to resources in transit 4.2 Describe the methods of protecting resources from contamination and adverse weather conditions during transit 4.3 State the reasons for monitoring loads during transit and the actions to take in case of problems with • imbalance • contamination • adverse weather
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be required for the activity and relevant legal restrictions on operation 5.2 Describe the methods of maintaining the equipment used
6. Know relevant health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements
Mapping to National Occupational Standards O29NCU8.2	

Supporting Unit Information

J/502/1404 Transport physical resources within the work area - Level 2

Indicative Content

Note: Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

The example of a physical resource in this case will be animal feed sacks. Activities for other physical resources need to follow this example.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to transport physical resources within the work area

1.1 Transport resources using powered or manual transportation equipment carry out pre transport checks. Consider Load, Individual capability, Task and Environment to determine the method of transportation by hand or with mechanical aids such as trolleys or sack trucks or powered such as forklifts. Consider duel – lifting if by hand.

1.2 Minimise damage to the resources and environment during manoeuvres and transit minimise damage to environment by ensuring e.g. no spillages, minimal damage to structures and surfaces by selection of correct transporters.

1.3 Ensure that load is secure and protected from contamination and adverse weather conditions demonstrate use of safe load secured and protection from elements such as rain or direct sunlight select correct method of securing load, e.g. ropes, nets, protective covers.

1.4 Monitor load during transit and take action if required demonstrate monitoring of load during transit by both visual and physical checks of load stability, weight and content of load, e.g. if load becomes unstable secure before continuing task.

1.5 Provide clear and accurate information for recording Purposes Complete relevant organisational documentation e.g. PUWER check list.

Learning Outcome 2. Be able to select, use and maintain relevant equipment

2.1 Select appropriate equipment for this area of work e.g. trolley, sack truck, lifting aids, forklift etc. Select correct PPE cross reference to L.O.3.

2.2 Use equipment according to relevant legislation Use relevant equipment according to Manufacturer's / supplier's / supervisor's instructions.

2.3 Prepare, maintain and store equipment in a safe and effective working condition Maintain and ensure correct storage of equipment follow guidance for

working on slopes etc including differing ground conditions and different types of terrain. Ensure equipment is safe to use, undertake PUWER check and if applicable LOLER checks.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable and additional requirements such as HSE recommended weights to lift. Ensure correct PPE selected and used in safe manner Safety boots, overalls, gloves, ear and eye protections and high visibility clothing. Environmental damage caused by activity to be minimised e.g. by carefully planning site access, working in appropriate weather conditions, care not to damage load or allow cross contamination. Clear immediately and spillages and keep work area clean and free from unauthorised access. Cross reference to L.O.6.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to transport physical resources within the work area

4.1 Describe the ways of handling transportation equipment to minimise damage to resources in transit e.g. correct stacking, sound packaging, secured safely with ropes, nets or sheeting.

4.2 Describe the methods of protecting resources from contamination and adverse weather conditions during transit e.g. –no cross contamination, secure packaging and protection from elements such as rain or direct sunlight e.g. sheeting ensure they are stable, cover sharp and abrasive edges.

4.3 State the reasons for monitoring loads during transit and the actions to take in case of problems with describe how high, wide stacks should be and how you would prevent any **imbalance** e.g. follow manufacturer's instructions for stacking, readjust the load. **Contamination** e.g. isolate the source, clean up the contamination, dispose of any waste material as per type (hazardous or organic) complete relevant documentation. **Adverse weather** e.g. rain- cover with waterproof sheeting.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be required for the activity and relevant legal restrictions on operation refer to LO 2. Correct pre-use checks undertaken to ensure the safety of operator and equipment. Describe

e.g. trolleys, sack trucks any mechanical aids for lifting. Forklifts etc Report any faults. Refer to HASAW act and Manual Handling Regulations.

5.2 Describe the methods of maintaining the equipment used Ensure PUWER and if applicable LOLER checks in place and recorded. Maintain equipment according to manufactures' instructions or guidelines.

Learning Outcome 6. Know the relevant health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements Health and Safety e.g. Management of Health & Safety at Work Regulations Environmental Protection e.g. Environmental Protection Acts Waste e.g. Hazardous Waste Regulations. PUWER, LOLER, Manual Handling Regulations. Describe how environmental damage can be minimised e.g. clear up any spillages, don't cross contaminate loads. Ensure any hazardous wastes is correctly secured and packaged and clearly labelled.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1, 2, 3,

Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in transporting physical resources within the work area and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 4, 5 and 6

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

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- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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Additional Information

Useful sources of reference

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Provision and Use of Work Equipment Regulations PUWER. All plant or equipment used at work, either in the office or in the field, comes under PUWER.
- The Lifting Operations and Lifting Equipment Operations LOLER. LOLER regulations apply in all premises and work situations. There are responsibilities for those in control of equipment, employers and employees.

Load and Unload Physical Resources within the Work Area

Unit Reference	**J/502/1421**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to load and unload physical resources within the work area. The type of physical resources and methods of loading and unloading can be applied to a number of environments
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.2)** ***The learner can***
1. Be able to load and unload physical resources	1.1 Assess the load to be moved to determine the method of lifting required 1.2 Carry out lifting operations safely, in accordance with instructions 1.3 Move heavy and bulky items correctly, in accordance with instructions 1.4 Position resources safely, securely and in a manner which protects them from damage and contamination including • products or materials • equipment
2. Be able to select, use and maintain relevant equipment	2.1 Select appropriate equipment for this area of work 2.2 Use equipment according to relevant legislation and manufacturer's instructions

	2.3 Prepare, maintain and store equipment in a safe and effective working condition
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage
4. Know how to load and unload physical resources	4.1 State the reasons for, and methods of, labelling resources for transportation 4.2 Describe how to assess the load to be moved to determine the safest the method of lifting 4.3 Describe the safe lifting and carrying techniques which should be used 4.4 Describe the loading and unloading requirements for transportation such as positioning, stacking and the weight of loads 4.5 Explain the ways of securing resources for transit in order to maintain safety and minimise damage 4.6 Describe appropriate methods of protecting resources from contamination and adverse weather conditions 4.7 Outline the methods for the safe stacking of products 4.8 Describe suitable methods of storing resources
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be required for the activity and relevant legal restrictions on operation 5.2 Describe the methods of maintaining the equipment used
6. Know relevant health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements 6.2 Describe how environmental damage can be minimised

Mapping to National Occupational Standards
O29NCU8.1

Supporting Unit Information

J/502/1421 Load and unload physical resources within the work area – Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

The example of a physical resource in this case will be animal feed sacks. Activities for other physical resources need to follow this example.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to load and unload physical resources

1.1 Assess the load to be moved to determine the method of lifting required Carry out pre-lift checks. Consider Load, Individual capability, Task and Environment to determine the method of lifting by hand or with mechanical aids such as trolleys or sack trucks. Consider duel –lifting if by hand.

1.2 Carry out lifting operations safely, in accordance with instructions Demonstrate safe lifting techniques e.g. assess, plan, prepare, perform

1.3 Move heavy and bulky items correctly, in accordance with instructions consider mechanical aids and bio-mechanical techniques. Cross reference to LO4.3

1.4 Position resources safely, securely and in a manner which protects them from damage and contamination position resources safely and securely e.g. – not damaged, no cross contamination, secured for both products or materials and any equipment. Refer to LO1.1. Demonstrate reducing load by splitting to more manageable load etc

Learning Outcome 2. Be able to select, use and maintain relevant equipment

2.1 Select appropriate equipment for this area of work e.g. trolley, sack truck, lifting aids. Select correct PPE cross reference to LO3.1.

2.2 Use equipment according to relevant legislation and manufacturer's instructions Use relevant equipment according to Manufacturer's / supplier's / supervisor's instructions Maintain and ensure correct storage of tools and equipment follow guidance for working on slopes etc including differing ground conditions and different types of terrain.

2.3 Prepare, maintain and store equipment in a safe and effective working condition Ensure equipment is safe to use ,undertake PUWER check and if applicable LOLER checks

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable and additional requirements such as HSE recommended weights to lift. Ensure correct PPE selected and used in safe and appropriate manner Safety boots, overalls, gloves, ear and eye protections and high visibility clothing.

3.2 Carry out work in a manner which minimises environmental damage e.g. by carefully planning site access, working in appropriate weather conditions, care not to damage load or allow cross contamination. Clear immediately and spillages and keep work area clean and free from unauthorised access.

LO4, LO5 and LO6 are the key areas of knowledge for this unit.

Learning Outcome 4. Know how to load and unload physical resources

4.1 State the reasons for, and methods of, labelling resources for transportation e.g. this way up and content of load, weight and type and state what to do if any hazards are foreseen.

4.2 Describe how to assess the load to be moved to determine the safest the method of lifting Refer to L.O. 1.1 (Load, Individual Capability, Task and Environment).

4.3 Describe the safe lifting and carrying techniques which should be used e.g. Travel route clear and well lit, Get close to load as possible - Slide - don't stretch, Correct foot position, Adopt good posture - Bend the knees, Get secure grip (gloves), Keep back straight - Maintain spine curve by lifting the head, Lift using thigh muscles - Avoid Jerking- Smooth lift, Keep load close to body - Heaviest side to trunk.

4.4 Describe the loading and unloading requirements for transportation such as positioning, stacking and the weight of loads describe how to split heavy loads, ensure they are stable, cover sharp and abrasive edges ensure even distribution when stacking, loading or unloading.

4.5 Explain the ways of securing resources for transit in order to maintain safety and minimise damage e.g. how to secure loads with ropes or netting.

4.6 Describe appropriate methods of protecting resources from contamination and adverse weather conditions e.g. no cross contamination, secure packaging and protection from elements such as rain or direct sunlight e.g. sheeting.

4.7 Outline the methods for the safe stacking of products describe how high, wide stacks should be and how you would prevent any toppling over e.g. follow manufacturer's instructions for stacking.

4.8 Describe suitable methods of storing resources follow manufactures' instructions for differing types of products e.g. how high to stack, correct way up and labels to front.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be required for the activity and relevant legal restrictions on operation refer to LO 2. Correct pre-use checks undertaken to ensure the safety of operator and equipment. Describe e.g. trolleys, sack trucks any mechanical aids for lifting. Report any faults. Refer to HASAW act and Manual Handling Regulations.

5.2 Describe the methods of maintaining the equipment used Ensure PUWER and if applicable LOLER checks in place and recorded. Maintain equipment according to manufactures' instructions or guidelines.

Learning Outcome 6. Know the relevant health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health & Safety at Work Regulations Environmental Protection e.g. Environmental Protection Acts Waste e.g. Hazardous Waste Regulations PUWER, LOLER, Manual Handling Regulations.

6.2 Describe how environmental damage can be minimised e.g. clear up any spillages, don't cross contaminate loads. Ensure any hazardous wastes is correctly secured and packaged and clearly labelled.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1, 2, 3,

Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in preparing to load and unload physical resources within the work area and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks

- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- HSE web site on recommended weights to lift and manual handling regulations etc
- The Provision and Use of Work Equipment Regulations PUWER
- All plant or equipment used at work, either in the office or in the field, comes under PUWER.
- The Lifting Operations and Lifting Equipment Operations LOLER. LOLER regulations apply in all premises and work situations. There are responsibilities for those in control of equipment, employers and employees.

Maintaining Plants Outdoors

Unit Reference	**J/502/1533**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to maintain the health of plants in an outdoor environment Where the learner is using chemicals they should have the relevant certificate of competence
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to select, use tools and maintain relevant equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to relevant legislation and manufacturer's instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to maintain the health of plants outdoors	2.1 Inspect plants as instructed 2.2 Identify all of the following threats to promote plant health: • pests • diseases • disorders • unfavourable conditions • competing growth 2.3 Use correct and effective methods of dealing with threats to plant health

	2.4 Promote and maintain healthy growth using all of the following methods • feeding • watering • surface cultivation • mulching
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety, is consistent with relevant legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to maintain the health of plants outdoors	4.1 Describe how to check and report signs of damage or threats to health to include • pests • diseases • disorders • unfavourable conditions • competing growth 4.2 State how seasonal weather conditions affect plant growth and health 4.3 Describe the different methods used to promote plant health including • feeding • watering • surface cultivation • mulching 4.4 Describe the effects of soil conditions on plant growth 4.5 State why watering regimes vary for different soils and plants 4.6 Describe how the correct use of agrochemicals/pesticides can improve plant health

	4.7 Describe how the incorrect use of agrochemicals/pesticides can harm plants 4.8 Describe the methods of dealing with threats to plant health covering; physical, cultural and irrigation
5. Know relevant health and safety and animal welfare legislation and environmental good practice	5.1 Outline the current health and safety and animal welfare legislation, codes of practice and any additional requirements 5.2 Describe how environmental damage can be minimised 5.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NCU76.1	

Supporting Unit Information

J/502/1533 Maintaining plants outdoors - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is **hardy nursery stock in containers**. The same approach should be used for other crops.

LO1, LO2, and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use tools and maintain relevant equipment

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats. Tools and equipment selected and used e.g. cutting equipment (knives, secateurs, shears); irrigation systems – automatic/manual, drip, overhead, capillary, hosepipes and watering cans; tying machines, equipment for applying nutrient (top dressing as granules, liquid through irrigation systems); windbreaks, shading, screening; lifting and carrying equipment.

1.2 Use equipment according to relevant legislation and manufacturer's instructions Manufacturer's / supplier's / supervisor's instructions followed for use of tools / equipment. Refer to LO1.1 for range.

1.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment; e.g. cleaning and checking prior to use, sharpening of cutting equipment, lubrication of shears and secateurs; cleaning, checking and calibration of irrigation and feeding equipment, lifting and carrying equipment. Equipment and tools cleaned and checked after use and safely returned to appropriate storage area.

Learning Outcome 2. Be able to maintain the health of plants outdoors

2.1 Inspect plants as instructed routine according to agreed pattern, monitoring specific problems, use appropriate reporting form or reporting procedures.

2.2 Identify all of the following threats to promote plant health: Refer to LO4.1.

2.3 Use correct and effective methods of dealing with threats to plant health (refer to LO4.1). Threat to plant identified; (refer to LO4.1). Action required and timescale agreed, Action completed within agreed timescale (Refer to LO4.6 & 4.8).

2.4 Promote and maintain healthy growth using all of the following methods feeding

- watering
- surface cultivation
- mulching

Refer to LO4.3 for details.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety, is consistent with relevant legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO5.1.

3.2 Carry out work in a manner which minimises environmental damage Refer to LO5.2

3.3 Dispose of waste safely and correctly Refer to LO5.3.

LO4 and LO5 are the key area of knowledge for this unit

Learning Outcome 4. Know how to maintain the health of plants outdoors

4.1 Describe how to check and report signs of damage or threats to health to include

- **Pests** examples – vine weevil, aphid, 2-spotted mite, slugs/snails, mice, rabbits
- **Diseases** examples – mildews rusts, coral spots,
- **Disorders** examples – reversion, nutrient deficiencies,
- **Unfavourable** conditions; examples – excessive wind, frost, high temperatures, shading
- **Competing** growth – weeds, mosses, flowers and fruits, excessive branches

Procedures for routine checking – responsibility for checking, timing, frequency, recording and reporting procedures, procedures for follow-up required.

4.2 State how seasonal weather conditions affect plant growth and health

Light levels – summer, longer days, greater intensity of incident light energy, increased photosynthesis, greater potential for growth, increased water loss; winter reduced incident light levels, leaf loss in deciduous plants.

Moisture summer – reduced rainfall, changed pattern of rainfall, greater transpiration loss, increased risk of water deficit to plant; winter, more rainfall,

slower evaporation and transpiration, increased chance of water logging.
Temperature Summer- higher average temperatures, faster metabolic rate, greater loss of water through transpiration, greater ability to take up water, risk of damage by high temperatures; Winter – lower average temperatures, lower metabolic rate, reduced ability to take up water, risk of cell damage due to freezing.
Wind greater wind speeds likely in winter, spring and autumn; increased transpiration loss, increased risk of root rock, wind-blow.

4.2 Describe the different methods used to promote plant health including

- **Feeding** – top dressing with inorganic or organic fertilizer; Inorganic fertilizers – straights, compounds, trace elements, controlled release; Organic – manure pellets, animal waste based fertilizers, seaweed based, plant based; Contribution of bulky materials used for mulching to plant feeding, manures, composts, other bulky waste. Liquid feeding, manual and application by machine (broadcast, directed, injected)
- **Watering** – by hand using hoses, cans; Sub-irrigation, drip, seep-hose, overhead; field scale – mobile systems, rain-guns.
- **Surface cultivation** - By hand (hoeing, cultivating, digging) Powered – use of rotorvators, inter-row cultivators, brush weeders
- **Mulching**; Organic materials – composted green waste, straw, manures, other wastes, paper, cardboard; Inorganic materials, permeable membranes, gravels, non-permeable films (plastic/starch, degradable, non-degradable)

4.3 Describe the effects of soil conditions on plant growth effects of soil conditions on plant growth; soil type, texture/structure, depth, nutrient and pH status, organic matter content, moisture levels, tilth.

4.4 State why watering regimes vary for different soils and plants Watering regimes for different soils and plants; type of soil, permeability, water retention capacity, slope, orientation, cultivation/compaction; types of plant – drought resistant, tolerant of poor drainage, season, climate, protected/not protected.

4.5 Describe how the correct use of agrochemicals/pesticides can improve plant health The correct use of agrochemicals/pesticides can improve plant health; reduced incidence of pests, disease and competition from weeds, reduced damage to root function or photosynthetic potential, reduced damage to stems interrupting transport. Reduced damage to flowers and fruit.

4.6 Describe how the incorrect use of agrochemicals/pesticides can harm plants the incorrect use of agrochemicals / pesticides can harm plants; direct damage to plant, reduced vigour, loss of leaf colour, reduction of natural predators, harm to biological control agents, damage to soil mycorrhiza; residues within crop.

4.7 Describe the methods of dealing with threats to plant health covering; physical, cultural and irrigation Methods of dealing with threats to plant health covering
Physical pruning/trimming, physical barriers, cultivation, manipulation of environment in protected crops, wind breaks, shading, weeds

Cultural choice of variety, timing of sowings and planting, management of nutrient and water, use of pesticides, use of biological control
Irrigation promoting growth, reducing stress, reduce impact of pest/disease attack

Learning Outcome 5. Know relevant health and safety and animal welfare legislation and environmental good practice

5.1 Outline the current health and safety and animal welfare legislation, codes of practice and any additional requirements e.g. Management of Health and Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification.

5.2 Describe how environmental damage can be minimised minimising soil damage, working in appropriate weather and soil conditions, avoiding run-off from erosion and roads or tracks, recycling and re-using of waste packaging and other material, control of unused material, reducing contamination and waste, disposal of unwanted plant material. Checking and accurate use of equipment, ensuring no leaks in irrigation systems, efficient use of water to avoid run-off, use of pesticides in accordance with legal requirements.

5.3 Describe the correct methods for disposing of organic and inorganic waste Organic waste – reduce waste removed from plant maintenance area by shredding and mulching or habitats, waste plant material composted (unless the material poses a threat to plant health e.g. diseased material and perennial weeds).
Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3
Delivery of these learning outcomes is by supervised practical work maintaining plants outdoors giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of maintaining plants outdoors photographs or video could be taken to provide evidence of progress. Copies of monitoring reports or worksheets can be used to provide evidence of quality and of sufficiency of evidence.

Learning Outcomes 4 and 5

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of maintaining plants outdoors, monitoring reports, work sheets and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  *DEFRA web site and publications (*http://www.defra.gov.uk/hort/index.htm*)*

- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

  Learners should be directed to relevant publications and web sites eg.
- Horticulture Week (www.hortweek.com)
- The Landscaper (www.landscapermagazine.com)
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *A Handbook for Horticultural Students* by Peter Dawson
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood
- *Farm Machinery* (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684

Maintain the Condition of Sports Turf Surfaces

Unit Reference	**K/502/0424**
Level	**2**
Credit Value	**7**
Guided Learning Hours	**53**
Unit Summary	This unit will provide the learner with the ability to demonstrate the knowledge and skills required to present sports turf surfaces so that they meet the requirements of a sport and a particular event
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.3)** ***The learner can***
1. Be able to select, use and maintain equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to maintain sports turf surfaces	2.1 Clear surfaces of unwanted debris 2.2 Prepare the playing surface so that it meets the requirements of the sport and the standard for the event 2.3 Maintain the quality and appearance of surfaces 2.4 Make markings which are clear and appropriate to the event 2.5 Set out the sports equipment required by the rules of the sport and the standard of the event

3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to maintain sports turf surfaces	4.1 Explain why it is important to clear surfaces of unwanted debris 4.2 Describe how to establish that the surface is in a fit condition for maintenance 4.3 State the importance of ensuring the surface meets the required standard and how to do so for the following • speed • surface response to a ball, animal or player • moisture content • grass cover • degree of consolidation • trueness 4.4 Describe all following methods in preparing surfaces • mowing • irrigation • scarifying and/or verticutting • rolling • top dressing • brushing or switching • aeration • edging (where appropriate) • feeding • marking out sports surface • setting out equipment
5. Know how conditions affect grass growth and the maintenance of playing surfaces	5.1 Describe the effects of season, climate and soil conditions on intensity, type and frequency of maintenance operations 5.2 Describe how ground and weather conditions affect maintenance operations

6. Know how to set out sports surfaces	6.1 Describe how to carry out marking appropriate to sports and events 6.2 Describe how to set out sports equipment correctly to meet the needs of the sport and the standard of the event and why it is necessary
7. Know the types of equipment required and how to maintain them	7.1 Describe the equipment which will be necessary for maintaining sports surfaces 7.2 Describe methods of maintaining the equipment ready for use
8. Know the current health and safety legislation and environmental good practice	8.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 8.2 Describe how environmental damage can be minimised 8.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL6.1	

Supporting Unit Information

K/502/0424 Maintain the condition of sports turf surfaces - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the assessment criteria number listed e.g. LO 1.3.

Note 2 - Examples are inclusive of the range of considerations for assessment criteria but are by no means all inclusive.

One sport area has been selected as an example for this unit – football pitch but there are many sports turf surfaces all requiring their own specialist turf treatment.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1 Select appropriate equipment for this area of work e.g. cylinder mowing machine, scarifyer, aerator (with assorted tines), fertiliser/top dressing applicator, pesticide applicator, brush, fork, rake, tape measure, string line, pegs. PPE selected e.g. steel toe-capped boots, ear defenders, gloves, protective clothing and any additional requirements. Selection to be according to current legislation and codes of practice e.g. CE quality standard.

1.2 Use equipment according to manufacturer's instructions and legal requirements use equipment and PPE only for the operation and in situations as detailed by the manufacturer and in accordance with the manufacturer's/supplier's/supervisor's instructions, trained to correct level or supervised, current legislation and codes of practice.

1.3 Prepare, maintain and store equipment in a safe and effective working condition Preparation for use e.g. pre start safety checks, set blades on cylinder mower, Maintenance e.g. cleaning, routine (check oil levels, grease), and periodic (change oil) as required by manufacturer. Range e.g. hand tools, mechanical equipment, power units. Store equipment e.g. safe and secure in accordance with the manufacturer's instructions, guidance and current legislation (pesticide applicators). Maintain records e.g. maintenance and repairs. Report faults e.g. to line manager.

Learning Outcome 2. Be able to maintain sports turf surfaces

2.1 Clear surfaces of unwanted debris clear surface of debris e.g. twigs, leaves, litter, animal waste, bottles, cans and any item which may cause damage to equipment or users.

2.2 Prepare the playing surface so that it meets the requirements of the sport and the standard for the event prepare surface e.g. follow sports governing body's guidelines to produce surface with appropriate speed, trueness of surface, ball reaction, firmness to user pressure, moisture levels, consolidation, shear strength, height of grass growth required.

2.3 Maintain the quality and appearance of surfaces maintain quality and appearance e.g. use competent staff or closely supervised operators, carry out maintenance operations which accord to the sport governing body's guidelines with equipment correctly maintained and prepared for the work, apply top-dressing to improve soil/level undulations, pesticides and fertilisers correctly to avoid sward damage.

2.4 Make markings which are clear and appropriate to the event marking e.g. to be in accordance with the sport governing body's guidelines and dimensions, lines to be true straights or curves using equipment and approved material.

2.5 Set out the sports equipment required by the rules of the sport and the standard of the event

2.6 Set out equipment to sport governing body's requirements and guidelines e.g. specified materials, dimensions and position. Refer to LO 6.2.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements work activities and use of equipment carried out consistently to current legislation and codes of practice e.g. health and safety of self and others, PPE used (refer to LO 1.1), manufacturer's instructions and guidance followed, risk assessments followed and any additional requirements.

3.2 Carry out work in a manner which minimises environmental damage environmental damage minimised e.g. use skilled staff, minimum use of powered equipment, soil condition (not too wet/dry), weather condition (not too wet/windy), care when working near underground services (CAT scan), avoid pollution of drains, apply pesticides/fertiliser as recommended by manufacturer, minimize waste, non-spillage of petroleum products, dispose of waste as required by legislation. Any other requirements.

3.3 Dispose of waste safely and correctly refer to LO 8.3.

LO4, LO5, LO6, LO7 and LO8 are the key areas of knowledge for this unit.

Learning Outcome 4. Know how to maintain sports turf surfaces

4.1 Explain why it is important to clear surfaces of unwanted debris e.g. damage to maintenance equipment and surface, true run of ball, danger to user, acceptable visual appearance.

4.2 Establish that surface is in fit condition for maintenance e.g. visual inspection, absence of debris, soil and turf condition optimum for operation to be undertaken, not in use.

4.3 Describe how to establish that the surface is in a fit condition for maintenance Standard to meet client and/or standard of sport governing body.

- **Speed** consistency e.g. height of cut, grass species, optimum soil moisture content, reduction of moss and thatch
- **Surface response to ball (bounce), animal or player** e.g. grass cover maintained, optimum moisture content, strong growth to prevent turf shearing from soil, rolling to firm surface, scarify to reduce thatch.
- **Moisture content** to maintain strong growth and operations e.g. ensure appropriate moisture content by applying irrigation and/or improve drainage for rolling.
- **Grass cover** for appropriate playing surface e.g. fertiliser programme to encourage strong growth, over-seeding/turfing damaged/bare area, irrigation to encourage strong growth when insufficient rainfall.
- **Degree of consolidation for ball response and bounce** e.g. rolling with correct weight roller with optimum soil moisture content to enable soil to compact.
- **Trueness of surface for true run of ball** e.g. grooming/scarifying to remove thatch and longitudinal growth, switching to remove surface dew, moisture content appropriate for a firm surface by irrigation and/or improve drainage, height of cut to specified level, full even grass cover

4.5 Describe all following methods in preparing surfaces

- **Mowing** e.g. to maintain the height of cut at specified level.
- **Irrigation** by hand held/portable of fixed system e.g. applying water to maintain the optimum moisture content requirements of soil and turgidity of grasses.
- **Scarifying and/or verticutting** with tines appropriate to amount to be removed e.g. reduce level of thatch and longitudinal growth.
- **Rolling** with pedestrian or ride on roller e.g. to firm/consolidate soil surface with appropriate moisture content, weight of roller and direction of rolling.
- **Top dressing** of appropriate material applied evenly e.g. to repair surface, level undulations, improve surface drainage, encourage strong growth.
- **Brushing** with hand or mounted equipment or **switching** with hand held wand e.g. switch to remove dew and worm casts, brush as for switching and to raise longitudinal growth for mowing.
- **Aeration** by hand or with powered equipment fitted with appropriate tines e.g. to relieve compaction, allow surface water to penetrate into soil, allow air into soil for health of grass plant and soil organisms, soil exchange.
- **Edging (where appropriate)** with hand held shears, half-moon or powered equipment e.g. to maintain a neat edge, cut back turf to form firm edge.
- **Feeding** with appropriate nutrient levels according to season and response of grasses required e.g. to provide nutrients and encourage strong healthy

grass growth, produce hard wearing turf resistant to wear, pests and diseases.

- **Marking out sports surface** with line marking equipment, string line and white material e.g. to specified dimensions to provide defined playing area and internal marking, accuracy and visual requirement of pitch markings.
- **Setting out equipment** of permanent goal posts and portable flags e.g. be accurately positioned, correct material and height.

Learning Outcome 5. Know how conditions affect grass growth and the maintenance of playing surfaces

5.1 Describe effects of season, climate and soil condition on intensity, type and frequency of operations e.g. daylight intensity and duration, climate effect (cold, frost, hot) on growth, dry/wet soil conditions on operations. Mowing frequency e.g. speed of growth, nutrient variations of soil. Wet/dry soil e.g. speed of growth, weight of equipment, effectiveness of rolling and aeration. Irrigation e.g. to maintain optimum soil moisture content. Snow and frost e.g. damage to grass blades, disease problems. Seasonal variations e.g. aeration tines, scarifying. Top-dressing e.g. surface drainage.

5.2 Describe how ground and weather conditions affect maintenance operations e.g. waterlogged soil give rise to soil structure damage. Drought e.g. slows growth and limits consolidation effect of rolling. Frozen ground e.g. operations damage grass blades. Length of daylight e.g. effect on speed of growth. Wind e.g. limit application of pesticides. Rain e.g. timing of fertiliser/pesticides application, refer to LO 5.1.

Learning Outcome 6. Know how to set out sports surfaces

6.1 Describe how to carry out marking appropriate to sports and events how to carry out pitch marking e.g. use of sports governing body's dimensions and guidelines, use and type of marking equipment and materials required, accurate dimensions (tape measure, pegs), accurate setting out (squaring of pitch), trueness of straight lines (string line) and curves.

6.2 Describe how to set out sports equipment correctly to meet the needs of the sport and the standard of the event and why it is necessary set out sports equipment e.g. accurate dimensions, accurate positioning to comply with sport governing body laws and activity requirements. Safety e.g. firmly fixed, use of approved materials to prevent injury.

Learning Outcome 7. Know the types of equipment required and how to maintain them

7.1 Describe the equipment which will be necessary for maintaining sports surfaces refer to LO 1.1

7.2 Describe methods of maintaining the equipment ready for use
maintaining equipment for use refer to LO 1.3

Learning Outcome 8. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work
Health and Safety at Work etc Act 1974 e.g. management of health and safety and safety at work.

- Risk assessments e.g. working practices.
- Codes of practice e.g. pesticides application and use of equipment.
- Exposure records e.g. noise, vibration, pesticides.
- COSHH Regulations e.g. risk assessment and use.
- Hazardous waste regulations e.g. waste disposal.
- Storage e.g. pesticides, fuel, materials.
- PPE e.g. safety boots, ear defenders, protective clothing.
- Environmental Protection Act e.g. environmental protection.
- Water Pollution Act e.g. water pollution.
- RIDDOR e.g. reporting requirements.
- PUWER e.g. use of plant and equipment.
- LOLER e.g. lifting operations and lifting equipment.
- Working at height Regulations e.g. step ladder.

Any additional requirements.

6.2 Describe how environmental damage can be minimised refer to LO 3.2

6.3 Describe the correct methods for disposing of organic and inorganic waste legislation e.g. pesticide regulations, COSHH. Organic green waste - grass clippings, leaves e.g. composting. Inorganic waste - mineral matter/glass/metal e.g. re cycle. Other methods e.g. specialist contractor (skip), Local Authority arrangements.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1, 2, and 3
Delivery of these learning outcomes is by supervised practical work activities giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Learners not holding statutory qualifications to use equipment and materials to be supervised by person who is qualified to do so.
Prior to, during and after completion of activities, photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 4, 5, 6, 7 and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts

- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Institute of Groundsmanship htpp://www.iog.org
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.

- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Use and Maintain Non-Powered and Hand Held Powered Tools and Equipment

Unit Reference	**K/502/0438**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to use and maintain non-powered tools and equipment and hand held powered equipment
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.2)** ***The learner can***
1. Be able to use and maintain non-powered and hand held powered tools and equipment	1.1 Ensure that the equipment is safe and in good working order 1.2 Select and use the correct personal protective clothing and equipment 1.3 Set up and use the equipment and machinery in accordance with the manufacturer's instructions and legal regulatory requirements 1.4 Maintain non-powered and hand held equipment in accordance with manufacturer's instructions 1.5 Identify any problems with the equipment and take appropriate action 1.6 Clean and store equipment correctly after use

2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 2.2 Carry out work in a manner which minimises environmental damage 2.3 Dispose of waste safely and correctly
3. Know how to us and maintain the tools and equipment	3.1 Explain the importance of using equipment in line with manufacturers' instructions 3.2 Describe the pre-operational checks and the methods of maintaining the equipment for use 3.3 List the main hazards and risks associated with using the equipment 3.4 Describe the types of problems that may occur with the equipment and how to deal with each of these correctly 3.5 State the types of protective clothing and the reasons why it must be worn
4. Know the current health and safety legislation and good environmental practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements 4.2 Describe how environmental damage can be minimised
Mapping to National Occupational Standards O29NL27.1,2	

Supporting Unit Information

K/502/0438 Use and maintain non-powered and hand held powered tools and equipment - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Note: Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

The example of tools or equipment in this case will be a bill hook. Activities for other tools or equipment need to follow this example.

LO1 and LO2 are the key areas of competence for this unit
LO3 and LO4 are the knowledge evidence units

Learning Outcome 1. Be able to use and maintain non- powered and hand held powered tools and equipment Cross reference with L.O.3

1.1 Ensure that the equipment is safe and in good working order Identify the correct tools and equipment that you are about to use or requires maintaining. Check that the tool is safe, sharp and not damaged in any way. Undertake PUWER check.

1.2 Select and use the correct personal protective clothing and equipment Correct PPE worn including e.g. Safety boots (free from mud or oil) ear defenders (if a powered tool), eye protection, gloves, overalls, high visibility clothing etc. Report any faults identified on relevant documentation.

1.3 Set up and use the equipment and machinery in accordance with the manufacturer's instructions and legal regulatory requirements Risk assessment undertaken and area checked for hazards or obstructions and work area kept clean. Ensure no unauthorised access to work area and safe working distance maintained. First aid kit on site. Use the tools and equipment in a safe manner as per manufactures guidelines

1.4 Maintain non-powered and hand held equipment in accordance with manufacturer's instructions Regular checks of tools and equipment to ensure tool is fully efficient. E.g. if tool becomes blunt –stop and sharpen in safe manner. If becomes unsafe to use take out of service and report to appropriate person in charge.

1.5 Identify any problems with the equipment and take appropriate action refer to LO1.4 above and report any faults identified on relevant documentation to person in charge.

1.6 Clean and store equipment correctly after use ensure all tools and equipment used on site are left in clean and serviceable conditions and are stored in correct place such as a workshop or other designated area. E.g. Billhook is sharp, has protective cover on (if applicable). Is wiped clean and wiped with oily rag or sprayed with WD40 or similar protective film to prevent rusting, deterioration etc.

Learning Outcome 2. Be able to work safely and minimise environmental damage Cross Reference with L.O.4.

2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable and additional requirements . Ensure correct PPE selected and used in safe manner) Safety boots, overalls, gloves, ear (if power tool used) and eye protections, high visibility clothing. Ensure site is secure and free from any unauthorised access. Signage in place whilst work being undertaken. Communications systems in place. Ensure correct manual handling techniques adopted. Safe working distances adhered to.

2.2 Carry out work in a manner which minimises environmental damage target species only to be removed to avoid any unnecessary environmental damage. Consider any protected species and any SSSI or SAC requirements at the site. Be able to identify invasive species e.g. Japanese Knot weed, Giant Hogweed and Himalayan Balsam.

2.3 Dispose of waste safely and correctly i.e. Identify organic and inorganic waste and dispose of in correct manner. Note the importance of L.O. 2.2 with reference to disposal of invasive species. E.g. Cut Hemlock left on site is poisonous to both humans and livestock as are many others of these invasive species. (Note also disposal of waste from powered hand tools such as spill mats or oily rags etc)

Learning Outcome 3. Know how to use and maintain tools and equipment. Cross reference with L.O.1

3.1 Explain the importance of using equipment in line with manufacturers' instructions Explain correct use of tools and equipment- refer to manufacturer's instructions. Explain the need for right tool for right task e.g. Hand held tools for delicate operations and hand held power tools for larger areas. Also explain the safety issues around each tool type. E.g. non-slip gloves for hand held billhooks.

3.2 Describe the pre-operational checks and the methods of maintaining the equipment for use Pre task check to ensure tools and equipment are

suitable and well maintained e.g. tools kept sharp and clean. Check list could be referred to, follow PUWER guidelines.

3.3 List the main hazards and risks associated with using the equipment be able to identify and list hazards associated with using equipment. E.g. Undertake Dynamic Risk Assessment take into account ground conditions, weather conditions, unauthorised access to site, livestock present, slips, trips, falls. Poisonous vegetation. Cuts, sprains etc. (Note if power tools used that Hand Arm Vibration Syndrome- HAVS will need to be considered). Manual handling techniques will also need to be considered.

3.4 Describe the types of problems that may occur with the equipment and how to deal with each of these correctly. E.g. if tool becomes blunt –stop and sharpen in safe manner as per manufactures guidelines. If becomes unsafe to use take out of service and report to appropriate person .If using powered tools refer to manufactures recommended time usage.

3.5 State the types of protective clothing and the reasons why it must be worn state the types of PPE and reasons why it should be worn. E.g. eye protection (flying debris) safety boots (uneven ground) high visibility clothing (be seen) non-slip gloves (prevent loss of control of tool) Cross reference to L.O.1.2.

Learning Outcome 4. Know the current health and safety legislation and good environmental practise Cross reference with L.O.2

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health & Safety at Work Regulations
Environmental Protection e.g. Environmental Protection Acts
Waste e.g. Hazardous Waste Regulations
Codes of Practice e.g. Protecting our Water, Soil and Air.
Additional requirements including Local Authority permissions e.g. planning permission and Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers. PUWER, Correct signage, Directional signs in place, Work area isolated and no unauthorised access. Identify hazards and take appropriate actions.

4.2 Describe how environmental damage can be minimised e.g. only remove identified vegetation, consider status of Site SSSI, SAC or similar, safe removal of any waste etc

Teaching Strategies And Learning Activities

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Learning Outcomes (LO)1 and 2
Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in using and maintaining non-powered and hand held powered tools and equipment and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 3 and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

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Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.
The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1 and 2 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 3 and 4 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence

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- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9.
- IACR-Centre for Aquatic Plant Management, Broadmoor Lane, Sonning, Reading, Berkshire RG4 6TH, UK.
- Tel: 0118 969 0072 Fax: 0118 944 1730 Email: capm@freeuk.com – provides excellent guidance on methods of removal of identified invasive plants and recommended effective disposal methods
- The Provision and Use of Work Equipment Regulations **PUWER**
- All plant or equipment used at work, either in the office or in the field, comes under **PUWER**
- SSSI - Site of Special Scientific Interest
- SAC - Special Area Of Conservation

Preparing Ground for Seeding and Planting

Unit Reference	**K/502/0990**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required in preparing the ground for planting plants and seeds. The preparation of the ground may cover the use of both hand tools and powered machinery such as tractor mounted equipment
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.3)** ***The learner can***
1. Be able to select, use and maintain equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition throughout
2. Be able to prepare ground for seeding and planting	2.1 Prepare the ground in a way that is appropriate to the plants/seeds being established, the soil type and ground conditions 2.2 Add the materials specified for the operation (it may be compost, fertiliser or sand) 2.3 Produce the required tilth for the specified finish 2.4 Clear debris from the site effectively, safely, tidily and legally

	2.5 Complete work to the agreed schedule
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to prepare the ground	4.1 Describe the different clearance and minor levelling methods which can be used for the following • green-field • urban derelict • reclaimed land • existing gardens 4.2 Describe how to achieve the correct tilth, consolidation, pH and nutrient levels depending on the use and finish 4.3 State where and when composts, fertilisers and other materials should be used and the types of that are appropriate 4.4 State how preparation may be affected by type of plants/seeds, soil type, ground and weather conditions and type of site 4.5 Describe the unwanted impacts to a site which might occur when preparing ground and how to avoid them 4.6 State why it is important to clear debris effectively, safely, tidily and legally
5. Know the types of hazards	5.1 Describe the hazards of underground services and how to avoid these
6. Know the types of weeds	6.1 Identify 15 types of perennial weeds and state how to control them
	7.1 Describe the equipment and materials which will be

7. Know the types of equipment and materials required and how to maintain them	necessary for preparing ground for seeding and planting covering the following materials • organic matter • fertiliser • lime • perennial weed herbicides 7.2 Describe methods of maintaining the equipment ready for use
8. Know the current health and safety legislation and environmental good practice	8.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 8.2 Describe how environmental damage can be minimised 8.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029NL1.3, L2.1	

Supporting Unit Information

K/502/0990 Preparing ground for seeding and planting - Level 2

INDICATIVE CONTENT

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, ear defenders. CE marked. Tools and equipment selected e.g. spade, rotorvator, tractor and plough / tines.

1.2&3 Use equipment according to instructions / Prepare, maintain and store equipment in a safe and effective working condition throughout equipment used only for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe: Preparation, e.g. spade blade cleaned. Use e.g. push tread with sole of foot to avoid slippage / scraping achilles tendon area. Maintenance e.g. clean /oil after use, wooden handle rub with linseed oil. Storage e.g. securely hanging from handle, blade down, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO7.2.

Learning Outcome 2. Be able to prepare ground for seeding and planting

2.1 Prepare the ground in a way that is appropriate to the plants/seeds being established, the soil type and ground conditions ground prepared appropriate to plants / seeds. To suit soil types e.g. clay, sand, silt, chalk, peat or loam. Appropriate to ground conditions and seasonality e.g. removal of perennial weeds, retention of moisture in sandy soils by timing / work patterns, wet clay or silt soils not trodden on.

2.2 Add the materials specified for the operation (it may be compost, fertiliser or sand)

2.3 E.g. add organic matter in form of compost or manure to sandy soils, fertiliser added to peat soils and course grit to clay or silt soils.

2.4 Produce the required tilth for the specified finish specified finish produced e.g. fine tilth - lettuce seed, deep tilth - plants such as roses

2.5 Clear debris from the site effectively, safely, tidily and legally gathering, picking up, removing debris from site. Safe lifting and handling. Refer to LO8.3

2.6 Complete work to the agreed schedule e.g. safely, on time and to specification.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO8.1.

3.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised e.g. by working in appropriate weather conditions, recycling / reuse, alternatives to peat, care not to spread perennial weeds - couch grass.

3.3 Dispose of waste safely and correctly Waste e.g. organic - green, roots and sticks or inorganic - stones, plastic bags. Correctly - refer to LO8.3. Safely e.g. PPE, safe lifting.

LO4, LO5, LO6, LO7 and LO8 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to prepare the ground

4.1 Describe the different clearance and minor levelling methods which can be used for the following:

- **Green-field sites** - waste scrub land with perennial weeds such as docks, thistles and nettles e.g. brush and small trees, abandoned cars, fly-tipped rubbish - use bow saws, brush cutters, tractors and trailers

  Note: In each of the next 3 examples need to CAT scan for underground services
- **Reclaimed land** - quarries e.g. stored topsoil, stone embankments, roads compacted by heavy lorries - bulldozers, backhoes, excavators, lorries
- **Urban derelict** - redundant factory e.g. structure, underground services, asbestos risk, concrete / tarmac - use heavy machinery, excavators, dump trucks
- **Existing sites** - restructure of existing site e.g. flag stones, dry stone walling, plants and trees - use hand tools, tractor and fore-end loader, trailer.

  Minor levelling methods as appropriate to site. How to mark out to level an area e.g. use pegs marked at same distance from top, straight edge and spirit level used to set tops of pegs level. Add or remove top soil as necessary

4.2 Describe how to achieve the correct tilth, consolidation, and pH and nutrient levels depending on the use and finish Good physical structure both at surface and depth for drainage and aeration. Role of well-rotted organic matter and how much needed. Method and degree of consolidation. How acid and alkaline soils affect the availability of some nutrients e.g. acid soils lock up phosphates. How to test pH and improve soils.

4.3 State where and when composts, fertilisers and other materials should be used and the types of that are appropriate Fertiliser use. How and when to improve main soil types using composts, fertilisers and other materials e.g. add organic matter in form of compost or manure to sandy soils. Types of organic matter e.g. manure. Types of fertiliser's e.g. general purpose. Optimum time(s) of year for application related to main soil types.

4.4 State how preparation may be affected by type of plants/seeds, soil type, ground and weather conditions and type of site to meet structural, pH and nutrient requirements. To avoid adverse effects related to soil type and ground or weather conditions e.g. do not trample clay when it is wet. How preparation is affected by site e.g. size of site, flat or sloping terrain.

4.5 Describe the unwanted impacts to a site which might occur when preparing ground and how to avoid them e.g. drying of sand avoided by adding organic matter and lightly raking to conserve moisture.

4.6 State why it is important to clear debris effectively, safely, tidily and legally e.g. efficient time use and working practices, safe lifting and handling, maintain pleasing appearance of site, local authority waste disposal requirements.

Learning Outcome 5. Know the types of hazards

5.1 Describe the hazards of underground services and how to avoid these e.g. electricity - loss of life or disruption of service. Detect using CAT scan or information / planning sources. Avoidance mark line(s) of services and erect barriers if necessary to avoid e.g. digging or deep ploughing.

Learning Outcome 6. Know the types of weeds

6.1 **Identify 15 types of perennial weeds and state how to control them** e.g. couch grass, ground elder, horsetail. How to control e.g. stinging nettles - dig out or control with contact weed killer.

Learning Outcome 7. Know the types of equipment and materials required and how to maintain them

7.1 Describe the equipment and materials which will be necessary for preparing ground for seeding and planting covering the following materials

- **organic matter**
- **fertiliser**
- **lime**
- **perennial weed herbicides**

Equipment - refer to LO1.1.

7.2 Describe methods of maintaining the equipment ready for use Maintenance: Tractor e.g. check oil, water, air cleaner, tyre pressures, greasing

according to manufacturer's instructions and schedules. Waste oil - refer to LO8.3.

Learning Outcome 8. Know the current health and safety legislation and environmental good practice

8.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work
Health and Safety e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations, Environmental Protection e.g. Environmental Protection Acts covering waste disposal Codes of Practice e.g. Protecting our Water, Soil and Air. Additional requirements e.g. Tractors - Safe Stop, ensure tetanus vaccination up to date.

8.2 Describe how environmental damage can be minimised Minimising environmental damage - refer to examples in LO3.2.

8.3 Describe the correct methods for disposing of organic and inorganic waste Waste disposal. Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste such as oil / filters from maintenance Tractors. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. If quantities justify check Environment Agency procedures regarding hazardous waste e.g. oil Refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised preparation of ground giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of ground preparation work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5, 6, 7and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of ground preparation work

and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.
The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, 6, 7 and 8 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit
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- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority web sites for Building Control Department
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Maintaining Water Features

Unit Reference	**K/502/1217**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the knowledge and skills required to maintain water features. Water features include ponds, streams, fountains and waterfalls
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to maintain water features	1.1 Inspect water features as required 1.2 Make sure surrounding areas are clean and tidy on completion 1.3 Make sure surrounding areas are clean and tidy on completion
2. Be able to select, use and maintain equipment for maintaining water features	2.1 Select appropriate equipment for this area of work 2.2 Use equipment according to manufacturer's instructions and legal requirements 2.3 Prepare, maintain and store equipment in a safe and effective working condition throughout
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage

	3.3 Dispose of waste safely and correctly
4. Know the principles of maintaining water features	4.1 Describe how to carry out inspections of water features streams, fountains, waterfalls and ponds 4.2 State why it is important to inspect water features according to schedule 4.3 Identify the types of problems that are likely to occur with water features and how to deal correctly with these covering • leaks • filters and pumps in need of cleaning • filters and pumps in need of replacement • dirt • unwanted vegetation 4.4 Describe the type of damage which can occur to services and surroundings and how to keep this to a minimum 4.5 State why it is important to keep working areas clean and tidy according to clients' requirements 4.6 State why it is important to complete work to agreed schedule
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be required for the activity 5.2 Describe the methods of maintaining the range of equipment used
6. Know the current health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste

Mapping to National Occupational Standards
O29L28.2

Supporting Unit Information

K/502/1217 Maintaining water features - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

Note 2 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to maintain water features

1.1 Inspect water features as required water features safely inspected health tests, structure, equipment, unwanted materials, plant / fish / wildlife health. Actions taken to address findings, records made as necessary, recommendations made for future care. Features safely accessed. No / minimal damage or disturbance caused to surroundings.

1.2 Make sure surrounding areas are clean and tidy on completion Surrounding areas left clean and tidy on completion. All debris or product removed from features cleared, mud / stains / soiling cleaned, any disarrangements e.g. stones or plants made good.

1.3 Make sure surrounding areas are clean and tidy on completion inspection and maintenance work scheduled in LO1.1 completed by date / on time / to cost and covering all areas identified in schedule.

Learning Outcome 2. Be able to select, use and maintain equipment for maintaining water features

2.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. gloves, overalls, and steel toe-capped boots. Tools and equipment selected e.g. water test kit, brushes, shovel, weed or fish treatment options, filter media, pump impellers or pre-filters.

2.2&3. Use equipment according to manufacturer's instructions and legal requirements / Make sure surrounding areas are clean and tidy on completion Manufacturer's / suppliers instructions followed for preparation, use, maintenance, storage of tools / equipment. Tools / equipment safely and securely stored.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Wildlife and Countryside Acts / COPs as applicable, risk assessment and additional requirements - refer to LO 6.1.

3.2 Carry out work in a manner which minimises environmental damage e.g. by carefully planning site access, use of wooden boards to prevent edge damage / falling in, recycling / reuse, ensuring that species, dirty water, diseased fish are not released into ground water, placing plant material removed from pond close enough from edge to let pond creatures return to water, awareness / survey of creatures present and providing appropriate shelter for toads / frogs / newts.

3.3 Dispose of waste safely and correctly e.g. organic - green or inorganic - worn out filter materials. Refer to LO 6.3.

LO4, LO5 and LO6 are the key areas of knowledge for this unit.

Learning Outcome 4. Know the principles of maintaining water features

4.1 Describe how to carry out inspections of water features streams, fountains, waterfalls and ponds Follow procedures / guidance and / or customer specification for inspection areas and schedule. Overall schedule and key inspection times e.g. Spring and late Autumn / Winter Spring inspection areas as relevant to ponds, streams, fountains, waterfalls including

Water health e.g. tests for pH, ammonia and nitrate levels

Structure e.g. cracks, leaks, surrounds, flow and patterns

Equipment e.g. filter systems, filter hosing, pump, UV lamps, and cover netting.

Debris e.g. leaves, branches, sludge, stones

Plant health and aesthetics e.g. state of plants, re-potting or splitting needs, presence / excess of weeds such as Blanketweed / Duckweed / Canadian Pondweed.

Fish health and aesthetics e.g. state of fish, visibility, breeding activity and rearing fry, presence of diseases such as Finrot, Slime disease, reducing predation.

4.2 State why it is important to inspect water features according to schedule Seasonality of inspection and maintenance activities e.g. placement of fine mesh nets to catch autumn leaves. Problems arising from delayed inspection or maintenance e.g. primary effect of leaves blocking / silting up water features. Connected effects e.g. dark water, changed ecological structure of pond, possible fish disease problems.

4.3 Identify the types of problems that are likely to occur with water features and how to deal correctly with these covering

- **Leaks** e.g. cracked concrete pond - define and clean crack, enlarge if necessary, fill with mortar or sealing compound, cover work with sealant
- **Filters and pumps in need of cleaning** e.g. filter media exhausted - clean media in small lots over several weeks so benefit of mature efficient filter is not lost. Always clean with stream / pond water, not tap water
- **Filters and pumps in need of replacement** e.g. initially new filter is not so efficient - use bacterial supplement to quickly restore filter efficiency
- **Dirt** e.g. silting up - pond hoovers available or remove most of water and clear silt to acceptable level (leaving some for pond plants to root). Silt traps for streams
- **Unwanted vegetation** / predators e.g. Autumn leaves falling into pond or Herons visiting - cover pond with plastic netting - mesh size appropriate to problem

4.4 Describe the type of damage which can occur to services and surroundings and how to keep this to a minimum damage to services. Electricity e.g. outdoor deviations or leakage in current following installation of pump connected to circuit /circuit breaker of dwelling - transfer to separate circuit. Electrical work carried out by Building Regulations - Part P qualified electrician. Drainage e.g. overflow of water into drainage / storm water / sewage system - install overflow system. Damage to surroundings e.g. floods, waterlogged, boggy ground, flooded lawns / trees / shrubs leading to death - install overflow system. Release of species, dirty water, diseased fish.

4.5 State why it is important to keep working areas clean and tidy according to clients' requirements Efficiency e.g. work materials organised, stored close to site of next work. Aesthetic e.g. no blemishes on appearance of water feature. Work attitude illustrated - client confidence. Safety e.g. no slipping or tripping hazards including moss / algae / lichens on walkways around water feature. Contamination of surroundings minimised.

4.6 State why it is important to complete work to agreed schedule importance of completing maintenance work to agreed schedule. Refer to LO4.2 and LO4.4 and to stay within costs.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be required for the activity refer to LO2.1.

5.2 Describe the methods of maintaining the range of equipment use Maintenance e.g. clean shovels or pumps / filters - check condition of filter material, inlet strainers and hoses - follow manufacturer's instructions and schedules.

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.4 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations, Electricity at Work Regulations

Environmental Protection e.g. Environmental Protection Acts covering waste disposal

Wildlife e.g. Wildlife and Countryside Act covering protection of Great Crested Newts

Codes of Practice e.g. Protecting our Water, Soil and Air

Additional requirements including Building Regulations - Part P qualification / notification of Local Authority. BS Wiring Regulations

Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers - refer to LO 3.1.

6.5 Describe how environmental damage can be minimised Refer to examples in LO3.2 and LO4.4.

6.6 Describe the correct methods for disposing of organic and inorganic waste recycle / reuse. Check costs, procedures and which Local Authority sites accept types of waste - bag or bin or consider skip hire / private disposal - refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3

Delivery of these learning outcomes is by supervised practical inspection and maintenance work giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of practical inspection and maintenance work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5 and 6

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of inspection and maintenance work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit
Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports / inspection reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion

- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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- Local Authority web sites for Building Control Department
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Installing Block Surfaces

Unit Reference	**K/502/1220**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit will provide the learner with the skills and knowledge required when installing block surfaces. It is designed to give a basic understanding of the materials, tools and techniques used by operatives to install both temporary and permanent hard surfaces It covers both flexible block surfaces and non-permeable surfaces
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Be able to select, use and maintain equipment for installing block surfaces	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to install block surfaces	2.1 Set-out for line and level 2.2 Construct a suitable restraining edge 2.3 Lay blocks by hand to a suitable pattern 2.4 Check laid blocks for alignment 2.5 Cut-in blocks to required standard - compact blocks

	2.6 Check completed surface for compliance with specifications and standards and rectify any problems as required 2.7 Fill joints and re-compact 2.8 Protect working areas effectively against weather and use until they are in a suitable condition 2.9 Leave the site safe, tidy and suitable for intended use 2.10 Maintain effective working relations with relevant people throughout
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to prepare for installing block surfaces	4.1 State the weather conditions that are appropriate for installation 4.2 Describe how to calculate the number of packs of blocks required 4.3 Identify and explain the range of blocks available, including permeable block systems, and their suitable applications
5. Know how to install block surfaces	5.1 Describe how to measure to ensure work is within tolerances 5.2 State how falls, lines and levels are determined and set out 5.3 Explain the importance of robust edge restraints 5.4 State how blocks should be stored on site, how they are delivered to the laying face, and how they are

	positioned for the laying operative 5.5 Describe the range of block patterns commonly used on site, their relative strengths and weaknesses, and how they are established covering • stretcher/running board • 90° herringbone • 45° herringbone • basket weave 5.6 State the importance of mixing and randomising blocks from three or more packs prior to laying 5.7 Describe how areas are continuously checked for compliance to line, level, joint width and block competence during the laying process 5.8 Describe how cutting-in is achieved, following the principles of minimum block size and inboard cutting techniques 5.9 State the importance of using the correct jointing material and its role in the performance of the completed surface 5.10 Describe techniques used for dry and wet grouting 5.11 Describe the importance of final compliance checks
6 Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be necessary for installing block surfaces 6.2 Describe methods of maintaining the equipment ready for use 6.3 State the importance of dust-suppression and RPE when using a cut-off saw
7. Know the current health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work. 7.2 Describe how environmental damage can be minimised

	7.3 Describe the correct methods for disposing of organic and inorganic waste

Mapping to National Occupational Standards
029NL30.1,2

Supporting Unit Information

K/502/1220 Installing block surfaces – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit.

Learning Outcome 1. Be able to select, use and maintain equipment for installing block surfaces

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. gloves, overalls and steel toe-capped boots with pierce resistant midsole. Use of power saw e.g. protective goggles, anti-vibration gloves, Respiratory Protective Equipment - particulate dust mask to required grade, ear defenders. CE marked. Tools / equipment selected e.g. pegs, spirit level, shovel, lump hammer, wheelbarrow, block splitter, power saw, vibrating plate compactor, and trowel.

1.2 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. vibrating plate compactor - operating instructions followed, oil and fuel checked / topped up. Use e.g. regular breaks taken, vibration setting lowest for task, distance between machine and bystanders safe. Maintenance e.g. ensured engine cool first, cleaned by brushing / vacuum, lubricated moving parts, checked for loose or cracked parts. Storage e.g. stored on level surface with power switch and fuel turned off. Secure e.g. valuable tools locked away, fuel and oil clearly labelled and stored separately, shadow board - check return. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO6.2.

Learning Outcome 2. Be able to install block surfaces

2.1 Set-out for line and level e.g. shape, features, obstacles, corners. Level accurately set out e.g. falls for drainage and camber for driveways. Excavated to sub grade as appropriate to materials being used and purpose e.g. patio / driveway and flexible or rigid construction, soft areas filled, sub-base added if necessary and compacted to level / fall.

2.2 Construct a suitable restraining edge: Suitable for purpose, bedded in appropriately and jointed e.g. kerbstone blocks. To correct line and drainage fall. Checked for level across edging. Haunched if necessary after alignment checks

2.3 Lay blocks by hand to a suitable pattern Laid on sand or mortar. Laid to course e.g. against fixed edge or to taut line. Mortar / concrete prepared and laid for workable area of bedding. Blocks handled and moved into place correctly for sand or mortar e.g. mortar - bottom / end of each block mortared, blocks pressed into bedding mortar, moved tightly against adjacent course forcing mortar into joint

2.4 Check laid blocks for alignment Alignment, level, fall, camber and block integrity checked at intervals throughout laying and adjusted if necessary. Methods of checking e.g. alignment checked visually from different directions and using string line. Methods of adjustment e.g. block extractor tool used to remove faulty blocks.

2.5 Cut-in blocks to required standard Blocks cut-in to required standard e.g. cut-outs marked, cutting equipment correctly and safely used, small cut-outs avoided. Compacted e.g. vibrating plate compactor.

2.6 Check completed surface for compliance with specifications and standards and rectify any problems as required e.g. final check against specifications - area, pattern, level, slope to drainage, camber. Standards e.g. depth below damp-proof course and BS7533 Part 3 minimum size for cut blocks

2.7 Fill joints and re-compact: Appropriate fill used. Timing - joints filled before or after compacting e.g. concrete blocks with no or minimal chamfer jointed before compacting, method of compaction.

2.8 Protect working areas effectively against weather and use until they are in a suitable condition working areas effectively protected against weather and use: Method and duration of protection e.g. plastic sheeting to protect against rain, taped off to prevent access, construction site warning signs.

2.9 Leave the site safe, tidy and suitable for intended use Safe e.g. correction of unstable / sunken blocks. Tidy e.g. mortar, grout or sand brushed off. Intended use e.g. meets specification.

2.10 Maintain effective working relations with relevant people throughout Communication with customer, staff, Local Planning Authority e.g. polite, respectful and keeping people informed. Respect for e.g. staff, property and grounds. Attitude to work e.g. keep promises, turn up on time, work to agreed plans and acceptable standard, tidy up afterwards.

Learning outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as

applicable, risk assessment and additional requirements e.g. Check with Local Authority (LPA) on position of services, requirements on paving over manhole covers, check with LPA / Environment Agency about run-off to foul water drains / sewers. Depending on depth of excavation may need to CAT scan / check position services.

3.2 Carry out work in a manner which minimises environmental damage e.g. use blocks / bricks with two presentable faces - turn over to replace stained areas, permeable paving - Sustainable Urban Drainage Systems.

3.3 Dispose of waste safely and correctly: Waste e.g. organic - green or inorganic - PPE, safe lifting.

LO4, LO5, LO6 and LO7 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to prepare for installing block surfaces

4.1 State the weather conditions that are appropriate for installation Weather conditions for working on block surfaces, working life and curing rate of mortar e.g. avoid working in frosty conditions, when temperature is above 32 degrees C or during heavy rain. Effects of weather conditions on jointing.

4.2 Describe how to calculate the number of packs of blocks required Calculate number of packs of blocks required: Measure dimensions of area to be paved and calculate total area or use computer assisted design (CAD). Consult suppliers for pack details and divide by area per pack. Factor in wastage.

4.3 Identify and explain the range of blocks available, including permeable block systems, and their suitable applications Moulded concrete blocks or kiln-fired clay bricks e.g. sizes, shapes, colours, textures, patterns and finishes for both types. Permeable block systems e.g. blocks with spacer nibs designed to make wider joints for water to drain through. Applications e.g. chamfered blocks laid in Herringbone pattern for areas that will be driven on.

Learning Outcome 5. Know how to install block surfaces

5.1 Describe how to measure to ensure work is within tolerances Blocks - Measure e.g. rest end of block against previously laid blocks, mark the bit that is over the line being cut to, factor in joint width. Ways of marking. Specification tolerances e.g. height of damp-proof course above blocks, slope of patio.

5.2 State how falls, lines and levels are determined and set out Equipment e.g. use marked pegs, straightedge and spirit level Fall e.g. mark pegs at progressively greater distances from top. Level e.g. all pegs marked at same distance from top of pegs. Lines e.g. with pegs and string or dry sand.

5.3 Explain the importance of robust edge restraints Importance e.g. prevention of lateral movement of blocks under the weight of vehicles and to delineate garden bed or lawn from the block area.

5.4 State how blocks should be stored on site, how they are delivered to the laying face, and how they are positioned for the laying operative e.g. pallets stored close to work area as possible, move to laying site by wheelbarrow (pneumatic tyres). Safety e.g. not obstructing pavements. Transport e.g. batches to at least complete each course or area. Positioning for laying e.g. spread across laid surface in order / patterns to be used and allowing space to work at laying face.

5.5 Describe the range of block patterns commonly used on site, their relative strengths and weaknesses, and how they are established covering

5.5.1 stretcher/running board

5.5.2 90º herringbone

5.5.3 45º herringbone

5.5.4 basket weave

e.g. Strengths and weaknesses - easy to lay, minimal / no cutting, suits paths and patios requiring an antiquated look and using clay or second hand pavers, less in keeping with modern houses, less popular nowadays. Establishing e.g. start at right angle corner and work along main direction of travel laying four sets of two bricks alternately rotated at 90 degrees to each other.

5.6 State the importance of mixing and randomising blocks from three or more packs prior to laying Important to spread variation of shades / textures or repeated zones of colour in multi-coloured blocks over large area to prevent noticeable patchy or zoned appearance.

5.7 Describe how areas are continuously checked for compliance to line, level, joint width and block competence during the laying process To line, e.g. blocks in courses checked for line against baseline - self checking or against adjacent blocks using taut line and/or by eye. Level e.g. straightedge and spirit level. Joint width by eye / spacer pegs / tool. Block competence checked e.g. damaged - replace or unstable / too low - lift and add mortar or sand, re-tamp. Importance of checking before jointing.

5.8 Describe how cutting-in is achieved, following the principles of minimum block size and inboard cutting techniques Inboard cutting technique: Principles e.g. competence and strength versus laying pattern. Techniques to avoid using pieces less than one third block size e.g. turn blocks through 90 degrees.

5.9 Describe the importance of final compliance checks correct jointing material: Maximising interlock e.g. importance of using right type of sand, sand grain size and shape. Types of jointing material e.g. kiln dried sand of correct size or polymeric sand - sand less expensive but allows weeds to grow / can be washed out resulting in loose paving whereas polymeric sand hardens in the joints.

5.10 State the importance of using the correct jointing material and its role in the performance of the completed surface Materials to use for dry or wet grouting, method of application, cleaning the surface, appropriate weather conditions e.g. dry grouting, use correct grade of sand, ensure sand and surface dry, soft brush into joints, sweep off surplus, delay if rain imminent to avoid sand wash out.

5.11 Describe the importance of final compliance checks Refer to LO2.6. Importance e.g. health and safety aspects, specification met, designer and customer satisfied.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be necessary for installing block surfaces refer to LO1.1

6.2 Describe methods of maintaining the equipment ready for use refer to LO 1.2&3

6.3 State the importance of dust-suppression and RPE when using a cut-off saw Health and Safety Executive (HSE) guidance - vacuum or water suppression systems. RPE essential to prevent breathing in respirable crystalline silica (RCS) and diseases e.g. silicosis.

Learning Outcome 7. Know the current health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work.

Health and Safety e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations

Provision and Use of Work Equipment Regulations, Town and Country Planning, England e.g. Town and Country Planning (General Permitted Development) (Amendment) (No 2) (England) - refer to Class F

Environmental Protection e.g. Environmental Protection Acts covering waste disposal

Codes of Practice e.g. Protecting our Water, Soil and Air,

Additional requirements e.g. Refer to LO3.1. HSE publication - Time to clear the air - protect your lungs when using cut off saws. Check grade of RPE e.g. FFP3 filtering face pieces.

7.2 Describe how environmental damage can be minimised Minimising environmental damage - refer to examples in LO3.

7.3 Describe the correct methods for disposing of organic and inorganic waste Waste disposal: Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste.

Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor - refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised installation of block surfaces giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after completion of block surface installation work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5, 6 and 7
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of block surface installation activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities

It is important that practical assessment activities are supervised appropriately

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/paving plans
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

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All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority web sites for Building Control Department
- The Paving Expert web site at http://www.pavingexpert.com/ provides comprehensive information about laying types of paving and related activities
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Identify and Report the Presence of Pests, Diseases and Disorders

Unit Reference	**K/502/1511**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to identify and report the presence of pests, diseases and disorders
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.4)** ***The learner can***
1. Identify and report the presence of pests, diseases and disorders	1.1 Monitor the crop(s) in accordance with production requirements 1.2 Correctly identify the presence of pests, diseases and disorders 1.3 Correctly identify the presence of any biological controls in use and beneficial insects 1.4 Establish the extent of the pest population, disease and any disorders 1.5 Promptly report the presence to the appropriate person
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 2.2 Carry out work in a manner which minimises environmental damage

3. Know how to identify and report the presence of pests, diseases and disorders	3.1 Describe reasons for monitoring the crop 3.2 Describe when to carry out crop monitoring 3.3 Describe common types of pests, diseases and disorders and the problems caused 3.4 Describe biological controls and beneficial insects that can be used 3.5 Identify to whom you should report the presence and extent of pests, diseases, disorders and biological control/beneficial insects
4. Know relevant health and safety legislation and environmental good practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements 4.2 Describe how environmental damage can be minimised 4.3 Describe the correct methods for disposing of waste. 4.4 Describe the health and safety risks in monitoring pests, diseases and disorders
Mapping to National Occupational Standards O29NCU78.1	

Supporting Unit Information

K/502/1511 Identify and report the presence of pests, diseases and disorders – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is field grown brassica crops. The same approach should be used for other crops.

LO1 and LO2 are the key areas of competence for this unit

Learner Outcome 1. Identify and report the presence of pests, diseases and disorders

1.1 Monitor the crop(s) in accordance with production requirements monitor is carried out effectively as instructed Refer to LO3.2; routine, planned as specified in programme; ad hoc by supervisor, during other operations, at crop stage.

1.2 Correctly identify the presence of pests, diseases and disorders Presence of pests, diseases and disorders identified. (Refer to LO3.3 for examples)

1.3 Correctly identify the presence of any biological controls in use and beneficial insects See note in LO3.

1.4 Establish the extent of the pest population, disease and any disorders Levels of pest, disease or disorder are identified and related to the action required. Level is recognised as presence, at economic injury level, at action threshold or at economic threshold.

1.5 Promptly report the presence to the appropriate person Presence is reported to supervisor, agronomist or manager; reporting face to face, by telephone, written report, electronically.

Learner Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO4.1.

2.2 Carry out work in a manner which minimises environmental damage
Refer to LO4.2.

LO3 and LO4 are the key area of knowledge for this unit

Learner Outcome 3. Know how to identify and report the presence of pests, diseases and disorders

3.1 Describe reasons for monitoring the crop early identification of problems, reducing crop damage and economic impact, reducing need for control measures, improved crop planning, and requirement of quality assurance scheme.

3.2 Describe when to carry out crop monitoring Timing of monitoring; ad hoc, with other activities, daily, weekly or less frequently; depends on season, crop sensitivity, crop stage, site history, market,

3.3 Describe common types of pests, diseases and disorders and the problems caused Examples refer to field gown brassica crops.

Pests

Cabbage root fly – root damage, loss of vigour, wilting, eventual death of plant
Aphid – sap suckers, reduce vigour, disfigurement by honey dew and black fungus, risk of virus transmission
Large and small white butterfly – leaf damage, loss of photosynthetic potential, contamination by detritus
Slugs - leaf damage – loss of photosynthetic potential, contamination by detritus; root damage – loss of vigour, wilting; stem damage – loss of translocation secondary infections in damaged tissue
Rabbit, pigeon – grazing of leaves, reducing photosynthesis, reduced value of leaf crops, destruction of young plant

Diseases

Mildews – grey appearance of leaves, loss of vigour, damage to curds of cauliflower
Club-root – swollen and distorted roots, loss of vigour, wilting
Damping off (wirestem) – darkened constricted area of stem near ground level, reduced translocation, instability and toppling , loss of vigour, destruction of young plant

Disorders

Boron deficiency – browning of core of stem, hollowing of stem, breakdown of tissue to foul smelling fluid
Whiptail – leaf blades turn thin and narrow, only midrib left,
Blindness – loss of growing point

3.4 Describe biological controls and beneficial insects that can be used
Biological control – rarely applicable on field brassica crops except the use of *Bacillus thuringiensis* for control of caterpillars.
Examples for protected crops

Aphidoletes for control of aphid, a small midge, larvae are voracious eaters of aphids

Aphidius for control of aphid, a small winged parasitic wasp, lays single eggs to parasitize immature aphids

Encarsia for control of whitefly in protected crops, a parasitic wasp, lays its eggs in young whitefly, parasitized whitefly turn dark and die.

Nematodes for control of vine weevil - Steinernema kraussei, a nematode that parasitizes vine weevil larvae preventing them from developing and damaging plants.

Beneficial insects – encouraged by providing varied habitats around growing areas; Examples – beetles – feed on eggs of slugs and other pests; lacewings and ladybirds (and their larvae) feed on aphids, bees and flies act as pollinators on crops.

3.5 Identify to whom you should report the presence and extent of pests, diseases, disorders and biological control/beneficial insects reporting to supervisor, agronomist or manager.

Learner Outcome 4. Know relevant health and safety legislation and environmental good practice

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling.

4.2 Describe how environmental damage can be minimised e.g. by carefully planning site access, working in appropriate weather conditions to avoid soil damage, early detection of problems avoiding extensive use of pesticides, biological control, integrated pest management.

4.3 Describe the correct methods for disposing of waste Organic waste – reduce waste, waste organic composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds).

Inorganic waste – wastage minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

4.4 Describe the health and safety risks in monitoring pest's diseases and disorders Exposure to pesticides in cropped areas, carrying out monitoring in working areas, risk of contact with machinery or equipment, exposure to heat, cold, UV.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1 and 2
Delivery of these learning outcomes is by supervised practical identification of pests, diseases and disorders giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

During monitoring photographs or video could be taken to provide evidence of progress. Copies of monitoring record can be used to provide evidence.

Learning Outcomes 3 and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of monitoring, monitoring records and witness testimony, answering oral or written questions, or profiles of pests diseases and disorder referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
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- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg

- Horticulture Week (www.hortweek.com*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals* by R. Wills, et al / Paperback / Published 1998
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *Nursery Stock Manual: Grower Manual 1* by Keith Lamb, et al / Paperback / Published 1995
- *A Handbook for Horticultural Students* by Peter Dawson
- *Cutting Propagation* by James L. Gibson and John M. Dole
- *Vegetable Diseases* by Steven Koike, Peter Gladders and Albert Paulus
- *The Commercial Greenhouse* by James William Boodley
- *Practical Woody Plant Propagation for Nursery Growers* by Bruce Macdonald
- *Vegetable Brassicas and Related Crucifers* by G.R. Dixon and M.H. Dickson
- *Greenhouse Operation and Management* by Paul Nelson
- Farm Horticulture by George W. Wood

Maintain the Health of Sports Turf

Unit Reference	**L/502/0397**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**38**
Unit Summary	This unit will provide the learner with the ability to demonstrate the knowledge and skills required for maintaining the health of sports turf so that it is suitable for play. It covers dealing with weeds, moss, pests, diseases and other disorders
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to select, use and maintain equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to maintain the health of sports turf	2.1 Inspect the turf as requested to identify and report conditions that threaten the health of the sports turf, which may include • weeds • pests • diseases • disorders • moss 2.2 Apply as instructed appropriate treatments safely, effectively and without damage to the surrounding areas

3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to maintain the health of sports turf	4.1 State the sources of information on turf treatments 4.2 Describe the effect of turf treatments and how to use these treatments effectively and at the appropriate time covering • physical • chemical • cultural 4.3 Describe the approved procedures for turf treatments and why it is important to follow these 4.4 Identify and describe five pests, five diseases, five disorders and their symptoms 4.5 Identify and name 15 weeds 4.6 Describe what effect the following conditions have on sports turf and why it is important to deal with them promptly • weeds • pests • diseases • disorders • moss 4.7 State who should be informed of conditions affecting sports turf and why
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for maintain sports turf 5.2 Describe methods of maintaining the range equipment ready for use

6 Know the current health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL5	

Supporting Unit Information

L/502/0397 Maintain the health of sports turf - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the assessment criteria number listed e.g. LO 1.3.

Note 2 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Where naming of weeds, pests and diseases is required either the common or botanical name will be acceptable.

One surface has been selected as an example for this unit – golf green, but there are many types of sports turf surface which require individual turf treatment.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1 Select appropriate equipment for this area of work e.g. cylinder mower, scarifier, aerator, pesticide applicator, fertiliser/top dressing applicator, roller, hole cutter, rake, brush, fork, edging shears/equipment, switch.
Select PPE e.g. steel toe-capped boots, ear defenders, gloves, protective clothing.
Selection to be according to current legislation and codes of practice e.g. CE quality standard.

1.2 Use equipment according to manufacturer's instructions and legal requirements Use equipment and PPE only for the operation and in situations as detailed by the manufacturer and in accordance with the manufacturer's/supplier's/supervisor's instructions, trained to correct level or supervised, to current legislation and codes of practice.

1.3 Prepare, maintain and store equipment in a safe and effective working condition e.g. pre start and safety checks, set blades on cylinder mower, fit appropriate tines to aerator. Maintenance e.g. cleaning, routine (check oil levels, grease), and periodic (change oil) as recommended by manufacturer. Range e.g. hand tools, mechanical equipment, power units. Store equipment e.g. safe and secure in accordance with the manufacturer's instructions and current legislation (pesticide applicators). Maintain records e.g. maintenance and repairs. Report faults e.g. to line manager.

Learning Outcome 2. Be able to maintain the health of sports turf

2.1 Inspect the turf as requested to identify and report conditions that threaten the health of the sports turf, which may include e.g. visual, findings compared with client requirements which may include

- Weeds e.g. broad leaf plants smother grasses, attract pests.
- Pests e.g. root eating insects which reduce health of and may kill grasses.
- Diseases e.g. infect grasses which reduce health of and may kill.
- Disorders e.g. soil compaction will reduce vigour of grasses.
- Moss e.g. spread and smoother grasses.

Written report identifying conditions e.g. to line manager.

2.2 Apply as instructed appropriate treatments safely, effectively and without damage to the surrounding areas Apply treatments e.g. chemicals applied safely according to current legislation, code of practice, manufacturer's instructions and guidance. Applied only in appropriate weather and soil conditions to targeted species and area using appropriate hand, powered or hydraulic equipment. Dispose of washings as required by legislation and code of practice refer to LO 6.3. Physical use of equipment, refer to LO 1.2 and 1.3. Cultural as directed by supervisor e.g. change to pH. PPE used as required by current legislation, code of practice, manufacturer's instructions and guidance, refer to LO 1.1. Keep records as required by regulations.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities and use of equipment carried out consistently to current legislation and codes of practice e.g. health and safety of self and others, PPE used refer to LO 1.1, manufacturer's instructions and guidance followed, risk assessment followed and any additional requirements.

3.2 Carry out work in a manner which minimises environmental damage e.g. use skilled staff, minimum use of powered equipment, soil condition (not too wet/dry), weather conditions (not too wet/windy), care when working near underground services (cat scan) and tree roots, avoid pollution of water and drains, non-spillage of petroleum products, apply pesticides only to targeted species, dispose of waste as required by legislation refer to LO 6.3 and any additional requirements.

3.3 Dispose of waste safely and correctly Collected waste disposed of correctly and safely as required by current legislation for the processing and disposal of waste e.g. green waste, equipment cleanings, pesticide washings, containers, packaging, refer to LO 6.3.

LO4, LO5 and LO6 are the key areas of knowledge for this unit.

Learning Outcome 4. Know how to maintain the health of sports turf

4.1 State the sources of information on turf treatments e.g. manufacturer's, trade suppliers, professional organisations, training providers, colleagues, catalogues and leaflets.

4.2 Describe the effect of turf treatments and how to use these treatments effectively and at the appropriate time covering Timing of treatments e.g. weather and growth cycle (weed treatment), soil conditions (too wet for scarifying too dry for aeration), avoid clash with player requirements.

- **Physical** e.g. removal by hand/mechanical means of weeds; Aeration e.g. drainage compaction; Scarification e.g. thatch.
- **Chemical** e.g. treatments for weed, pests and diseases; Disorders e.g. dry patch; Fertilisers e.g. nutrition levels - inorganic/organic.
- **Cultural** e.g. change to pH, removal of clipping, irrigation, drainage.

4.3 Describe the approved procedures for turf treatments and why it is important to follow these Approved procedures and treatments e.g. to current legislation and codes of practice, manufacturer's recommendations and guidelines, refer to LO 2.2. Reason e.g. quality of turf maintained, pollution avoided, and availability for user.

4.4 Identify and describe five pests, five diseases, five disorders and their symptoms Identify and describe 5 pests e.g. Leatherjackets – Tipula spp: 5 diseases e.g. Fusarium Patch – Microdochium nivale; 5 disorders e.g. compaction and the symptoms of their presence refer to LO 2.1

4.5 Identify and name 15 weeds e.g. White Clover – Trifolium repens.

4.6 Describe effect on sports turf refer to LO 2.1 and why they should be dealt with promptly

- **Weeds** e.g. maintain/improve quality of playing surface, true run and roll of ball.
- **Pests** e.g. prevent damage/death of grasses, maintain healthy growth and even surface for true run and roll of ball.
- **Diseases** e.g. prevent damage/death of grasses retain good visual appearance and quality of surface.
- **Disorders** e.g. improve water penetration, maintain vigour of grasses.
- **Moss** e.g. maintain grass cover and reduce surface sponginess

4.7 State who should be informed of conditions affecting sports turf and why Report to e.g. line manager. For action e.g. to minimise effect on turf, treat problem, isolate area.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for maintain sports turf Refer to LO 1.1.

5.2 Describe methods of maintaining the range equipment ready for use Refer to LO 1.3.

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work

- Health and Safety at Work etc Act 1974 e.g. management of health and safety and safety at work.
- Risk assessments e.g. working practices.
- Codes of practice e.g. pesticide application, use of equipment.
- Exposure records e.g. noise, vibration, pesticides.
- COSHH Regulations e.g. risk assessment and use.
- Hazardous Waste Regulations e.g. waste disposal.
- Storage e.g. pesticides, fuel, materials.
- PPE e.g. safety boots, ear defenders, protective clothing.
- Environmental Protection Act e.g. environmental protection.
- Water Pollution Act e.g. water protection.
- RIDDOR e.g. reporting requirements.
- PUWER e.g. use of plant and equipment.
- LOLER e.g. lifting operations and lifting equipment.

Any additional requirements.

6.2 Describe how environmental damage can be minimised Refer to LO 3.2.

6.3 Describe the correct methods for disposing of organic and inorganic waste Disposal of waste to current waste storage and disposal legislation e.g. Pesticide Regulations, COSHH. Organic waste - leaves and green growth e.g. compost. Inorganic waste – mineral matter, metal, glass e.g. recycle. Other methods e.g. specialist contractor (skip), Local Authority arrangements.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO) 1, 2 and 3

Delivery of these learning outcomes is by supervised practical work activities giving learners the opportunity, first to practice the various tasks involved and then to be

observed correctly doing each task to demonstrate achievement of the assessment criteria.

Learners not holding statutory qualifications to use equipment and materials to be supervised by person who is qualified to do so.

Prior to, during and after completion of activities, photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- BIGGA http://www.bigga.org.uk
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Provide Customer Service When Selling Plants

Unit Reference	**L/502/0772**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to sell plants and other products to customers. Good customer service relies on being able to communicate with customers in a variety of ways. You need to know why it is important to provide the right information and how to deal with complaints and problems
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.4)** ***The learner can***
1. Know how to provide good customer service	1.1 Source information on the products being sold 1.2 Outline the different methods of communication and describe when to use them. 1.3 Describe the different types of customer's e.g. internal, external 1.4 Describe what customers expect, what encourages them to return and why they may not come back 1.5 Explain the importance of providing customers with the right information and why product knowledge is essential 1.6 Outline the principles of customer service including opening and closing sales

	1.7 State how to deal with queries and complaints and who to refer them to
2. Be able to sell plants and products to customers	2.1 Communicate with customers in an appropriate manner 2.2 Provide appropriate information on the plants and products 2.3 Open and close sales satisfactorily 2.4 Deal with customer queries and complaints and refer to other staff as appropriate
Mapping to National Occupational Standards O29NPH15.2	

Supporting Unit Information

L/502/0772 Provide customer service when selling plants - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1 is the key areas of knowledge for this unit

Learning Outcome 1. Know how to provide good customer service

1.1 Source information on the products being sold e.g. company product catalogues, sales leaflets, current special offers and forthcoming products.

1.2 Outline the different methods of communication and describe when to use them Listening to customer e.g. to identify their requirements. Questioning e.g. to demonstrate understanding and clarify / confirm requirements. Feedback forms.

1.3 Describe the different types of customers e.g. internal, external Internal e.g. work for the company and contribute to its success / overall image and to each individual's success. External e.g. buy the products and services provided by the company and contribute to determining its profitability.

1.4 Describe what customers expect, what encourages them to return and why they may not come back e.g. competitive prices, the right product and quality for the customer, pleasant conducive environment. Return encouraged by e.g. noticeably good customer service including knowledgeable staff and good after sales care. Also encourages telling other potential customers about good experience. Customers discouraged by doing the opposites to the principles of customer service below.

1.5 Explain the importance of providing customers with the right information and why product knowledge is essential Right information e.g. helps customers to reach decisions as if they are uncertain about a product they are less likely to buy. Product knowledge is essential to efficiently guide customers to the right product(s) to meet their needs and move confidently to credible alternatives if these change.

1.6 Outline the principles of customer service including opening and closing sales Principles of customer service to internal and external customers include some of the above and:
Establishing and maintaining trust and rapport with the customer
Meeting customer expectations or solving their problem
Being polite, courteous and respectful
Providing the personal touch in responding to verbal, telephone, written or email enquiries and timeliness of response

Always being helpful even when there is no chance of a sale
Doing that 'extra thing' that makes the customer take notice of the service provided
Keeping promises etc
Ask the right type of questions to open and close sales.

1.7 State how to deal with queries and complaints and who to refer them to Queries and complaints e.g. listen carefully to what the customer is actually querying / complaining about, deal with the situation quickly and sensitively following complaints procedure and / or pass them on appropriately to supervisor or department manager.

LO2 is the key areas of competence for this unit

Learning Outcome 2. Be able to sell plants and products to customers

2.1 Communicate with customers in an appropriate manner Customers communicated with politely, courteously, respectfully and knowledgeably. Refer to methods and uses in LO's 1.1, 1.2, 1.5, 1.6, 1.7.

2.2 Provide appropriate information on the plants and products Information provided relevant to customer's expectations and at appropriate level e.g. ranging from simple identification of a requirement such as shade tolerant plants to use of labels, information sheets, internet or other reference sources to provide detailed plant care / suitability / alternative product information.

2.3 Open and close sales satisfactorily Sales opened and closed using effective questioning and follow through e.g. use the right type of questions at the right time and after asking opening or closing questions pause to allow customer response, listen to the response, be sensitive to the emotion in it and adapt further efforts accordingly.

2.4 Deal with customer queries and complaints and refer to other staff as appropriate Queries and complaints dealt with quickly, sensitively and to the satisfaction of the customer following the complaints procedure within the responsibilities of the learner e.g. damaged or diseased plants replaced or refund made. Passed on to senior staff quickly and with accurate information about the nature of the query / complaint e.g. variation on price for large order. Refer to LO1.7.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcome 1

Delivery of this learning outcome is by assessment of competence for those who have experience in this area of work or by supervised customer service activities giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

During customer service activities video or voice recordings could be taken both to provide performance feedback to the learner and also evidence of progress.

Learning Outcome 2
Delivery of this learning outcome is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of customer service activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcome 1 can be assessed practically by observation or by generation of diverse evidence. This could also link to Learning Outcome 2 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Provide Nutrients to Crops or Plants

Unit Reference	**L/502/0853**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, and skills required to provide nutrients to crops or plants
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Know how nutrients requirements vary and their method of application	1.1 Describe how nutrient requirements vary according to the crop or plant grown and stage of development 1.2 Describe the range of conditions in which nutrient stress can occur 1.3 Describe the nutrients which are commonly used in the cultivation of crops or plants 1.4 Describe the methods of providing nutrients to crops or plants 1.5 Describe the types of records required and the importance of accurate record keeping
2. Know the types of equipment required and how to maintain them	2.1 Describe the equipment which will be necessary to provide nutrients to crops or plants 2.2 Describe methods of maintaining the equipment ready for use

3. Know the current health and safety legislation and environmental good practice	3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 3.2 Describe how environmental damage can be minimised
4. Be able to provide nutrients to crops or plants	4.1 Identify the condition of plants or crops in relation to nutrient requirements 4.2 Apply nutrients correctly to maintain crop or plant growth and development as required 4.3 Provide clear and accurate information for recording purposes
5. Be able to work safely and minimise environmental damage	5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 5.2 Carry out work in a manner which minimises environmental damage
6. Be able to select, use and maintain equipment	6.1 Select appropriate equipment for this area of work 6.2 Use equipment according to manufacturer's instructions and legal requirements 6.3 Prepare, maintain and store equipment in a safe and effective working condition
Mapping to National Occupational Standards O29NPH 3.2	

Supporting Unit Information

L/502/0853 Provide nutrients to crops or plants - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – Example used in this unit is field grown brassica crops. Similar process should be applied to other crops are appropriate.

LO1, LO2 and LO3 are the key area of knowledge for this unit

LO4, LO5 and LO6 are the key areas of competence for this unit

Learning Outcome 1. Know how nutrients requirements vary and their method of application

1.1 Describe how nutrient requirements vary according to the crop or plant grown and stage of development Propagation – nutrient content and pH of growing medium, volume of medium in module, start and frequency of additional feeding to module, amount and type of feed applied, changes prior to transplanting. Field grown crop – existing nutrient and pH levels in soil, added base fertility as lime (White or mag lime), organic matter, organic fertilizers or granular fertilizer, top dressing (liquid or granular) during crop growth.

1.2 Describe the range of conditions in which nutrient stress can occur low fertility, dry conditions, free draining sandy soils with low soil organic matter content, imbalance of nutrients, high conductivity in soil, salinity, low temperature preventing uptake, root damage by pest or disease, underdeveloped roots, root damage during transplanting, mechanical damage by post planting operations.

1.3 Describe the nutrients which are commonly used in the cultivation of crops or plants

pH – optimum pH varies with plant type, brassica crops prefer high pH (alkaline) conditions

Nitrogen (usually as nitrates) – promotes vigorous leaf growth and strong leaf colour

Phosphorous (phosphates) promote root growth

Potassium (potash) – promotes flowering and fruiting.

Magnesium – can be deficient in wet soils due to leaching, high potash or acid

soils (plants unable to absorb)
Boron – required only in small quantities but can be deficient in some soils, serious impact on brassica crops (Browning and collapse of stems from centre).

1.4 Describe the methods of providing nutrients to crops or plants Nutrient incorporated into growing media or as an additive
Limestone – as ground limestone to raise pH of soil
Green manures – crops grown to improve fertility then returned into soil;. Provide nutrient by fixing atmospheric nitrogen, recycling nutrients from lower layers of soil or to by taking up free nutrients to prevent loss through leaching in winter. (examples – phacelia, clovers, field beans, rye)
Application of bulky organic matter containing nutrients – nutrients available as organic
matter breaks down (examples farm yard manures, composted vegetable matter,
municipal green waste)
Organic fertilizers (Bone meal, seaweed based, pelleted manures)
Artificial fertilizers; straights (muriate of potash, rock phosphate) as powders or granules;
Compounds containing NP&K (e.g. 15; 10; 10) available as powders, granules or liquid formulation with or without trace elements. Liquids available for direct injection or application through irrigation systems. Slow release fertilizers

1.5 Describe the types of records required and the importance of accurate record keeping Records – details of results of testing of soil or growing media for nutrient/pH, application records (date, amount, type) Importance of records - to check effectiveness of nutrient application, identify problems in nutrient levels, to analyse changes in the crops, reduce nutrient use, aid future management of the crop, meet requirements of assured produce schemes, certification, land stewardship schemes, nutrient budgeting.

Learning Outcome 2. Know the types of equipment required and how to maintain them

2.1 Describe the equipment which will be necessary to provide nutrients to crops or plants Green manures – cultivation machinery and seeders (broadcast or drills) to establish, mowers to cut vegetation and facilitate turning in,
Bulky organic matters – forks and wheelbarrows, manure spreaders, loaders,
Granular fertilizers and powders – hand operated or tractor mounted spreaders (Spinner, oscillating spout), placement applicators
Liquid fertilizers – irrigation equipment, diluters, injectors.
Liquids (field scale) – direct injection equipment

2.2 Describe methods of maintaining the equipment ready for use Daily checking and cleaning as required of all equipment, lubrications of machinery as directed by manufacturer, periodic servicing of power units; thorough cleaning

and removal of fertilizers to prevent corrosion of fertilizer application equipment, checking and cleaning all other equipment after use to ensure readiness for next operation.

Learning Outcome 3. Know the current health and safety legislation and environmental good practice

3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Nitrate Sensitive Zones, Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling, Stop Safe.

3.2 Describe how environmental damage can be minimised minimising soil damage, avoiding run-off from erosion and roads or tracks, compliance with Environment Agency requirements and advice, limits to use of Nitrogen fertilizer, timing to ensure rapid use of soluble fertilizers, avoiding periods when heavy rainfall is likely to cause run-off, careful storage and use of bulky organic matters in line with EA recommendations, rapid incorporation of organic matter to reduce loss to atmosphere, control of unused packaging, disposal of unwanted materials as appropriate (disposal through licensed waste disposal agent).

Learning Outcome 4. Be able to provide nutrients to crops or plants

4.1 Identify the condition of plants or crops in relation to nutrient requirements growth stage, programmed nutrient requirements, observation of crop condition, analysis results (Refer to LO1.1).

4.2 Apply nutrients correctly to maintain crop or plant growth and development as required refer to LO1.3 & LO1.4.

4.3 Provide clear and accurate information for recording purposes Clear and accurate information is provided by reporting to supervisor, agronomist or manager or recording according to requirements (refer to LO1.5).

Learning Outcome 5. Be able to work safely and minimise environmental damage

5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO3.1.

5.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised See LO3.2.

Learning Outcome 6. Be able to select, use and maintain equipment

6.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats, face and eye protection, ear defenders, dust masks. Tools and equipment selected and used Refer to LO2.1 for examples.

6.2 Use equipment according to manufacturer's instructions and legal requirements Manufacturer's / supplier's / supervisor's instructions followed for use of tools / equipment (Refer to LO2.1 & LO3.2).

6.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment; See LO2.2 for detail.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1 and 2
Delivery of these learning outcomes is by supervised practical work providing nutrient to crop or plants giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of the work photographs or video could be taken to provide evidence of progress. Copies of monitoring and application records or reports can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 3 and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of providing nutrient to crop or plants, monitoring records and reporting sheets and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised competently and appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/soil analysis/records of fertiliser application
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment

- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998

- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *Nursery Stock Manual: Grower Manual 1* by Keith Lamb, et al / Paperback / Published 1995
- *The Compost Book* by David Taylor, et al / Hardcover / Published 1994
- *A Handbook for Horticultural Students* by Peter Dawson
- *Soil Science and Management* by Edward J. Plaster
- *The Commercial Greenhouse* by James William Boodley
- *Vegetable Brassicas and Related Crucifers* by G.R. Dixon and M.H. Dickson
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood
- *Farm Machinery* (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684
- *Profitable Farm Mechanisation* by Claude Culpin ISBN-13: 9780258969847

Carry Out Harvesting Operations

Unit Reference	**L/502/0951**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, and skills required to enable learners to carry out harvesting operations. The term harvesting is used to mean removing products from crops. Harvesting method will depend on the type of crop and may be either mechanical or manual. The unit does not cover collecting plants for dispatch or sale which is covered by a separate unit.
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.6)** ***The learner can***
1. Know how to identify crops that are ready for harvesting	1.1 State how to identify the stage at which the crops should be harvested 1.2 Describe why it is important to be able to recognise when the crops is not ready for harvesting 1.3 State the optimum time available for harvesting the crops and acceptable rates of harvesting 1.4 State why customer specifications are important
2. Know how to harvest crops	2.1 List the production requirements for harvesting different crops 2.2 Describe the methods, mechanical or manual, for harvesting crops

	2.3 Describe how to maximise/maintain the quality of the crops during and post harvesting 2.4 State why it is important to maintain levels of hygiene during harvesting and how this can be achieved 2.5 State the types of problems which can occur during harvesting and how to deal with these covering • access • equipment • staffing • adverse weather conditions • soil conditions 2.6 Describe factors that could affect the rates at which harvesting can take place 2.7 State the records to be kept and the reasons for completing these
3. Know the types of equipment required and how to maintain them	3.1 Describe the equipment which will be necessary for harvesting the crop 3.2 Describe methods of maintaining the equipment ready for use
4. Know the current health and safety legislation and environmental good practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 4.2 Describe how environmental damage can be minimised 4.3 Describe the correct methods for disposing of organic and inorganic waste
5. Be able to work safely and minimise environmental damage	5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice 5.2 Carry out work in a manner which minimises environmental damage 5.3 Dispose of waste safely and correctly

6. Be able to select, use and maintain equipment	6.1 Select appropriate equipment for this area of work 6.2 Use equipment according to manufacturer's instructions and legal requirements 6.3 Prepare, maintain and store equipment in a safe and effective working condition
7. Be able to harvest crops	7.1 Correctly identify the crop which is to be harvested and check that it is ready for harvesting 7.2 Inform the appropriate person if the condition of the crop is not suitable for harvesting 7.3 Handle the harvested crop in a way which maintains quality and minimises damage 7.4 Maintain suitable levels of hygiene during harvesting 7.5 Harvest at a commercial rate in accordance with production requirements to meet planned deadlines 7.6 Provide clear and accurate information for recording purposes
Mapping to National Occupational Standards O29NPH4.1	

Supporting Unit Information

L/502/0951 Carry out harvesting operations - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Note 2 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 3 – The example used in this indicative content is lettuce. The same approach should be used for other crops.

LO1, LO2, LO3 and LO4 are the key area of knowledge for this unit

Learning Outcome 1. Know how to identify crops that are ready for harvesting

1.1 State how to identify the stage at which the crops should be harvested e.g. size, weight, size, colour, and maturity, weather and ground conditions.

1.2 Describe why it is important to be able to recognise when the crops is not ready for harvesting Not ready for harvest as undersize, under-weight, under-ripe, damaged by pest, disease or disorder giving rise to low quality, limited storage, excessive grade-out, dissatisfied customers or loss of income, reputation.

1.3 State the optimum time available for harvesting the crops and acceptable rates of harvesting Optimum harvesting time; time of day, day of week or season, weather or ground conditions, crop condition. Harvest rates; spot rates, overall rates; rates affected by gang size and equipment requirements, amount of selection, trimming and packing required.

1.4 State why customer specifications are important statutory grading requirements; customer specifications for quality, size, timing; loss of income, loss of custom.

Learning Outcome 2. Know how to harvest crops
Example used is lettuce

2.1 List the production requirements for harvesting different crops programming of propagation and planting to ensure crops are ready in sequence, crop preparation needed for harvest (e.g. irrigation), availability of harvesting aids, transport and packhouse facility, skills and labour levels for harvesting.

2.2 Describe the methods, mechanical or manual, for harvesting crops harvesting methods for lettuce. Mechanical; fully mechanised harvesting, manual harvesting with use of harvesting aids, use of rigs for harvesting and packing; Manual harvesting including cutting, trimming and cleaning with or without hand packing or wrapping in the field, packing in market boxes or bulk boxes.

2.3 Describe how to maximise/maintain the quality of the crops during and post harvesting Quality of product governed by timeliness, harvest conditions (temperature, water content), correct use of harvesting aids and skill level of operators, post-harvest handling to avoid degradation, control of temperature and humidity during field storage and transport to packhouse or sales area.

2.4 State why it is important to maintain levels of hygiene during harvesting and how this can be achieved Hygiene levels; reducing causes of contamination; use of appropriate clothing/PPE, soil, weeds and damaged plant material. Impact on harvest rate, product quality, storage and sale value. Prevention of contamination by appropriate crop spacing, mechanisation, skill of operators.

2.5 State the types of problems which can occur during harvesting and how to deal with these covering Problems likely to arise during harvest to include Difficulties in accessing the site and crop within the site. Avoid by choice of site, timeliness, use of appropriate machinery and equipment.

Breakdowns and damage to crops by equipment. Correct choice of equipment and appropriate maintenance prior to and during operations to reduce breakdowns and damage to crops.

Staff training and supervision of staff to avoid damage to crops, wastage and to maintain acceptable rates of operation

Monitoring weather and ground conditions during operations; Changing working practice in response to adverse changes in weather (rainfall, lightening, frost, high temperatures, wind).

Changing working practice in response to changes in ground conditions (wet ground and water logging, frost, damage to structure by machinery, damage and contamination to crops).

2.6 Describe factors that could affect the rates at which harvesting can take place changes to rate of operation resulting from variations within the crop, weather and soil conditions, machine or equipment failure or malfunction, skill level, operator fatigue,

2.7 State the records to be kept and the reasons for completing these Records of harvesting; field and gang records, quantity, timing, quality; reporting in person face to face or by telephone, or recording by written notes or approved recording form or electronically as required by the organisation; report to include details of harvested amounts and timing by area, variety, person, team as appropriate; and problems arising. Records used for planning of marketing, crop yields, inputs to storage, customer required audit trails.

Learning Outcome 3. Know the types of equipment required and how to maintain them

Example used is lettuce

3.1 Describe the equipment which will be necessary for harvesting the crop Range of machinery for harvesting of lettuce; complete harvesters, Harvesting Aids such as rigs; trailers and pallet handlers for transporting and handling harvested crop, cutting and wrapping equipment.

3.2 Describe methods of maintaining the equipment ready for use Daily checking and cleaning as required of all equipment to avoid contamination of the harvested product, lubrications of machinery as directed by manufacturer, periodic servicing of power units; sharpening of cutting equipment; checking and cleaning all equipment after use to ensure readiness for next operation.

Learning Outcome 4. Know the current health and safety legislation and environmental good practice

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling, Stop Safe

4.2 Describe how environmental damage can be minimised minimising soil damage, avoiding run-off from erosion and roads or tracks, compliance with Environment Agency requirements and advice, control of unused packaging, disposal of unwanted plant material as appropriate (see 4.3).

4.3 Describe the correct methods for disposing of organic and inorganic waste Organic waste – reduce waste removed from harvest area, plant material returned to crop area or composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

LO5, LO6 and LO7 are the key areas of competence for this unit

Learning Outcome 5. Be able to work safely and minimise environmental damage

5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO4.1.

5.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised See LO4.2.

5.3 Dispose of waste safely and correctly see LO4.3.

Learning Outcome 6. Be able to select, use and maintain equipment
Exemplar is lettuce

6.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats.
Tools and equipment selected and used Refer to LO3.2 for examples

6.2 Use equipment according to manufacturer's instructions and legal requirements Manufacturer's / supplier's / supervisor's instructions followed for use of tools / equipment (Refer to LO3.1).

6.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment; See LO3.2 for detail.

Learning Outcome 7. Be able to harvest crops Example used is lettuce

7.1 Correctly identify the crop which is to be harvested and check that it is ready for harvesting See LO2.7. Suitable environmental conditions such as weather and ground state are identified.

7.2 Inform the appropriate person if the condition of the crop is not suitable for harvesting Crop not suitable for harvesting reported to supervisor, manager or other appropriate person as being undersize, under-weight, under-ripe, damaged by pest, disease or disorder.

7.3 Handle the harvested crop in a way which maintains quality and minimises damage the harvested crop handled in a way which maintains quality and minimises damage by methods detailed in LO2.2.

7.4 Harvest at a commercial rate in accordance with production requirements to meet planned deadlines See LO 2.4 for methods
Harvesting carried out at a commercially acceptable spot rate and overall rate subject to effect of gang size and equipment requirements, amount of selection, trimming and packing required.

7.5 Provide clear and accurate information for recording purposes Crop harvested recorded or reported on to supervisor or appropriate person (refer to LO2.7)

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of harvesting, harvesting records and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Learning Outcomes 5, 6, and 7
Delivery of these learning outcomes is by supervised practical harvesting work giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of harvesting photographs or video could be taken to provide evidence of progress. Copies of harvest record can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised competently and appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

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Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications *(*http://www.defra.gov.uk/hort/index.htm*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- The Complete Book of the Greenhouse *by* Ian G. Walls, et al / Paperback / Published 1996
- Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals by R. Wills, et al / Paperback / Published 1998
- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- Nursery Stock Manual: Grower Manual 1 by Keith Lamb, et al / Paperback / Published 1995
- A Handbook for Horticultural Students by Peter Dawson
- Vegetable Diseases by Steven Koike, Peter Gladders and Albert Paulus
- The Commercial Greenhouse by James William Boodley
- Practical Woody Plant Propagation for Nursery Growers by Bruce Macdonald
- Vegetable Brassicas and Related Crucifers by G.R. Dixon and M.H. Dickson
- Greenhouse Operation and Management by Paul Nelson
- Farm Horticulture by George W. Wood
- Farm Machinery (Resource Management) (5th Edition) by Brian Bell ISBN 13:9781903366684

Establish Interior Plant Displays

Unit Reference	**L/502/1176**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to establish natural interior plant displays. It covers making sure the displays are positioned to take account of the plants and the environmental conditions. The learner will be able to select, handle and transport the necessary materials and will ensure displays have the required visual impact The use of equipment and chemicals must meet the requirements of legislation and codes of practice.
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to select, use and maintain equipment for establishing interior plant displays	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to install interior plant displays	2.1 Handle and transport plants and materials safely and efficiently including Materials • nutrients • containers • irrigation systems Plants • tropical

	• temperate • shade lovers • sun lovers 2.2 Maintain the plants and materials in a condition fit for use 2.3 Install features that enhance the visual impact of the display and avoid damage to the environment 2.4 Group and position plants appropriately according to environmental conditions including • adjacent features • light • humidity • air movement • temperature 2.5 Use methods of support that are consistent with the intended purpose of the display 2.6 Minimise the damage to plants, features and surrounding areas 2.7 Reinstate the site to the customer's satisfaction
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to install interior plant displays	4.1 Describe how to handle and transport the following materials safely and efficiently • nutrients • containers • irrigation systems 4.2 Describe how to position water and non-water features in a way which enhances the display and avoids damage to the environment

	4.3 Describe how to group and position the plants listed below in a way which is appropriate to them, the environment and the intended visual impact: Plants • tropical • temperate • shade lovers • sun lovers Environment • adjacent features • light • humidity • air movement • temperature 4.4 Describe how to make sure support methods are consistent with the display and the health and vigour of the plants 4.5 State why it is important that the site is reinstated to the client's satisfaction and how to judge whether this has been done
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be necessary for establishing interior plant displays 5.2 Describe methods of maintaining the equipment ready for use
6. Know the current health and safety legislation and environmental good practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL8.2	

Supporting Unit Information

L/502/1176 Establish Interior Plant Displays – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment for establishing interior plant displays

1.1&3 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, gloves. CE marked. Tools and equipment selected e.g. hand fork / trowel, watering can, trickle / drip feed system, scissors / small secateurs, plant containers, baskets, pots, supports / ties.

1.2&3 Use equipment according to instructions / **Prepare, maintain and store equipment in a safe and effective working condition** Equipment used only for the operation and in situations as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. small secateurs - blades sharpened. Use e.g. do not cut above recommended thickness or twist secateurs when cutting. Maintenance e.g. clean blades after use to remove sap, oil blades and mechanism. Storage e.g. shadow board - check return, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance / repairs. Report faults - line manager. Refer LO 5.2.

Learning Outcome 2. Be able to install interior plant displays

2.1 Handle and transport plants and materials safely and efficiently including materials

Materials

- **Nutrients** Handled e.g. using gloves and dust mask if appropriate. Transported e.g. loaded to avoid crushing of nutrient sticks. Safely e.g. clearly labelled. Efficiently e.g. in separate stackable water tight containers
- **Containers** Handled e.g. correct manual handling, aids used. Transported e.g. loaded and secured to avoid movement. Safely e.g. chips or breakage avoided by padding. Efficiently e.g. unfilled stacked inside each other and resting on widest base
- **Irrigation systems** Handled e.g. avoid tangling tubes. Transported e.g. parts packed in separate clearly labelled containers. Safely e.g. loaded to

avoid crushing / bending of tubes. Efficiently e.g. parts that fit together loaded together

Plants

- **Tropical** Handled e.g. protected from cold by wrapping in newspaper. Transported e.g. in cold weather vehicle heated before plants loaded. Safely e.g. plants fully covered, no exposure to cold. Efficiently e.g. rapid move on arrival at display site
- **Temperate** Handled e.g. care not to bruise stem / leaves / roots. Transported e.g. tall plants secured and lying on sides. Safely e.g. cover roots to protect from drying / damage. Efficiently e.g. bare root rather than potted to save space
- **Shade lovers** Handled e.g. protected by wrapping in roll of newspaper and surrounded by plastic to retain moisture. Transported e.g. do not allow sun to beat down on plants through windows. Safely e.g. optimise timing of handling / transport to avoid heat of midday. Efficiently e.g. fern rolls clearly labelled
- **Sun lovers** Handled e.g. pick up cacti in pot. Transported e.g. cacti transported dry and wrapped in / cushioned by newspaper. Safely e.g. cacti - use gloves or paper band for prickly cacti. Efficiently e.g. in pots held in transport pallets, boxed

2.3 Maintain the plants and materials in a condition fit for use Plants e.g. provided with correct sunlight / shade, temperature, humidity, air flow, watered and fed, diseases / disorders promptly treated, pruned / groomed. Materials e.g. maintained, cleaned, labelled and stored securely when not in use.

2.4 Install features that enhance the visual impact of the display and avoid damage to the environment Features installed that enhance the visual impact of the display e.g. tiered staging, table, shelf, pedestal / vertical display, container - shapes, sizes, materials, sculpted, multiple planters, hanging basket, water - fountains, waterfalls, ponds. Damage to the environment avoided e.g. trickle feed systems fitted with timers, natural light used wherever possible.

2.5 Group and position plants appropriately according to environmental conditions including

- **Adjacent features** e.g. standard arrangements based on tall foliage or climbing plants such as kentia palm or philodendrons at back and shorter flowering plants such as begonias, cyclamen, and poinsettia at front. Positioning may also be used to enhance appearance of adjacent fixed features e.g. soften lines of window.
- **Light** e.g. light loving flowering plants / cacti and succulents adjacent to window, plants that prefer shade such as aspidistra, philodendron away from window
- **Humidity** e.g. centrally heated bathroom good for plants such as caladium and bromeliads - refer also to LO4.3.
- **Air movement** e.g. plants such as pelargoniums, fatsia positioned by open windows in summer. Poinsettia positioned away from hot or cold draughts

- **Temperature** e.g. cacti and succulents tolerant to temperature fluctuations. Most indoor plants grow well within temperature range 13 to 24 degrees C. Group plants e.g. such as aspidistra, hedera, yucca if tolerance needed of lower temperatures - down to 4 degrees C. Tender plants will start to fall below 15 degrees C e.g. anthurium, syngonium.

2.6 Use methods of support that are consistent with the intended purpose of the display Methods of support used consistent with the intended purpose of display e.g. trailing plants such as jasminum types supported by wire hoop(s) to add interest and present flowers for dispersal of scent.

2.7 Minimise the damage to plants, features and surrounding areas Damage to plants, features and surrounding areas minimised e.g. damage to plants from drafts / excessive air flow and features from people passing or carrying out activities minimised by careful placing (refer to LO2.4), drip trays placed to avoid seepage or staining from the base of pots / containers, need for manual watering removed by use trickle feed systems avoiding possibility of water splashes on floor, furniture, paperwork.

2.8 Reinstate the site to the customer's satisfaction Furniture replaced, site function fully restored, site left tidy and clean.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable, risk assessment and additional requirements.

3.2 Carry out work in a manner which minimises environmental damage e.g. trickle feeders used with timer to conserve water, grey water used where possible, use of natural rather than artificial light, recycling/reuse.

3.3 Dispose of waste safely and correctly Waste disposed of correctly and safely: Waste e.g. organic - green or inorganic - worn out pots or containers, watering tubing. Correctly - refer to LO 6.3. Safely e.g. PPE, safe lifting.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to install interior plant displays

4.1 Describe how to handle and transport the following materials safely and efficiently - refer to LO 2.1.

4.2 Describe how to position water and non-water features in a way which enhances the display and avoids damage to the environment positioning water and non-water features to enhance display. Aesthetic considerations e.g. moving / still water, sound or non-water - solitary or grouped, patterns,

heights, complementary / contrasting foliage / flowers, lighting of both types of feature. Provision of services e.g. water supply / overflow, artificial light. Accessibility for servicing e.g. to check pumps and change filters or for watering, grooming. Avoiding damage to environment e.g. adequate support for weight of water feature / feature, timed water application to avoid wet areas - slipping hazard or damage to carpets / structure, positioning to avoid tripping or catching hazards and adverse effect on people traffic flow around feature.

4.3 Describe how to group and position the plants listed below in a way which is appropriate to them, the environment and the intended visual impact:

4.4 How to group and position plants. Individual plants positioned in locations that will meet their environmental needs. Plant types with compatible environmental needs grouped and positioned together for ease in meeting their needs / maintenance. Refer to LO2.4 e.g. tropical plants such as philodendrons and dracaenas prefer a warm area, light shade to moderate brightness and a humid atmosphere. Plants positioned to support and enhance the performance of adjacent plants e.g. shade loving placed below tall plants, plants placed in water filled tray /container to provide humidity for surrounding plants, spacing increased to improve air movement. Appropriate to the intended visual impact e.g. foliage / flower / fruit, climbing / spreading / hanging, complementary or contrasting.

4.5 Describe how to make sure support methods are consistent with the display and the health and vigour of the plants Support methods consistent with the display e.g. compatibility of size with pot / container and plant. Type and degree of support needed e.g. moss pillar for plants with aerial roots or bamboo tripod to encourage climbers. Aesthetics e.g. visibility and appearance of support against plant. Health and vigour e.g. prevention of undesirable trailing / spreading modes of growth that might encourage disease / detract from display, correct size to support continuing growth, care not to damage roots when inserting.

4.6 State why it is important that the site is reinstated to the client's satisfaction and how to judge whether this has been done Importance of reinstating site to client's satisfaction e.g. to fully meet specification, reputation, likelihood of ongoing maintenance work, health and safety - not leaving tripping hazards. Judge client's satisfaction with completion using formal procedures such as check against specification, questionnaire, checklist tick off and customer's verbal response and body language. Refer to LO2.7.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be necessary for establishing interior plant displays refer to LO1.1.

5.2 Describe methods of maintaining the equipment ready for use Maintenance e.g. drip / trickle feeder - clean filter and ensure pipes / nozzles do not get blocked - follow manufacturer's instructions and schedules.

Learning Outcome 6. Know the current health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work Health and Safety e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Environmental Protection e.g. Environmental Protection Acts covering waste disposal.

6.2 Describe how environmental damage can be minimised refer to examples in LO3.2.

6.3 Describe the correct methods for disposing of organic and inorganic waste Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. Refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3

Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised establishment of interior plant displays giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after completion of establishment work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5 and 4

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of the establishment of a

plant display and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/positioning and grouping plans
- Witness statements
- Taped evidence (video or audio)

- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations

Establish Propagation Material

Unit Reference	**L/502/1498**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required for establishing the propagation material in a growing environment. It covers the methods required to promote plant development including watering, temperature and humidity control
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.2)** ***The learner can***
1. Be able to establish propagation material	1.1 Use and prepare the required rooting medium in accordance with instructions 1.2 Handle plant material in a manner which minimises damage and wastage, and optimises growth 1.3 Position propagation material in the required rooting medium 1.4 Promote plant development after propagation in accordance with instructions using at least two of the following • watering • temperature control • humidity control • removal of diseased material
2. Be able to maintain accurate records	2.1 Provide clear and accurate information for recording purposes

3. Know how to maintain accurate records	3.1 Identify the types of records required and explain the importance of accurate record keeping
4. Be able to work safely and minimise environmental damage	4.2 Work in a way which maintains health and safety and is consistent with relevant legislation, hygiene, codes of practice and any additional requirements 4.3 Carry out work in a manner which minimises environmental damage 4.4 Dispose of waste safely and correctly
5. Be able to select, use and maintain relevant equipment	5.1 Select appropriate equipment for this area of work 5.2 Use equipment according to relevant legislation and manufacturer's instructions 5.3 Prepare, maintain and store equipment in a safe and effective working condition
6. Know how to establish propagation material	6.1 Describe the different types of rooting material how these should be handled 6.2 Describe the correct positioning of propagation material 6.3 Describe all the methods of promoting plant development • watering • temperature control • humidity control • removal of diseased material 6.4 Describe the types of growing and rooting environments 6.5 State the importance of weaning crops before transplanting between different environments
7. Know relevant health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements

	7.2 Describe how environmental damage can be minimised 7.3 Describe the correct methods for disposing of waste 7.4 State the need for hygiene throughout the propagation process
8. Know the types of equipment required and how to maintain them	8.1 Describe the equipment which will be required for the activity 8.2 Describe the methods of maintaining the range of equipment
Mapping to National Occupational Standards 029NCU72.3	

Supporting Unit Information

L/502/1498 Establish propagation material - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

LO1, LO2, LO4 and LO5 are the key areas of competence for this unit

LO3, LO6, LO7 and LO8 are the key area of knowledge for this unit

Learning Outcome 1. Be able to establish propagation material

1.1 Use and prepare the required rooting medium in accordance with instructions Rooting medium is prepared in accordance with instructions (refer to LO6.1).

1.2 Handle plant material in a manner which minimises damage and wastage, and optimises growth Plant material is handled and treated in a manner which minimises damage and wastage, and optimises growth (refer to LO6.1 & LO6.2).

1.3 Position propagation material in the required rooting medium Propagation material positioned in the growing medium and facility as instructed or according to propagation programme (Refer to LO6.2 and LO6.4).

1.4 Promote plant development after propagation in accordance with instructions using at least two of the following (See LO6.3).

- **Watering**
- **Temperature control**
- **Humidity control**
- **Removal of diseased material**

Learning Outcome 2. Be able to maintain accurate records

2.1 Provide clear and accurate information for recording purposes Clear and accurate records of propagation activities and after-care of propagation material are generated (refer to LO3.1).

Learning Outcome 3. Know how to maintain accurate records

3.1 Identify the types of records required and explain the importance of accurate record keeping source of plant material, date, time, number of plants propagated, type, date, who did it, treatments, location, monitoring reports, problems encountered including incidence of pest and disease and environmental conditions and action taken.
Reported to supervisor, manager or propagator either verbally face to face or by telephone, or by written note or record on propagation programme.
Recorded or reported in writing, or electronically.
Records required to ensure adherence to propagation programme, enable action to be taken in event of shortages of other problems, future management of crop.

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with relevant legislation, hygiene, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO7.1.

4.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised See LO7.2.

4.3 Dispose of waste safely and correctly see LO7.3.

Learning outcome 5. Be able to select, use and maintain relevant equipment

5.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats.
Tools, equipment and facility selected and used Refer to LO8.1 for examples.

5.2 Use equipment according to relevant legislation and manufacturer's instructions Manufacturer's / supplier's / supervisor's instructions followed for use of tools / equipment/facility (Refer to LO8.1).

5.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation, maintenance and storage of tools / equipment; (See LO8.2 for detail).

Learning Outcome 6. Know how to establish propagation material

6.1 Describe the different types of rooting material and how these should be handled
Cuttings – (Softwood, semi-ripe, root, leaf) Placed in suitable growing medium as soon as possible after preparation, protect from moisture loss, root-zone

warming, shading, monitoring for pests, disease, disorder, environmental conditions, root development; removal of damaged material, varying environmental conditions as roots develop. (Hardwood) – placed in bin or box as required, protect from pests (especially vermin), lined out, kept weed-free, watered as required.

Budding and grafting – sealing to prevent the union drying out, maintaining vigorous growth of the stock plant, monitoring, and heating of the graft (hot air or hot pipe) to stimulate cambium activity.

Micro-propagation – maintenance of the environment, continuing hygiene regime, monitoring of environmental conditions, varying conditions as cells develop and differentiate, removal and potting on into controlled growing room/area, manage as rooting cuttings.

Division – Placed in suitable growing medium as soon as possible after preparation, protect from moisture loss, shading, monitoring for pests, disease, disorder, environmental conditions, root and shoot development; removal of damaged material, varying environmental conditions as new plants develop.

6.2 Describe the correct positioning of propagation material

Cuttings – depth, orientation, spacing or positioning within the module/container, choice of growing medium, use of appropriate facility for protection from moisture loss, temperature variations, pest, disease, and damage.

Budding and grafting – choice of field/beds/nursery area, spacing of stocks in beds/field or size of container, positioning of irrigation system and support system if appropriate, positioning of hot air/hot pipe system (for grafting)

Micro-propagation – placing in appropriate growing media and container, positioning within growing cabinet/room, removal to growing area, potting up and care as for cuttings.

Division – depth, orientation, spacing or positioning within the module/container, choice of growing medium, use of appropriate facility for protection from moisture loss, temperature variations, pest, disease, damage.

6.3 Describe all the methods of promoting plant development

- **Watering** use of mist, humidifiers, shading and covers to maintain humidity, use of overhead irrigation or hand watering to maintain developing cuttings or divided plants or stocks in container
- **Temperature control** use of heating, ventilation, shading, thermal screens manually or by environmental control system to control temperatures in protected growing areas, use of root zone warming, graft heating by hot air or hot pipe, use of windbreaks to retain temperature within the outdoor growing areas,
- **Humidity control** use of heating, ventilation, shading, thermal screens manually or by environmental control system to control humidity in protected growing areas, use of sealants to prevent drying out of grafts and budding, use of polythene or fleece covers to maintain humidity in growing

areas, use of windbreaks to reduce moisture loss from outdoor growing areas.

- **Removal of diseased material** routine monitoring of plants in propagation facility, growing cabinets/rooms or fields/beds, identifying of material damaged by disease, (or pest, drying out, water logging) removal of damaged material (part of plant, single plant, batch of plants or entire crop).

6.4 Describe the types of growing and rooting environments Location; open ground, beds, and containers outdoor or protected. Growing media – soil, sand, perlite, vermiculite, grits, mixtures including peat based and peat free, addition of wood products, inert materials, (sand, grit, vermiculite), coir, green waste. Environments – outdoor/protected areas, sheltered beds, shade houses, polythene tunnels, glasshouses, growing cabinets and rooms.

6.5 State the importance of weaning crops before transplanting between different environments Weaning crops before transplanting (or moving) between environments – impact of changes of temperature and humidity, increased water loss from plant (lower ambient humidity, increased wind-flow over crop), root damage reducing ability to absorb water, reduced incidence of disease and pest, improved light levels increasing potential for photosynthesis.

Learning Outcome 7. Know relevant health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health & Safety at Work Regulations; protective clothing and application equipment cleaned following use as specified in Code of Practice for Using Plant Protection Products, Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling.

7.2 Describe how environmental damage can be minimised minimising soil damage, avoiding run-off from erosion and roads or tracks, compliance with Environment Agency requirements and advice, control of unused packaging, disposal of unwanted plant material as appropriate (see LO7.3).

7.3 Describe the correct methods for disposing of waste Organic waste – reduce waste removed from plant area, unwanted plant material composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

7.4 State the need for hygiene throughout the propagation process the need for hygiene throughout the propagation process; - reduce incidence of pests and diseases, reduce rate of spread of pests and diseases, improve efficiency of propagation, improve plant health.

Learning Outcome 8. Know the types of equipment required and how to maintain them

8.1 Describe the equipment which will be required for the activity Equipment required for propagation; cutting equipment (knives, secateurs, specialised graft cutters), irrigation equipment (overhead, cans, hosepipes, mist systems or humidifiers) protected growing areas (outdoor/protected areas, sheltered beds, shade houses, polythene tunnels, glasshouses, growing cabinets and rooms.

8.2 Describe the methods of maintaining the range of equipment Daily checking and cleaning as required of all equipment to avoid contamination of the propagation material, sharpening of cutting equipment; checking and cleaning all facilities after use to ensure readiness for next operation.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 4 and 5
Delivery of these learning outcomes is by supervised practical work establishing propagation material giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of the work photographs or video could be taken to provide evidence of progress. Copies of propagation/growing/monitoring records can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 3, 6, 7 and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work establishing propagation material, propagation/growing and monitoring records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding

- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
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- *Soil Science and Management* by Edward J. Plaster
- *The Commercial Greenhouse* by James William Boodley
- *Practical Woody Plant Propagation for Nursery Growers* by Bruce Macdonald
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood

Collect and Prepare Propagation Material

Unit Reference	**L/502/1503**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to collect propagation and preparing the propagation material. It covers the different methods of propagation
Learning Outcomes (1 to 10) ***The learner will***	**Assessment Criteria (1.1 to 10.2)** ***The learner can***
1. Be able to collect propagation material	1.1 Collect propagation material in accordance with instructions 1.2 Check the collected material meets the requirements of the propagation programme 1.3 Store collected material in accordance with instructions
2. Be able to prepare propagation material	2.1 Handle plant material in a manner which minimises damage and wastage, and optimises growth 2.2 Use a suitable propagation method •cuttings •budding •grafting •micro-propagation •division • Prepare and treat propagation material in accordance with instructions

3. Be able to maintain accurate records	3.1 Provide clear and accurate information for recording purposes
4. Know how to maintain accurate records	4.1 Identify the types of records required and explain the importance of accurate record keeping.
5. Be able to work safely and minimise environmental damage	5.1 Work in a way which maintains health and safety and is consistent with relevant legislation, hygiene, codes of practice and any additional requirements 5.2 Carry out work in a manner which minimises environmental damage 5.3 Dispose of waste safely and correctly
6. Be able to select, use and maintain relevant equipment	6.1 Select appropriate equipment for this area of work 6.2 Use equipment according to relevant legislation and manufacturer's instructions 6.3 Prepare, maintain and store equipment in a safe and effective working condition
7. Know how to collect propagation material	7.1 State where and how to obtain information on plants and plant identification 7.2 State the ways in which the plant material should be handled 7.3 Describe the methods for collecting propagation material and the requirements of the propagation programme 7.4 State the methods and length of time for storing material prior to use
8. Know how to prepare the propagation material	8.1 Describe all the propagation methods •cuttings •budding •grafting •micro-propagation •division

	8.2 Describe all the ways of preparing propagation materials •trimming of cuttings •trimming of divisions •preparation of stocks •trimming of scions 8.3 Describe the methods used for treating prepared propagation material 8.4 State the context where hormone treatments are used to encourage rooting
9. Know relevant health and safety legislation and environmental good practice	9.1 Outline the current health and safety legislation, codes of practice and any additional requirements 9.2 Describe how environmental damage can be minimised 9.3 Describe the correct methods for disposing of waste. 9.4 State the need for hygiene throughout the propagation process
10. Know the types of equipment required and how to maintain them	10.1 Describe the equipment which will be required for the activity 10.2 Describe the methods of maintaining the range of equipment
Mapping to National Occupational Standards 029NCU72.1,2	

Supporting Unit Information

L/502/1503 Collect and prepare propagation material – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

LO1, LO2, LO3, LO5 and LO6 are the key areas of competence for this unit

Learning Outcome 1. Be able to collect propagation material

1.1 Collect propagation material in accordance with instructions (refer to LO7.3).
1.2 Check the collected material meets the requirements of the propagation programme (refer to LO7.3).
1.3 Store collected material in accordance with instructions (refer to LO7.4).

Learning Outcome 2. Be able to prepare propagation material

2.1 Handle plant material in a manner which minimises damage and wastage, and optimises growth (refer to LO7.3).
2.2 Use a suitable propagation method

- **Cuttings**
- **Budding**
- **Grafting**
- **Micro-propagation**
- **Division**

(Refer to LO8.1).
2.3 Prepare and treat propagation material in accordance with instructions (refer to LO8.2 & LO8.3).

Learning Outcome 3. Be able to maintain accurate records

3.1 Provide clear and accurate information for recording purposes (refer to LO4.1).

Learning Outcome 4. Know how to maintain accurate records

4.1 Identify the types of records required and explain the importance of accurate record keeping records to be kept; source of plant material, date, time, amount collected, number of plants prepared, type, date, who did it, treatments, location, problems encountered including noting if number differs from propagation programme requirements and action taken.
Reported to supervisor, manager or propagator either verbally face to face or by telephone, or by written note or record on propagation programme.
Recorded or reported in writing or electronically.
Records required to ensure adherence to propagation programme, enable action to be taken in event of shortages of other problems, future management of crop.

Learning Outcome 5. Be able to work safely and minimise environmental damage

5.1 Work in a way which maintains health and safety and is consistent with relevant legislation, hygiene, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO9.1.

5.2 Carry out work in a manner which minimises environmental damage environmental damage minimised See LO9.2.

5.3 Dispose of waste safely and correctly see LO9.3.

Learning Outcome 6. Be able to select, use and maintain relevant equipment

6.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats.
Tools and equipment selected and used Refer to LO10.1 for examples

6.2 Use equipment according to relevant legislation and manufacturer's instructions Manufacturer's / supplier's / supervisor's instructions followed for use of tools / equipment (Refer to LO10.1).

6.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment; (See LO10.2 for detail).

Learning Outcome 7. Know how to collect propagation material

7.1 State where and how to obtain information on plants and plant identification supervisor, bed and batch labels on nursery, plant labels, plant lists, propagation lists, catalogues, books (e.g. RHS Encyclopaedia of Plants and Flowers), internet.

7.2 State the ways in which the plant material should be handled use of appropriate cutting equipment to avoid damage, protection from moisture loss

during collection and storage, batches kept separate and labelled, delays minimised.

7.3 Describe the methods for collecting propagation material and the requirements of the propagation programme collection on-site from plants growing in bespoke area or garden, stock beds, plants growing on the nursery. Removal of entire plant to propagation area, removal of material from plant, preparing cutting on site.

Requirements of the propagation programme; true to type, healthy and undamaged, freedom from pest's disease and disorders, appropriate growth stage, season and timing as required by programme.

7.4 State the methods and length of time for storing material prior to use Storage of material prior to use; prolonging storage by reducing moisture loss and respiration rate; collecting material when cool, using opaque white bags, damping down, keeping in shade, removal to cool storage area or refrigerated store, storage life influenced by type of plant material, time of year, weather conditions, storage conditions. Length of time varies from a few hours (e.g. softwood cuttings of Fuchsia in hot weather) to several months (e.g. hardwood cuttings of woody species such as willow).

Learning Outcome 8. Know how to prepare the propagation material

8.1 Describe all the propagation methods

- **Cuttings** removal of a portion of stem, root or leaf from the parent plant and encouraging it to develop into a new plant (Softwood, semi-ripe, hardwood, root, leaf)
- **Budding** a grafting method used on roses and fruit trees. A well-developed bud is taken from one plant (the scion) and placed under the bark of another (the stock).
- **Grafting** the artificial union of one part of a plant (the scion) with the parts of another (the stock). Typically used for apples.
- **Micro-propagation** a form of biotechnology when a complete plant is raised from single cells (usually apical meristem) Used for bulking up from small amounts of tissue and producing virus free stocks.
- **Division** propagation by splitting the root of herbaceous species, by hand, using a knife or with forks.

8.2 Describe all the ways of preparing propagation materials

- **Trimming of cuttings** cutting to appropriate length, cutting back to a node or to other area of active growth, removal of part of the cutting to reduce transpiration loss.
- **Trimming of divisions** removal of long or excessive roots (or shoots), removal of damaged, diseased or dead parts of the plant
- **Preparation of stocks** lifting from beds, storage, potting on, removal of side shoots, cutting of top of stock to receive scion
- **Trimming of scions** removal of unwanted growth (too long or side shoots), shaping to match prepared stock.

8.3 Describe the methods used for treating prepared propagation material Storage (see LO7.4), preparation (see LO8.2) wounding, dipping in hormone (powder or liquid), and application of fungicides.

8.4 State the context where hormone treatments are used to encourage rooting recommended on cuttings that do not easily form roots to encourage rooting, increase speed of root production, increase amount of root production, mainly used for soft and semi-cuttings of species that are hard to root.

Learning Outcome 9. Know relevant health and safety legislation and environmental good practice

9.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health & Safety at Work Regulations; protective clothing and application equipment cleaned following use as specified in Code of Practice for Using Plant Protection Products, Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling, Stop Safe.

9.2 Describe how environmental damage can be minimised minimising soil damage, avoiding run-off from erosion and roads or tracks, compliance with Environment Agency requirements and advice, control of unused packaging, disposal of unwanted plant material as appropriate (see LO9.3).

9.3 Describe the correct methods for disposing of waste Organic waste – reduce waste removed from plant area, unwanted plant material composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

9.4 State the need for hygiene throughout the propagation process reduce incidence of pests and diseases, reduce rate of spread of pests and diseases, improve efficiency of propagation, and improve plant health.

Learning Outcome 10. Know the types of equipment required and how to maintain them

10.1 Describe the equipment which will be required for the activity cutting equipment (knives, secateurs, specialised graft cutters), protected storage areas.

10.2 Describe the methods of maintaining the range of equipment daily checking and cleaning as required of all equipment to avoid contamination of

the propagation material, sharpening of cutting equipment; checking and cleaning all equipment after use to ensure readiness for next operation.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 5 and 6
Delivery of these learning outcomes is by supervised practical collecting and preparing material for propagation giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of propagation photographs or video could be taken to provide evidence of progress. Copies of propagation records can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 4, 7, 8, 9 and 10
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of collecting and preparing material for propagation, propagation records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.
Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be

assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)

- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

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Learners should be directed to relevant publications and web sites eg.

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- Farm Horticulture by George W. Wood

Maintain Equipment and Machines

Unit Reference	**L/502/1520**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to carry out routine maintenance of equipment and machines. The maintenance should be carried out in line with the manufacturer's guidance and/or instructions
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to prepare equipment and machines for maintenance	1.1 Identify the equipment and machines requiring maintenance 1.2 Check that the equipment and machines requiring maintenance are safe, and completely isolated from the power source 1.3 Take the correct precautions to minimise dangers from contamination and hazardous chemicals 1.4 Keep the work area safe and in a condition suitable for the maintenance procedure 1.5 Obtain and prepare tools and materials suitable for the maintenance procedure

2. Be able to carry out maintenance procedures	2.1 Maintain equipment and machines in accordance with manufacturers' instructions, standard procedure and legislation 2.2 Clean, service and store tools after use
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 3.2 Minimise the escape of substances and dispose of hazardous and non-hazardous waste safely and correctly
4. Know how to prepare and carry out maintenance for equipment and machines	4.1 Outline the methods for preparing equipment and machines • manual • mechanical 4.2 Describe the dangers created by stored energy and how these should be responded to during the preparation stage 4.3 State the hazardous chemicals and substances which may be present and ways in which they should be dealt with 4.4 Describe the type of tools, equipment and materials required for the maintenance procedure 4.5 Describe types of protective clothing required and the reasons why it must be worn 4.6 Describe the methods for maintaining equipment and machines and the possible consequences of not maintaining 4.7 Outline the levels of responsibility in relation to the maintenance of equipment and machinery and whom to go to for advice 4.8 Describe safe and suitable methods of storing tools, equipment and machinery

5. Know relevant health and safety and legislation and environmental good practice	5.1 Describe the correct methods for disposing of waste 5.2 Outline the current health and safety legislation codes of practice and any additional requirements 5.3 Outline the legislative requirements relating to the maintenance of equipment and machinery
Mapping to National Occupational Standards O29NCU27.1,2	

Supporting Unit Information

L/502/1520 Maintain equipment and machines - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

The example of equipment or a machine in this case will be a tractor. Activities for other equipment or machines need to follow this example.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to prepare equipment and machines for maintenance

1.1 Identify the equipment and machines requiring maintenance

1.2 Check that the equipment and machines requiring maintenance are safe, and completely isolated from the power source adopt Safe Stop methods (See guidance in teaching strategy and learning activities). Check statutory Guarding requirements. Ensure that tractor is away from all power sources and completely isolated. Undertake PUWER check.

1.3 Take the correct precautions to minimise dangers from contamination and hazardous chemicals ensure spill kits are in place, Signage in place and only authorised persons allowed to enter work area. COSHH checks undertaken. Storage of waste both hazardous and non-hazardous in correct containers. Select correct PPE- cross reference to LO5.

1.4 Keep the work area safe and in a condition suitable for the maintenance procedure Risk assessment undertaken and area kept clear of obstructions and work area kept clean. Adequate lighting and ventilation in place and correct PPE worn including e.g. Safety boots (free from mud or oil) ear defenders, eye protection, gloves etc. Consider fuel storage Report any faults identified on relevant documentation. Ensure no unauthorised access to work area.

1.5 Obtain and prepare tools and materials suitable for the maintenance procedure Ensure all tools and materials required are on site and in clean and serviceable conditions and are stored in correct place. Keep work area tidy and clear of obstructions. Cross reference to LO4.

Learning Outcome 2. Be able to carry out maintenance procedures

2.1 Maintain equipment and machines in accordance with manufacturers' instructions, standard procedure and legislation Identify all controls on equipment or machinery to be maintained (in this case a tractor) Interpret instrument readings. Carry out maintenance checks. Mount vehicle, carry out

safety checks and start engine, demonstrate correct cold starting procedures. Use correct tools for each task. Manufacturer's / supplier's / supervisor's instructions followed for, maintenance, storage of tools / equipment /disposal of waste and reporting of any faults.

2.2 Clean, service and store tools after use ensure that all tools checked, cleaned and are stored safely in the correct place such as a workshop. Report any faults and defects in the appropriate manner to the person in charge. Ensure PUWER compliance. Ensure personal hygiene at all times. Cross reference to LO4.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable and additional requirements. Ensure correct PPE selected and used in safe manner) Safety boots, overalls, gloves, ear and eye protections. Ensure site is secure and free from any unauthorised access. Signage in place whilst work being undertaken. Communications systems in place such as pre agreed hand signals or mobile phones etc. Ensure correct manual handling techniques adopted.

3.2 Minimise the escape of substances and dispose of hazardous and non-hazardous waste safely and correctly ensure that all precautions are in place to prevent the escape of hazardous substances and that all safety measures are in place. Hazards to be minimised e.g. by carefully planning site access, working in appropriate weather conditions, care not to discharge pollutants into controlled waters. Waste disposed of correctly and safely e.g. organic - green or inorganic - metal, batteries, sharps, waste oils and contaminated materials in designated containers. If contaminated waste carried ensure that correct documentation and records are kept up to date and accurate. Ensure that equipment and machines and tools are cleaned after operation to prevent e.g. Corrosion, personal contamination, Remove unwanted residues safely using appropriate methods e.g. compressed air, water, brush. Cross reference to LO5.

LO4 and LO5 are the key areas of knowledge for this unit.

Learning Outcome 4. Know how to prepare and carry out maintenance for equipment and machines

4.1 Outline the methods for preparing equipment and machines all records completed e.g. Dynamic Risk Assessment (D.R.A.), PUWER checks. LOLER checks if applicable. Time usage records. Complete any relevant reports (faults

etc - and report these. Stop operations if faults found) Follow manufacturer's instructions for both **manual** (i.e. hand cleaning) and **mechanical** (e.g. power washer or airline) and follow all safety guidelines.

4.2 Describe the dangers created by stored energy and how these should be responded to during the preparation stage Identify sources of stored energy and any associated dangers (i.e. batteries, hydraulic piping etc) and safely disable prior to any maintenance work being undertaken on any equipment or machinery by adopting SAFE STOP.

4.3 State the hazardous chemicals and substances which may be present and ways in which they should be dealt with have knowledge of COSHH and be able to identify hazardous chemicals and the correct safety measures in place to deal with any spillages. (e.g. oils, detergents - have spill-mats and cleaning materials available and if used dispose of correctly dependant on waste type) Ensure that correct PPE is worn at all times refer to LO 3.

4.4 Describe the type of tools, equipment and materials required for the maintenance procedure tools (e.g. Hand held spanners, etc and mechanical e.g. power washers, airlines etc) equipment (e.g. trolley jack or mechanical lifts) and materials (spill mats, sawdust, absorbent materials).

4.5 Describe types of protective clothing required and the reasons why it must be worn e.g. Overalls to prevent contamination, Eye protections, ear defenders, safety boots, hard hats if applicable, gloves, high visibility clothing and give reasons why these should be worn such as personal protection and legal requirements.

4.6 Describe the methods for maintaining equipment and machines and the possible consequences of not maintaining Follow manufacturer's guidelines and describe methods for maintaining equipment and machinery. Name possible consequences of not maintaining (e.g. lack of performance, danger to operator, non-compliance of legislation such as PUWER, LOLER, increased running costs etc).

4.7 Outline the levels of responsibility in relation to the maintenance of equipment and machinery and whom to go to for advice Understand and describe the level of responsibility in relation to maintaining equipment. E.g. HASAW Act, company policies and procedures. Name who to report to e.g. line manager or supervisor.

4.8 Describe safe and suitable methods of storing tools, equipment and machinery i.e. correct designated areas, machinery left in safe conditions (switched off, left safe, immobilised) tools left clean and ready for use. Access to keys etc only to authorised personnel. All documentation completed and records kept up to date of maintenance carried out and any faults found reported to supervisor.

Learning Outcome 5. Know relevant health and safety legislation and environmental good practise

5.1 Describe the correct methods for disposing of waste e.g. asbestos, batteries, waste oil. Identify organic and inorganic waste and describe the differing disposal requirements such as designated containers and areas. Describe differing PPE types for differing waste materials such as contaminated wastes. Ensure records are accurate and up to date.

5.2 Outline the current health and safety legislation codes of practice and any additional requirements Health and Safety e.g. Management of Health and Safety at Work Regulations.
Environmental Protection e.g. Environmental Protection Acts
Waste e.g. Hazardous Waste Regulations
Codes of Practice e.g. Protecting our Water, Soil and Air.
Additional requirements including Local Authority permissions e.g. planning permission and Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers. Safe Stop, PUWER, LOLER. Correct signage, directional signs in place, work area isolated and no unauthorised access. Identify hazards and take appropriate actions.

5.3 Outline the legislative requirements relating to the maintenance of equipment and machinery PUWER, LOLER, COSHH. Safe Stop. Competent operators only.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1, 2, 3,
Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in maintaining equipment and machinery and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 4 and 5
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and

witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria
Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Individual units and qualifications are subject to specific additional requirements as stipulated by SSC Assessment Strategy.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks

- Witness statements
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- Photographic evidence
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This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9
- The leaflet from HSE Books Tractor Action ISBN 0 7176 2711X will provide useful information on maintenance
- **SAFE STOP**
- Make sure the handbrake is fully applied
- Make sure all controls and equipment are left safe
- Stop the Engine

- Remove the key
- The Provision and Use of Work Equipment Regulations PUWER. All plant or equipment used at work, either in the office or in the field, comes under PUWER
- The Lifting Operations and Lifting Equipment Operations LOLER. LOLER regulations apply in all premises and work situations. There are responsibilities for those in control of equipment, employers and employees

Monitor and Report on the Growth and Development of Crops and Plants

Unit Reference	**M/502/0408**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to enable them to monitor and report on the growth and development of crops. This unit covers how to recognise the types of problems which may occur
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.2)** ***The learner can***
1. Be able to report on the growth and development of crops	1.1 Monitor and assess the growth and development of the crops in accordance with requirements against desired healthy growth, pests disease and disorders 1.2 Report on the growth and conditions of the crops to the appropriate person 1.3 Provide clear and accurate information for recording purposes
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 2.2 Carry out work in a manner which minimises environmental damage

3. Know how to monitor the growth and development of crops	3.1 Describe the growth and development requirements of the crop(s) 3.2 Describe how to recognise the types of problems which may occur with the growth and development of the crop including • moisture problems • nutrient problems • physical damage, • pests, diseases and disorders • excessive or inappropriate growth • weed competition 3.3 Specify the correct actions to take in relation to problems with growth and development of the crop 3.4 Provide clear and accurate information for recording purposes
4. Know the current health and safety legislation and environmental good practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 4.2 Describe how environmental damage can be minimised
Mapping to National Occupational Standards O29NPH3.1	

Supporting Unit Information

M/502/0408 Monitor and report on the growth and development of crops and plants - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – Example used in this unit is field grown brassica crops. Similar process should be applied to other crops as appropriate.

LO1 and LO2 are the key areas of competence for this unit

LO3 and LO4 are the key area of knowledge for this unit

Learning Outcome 1. Be able to report on the growth and development of crops

1.1 Monitor and assess the growth and development of the crops in accordance with requirements against desired healthy growth, pests disease and disorders Growth and condition of the crop for healthy growth, pests disease and disorders is monitored reported as required by organisation/supervisor/cropping programme (refer to LO3.1 and LO 3.2).

1.2 Report on the growth and conditions of the crops to the appropriate person Growth and condition of the crop for healthy growth, pests disease and disorders is reported as required by organisation/supervisor/cropping programme (refer to LO3.4).

1.3 Provide clear and accurate information for recording purposes Records of the growth and condition of the crop for healthy growth, pests disease and disorders is recorded accurately and clearly (refer to LO3.4).

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO4.1.

2.2 Carry out work in a manner which minimises environmental damage environmental damage minimised. Refer to LO4.2.

Learning Outcome 3. Know how to monitor the growth and development of crops

3.1 Describe the growth and development requirements of the crop(s)

Growth and development requirements (example is field grown brassica crops) Direct sowing – fine tilth, adequate moisture, freedom from compaction or capping, adequate nutrient, protection from pests, disease and weeds during early stages of growth. Plants raised in protected environment and transplanted (modules or bare-root); adequate nutrient in compost or supplied as liquid feed after germination, protection from pests, diseases and damage.

Transplanting and establishment – firm, deep, medium tilth, adequate water for establishment (either in soil pre-planting or applied after planting), adequate nutrient in soil, freedom from weeds, protection from pests (in particular rabbits and birds) and diseases, protection from other damage (wind, wind-blown soil, water), avoiding extremes of temperature (generally by timing).

Growth – adequate water for growth at critical stages (either as rainfall or applied as irrigation), adequate nutrient in soil, freedom from weeds, protection from pests and diseases, protection from other damage (wind, wind-blown soil, water, machinery).

3.2 Describe how to recognise the types of problems which may occur with the growth and development of the crop

Moisture problem

During propagation – under watering (or uneven watering) giving rise to wilting, (temporary during daytime and high temperatures) reduced vigour, death of plants; Overwatering causing lack aeration in growing medium, loss of nutrient, loss of vigour, discoloration of leaves, death of plants During establishment – Lack of water causing slow recovery from planting, higher risk from pest and disease attack, limited growth after planting reducing later growth and yield, total loss of plants or crop, problems associated with growth check e.g. buttoning in cauliflowers. Excess water- causing lack aeration in growing medium, loss of nutrient, loss of vigour, discoloration of leaves, death of plants During growth – shortage of water (drought) giving rise to wilting, (temporary during daytime and high temperatures or permanent) reduced vigour, death of plants; Too much water from excess rainfall or overwatering causing lack aeration in growing medium, loss of nutrient, loss of vigour, discoloration of leaves, death of plants.

Nutrient problems

During propagation and growth – problems arising from shortage or excess of available nutrient (major or trace) Examples

Nitrogen deficiency – yellow or pale leaves, reduced leaf area, loss of vigour,

reduced yield
Low pH – susceptibility to club root and magnesium deficiency
Boron deficiency – breakdown
Manganese deficiency – whiptail in cauliflowers
Physical damage – caused by wind (rocking and dislodging) windblown sand/soil shredding of leaves and contamination of crop; hail – shredding/bruising of leaves/flowers, tractors working in the crop – insufficient clearance causing breaking of leaves, dislodging; removal of plants during weed control causing reduced populations and lower yields.
Pests, diseases and disorders Examples typical of brassica crops
Pests cabbage root fly – root damage, loss of vigour, wilting, eventual death of plant
Aphid – sap suckers, reduce vigour, disfigurement by honey dew and black fungus, risk of virus transmission
Large and small white butterfly – leaf damage, loss of photosynthetic potential, contamination by detritus
Slugs - leaf damage – loss of photosynthetic potential, contamination by detritus; root damage – loss of vigour, wilting; stem damage – loss of translocation secondary infections in damaged tissue
Rabbit, pigeon – grazing of leaves, reducing photosynthesis, reduced value of leaf crops, destruction of young plant
Diseases mildews – grey appearance of leaves, loss of vigour, damage to curds of cauliflower
Club-root – swollen and distorted roots, loss of vigour, wilting
Damping off (wirestem) – darkened constricted area of stem near ground level, reduced translocation, instability and toppling , loss of vigour, destruction of young plant
Disorders boron deficiency – browning of core of stem, hollowing of stem, breakdown of tissue to foul smelling fluid
Whiptail – leaf blades turn thin and narrow, only midrib left,
Blindness – loss of growing point,
Excessive or inappropriate growth plants not true to type, stopping of sprouts (removal of growing point)
Weed competition competition for water, nutrient, light, space leading to total loss of crop (most likely in propagation/establishment phase) reduced vigour, elongation of leaves, contamination by weed seeds, late maturity, difficulties during harvest

3.3 Specify the correct actions to take in relation to problems with growth and development of the crop

Use of irrigation to reduce stress and encourage vigorous growth
Field drainage to improve aeration and reduce chances of water logging
Use of open structured growing media to permit rapid drainage,
Nutrient problems – improved general fertility including the use of bulky organic matter and green manures, application of fertilizers (base fertilizers pre-planting

or sowing or use of top dressing)
Control of pests and disease by cultural or biological methods within an integrated management system or by use of pesticides
Physical damage to crops, erosion control by careful soil management, use of windbreaks (hedges, barriers, intercropping, under sowing)
Weeds control by use of cultural techniques (cultivation, inter-row cultivators, brush weeders, flame weeders, use of herbicides).

3.4 Provide clear and accurate information for recording purposes Types of record; crop, location, date of monitoring, problems identified (See LO3.2 for examples), action carried out within the crop, applications made, changes within the crop; recorded or reported manually or electronically.
Use of records; to monitor growth and development, identify need for action, monitor effectiveness of action, to analyse changes in the crops, reduce inputs to the crop, aid future management of the crop.

Learning Outcome 4. Know the current health and safety legislation and environmental good practice

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Management of Health & Safety at Work Regulations; protective clothing and application equipment cleaned following use as specified in Code of Practice for Using Plant Protection Products, Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling.

4.2 Describe how environmental damage can be minimised minimising soil damage, avoiding run-off from erosion and roads or tracks, compliance with Environment Agency requirements and advice, control of unused packaging, disposal of unwanted plant material by composting (unless the material poses a threat to plant health e.g. diseased material or perennial weeds as appropriate

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1 and 2
Delivery of these learning outcomes is by supervised practical work monitoring and reporting on crop growth and development giving learners the opportunity, first to

practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of the work photographs or video could be taken to provide evidence of progress. Copies of monitoring records or reports can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 3 and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of monitoring and reporting on crop growth and development, monitoring records and reporting sheets and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas

of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets

- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- The Complete Book of the Greenhouse by Ian G. Walls, et al / Paperback / Published 1996
- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- Nursery Stock Manual: Grower Manual 1 by Keith Lamb, et al / Paperback / Published 1995
- A Handbook for Horticultural Students by Peter Dawson

Installing Sett/Cobble Surfaces

Unit Reference	**M/502/1221**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	This unit will provide the learner with the skills and knowledge required when installing sett cobble surfaces. It is designed to give a basic understanding of the materials, tools and techniques used by operatives to install both temporary and permanent hard surfaces
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Be able to select, use and maintain equipment for installing sett/cobble surfaces	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to install sett/cobble surfaces	2.1 Set-out for line and level 2.2 Construct a suitable restraining edge 2.3 Lay sett/cobbles by hand to a suitable pattern 2.4 Check laid sett/cobbles for alignment 2.5 Cut-in sett/cobbles to required standard and compact sett/cobbles

	2.6 Check completed surface for compliance with specifications and standards and rectify any problems if necessary 2.7 Fill joints and re-compact 2.8 Protect working areas effectively against weather and use until they are in a suitable condition 2.9 Leave the site safe, tidy and suitable for intended use 2.10 Maintain effective working relations with relevant people throughout
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to prepare for installing sett cobble surfaces	4.1 State the weather conditions that are appropriate for installation 4.2 Identify the range of sett/cobbles available, including permeable sett/cobble systems, and their suitable applications covering • sawn cubes • cropped cubes • sawn sets • cropped/textured setts • cobbles 4.3 Describe how to calculate the number of packs of sett/cobbles required
5. Explain the principles of installing sett/cobble surfaces	5.1 Describe how to measure to ensure work is within tolerances 5.2 State how falls, lines and levels are determined and set out 5.3 Explain the importance of robust edge restraints

	5.4 State how sett/cobbles should be stored on site, how they are delivered to the laying face, and how they are positioned for the laying operative 5.5 Describe the range of sett/cobble patterns commonly used on site, their relative strengths and weaknesses, and how they are established 5.6 State the importance of mixing and randomising sett/cobbles from three or more packs prior to laying 5.7 Describe how areas are continuously checked for compliance to line, level, joint width and sett/cobble competence during the laying process 5.8 Describe how cutting-in is achieved, following the principles of minimum sett/cobble size and inboard cutting techniques 5.9 State the importance of using the correct jointing material and its role in the performance of the completed surface 5.10 Describe techniques used for dry and wet grouting 5.11 Describe the importance of final compliance checks
6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be necessary for installing sett/cobble surfaces 6.2 Describe methods of maintaining the equipment ready for use 8.3 Explain the importance of dust-suppression and RPE when using a cut-off saw
7. Know the current health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 7.2 Describe how environmental damage can be minimised 7.3 Describe the correct methods for disposing of organic and inorganic waste

Mapping to National Occupational Standards
029NL30.5

Supporting Unit Information

M/502/1221 Installing sett/cobble surfaces – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment for installing sett/cobble surfaces

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. gloves, overalls, and steel toe-capped boots with pierce resistant midsole. Use of power saw e.g. protective goggles, anti-vibration gloves, Respiratory Protective Equipment - particulate dust mask to required grade - refer to LO6.3, ear defenders. CE marked. Tools / equipment selected e.g. pegs, spirit level, shovel, lump hammer**,** wheelbarrow, block splitter, power saw, vibrating plate compactor, and trowel.

1.2&3 Use equipment according to instructions / Prepare, maintain and store equipment in a safe and effective working condition

Manufacturers / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. vibrating plate compactor - operating instructions followed, oil and fuel checked / topped up. Use e.g. regular breaks taken, vibration setting lowest for task, distance between machine and bystanders safe. Maintenance e.g. ensured engine cool first, cleaned by brushing / vacuum, lubricated moving parts, checked for loose or cracked parts. Storage e.g. stored on level surface with power switch and fuel turned off. Secure e.g. valuable tools locked away, fuel and oil clearly labelled and stored separately, shadow board - check return. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO6.2.

Learning Outcome 2. Be able to install sett/cobble surfaces

2.1 Set-out for line and level e.g. shape, features, obstacles corners. Level accurately set out e.g. set falls for drainage and camber for driveways. Excavation to sub grade as appropriate to materials being used, purpose e.g. patio / driveway and flexible or rigid construction, fill soft areas, add sub-base if necessary and compact to level / fall.

2.2 Construct a suitable restraining edge: Suitable for purpose, appropriately bedded in and jointed. To correct line and drainage fall.

2.3 Lay sett/cobbles by hand to a suitable pattern: Laid e.g. to taut line to set courses and level. Workable area of bedding mortar / concrete prepared and laid e.g. enough for one course at a time. Handling and moving setts / cobbles into place, grading, tamping down, checking and adjusting level.

2.4 Check laid sett/cobbles for alignment Depending on pattern e.g. coursed setts to taut line with vertical joints staggered. Level, fall and camber checked. Also check appearance to eye.

2.5 Cut-in sett/cobbles to required standard and compact sett/cobbles e.g. marking cut-outs, correct and safe use of cutting equipment, avoiding small cut-outs. Compacted e.g. rubber mallet, vibrating plate compactor, and board over cobbles.

2.6 Check completed surface for compliance with specifications and standards and rectify any problems if necessary Completed surface checked for compliance and problems rectified e.g. specifications - area, pattern, slope to drainage, camber. Standards e.g. depth below damp-proof course and BS7533 Part 3 minimum size for cut blocks.

2.7 Fill joints and re-compact e.g. appropriate fill used, timing, and method of firming. Working areas effectively protected against weather and use. Method and duration of protection e.g. cold weather cover with sacking, taped off to prevent access.

2.8 Protect working areas effectively against weather and use until they are in a suitable condition Safe e.g. correction of unstable setts. Tidy e.g. mortar, grout or sand brushed off. Intended use e.g. meets specification.

2.9 Maintain effective working relations with relevant people throughout Communication with customer, staff, Local Planning Authority e.g. polite, respectful and keeping people informed. Respect for e.g. staff, property and grounds. Attitude to work e.g. keep promises, turn up on time, work to agreed plans and acceptable standard, tidy up afterwards.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable, risk assessment and additional requirements e.g. Check with Local Authority (LPA) on position of services, requirements on paving over manhole covers, check with LPA / Environment Agency about run-off to foul water drains / sewers. Depending on depth of excavation may need to CAT scan / check position services.

3.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised e.g. leave space around trees, care not to damage roots or grassed areas, damp down cutting dust and use of back board,

recycle / reuse materials. Carry out work in a manner which minimises environmental damage.

3.3 Waste disposed of correctly and safely Waste e.g. organic - green or inorganic - stones, broken setts, excess mortar, sub-soil. Correctly - refer to LO7.3. Safely e.g. PPE, safe lifting.

LO4, LO5, LO6 and LO7 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to prepare for installing sett cobble surfaces

4.1 State the weather conditions that are appropriate for installation e.g. for working, application of pitch, working life and curing rate of mortar, effects on jointing.

4.2 Identify the range of sett/cobbles available, including permeable sett/cobble systems, and their suitable applications covering. Range of setts, cubes, cobbles available. Setts and cubes, e.g. sizes, colours and finishes. Materials e.g. setts - igneous or sedimentary rock, cubes - usually igneous, cobbles - beach pebbles. Applications e.g. sawn sets for patios, cropped sets for paths, cobbles to break up expanses and add interest. Permeable sett / cobble systems e.g. water directed through the joints and laying course into sub-base without fines and eventual total infiltration of all water into the underlying ground.

4.3 Describe how to calculate the number of packs of sett/cobbles required Calculate number of packs of setts, cubes, cobbles required: Technique for calculating or use tables with calculations of square metres covered per tonne of different dimensions or consult suppliers for pack details or computer assisted design (CAD). Factor in variability and wastage.

Learning Outcome 5. Explain the principles of installing sett/cobble surfaces

5.1 Describe how to measure to ensure work is within tolerances e.g. rest end of sett against previously laid setts, mark the bit that is over the line being cut to. Factor in joint width. Describe ways of marking. Also identify and measure against any tolerances in specification e.g. height of damp-proof course above setts, slope of patio.

5.2 State how falls, lines and levels are determined and set out use marked pegs, straightedge and spirit level. Fall e.g. mark pegs at progressively greater distances from top. Level e.g. all pegs marked at same distance from top of pegs. Lines e.g. with pegs and string or dry sand.

5.3 Explain the importance of robust edge restraints important to prevent lateral movement of flexible setts and to delineate the soil in a bed or grass of a lawn from the stone area.

5.4 State how sett/cobbles should be stored on site, how they are delivered to the laying face, and how they are positioned for the laying operative pallets stored close to work area as possible, move to laying site by wheelbarrow (pneumatic tyres). Transport batches to at least complete each course or area. Positioning for laying depends on type construction e.g. flexible on sand, lay setts and use walking boards on top to extend area. Bed/tamp courses/areas.

5.5 Describe the range of sett/cobble patterns commonly used on site, their relative strengths and weaknesses, and how they are established e.g. coursed, random. Strengths and weaknesses e.g. coursed are easy to lay, look good but can be expensive and compared to other materials hard work to lay. Some types not so easy to walk on. Establishing random layout e.g. ensure four corners do not meet.

5.6 State the importance of mixing and randomising sett/cobbles from three or more packs prior to laying where same colour / finish chosen important to prevent patchy appearance if these differ between packs.

5.7 Describe how areas are continuously checked for compliance to line, level, joint width and sett/cobble competence during the laying process to line e.g. setts/cobbles in courses checked for line against adjacent stones, taut line and/or by eye. Level e.g. straightedge and spirit level. Joint width by eye or spacer pegs. Sett/cobble competence checked e.g. unstable or if too low lift and add mortar or sand, re-tamp.

5.8 Describe how cutting-in is achieved, following the principles of minimum sett/cobble size and inboard cutting techniques Inboard cutting technique: Principles e.g. competence and strength versus laying pattern. Techniques to avoid using pieces less than one third set size e.g. turn setts through 90 degrees.

5.9 State the importance of using the correct jointing material and its role in the performance of the completed surface Maximising interlock e.g. importance of sand grain size and shape. Different materials for different width joints. Effect of unsuitable sand in weakening strength of paving.

5.10 Describe techniques used for dry and wet grouting Mix to use, method of application, cleaning the surface, appropriate weather conditions. E.g. wet grouting, use 1:3-4 mix sand - cement - plasticiser, brush wet mortar into joints, clean off surface of setts by brushing and spraying, wet / damp weather or hot days.

5.11 Describe the importance of final compliance checks Final compliance checks: Importance e.g. health and safety aspects, specification met, designer and customer satisfied.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be necessary for installing sett/cobble surfaces refer to LO1.1

6.2 Describe methods of maintaining the equipment ready for use refer to LO 1.2&3

6.3 Explain the importance of dust-suppression and RPE when using a cut-off saw Importance of dust suppression and RPE when using a cut-off saw: Health and Safety Executive (HSE) guidance - vacuum or water suppression systems. RPE essential to prevent breathing in respirable crystalline silica (RCS) and diseases e.g. silicosis.

Learning Outcome 7. Know the current health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work Health and Safety e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations. Town and Country Planning, England e.g. Town and Country Planning (General Permitted Development) (Amendment) (No 2) (England) - refer to Class F. Environmental Protection e.g. Environmental Protection Acts covering waste disposal. Codes of Practice e.g. protecting our Water, Soil and Air. Additional requirements e.g. refer to LO3.1. HSE publication - Time to clear the air - protect your lungs when using cut off saws. Check grade of RPE e.g. FFP3 filtering face pieces.

7.2 Describe how environmental damage can be minimised refer to examples in LO3.2.

7.3 Describe the correct methods for disposing of organic and inorganic waste Waste disposal: Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor - refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised installation of sett/cobble surfaces giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after completion of sett/cobble surface installation work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5, 6 and 7
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of sett/cobble surface installation activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/paving plans
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments

- Local Authority web sites for Building Control Department
- The Paving Expert web site at http://www.pavingexpert.com/ provides comprehensive information about laying types of paving and related activities
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Prepare Plants for Dispatch

Unit Reference	**H/502/1509**
Level	**2**
Credit Value	**1**
Guided Learning Hours	**8**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to prepare plants for dispatch to meet customer requirements
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.2)** ***The learner can***
1. Prepare plants for despatch	1.1 Prepare and maintain the plants for despatch 1.2 Ensure the plants meet customer requirements and replace any plants as necessary to meet requirements 1.3 Ensure plants are ready for despatch at the correct time 1.4 Maintain the health of plants that require intermediate storage prior to despatch 1.5 Provide clear and accurate information for recording purposes
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 2.2 Carry out work in a manner which minimises environmental damage

	2.3 Dispose of waste safely and correctly
3. Be able to select, use and maintain relevant equipment	3.1 Select appropriate equipment for this area of work 3.2 Use equipment according to relevant legislation and manufacturer's instructions 3.3 Prepare, maintain and store equipment in a safe and effective working condition
4. Understand the need to prepare plants for despatch	4.1 Describe methods for preparing and maintaining the health of plants ready for despatch 4.2 Describe how to identify customer requirements 4.3 State how to identify plants which do not meet customer requirements and are not of sufficiently good quality for despatch and the action to take 4.4 Describe storage arrangements for plants prior to despatch 4.5 Identify the types of records required and explain the importance of accurate record keeping
5. Know relevant health and safety legislation and environmental good practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements 5.2 Describe how environmental damage can be minimised 5.3 Describe the correct methods for disposing of waste
6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be required for the activity

	6.2	Describe the methods of maintaining the range of equipment
Mapping to National Occupational Standards O29NCU79.2		

Supporting Unit Information

H/502/1509 Prepare plants for dispatch – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

Note 2 - The example used in this indicative content is hardy outdoor nursery stock. The same approach should be used for other crops.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Prepare plants for dispatch

1.1 Prepare and maintain the plants for despatch (Refer to LO4.1)
1.2 Ensure the plants meet customer requirements and replace any plants as necessary to meet requirements Actions taken to ensure the plants meet customer requirements; plants are replaced as necessary to meet requirements (Refer to LO4.2).
1.3 Ensure plants are ready for despatch at the correct time (refer to LO4.2)
1.4 Maintain the health of plants that require intermediate storage prior to despatch (refer to LO4.4).
1.5 Provide clear and accurate information for recording purposes (refer to LO4.5).

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation See LO5.1.
2.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised (refer to LO5.2).
2.3 Dispose of waste safely and correctly see LO5.3.

Learning Outcome 3. Be able to select, use and maintain relevant equipment

3.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves,

aprons, hats.
Tools and equipment selected and used Refer to LO6.1 for examples.

3.2 Use equipment according to relevant legislation and manufacturer's instructions Tools and equipment are only used for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe including the Code of Practice for Using Plant Protection Products (Refer to LO6.1 for range of equipment).

3.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation, maintenance and storage of tools / equipment; See LO4.2 for detail of activities.

LO4, LO5 and LO6 are the key area of knowledge for this unit

Learning Outcome 4. Understand the need to prepare plants for dispatch

4.1 Describe methods for preparing and maintaining the health of plants ready for despatch Checking for quality, overwrapping, labelling (including barcode, price and other customer information), boxing up, packing on trolleys, pallets or other unit load, preparation or collection of delivery notes (if applicable).
Maintenance by; overwrapping with plastic or netting, shading, keeping plants in protected environment, watering.

4.2 Describe how to identify customer requirements type of plant, number, condition, containers or carry trays, stored in appropriate location, labelling (including price and barcode if appropriate), plants within order recorded and marked as included. Timescale, meeting customer requirements at time of delivery/collection. Recognised by; instruction from supervisor, information in customer order detail or picking list, organisational policies and commitments to quality, standards defined by regulations or agreement, prior knowledge of customer.

4.3 State how to identify plants which do not meet customer requirements and are not of sufficiently good quality for despatch and the action to take Plants not meeting customer requirements of quality for dispatch; wrong quantity, type or size, affected by pests, disease or disorder, contaminated or damaged, affected by unwanted growth, late.
Recognised by information on picking list or order form, information supplied by other staff, supervisor or sales person, visual inspection during preparation for dispatch, monitoring of plants in storage, checking during loading.
Actions; take remedial action if appropriate, notifying supervisor, sales person or customer, replacing with stock from growing area, alternative source; timescale; immediate or as soon as practical.

4.4 Describe storage arrangements for plants prior to despatch protecting plants from heat, cold, wind, drying out, mechanical damage by contact with vehicles or people or falling, and contamination. Protection by; wrapping with plastic or netting, shading, keeping plants in protected environment, watering.

4.5 Identify the types of records required and explain the importance of accurate record keeping Records required; customer (including account number if required), order number, number and type of plants, containers or carry trays used, storage location, labelled, changes or substitutions, other notes.

Recorded by handwritten list, checking off on order form or picking list, other format required by organisation. Recorded electronically; hand-held key pad, barcode scanner, PC or laptop.

Importance; accuracy of order, loss of custom, loss of product, loss of income, loss of reputation.

Learning Outcome 5. Know relevant health and safety legislation and environmental good practice

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health and Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, assured produce schemes, certification, LOLER, PUWER, Manual Handling.

5.2 Describe how environmental damage can be minimised avoiding run-off from erosion and roads or tracks, recycling and reusing packing material and containers, control of unused packing material and labels, disposal of unwanted plant material. (Refer to LO5.3).

5.3 Describe the correct methods for disposing of waste Organic waste – reduce waste removed from plant area, unwanted plant material composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be required for the activity range of equipment for preparing hardy outdoor nursery stock for dispatch. For transport; hand trolley or other transport aid, Electronic recording equipment (key pads and barcode scanners).

6.2 Describe the methods of maintaining the range of equipment daily checking as required of all equipment to ensure efficiency of use, cleaning as required of all equipment to avoid contamination of the product, lubrications of machinery as directed by manufacturer, periodic servicing of power units; Battery charging, downloading data, updating software.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by supervised practical work preparing plants for dispatch giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of preparation work photographs or video could be taken to provide evidence of progress. Copies of orders, picking lists or reports can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of preparing plants for dispatch, customer orders or picking lists and reports and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications and HSE information sheets
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- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  DEFRA web site and publications
  *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section 9
  Learners should be directed to relevant publications and web sites eg.
- Horticulture Week (www.hortweek.com*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals* by R. Wills, et al / Paperback / Published 1998
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *Nursery Stock Manual: Grower Manual 1* by Keith Lamb, et al / Paperback / Published 1995
- *A Handbook for Horticultural Students* by Peter Dawson
- *The Commercial Greenhouse* by James William Boodley
- *Practical Woody Plant Propagation for Nursery Growers* by Bruce Macdonald
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood

Obtain, Position and Prepare Growing Media

Unit Reference	**M/502/1512**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to gather together all the materials required to be incorporated within the growing media and includes preparation of the growing media
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.2)** ***The learner can***
1. Be able to obtain and position materials	1.1 Identify the required materials for incorporation into the growing media in accordance with production requirements 1.2 Make ready materials for incorporation into the growing media in accordance with production requirements covering • correctly obtaining materials • measuring out materials • positioning materials 1.3 Provide clear and accurate information for recording purposes
2. Prepare growing media	2.1 Incorporate materials into the growing media in accordance with planting requirements 2.2 Prepare the growing medium in accordance with planting requirements covering consistency and moisture level

3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Be able to select, use and maintain relevant equipment	4.1 Select appropriate equipment for this area of work 4.2 Use equipment according to relevant legislation and manufacturer's instructions 4.3 Prepare, maintain and store equipment in a safe and effective working condition
5. Know how to obtain and position materials	5.1 Describe the production requirements in relation to the preparation of growing media 5.2 Describe the procedures for obtaining materials required 5.3 Describe the different growing media required within enterprises 5.4 Describe different ingredients and their different properties used in the preparation of growing media 5.5 Describe the procedures for making ready the growing media covering all the following • correctly obtaining materials • measuring out materials • positioning materials 5.6 State the commercial speeds at which work should be performed 5.7 Identify the types of records required and explain the importance of accurate record keeping

6. Know how to prepare growing media	6.1 Describe the types of growing media used within enterprises 6.2 Describe how to prepare growing medium in relation to planting requirements covering • consistency • moisture level
7. Know relevant health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements 7.2 Describe how environmental damage can be minimised 7.3 Describe the correct methods for disposing of waste
8. Know the types of equipment required and how to maintain them	8.1 Describe the equipment which will be required for the activity 8.2 Describe the methods of maintaining the range of equipment
Mapping to National Occupational Standards O29NCU74.1,2	

Supporting Unit Information

M/502/1512 Obtain, position and prepare growing media – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2, LO3 and LO4 are the key area of competence for this unit

Learning Outcome 1. Be able to obtain and position materials

1.1 Identify the required materials for incorporation into the growing media in accordance with production requirements Materials required for incorporation into the growing media identified(refer to LO5.1 and LO5.4)

1.2 Make ready materials for incorporation into the growing media in accordance with production requirements covering

- **Correctly obtaining materials** – selection of materials, collection from storage, safe transport to site. (Refer to LO5.1)
- **Measuring out materials** – weighing, measuring by volume of liquids or solid materials, counting
- **Positioning of materials** – near to site of usage, safe from damage by people, vehicles, contamination or water, not causing a trip hazard or obstruction

1.3 Provide clear and accurate information for recording purposes (Refer to LO5.7).

Learning Outcome 2. Prepare growing media

2.1 Incorporate materials into the growing media in accordance with planting requirements Materials incorporated into growing medium using mixer, by hand, rotorvator or other powered equipment (refer to LO5.1).

2.2 Prepare the growing medium in accordance with planting requirements covering consistency and moisture level Growing medium prepared by mixer, by hand, rotorvator or other powered equipment (refer to LO6.2).

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation (Refer to LO7.1).

3.2 Carry out work in a manner which minimises environmental damage (refer to LO7.2)

3.3 Dispose of waste safely and correctly (See LO7.3)

Learning Outcome 4. Be able to select, use and maintain relevant equipment

4.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, dust masks, ear defenders. Tools and equipment selected and used (refer LO8.1 for range of equipment).

4.2 Use equipment according to relevant legislation and manufacturer's instructions Equipment used only for the operation and in situations as detailed by the manufacturers / suppliers / supervisor's instructions, current legislation and codes of practice; (refer LO8.2).

4.3 Prepare, maintain and store equipment in a safe and effective working condition Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment (refer LO8.2).

LO5, LO6, LO7 and LO8 are the key area of knowledge for this unit

Learning Outcome 5. Know how to obtain and position materials

5.1 Describe the production requirements in relation to the preparation of growing media

5.2 Time and location required, purpose and properties, make-up of the growing media – ratio of bulky matter (peat, loam, green waste, wood products, coir, other composted material, other bulky materials including sand, grit) quantity and type of fertiliser and lime and other additives; moisture content, looseness/fluffiness.

5.3 Describe the procedures for obtaining materials required procedures for obtaining materials; purchase/ordering procedures, storage arrangements, access to stores, recording of materials taken out, used and returned; facilities for transport to location required.

5.4 Describe the different growing media required within enterprises Different growing media required within enterprises – by manufacturer, purpose, contents (bulky materials and additives), properties – particle size/range, nutrient content, pH, air-fill porosity.

5.5 Describe different ingredients and their different properties used in the preparation of growing media Ingredients and their properties used in the preparation of growing media; Bulky materials - peat, loam, green waste, wood products, coir, other composted material, other bulky materials including sand, grit (properties – density/weight, water and nutrient holding/drainage, stability); Additives – fertiliser (nutrient content and availability, total and

proportion, controlled release), lime (type, pH) wetting agents (rewetting and improved moisture retention), pesticides (pathogens or pests controlled, impact on other species and people handing material, effective time-scale) and other specialist additives,

5.6 Describe the procedures for making ready the growing media covering all the following

- **Selecting correct materials** – information from cropping programme, supervisor organisational procedures, ordering/purchasing, collecting from storage, methods of safe transport to site – hand, lifting and carrying equipment, transport aids.
- **Measuring out materials** – weighing, measuring by volume of liquids or solid materials, counting.
- **Positioning of materials** – near to site of usage, safe from damage by people, vehicles, contamination or water, not causing a trip hazard or obstruction.

5.7 State the commercial speeds at which work should be performed Rate of work appropriate to task, dependant on availability of material, ease of access to equipment and materials, effectiveness of equipment, gang size required.

5.8 Identify the types of records required and explain the importance of accurate record keeping Types of records required and importance of accurate record keeping.

Recording or reporting on materials used/remaining, date, time, growing medium prepared, treatments included in growing media (including use of pesticides); location of growing media (if other than preparation site), condition of growing media, problems encountered.

Recording in written or electronic format or by labelling the growing media.

Accurate recording – identify stock levels of ingredients to enable re-order, problems with equipment (to facilitate repair), ingredients or prepared media (to avoid problems in future), availability of prepared growing media for production programme.

Learning Outcome 6. Know how to prepare growing media

6.1 Describe the types of growing media used within enterprises Types of growing media used within enterprises – mixed on site, manufacturer, bulk or bagged, purpose (crop and crop stage), contents, properties including additives, additional treatments mixed on site.

6.2 Describe how to prepare growing medium in relation to planting requirements covering

- **Consistency** – procedures for ensuring evenness of growing media, equipment (mixers, elevators) used, techniques used, monitoring and measuring of growing media to ensure consistency.
- **Moisture level** – procedures for ensuring appropriate moisture content of growing media, equipment used, techniques used, monitoring and measuring

of growing media to ensure appropriate moisture content is obtained and maintained

Learning Outcome 7. Know relevant health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, environmental health requirements, assured produce schemes, certification, LOLER, PUWER, Manual Handling, Stop Safe.

7.2 Describe how environmental damage can be minimised by carefully planning site access, working in appropriate weather conditions, care not to allow run-off into controlled waters, minimising spillage and loss of growing media and other materials, managing unused containers, checking and accurate use of weighing and measuring equipment, use of pesticides in accordance with legal requirements, compliance with Environment Agency requirements and advice.

7.3 Describe the correct methods for disposing of waste Organic waste – reduce wastage of material and growing media, unwanted organic material composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed.

Learning Outcome 8. Know the types of equipment required and how to maintain them

8.1 Describe the equipment which will be required for the activity Weighing and measuring equipment, compost mixers, hand tools, rotorvators and other powered equipment, lifting and carrying equipment and transport aids, watering equipment (manual and automatic).

8.2 Describe the methods of maintaining the range of equipment preparation and maintenance of tools and equipment e.g. cleaning and checking prior to use, setting up and calibration of weighing and measuring equipment, checking and lubrication of lifting and carrying equipment and transport aids. Watering equipment checked, cleaned and calibrated before use. Equipment and tools cleaned and checked after use and safely returned to appropriate storage area.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, and 4
Delivery of these learning outcomes is by supervised practical work obtaining, positioning and preparing growing media giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of practical work obtaining, positioning and preparing growing media photographs or video could be taken to provide evidence of progress. Copies of harvest record can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Learning Outcomes 5, 6, 7 and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of practical work obtaining, positioning and preparing growing media, harvesting records and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes covering key areas of knowledge link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes covering key areas of competence to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

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- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
  *DEFRA web site and publications (*http://www.defra.gov.uk/hort/index.htm*)*
- The Environment Agency web site http://www.environment-agency.gov.uk for guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has references in Section
  Learners should be directed to relevant publications and web sites eg.
- Horticulture Week (www.hortweek.com*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *Nursery Stock Manual: Grower Manual 1* by Keith Lamb, et al / Paperback / Published 1995
- *A Handbook for Horticultural Students* by Peter Dawson
- *Vegetable Diseases* by Steven Koike, Peter Gladders and Albert Paulus
- *Soil Science and Management* by Edward J. Plaster
- *The Commercial Greenhouse* by James William Boodley
- *Vegetable Brassicas and Related Crucifers* by G.R. Dixon and M.H. Dickson
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood

Use and Maintain Pedestrian Controlled Powered Equipment

Unit Reference	**R/502/0434**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to use and maintain pedestrian controlled powered equipment
Learning Outcomes (1 to 5) ***The learner will***	**Assessment Criteria (1.1 to 5.3)** ***The learner can***
1. Be able to use and maintain pedestrian controlled powered equipment	1.1 Ensure the pedestrian controlled power equipment is safe and in good working order 1.2 Use equipment according to manufacturer's instructions and legal regulatory requirements 1.3 Clean and store equipment correctly after use 1.4 Maintain pedestrian controlled power equipment in accordance with manufacturer's instructions 1.5 Select and use the appropriate personal protective clothing and equipment 1.6 Identify any problems with the equipment and take the correct action
2. Be able to work safely and mini mise environmental d amage	2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements

	2.2 Carry out work in a manner which minimises environmental damage 2.3 Dispose of waste safely and correctly
3. Know how to use and maintain pedestrian controlled powered equipment	3.1 List the main hazards and risks associated with using the pedestrian controlled powered equipment and describe appropriate action 3.2 Explain the importance of operating equipment in line with manufacturer's instructions 3.3 Describe methods of checking and maintaining the equipment for use covering • correct pre-use checks • correct start-up procedure • use appropriate work method • correct stopping procedure • correct post-use maintenance • reporting problems to the appropriate person
4. Know the operating principles of powered equipment	4.1 Explain the operating differences between two and four-stroke engines 4.2 Explain the principles of operating lines of drive – clutch, v-belts, chains 4.3 Describe the basic differences between petrol and diesel engines
5. Know the current health and safety legislation and environmental practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements 5.2 Describe how environmental damage can be minimised 5.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL27.1, 2	

Supporting Unit Information

R/502/0434 Use and maintain pedestrian controlled powered equipment - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

The example of pedestrian controlled powered equipment in this case will be a pedestrian mower. Activities for other tools or equipment need to follow this example.

LO1 and LO2 are the key areas of competence for this unit

Learning Outcome 1. Be able to set up, use and maintain pedestrian controlled powered equipment Cross reference with L.O.3.

1.1 Ensure the pedestrian controlled power equipment is safe and in good working order check that the pedestrian controlled powered equipment is safe and not damaged in any way. Undertake PUWER check. Undertake a Dynamic Risk Assessment (DRA).

1.2 Use equipment according to manufacturer's instructions and legal regulatory requirements Undertake a Site Specific Risk Assessment. Use the pedestrian controlled powered equipment in a safe manner and following manufactures Instructions. Consider weather conditions and ground conditions such as degree of slopes and ground conditions such as wet ground, on site hazards which need to be identified and if possible removed. Ensure signage is in place to prevent unauthorised access to site.

1.3 Clean and store equipment correctly after use Ensure all pedestrian controlled powered equipment used on site are left in clean and serviceable conditions and are stored in correct place. E.g. has protective cover on (if applicable). Is wiped clean and wiped with oily rag or sprayed with WD40 or similar protective film to prevent rusting, deterioration etc. Clean all excess grass cuttings off. Adopt Safe Stop principles, remove key and park safely and securely.

1.4 Maintain pedestrian controlled power equipment in accordance with manufacturer's instructions Regular checks of pedestrian controlled powered equipment to ensure it is fully efficient. E.g. if pedestrian controlled powered equipment becomes unsafe to use take out of service and report to appropriate person in charge.

1.5 Select and use the appropriate personal protective clothing and equipment Correct PPE worn

including e.g. Safety boots (free from mud or oil) ear defenders, eye protection, non-slip gloves, overalls, high visibility clothing etc. Report any faults identified on relevant documentation.

1.6 Identify any problems with the equipment and take the correct action Refer to LO1.4 above and report any faults identified (e.g. faulty guards) on relevant documentation.

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable and additional requirements. Ensure correct PPE selected and used in safe manner) Safety boots, overalls, gloves, ear and eye protections, high visibility clothing. Ensure site is secure and free from any unauthorised access. Signage in place whilst work being undertaken. Communications systems in place. Ensure correct manual handling techniques adopted. Safe working distances adhered to. Cross reference to L.O.1.5.

2.2 Carry out work in a manner which minimises environmental damage Target species only to be removed. Consider any protected species and any SSSI or SAC requirements at the site. Be able to identify invasive species e.g. Japanese Knot weed, Giant Hogweed and Himalayan Balsam.

2.3 Dispose of waste safely and correctly i.e. Identify organic and inorganic waste and dispose of in correct manner. Note the importance of AC 2.2 with reference to disposal of invasive species.
E.g. Cut Hemlock left on site is poisonous to both humans and livestock as are many others of these invasive species. (Note also disposal of waste generated from ride-on powered equipment such as spill mats following refuelling or oily rags etc) Dispose of in appropriate container and in designated areas.

LO3, LO4, and LO5 are the key areas of knowledge for this unit

Learning Outcome 3. Know how to use and maintain pedestrian controlled powered equipment Cross reference to L.O.1

3.1 List the main hazards and risks associated with using the pedestrian controlled powered equipment and describe appropriate action e.g. Undertake Dynamic Risk Assessment take into account ground conditions, weather conditions, unauthorised access to site, livestock present, slips, trips, falls. Poisonous vegetation Overturning. Cuts, sprains etc. Hand Arm Vibration Syndrome- HAVS will need to be considered Manual handling techniques will also need to be considered. Erect warning signs to warn public and others.

3.2 Explain the importance of operating equipment in line with manufacturer's instructions (e.g. operating on slopes, speed, no unauthorised passengers) Explain correct use of pedestrian controlled powered equipment- refer to manufacturer's instructions.

3.3 Describe methods of checking and maintaining the equipment for use Explain the need for pre-use checks. Refer to LO1 PUWER checks. Correct start up procedures (on flat surface, neutral gear, handbrake on etc). Describe appropriate work method (grass cutting and removal and disposal of waste). Describe Safe Stop method. Describe who to report any problems to (supervisor, person in charge).

Learning Outcome 4. Know the operating principals of pedestrian controlled powered equipment

4.1 Explain the operating differences between two and four-stroke engines engines e.g. fuel mixes as per manufactures' instruction. Note: Fuel mixing – failure to mix correctly will result in oiling up of the spark plug, loss of power, excessive fumes, overheating or possible engine seizure.

4.2 Explain the principles of operating lines of drive – clutch, v-belts, chains, (refer to operators manual) and belts, chains (refer to operators manuals and consider guarding of moving parts.

4.3 Describe the basic differences between petrol and diesel engines (refer to cold/warm starts, performance levels etc).

Learning Outcome 5. Know the current health and safety legislation and good environmental practise

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Management of Health and Safety at Work Regulations
Environmental Protection e.g. Environmental Protection Acts
Waste e.g. Hazardous Waste Regulations
Codes of Practice e.g. Protecting our Water, Soil and Air.
Additional requirements including Local Authority permissions e.g. planning permission and Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers. PUWER, Correct signage, Directional signs in place, Work area isolated and no unauthorised access. Identify hazards and take appropriate actions. Cross reference to L.O.2.1

5.2 Describe how environmental damage can be minimised e.g. only remove identified vegetation; consider status of Site SSSI, SAC or similar, safe removal of any waste etc. Don't operate if damage to ground is occurring and evident Cross reference to L.O.2.2

5.3 Describe the difference between organic and inorganic waste and the correct disposal methods e.g. disposal of cut vegetation and disposal of

contaminated wastes such as spill mats, oily rags, plastics. Cross reference to L.O.2.3

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1 and 2 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 3, 4 and 5 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements

- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9.
- **SAFE STOP**
    - Make sure the handbrake is fully applied
    - Make sure all controls and equipment are left safe
    - Stop the Engine
    - Remove the key
- The Provision and Use of Work Equipment Regulations PUWER. All plant or equipment used at work, either in the office or in the field, comes under PUWER.

Maintain Moisture Levels For Crops or Plants

Unit Reference	**R/502/0854**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, and skills required to maintain moisture levels to crops or plants
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.2)** ***The learner can***
1. Know why it is important to maintain moisture for crops and plants	1.1 Describe how moisture requirements vary according to the crop or plants and stage of development 1.2 Describe the methods and systems for maintaining moisture levels 1.3 Describe the impact of prevailing weather conditions on the crop or plants water requirements 1.4 Identify the types of records required and the importance of accurate record keeping
2. Know the types of equipment required and how to maintain them	2.1 Describe the equipment which will be necessary for maintaining moisture levels to crops or plants 2.2 Describe methods of maintaining the equipment ready for use
3. Know the current health and safety legislation and environmental good practice	3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work

	3.2 Describe how environmental damage can be minimised
4. Be able to select, use and maintain equipment	4.1 Select appropriate equipment for this area of work 4.2 Use equipment according to manufacturer's instructions and legal requirements 4.3 Prepare, maintain and store equipment in a safe and effective working condition
5. Be able to maintain moisture levels for crops and plants	5.1 Identify correctly the condition of the crop or plant 5.2 Maintain moisture levels in accordance with the crop or plant requirements 5.3 Provide clear and accurate information for recording purposes
6. Be able to work safely and minimise environmental damage	6.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 6.2 Carry out work in a manner which minimises environmental damage
Mapping to National Occupational Standards O29NPH 3.2	

Supporting Unit Information

R/502/0854 Maintain moisture levels for crops or plants – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2 and LO3 are the key areas of knowledge for this unit

Learning Outcome 1. Know why it is important to maintain moisture for crops and plants

1.1 Describe how moisture requirements vary according to the crop or plants and stage of development Characteristics of crop or plant types such as number of leaves, leaf shape, texture and colour related to transpiration rate. Different tolerances to reduced moisture e.g. roses need to be well watered to maintain healthy growth, plants originating from Mediterranean types of climates more drought resistant / tolerant.
Crop or plant type e.g. leafy vegetables need watering throughout most of their development, root / fruit crops have more specific critical periods (see below), established perennials, ornamental shrubs, trees need little watering.
Yield expectations e.g. if high water requirements increase.
Effect of stage of development on moisture requirements of e.g. seedlings, newly transplanted plants, early growing stages, established plants, flower / fruit / root / seed development.
Give specific examples to illustrate each stage of development e.g. sweet corn needs watering when flowering commences and as the grains are developing, ripening of potato tubers is a critical stage for watering.

1.2 Describe the methods and systems for maintaining moisture levels Application methods e.g. watering can or hose pipe, sprinkler, trickle or drip feed systems, perforated pipe, use of timers. Cultivation methods e.g. improve soil structure - double digging, incorporating organic matter or soil additives. Mulching e.g. well-rotted organic matter or sheet mulch. Physical e.g. target water by creating dip in soil around plant or using pots or half-plastic bottles to target water at roots. Weeding e.g. remove weeds to reduce competition for water. Water conservation e.g. water butts to catch run-off, grey water containers

1.3 Describe the impact of prevailing weather conditions on the crop or plants water requirements
Impact of prevailing weather conditions on crop or plant water requirements. Rainfall patterns related to e.g. soil moisture reserves, drought or water logging, watering needs. Sunlight / high temperatures related to e.g. increased

needs for water due to more rapid growth and transpiration. High relative humidity related to reduced transpiration. Wind in relation to rate of water loss from plants in both hot and cold weather.

1.4 Identify the types of records required and the importance of accurate record keeping records specified within organisation's procedures / guidance e.g. greenhouses - temperature using wet and dry bulb thermometers, to derive relative humidity using hygrometric tables. Importance e.g. to adjust conditions to maintain relative humidity within most beneficial range for plants.

Learning Outcome 2. Know the types of equipment required and how to maintain them

2.1 Describe the equipment which will be necessary for maintaining moisture levels to crops or plants e.g. watering can and suitable roses, hose pipe and reel, sprinkler trickle or drip feed systems, perforated pipe, timers, fork, hoe, water butts.

2.2 Describe methods of maintaining the equipment ready for use e.g. clean watering can rose and water butts to prevent build-up of algae. Follow manufacturer's instructions and schedules for maintaining sprinklers or trickle feed systems.

Learning Outcome 3. Know the current health and safety legislation and environmental good practice

3.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations
Environmental Protection e.g. Environmental Protection Acts covering waste disposal
Codes of Practice e.g. Protecting our Water, Soil and Air
Additional requirements e.g. do not use hose or sprinklers during prolonged drought.

3.2 Describe how environmental damage can be minimised mage - Refer to examples in LO6.2.

LO4, LO5 and LO6 are the key areas of competence for this unit

Learning Outcome 4. Be able to select, use and maintain equipment

4.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, and water-proof gloves. CE marked. Tools and equipment selected e.g. outdoor tap, watering can, sprinkler,

trickle or drip feed systems, hose or perforated pipe, mulch, water-retaining granules, rainwater butt.

4.2&3 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. connect hose pipe to tap, unreel hose to required length, attach suitable nozzle. Use e.g. check no kinks in pipe, set timer if fitted, move to new positions as required. Maintenance e.g. reel hose in between uses. Storage e.g. store in shed when not in use - out of sun and frost. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO2.2.

Learning Outcome 5. Be able to maintain moisture levels for crops and plants

5.1 Identify correctly the condition of the crop or plant Condition of crop or plant correctly identified. Interpretation of plant signs e.g. appearance of plants when normal, when lacking water or when waterlogged. Interpretation of state of soil / compost e.g. its colour, does it feel moist, sound of clay pots when tapped. Arrive at correct decisions about whether plants / crops need water in various situations.

5.2 Maintain moisture levels in accordance with the crop or plant requirements moisture levels maintained in accordance with crop / plant requirements. Different watering methods used e.g. watering can, perforated pipe. Correct amount of water applied e.g. thorough soaking of soil or compost avoiding superficial coverage that might speed the overall loss of moisture from the soil. Correct timing e.g. on hot sunny days water plants in evenings. Correct frequency e.g. water immediately if plants wilting, on hot, sunny days water two or three times per day for containers / hanging baskets. In accordance with crop / plant requirements e.g. attention to newly planted crops / plants, shallow rooted beds, containers, hanging baskets, vegetable or fruit beds. Do not overwater e.g. can cause rotting of roots and wastes water.

5.3 Provide clear and accurate information for recording purposes Clear and accurate information provided for recording purposes. According to organisational guidelines / practices e.g. areas covered, timing, frequency and dates of application.

Learning Outcome 6. Be able to work safely and minimise environmental damage

6.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements

e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO3.1.

6.2 Carry out work in a manner which minimises environmental damage e.g. collect rain water, recycle grey water, target application with trickle or drip feed, timer to apply at optimum times of day / curtail amount used, reduce evaporation by using mulch, reduce run-off using water-retaining granules, use of sprinklers minimised, precautions not to let fertiliser get washed off into waterways.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of watering activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learning Outcomes 4,5 and 6
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised watering activities giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of setting up watering systems photographs or video could be taken to provide evidence of progress.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

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All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 4, 5 and 6 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 1, 2 and 3 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

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Evidence Of Achievement

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- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/temperature recordings and humidity derivations/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
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This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Maintain the Health and Appearance of Interior Plant Displays

Unit Reference	**R/502/1177**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to maintain the appearance and health of natural interior plant displays. It also covers identifying and controlling pests, diseases and unwanted growth. The use of equipment and chemicals must meet the requirements of legislation and codes of practice
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.3)** ***The learner can***
1. Be able to select, use and maintain equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to maintain the appearance of interior plant displays	2.1 Inspect the display and three different plants from the groups below according to agreed schedules • tropical • temperate • shade lovers • sun lovers 2.2 Maintain the display in a way that is appropriate to three of their environmental conditions and the overall visual impact

	• adjacent features • light • humidity • air movement • temperature 2.3 Carry out all maintenance operations below to promote the health and vigour of the plants • cleaning • providing support • replacement of plants, features or containers • pruning 2.4 Work in a way that is sensitive to other people on the site 2.5 Minimise damage to plants, features and surrounding areas and reinstate the site to the client's satisfaction
3. Be able to maintain the health of interior plants	3.1 Identify all threats to plant health below • pests • diseases • disorders • unfavourable conditions • competing growth 3.2 Use appropriate methods to promote and maintain healthy growth, including • feeding • watering • surface cultivation 3.3 Use three of the methods below to deal with threats to plant health • physical • chemical • cultural • irrigation
4. Be able to work safely and minimise environmental damage	4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 4.2 Carry out work in a manner which minimises environmental damage

	4.3 Dispose of waste safely and correctly
5. Know how to maintain the appearance and health of interior plant displays	5.1 Explain the importance of maintaining the appearance of interior plant displays to agreed schedules 5.2 Describe how to carry out all the following maintenance operations to promote the health and vigour of the plants and their environmental conditions • cleaning • providing support • replacement of plants, features or containers • pruning 5.3 Explain how all environmental conditions affect the way plants are maintained • adjacent features • light • humidity • air movement • temperature 5.4 Describe how to identify all the signs of damage or threats to plant health and how to respond to these • pests • diseases • disorders • unfavourable conditions • competing growth 5.5 Describe the methods of dealing with threats to plant health • physical • chemical • cultural • irrigation 5.6 Describe the methods of promoting plant health: • cleaning • providing support • replacement of plants, features or containers • pruning 5.7 State why it is important to restore the site to the client's satisfaction and how to judge whether this has been achieved

6. Know the types of equipment required and how to maintain them	6.1 Describe the equipment which will be necessary for maintaining the health and appearance of interior plant displays 6.2 Describe methods of maintaining the equipment ready for use
7. Know the current health and safety legislation and environmental good practice	7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 7.2 Describe how environmental damage can be minimised 7.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL9.1, 2	

Supporting Unit Information

R/502/1177 Maintain the health and appearance of interior plant displays - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive

LO1, LO2, LO3 and LO4 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment

1.1&3 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, gloves. CE marked. Tools and equipment selected e.g. hand fork/trowel, watering can, trickle/drip feed system, scissors/small secateurs, plant containers, baskets, pots, supports/ties.

1.2&3 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. small secateurs - blades sharpened. Use e.g. do not cut above recommended thickness or twist secateurs when cutting. Maintenance e.g. clean blades after use to remove sap, oil mechanism. Storage e.g. shadow board - check return, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance / repairs. Report faults - line manager. Refer LO 5.2.

Learning Outcome 2. Be able to maintain the appearance of interior plant displays

2.1 Inspect the display and three different plants from the groups below according to agreed schedules e.g. to agreed schedule for environmental conditions - temperature/ air movement/humidity/light. Water sufficiency/excess. Feeding needs. Unwanted growth - dead/damaged/diseased stems/foliage. Presence of pests. Covering 3 different plants from each of the following categories:

- **Tropical** e.g. medinilla, philodendron
- **Temperate** e.g. begonia, exacum
- **Shade lovers** e.g. aspidistra, dracaena
- **Sun lovers** e.g. hibiscus rosa-sinensis, jasminum

2.2 Maintain the display in a way that is appropriate to three of their environmental conditions and the overall visual impact Display

maintained appropriate to 3 environmental conditions - refer to example in LO5.3. Overall visual impact maintained e.g. damaged foliage groomed or rearranged to hide, leaf stalks checked for presence of mealy bugs.

2.3 Carry out all maintenance operations below to promote the health and vigour of the plants maintenance operations to promote health and vigour: Refer to examples in LO5.2.

2.4 Work in a way that is sensitive to other people on the site Work carried out sensitively: Timing e.g. work carried out when area/office less busy or after hours. Organisation e.g. materials ready to hand, well organised for quick, unobtrusive work. Disturbance e.g. noise/distraction/talking to staff minimised. Attitude e.g. politeness, speed of work and competence, attending to customer's needs. Aim to create pleasant, conducive atmosphere.

2.5 Minimise damage to plants, features and surrounding areas and reinstate the site to the client's satisfaction e.g. damage to plants from dry air reduced by misting and steps to increase humidity - refer to LO5.3, features protected from becoming receptacles for litter by considered placement of/in relation to waste bins. Care not to spatter desks/paperwork when misting, watering especially of plants located at height. Site reinstated to customer's satisfaction: Furniture replaced, site function fully restored, left tidy and clean.

Learning Outcome 3. Be able to maintain the health of interior plants

3.1 Identify all threats to plant health below

- **Pests** e.g. aphid, whitefly, red spider mite
- **Diseases** e.g. root rot, botrytis, sooty mould
- **Disorders** e.g. under watering/over watering, too much/little light, too dry/humid, nutrient deficiency
- **Unfavourable conditions** e.g. draughts, plants moved, sun scorch
- **Competing growth** e.g. weeds, adjacent plants, weak shoots

3.2 Use appropriate methods to promote and maintain healthy growth, including

- **Feeding** e.g. liquid feeds for pots, according to specific plant needs, growth stage, reduce/do not feed during periods of rest. Regularity, type and amount
- **Watering** e.g. watering systems e.g. trickle feed on timer, meet specific plant needs, take account of plant/pot size, light intensity, existing soil moisture
- **Surface cultivation** e.g. loosen top layer compost with fork or replace with fresh/sterile compost to combat surface crust/mould

3.3 Use three of the methods below to deal with threats to plant health

- **Physical** e.g. snails, slugs, woodlice - barrier jelly applied around rims of pots
- **Chemical** e.g. aphids, whitefly - spray with permethrin, repeat as needed
- **Cultural** e.g. grey mould - good ventilation, attention to spacing of plants

- **Irrigation** e.g. aphids - spray with insecticidal soft soap

Learning Outcome 4. Be able to work safely and minimise environmental damage

4.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable, risk assessment and additional requirements - refer to LO7.1.

4.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised e.g. trickle feeders used with timer to conserve water, grey water used where possible, use of natural rather than artificial light, do not waste fertiliser, cultural rather than chemical control.

4.3 Dispose of waste safely and correctly waste e.g. organic - green - pruned leaves and stems, or inorganic - worn out pots/containers, plant feed bottles, plastic. Correctly - refer to LO7.3. Safely e.g. PPE, safe lifting.

LO5, LO6 and LO7 are the key areas of knowledge for this unit

Learning Outcome 5. Know how to maintain the appearance and health of interior plant displays

5.1 Explain the importance of maintaining the appearance of interior plant displays to agreed schedules Importance of maintaining appearance of interior plant displays to agreed schedules: Practical e.g. appearance of plants / features quickly diminishes if scheduled attention is missed / rushed. Water deficiency, pests, etc can detract from appearance and returning display back up to standard is harder / more costly work. Lose benefits of e.g. good reflection on business, aesthetic appeal, mood uplifting, inspiring, stimulating

5.2 Describe how to carry out all the following maintenance operations to promote the health and vigour of the plants and their environmental conditions

- **Cleaning plants**. Remove dust. Clean leaves e.g. sponge with water or brush plants with hairy leaves / cacti / succulents. Polish leaves e.g. use aerosols for small leaves or gently wipe larger leaves. Handling of foliage e.g. leaves handled, gently with support underneath and not pressed / bruised, particular care taken with young leaves
- **Providing support**: Support types e.g. moss pillar, wire netting, bamboo canes. Types of ties e.g. plastic ties or twine. Tying in e.g. stems of plant with aerial roots, twinned around moss pillar and tied in. Careful placing of supports and tying in e.g. bamboo cane placed in pot before plant, ties not too tight on stem
- **Replacement of plants**, features or containers: Moving e.g. plant with discoloured, foliage removed from container at top of filing cabinet - safely

reached, removed, and moved to floor level, assistance used if necessary. Timing - refer to LO2.4. Method e.g. plant removed in its pot and replaced like for like or new to freshen up display

- **Pruning**: Purposes e.g. to shape plants, control growth, remove dead / diseased / damaged material, encourage flowering. Methods of pruning e.g. pinching out growing tips to encourage bushiness / flowering, cutting with small secateurs. What and when to prune e.g. hibiscus - in late winter cut back stems to induce bushiness, poinsettia – cut stems to 10 cm after leaves have fallen and when new growth starts, prune back to strongest stems

5.3 Explain how all environmental conditions affect the way plants are maintained

5.4 How all environmental conditions affect the way plants are maintained covering: (i) adjacent features, (ii) light, (iii) humidity, (iv) air movement, (v) temperature direct effects of one condition e.g. (iii) Humidity - Aglaonema inspected and leaves found to have some brown tips / shrivelled indicating air too dry. Actions taken to raise humidity e.g. frequency of misting leaves increased, pot surrounded with damp compost or Aglaonema stood on tray of clay pellets / gravel filled with water. Effects of other conditions e.g. (i) Adjacent plants could be added to increase humidity and also to affect other environmental conditions - shielding Aglaonema from (IV) air movement, providing shade to reduce the intensity of the (ii) light reaching the plant.

5.5 Describe how to identify all the signs of damage or threats to plant health and how to respond to these

- **Pests** e.g. aphids - signs include sticky honey-dew, blistered appearance of leaves. Response e.g. treat early with insecticidal soap, pyrethrum or systemic insecticide
- **Diseases** e.g. botrytis - signs include fluffy grey fungal growth, discoloured foliage. Response e.g. remove affected areas, clear dead material around plant, refer LO3.3(iii)
- **Disorders** e.g. under watering - signs include crisp brown spots or wilting leaves. Response e.g. check absorption of water in pot - quick run through or caked surface compost, water thoroughly, install trickle feed system, check temperature, sunlight
- **Unfavourable conditions** e.g. draughts - signs include leaves turning yellow / falling. Response - check proximity to doors / windows, move plant to draught free position
- **Competing growth** e.g. shade from adjacent plants - signs include plant growing slowly, variegated leaves turning green. Response e.g. alters arrangement and spacing of plants to reduce shade, re-locate plant to receive more sunlight.

5.6 Describe the methods of dealing with threats to plant health (i) physical, (ii) chemical, (iii) cultural, (iv) irrigation - refer to LO3.3.

5.7 Describe the methods of promoting plant health (i) cleaning, (ii) providing support, (iii) replacement of plants, features or containers, (iv) pruning - Refer to LO5.2.

5.8 State why it is important to restore the site to the client's satisfaction and how to judge whether this has been achieved Importance of reinstating site to client's satisfaction e.g. to fully meet specification, reputation, likelihood of ongoing maintenance work, health and safety - not leaving tripping hazards. Judge client's satisfaction with completion using formal procedures such as check against specification, questionnaire, checklist tick off and customer's verbal response and body language.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the equipment which will be necessary for maintaining the health and appearance of interior plant displays refer to LO1.1

6.2 Describe methods of maintaining the equipment ready for use refer to LO1.2&3.

Learning Outcome 7. Know the current health and safety legislation and environmental good practice

7.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Environmental Protection e.g. Environmental Protection Acts covering waste disposal.

7.2 Describe how environmental damage can be minimised refer to examples in LO4.2.

7.3 Describe the correct methods for disposing of organic and inorganic waste: Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. Refer to LO4.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised maintenance of health and appearance activities for interior plant displays giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after completion of health and appearance maintenance activities, photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5 and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of supervised maintenance of health and appearance activities on an interior plant display(s) and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/records of pests, diseases and treatments
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations

Excavate and Form Foundations for Fencing

Unit Reference	**T/501/7042**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, understanding and skills required to enable learners to excavate and form foundations for fencing under minimal direction or guidance
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.4)** ***The learner can***
1. Work safely and in line with requirements	1.1 Work safely in line with health and safety requirements 1.2 Complete work in a manner which causes minimal disturbance to the environment 1.3 Dispose of waste and excess materials safely
2. Be able to select, prepare and maintain tools and equipment	2.1 Select and prepare tools, equipment and resources ready for use 2.2 Maintain tools, equipment and resources in a clean and serviceable condition throughout excavation
3. Be able to excavate foundations to comply with (fence) specifications	3.1 Use recommended working practices to excavate ground
4. Be able to form foundations to	4.1 Place concrete/or other suitable material and compact to provide for foundation strength, size, profile and finish

comply with (fence) specification	4.2 Establish provision to support the future installation of posts
5. Be able to deal with difficulties	5.1 Deal with difficulties experienced during work within levels of responsibility 5.2 Request advice on how to deal with difficulties outside level of own responsibility
6. Know the relevant legislation and codes of practice	6.1 Outline the health and safety, legislation and codes of practice associated with excavation work 6.2 Identify the environmental issues associated with the disposal of waste, excess materials and concrete/other material
7. Know how to excavate for fence foundations	7.1 Name the types and correct use of equipment used for excavating post holes and strip trenches 7.2 Outline how and when temporary supports should be used to support excavations
8. Know how to form foundations for fencing specifications	8.1 Outline the materials and ratios used in concrete/other suitable material 8.2 Explain the methods used for mixing, placing, compacting, finishing and curing concrete/other suitable material 8.3 Outline the methods used for forming pockets in concrete/other suitable material for future fixing 8.4 Outline the techniques used for casting-in fixing items
Mapping to National Occupational Standards FE3.1	

Supporting Unit Information

T/501/7042 Excavate and form foundations for fencing – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

LO1, LO2, LO3, LO4 and LO5 are the key areas of competence for this unit

Learning Outcome 1. Work safely and in line with requirements

1.1 Work safely in line with health and safety requirements Risk assessment studied and implemented. Work activities carried out consistently with current legislation, codes of practice and any additional requirements. Health and Safety e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Town and Country Planning, England e.g. Town and Country Planning (General Permitted Development) (Amendment) (No 2) (England) - refer to Class F Environmental Protection e.g. Environmental Protection Acts covering waste disposal, Codes of Practice e.g. Protecting our Water, Soil and Air,

1.2 Complete work in a manner which causes minimal disturbance to the environment Work is completed in a manner which causes minimal disturbance to environment;
Use and wastage of materials is minimised, (e.g. waste material recycled or re-used, use of crushed building waste instead of quarried stone)
Pollution from the site is minimised (e.g. run-off of water and suspended materials is controlled, dust is controlled, noise levels reduced, packaging materials controlled).
Disturbance and loss of habitat is minimised, important features (e.g. feeding or nesting areas, plants) are marked and protected,
Waste is disposed of in line with legislation, codes of practice and policies; e.g. Duty of care - controlled wastes, organisations policy for handling of wastes (storage, local authority site/scheme, licensed contractor, recycle / reuse).

1.3 Dispose of waste and excess materials safely Waste and excess materials handled and disposed of safely. Organic waste – reduce waste removed from cropping area (by careful selection of cop, waste material returned to the field (unless the material poses a threat to plant health e.g. diseased material and perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging

minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

Learning Outcome 2. Be able to select, prepare and maintain tools and equipment

2.1 Select and prepare tools, equipment and resources ready for use
Appropriate equipment and resources for this area of work is selected and made ready for use; Preparation for operation as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe use. Preparation of range of equipment e.g.
Marking out equipment – levels, pegs, strings (used to ensure accurate positioning) – checking as clean and not damaged, setting up and calibration of levels;
Equipment for excavating trenches;
Hand tools (spade, shovel, pick axe, mattock), checked as clean and Undamaged.
Mechanical (back hoe, 360^{o} diggers, trenchers) (used for removing soil/other material to form trench, removal/loading of material, back-filling) serviced as required, greased/oiled, refuelled, lights checked, hoses checked for wear or leaks, appropriate bucket fitted for task;
For post-holes – hand tools as above, mechanical (post-hole borers hand Operated or tractor mounted) Preparation as for excavating.

2.2 Maintain tools, equipment and resources in a clean and serviceable condition throughout excavation Tools, equipment and resources maintained in a clean and serviceable condition throughout excavation, securely and safely stored when not in use (refer to LO2.1 for range of equipment). Monitoring, refuelling, storage, protection,

Learning Outcome 3. Be able to excavate foundations to comply with (fence) specifications

3.1 Use recommended working practices to excavate ground Recommended working practices is used to excavate ground. Work is carried out (see LO2.1 for range of activities) according to instructions, equipment is only used for purpose and in conditions recommended by manufacturer/supplier, risk assessment implemented, codes of practice and legislation complied with (refer to LO1.1), work is carried out according to plan or instructions to meet purpose and appearance.

Learning Outcome 4. Be able to form foundations to comply with (fence) specification

4.1 Place concrete/or other suitable material and compact to provide for foundation strength, size, profile and finish Concrete/or other suitable material placed and compacted to provide for foundation strength, size, profile and finish according to plans or instructions;
Concrete made up of; Cement (Portland), Sharp Sand, Aggregate (Normally 20mm for fencing) or Ballast (sand/aggregate mix), water; Ratios;
Wet mixes – e.g. 1 part cement; 2.5 parts sand; 3.5 aggregate
Dry mixes – e.g. 1 part cement; 2 parts sand; 4 parts aggregate
Mixing – by hand or by mixer, addition of wetting agents, water
Placing – using hand tools or direct from delivery vehicle
Compacting – tamping by hand, use of vibrators
Finishing – rough or smooth, by hand or machine
Curing – (preventing of excessively fast drying), use of water sprinklers, flooding or covering with plastic.
Other materials – stone and or gravel, quarry waste, intrinsic material (e.g. soil/sub-soil); placed in layers, tamped and consolidated.

4.2 Establish provision to support the future installation of posts Pockets formed using shutters, formers, sockets, reinforcing included in foundation Anchors, bases (e.g. met-posts), bolts and fittings set in foundation material, material tamped round to ensure firm, levels used to ensure accurate positioning.

Learning Outcome 5. Be able to deal with difficulties

5.1 Deal with difficulties experienced during work within levels of responsibility e.g. problems with equipment or other resources (shortage of fuel, materials replaced/replenished from store), Work stopped when conditions become unfavourable or if unsafe to proceed (e.g. heavy rain, ice, machinery failure, presence of unauthorised persons on site) (refer to LO1.1 for circumstances and codes of practice), obstructions to excavations cleared.

5.2 Request advice on how to deal with difficulties outside level of own responsibility Advice is requested on how to deal with difficulties outside level of own responsibility.
E.g. problems with equipment failures reported to supervisor, need to order more materials reported to supervisor, difficulties in meeting specifications on plans referred to supervisor or architect/designer/client.

LO6, LO7 and LO8 are the key area of knowledge for this unit

Learning Outcome 6. Know the relevant legislation and codes of practice

6.1 Outline the health and safety, legislation and codes of practice associated with excavation work (refer to LO1.1).

6.2 Identify the environmental issues associated with the disposal of waste, excess materials and concrete/other material Identify the

environmental issues associated with the disposal of waste, excess materials and concrete/other material; (refer to LO1.2)
Production of materials; mineral inputs into production (e.g. quarried limestone impacting on landscape, energy use, noise, dust), energy input to manufacturing (e.g. operation of kilns, transport) waste (e.g. dusts, Carbon Dioxide).
Use of materials; energy use (e.g. transport, mixers, cutting equipment), loss of habitat, drainage (lack of attenuation), visual impact, use of wood products
Waste; water and pollutants from sites, carbon dioxide and other gases from combustion, waste packaging, noise, dust, materials from site clearance, removal of excess or unused materials.
Waste disposal: Duty of care - controlled wastes, organisations policy for handling of wastes (storage, local authority site/scheme, licensed contractor, recycle / reuse).

Learning Outcome 7. Know how to excavate for fence foundations

7.1 Name the types and correct use of equipment used for excavating post holes and strip trenches (refer to LO2.1 for range of equipment and methods of use).

7.2 Outline how and when temporary supports should be used to support excavations
Shuttering and boards used to support to prevent slippage and instability, protect workforce and equipment,
Use for; deep trenches, soft or unstable soils/materials, wet conditions, near to traffic.

Learning Outcome 8. Know how to form foundations for fencing specifications

8.1 Outline the materials and ratios used in concrete/other suitable material (refer to LO4.1 for details)

8.2 Explain the methods used for mixing, placing, compacting, finishing and curing concrete/other suitable material (refer to LO4.1 for details)

8.3 Outline the methods used for forming pockets in concrete/other suitable material for future fixing (refer to LO4.2 for details)

8.4 Outline the techniques used for casting-in fixing items; (refer to LO4.2 for details)

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with

identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 4 and 5
Delivery of these learning outcomes is by supervised practical work excavating and forming foundations for fencing giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Learning Outcomes 6, 7, and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work excavating and forming foundations for fencing, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.
Prior to, during and after completion of work excavating and forming foundations for fencing photographs or video could be taken to provide evidence of progress. Copies of packhouse or field records can be used to provide evidence of quantity of work and of sufficiency of evidence.

Methods of assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3, 4 and 5 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 6, 7 and 8 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally

teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments

- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has list of references in Section 9
- Local Authority web sites for Building Control Department
- The Paving Expert web site at http://www.pavingexpert.com/ provides comprehensive information about foundations and materials

  Learners should be directed to relevant publications and web sites eg.
- The Landscaper (www.landscapermagazine.com)
- *DEFRA web site and publications (*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *A Handbook for Horticultural Students* by Peter Dawson
- *Farm Horticulture* by George W. Wood

Install Hard Standing Sub-Layers

Unit Reference	**T/502/1219**
Level	**2**
Credit Value	**7**
Guided Learning Hours	**53**
Unit Summary	This unit will provide the learner with the skills and knowledge required in installing various forms of hard-standing sub-layers that are used within the landscaping industries. It is designed to give a basic understanding of the materials, tools and techniques used by operatives to install both temporary and permanent hard surfaces
Learning Outcomes (1 to 9) ***The learner will***	**Assessment Criteria (1.1 to 9.3)** ***The learner can***
1. Be able to select, use and maintain equipment for installing hard standing sub-layers	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to install sub-layers	2.1 Prepare the area prior to installing sub layers 2.2 Install sub-layers to accurate levels and profiles 2.3 Protect prepared sub-layers effectively against weather and use until they are in a suitable condition
3. Be able to install laying courses	3.1 Set-out for line and level 3.2 Place and prepare suitable laying courses

	3.3 Manually agitate the laying course at edges and around obstructions such as drainage access covers 3.4 Manually make good the channel left by screed rails with minimum disturbance to or compaction of adjacent screeded area
4. Be able to prepare individual course beds	4.1 Place and prepare a suitable laying course for an individual bed
5. Be able to work safely and minimise environmental damage	5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 5.2 Carry out work in a manner which minimises environmental damage 5.3 Dispose of waste safely and correctly 5.4 Leave the site safe, tidy and suitable for intended use 5.5 Maintain effective working relations with relevant people throughout
6. Know the principles of sub-base function and aggregate compaction in sub-bases	6.1 Describe the importance of sub-layers 6.2 Describe the impact that prevailing weather conditions may have on sub-layers 6.3 Describe the impact of sub-grade conditions on the performance of overlying layers 6.4 List the sequence of layers that may be encountered within a typical installation and the relevance of each to the overall structure 6.5 List the range of primary and secondary aggregates that are used in the installation of sub-layers 6.6 Identify the range of conventional and permeable materials used in sub-layer installation 6.7 State the importance of sub-layer drainage and how this can be best achieved in a range of circumstances

	6.8 Explain the importance of levelling and grading the aggregate within each sub-layer and of working to defined tolerances and profiles, including the checks used to ensure compliance 6.9 Describe to what degree, and the importance of installing each sub-layer in stages with a specified maximum thickness
7. Know the principles of installing laying courses	7.1 Describe the weather conditions that are appropriate for screed preparation 7.2 State how to measure to ensure work is within tolerances 7.3 Describe how falls, lines and levels are determined and set out 7.4 State how to calculate the expected surcharge and/or the screed depth required for a notched screed bar 7.5 State the importance of using the correct type of laying course material 7.6 State the importance of laying course grain shape, grain size, and moisture content to overall performance 7.7 Identify the correct storage and protection conditions for laying course material 7.8 Describe how the laying course is placed and prepared manually, how it is shaped to follow summits and hollows, and how its compaction is pre-determined 7.9 Describe how channels formed by screed rails are made good 7.10 Describe how screeding can be carried out using existing fixed edges and/or screed rails
8. Know the types of equipment required and how to maintain them	8.1 Describe the equipment which will be required for the activity 8.2 Describe methods of maintaining the equipment in a fit state for use

9. Know the current health and safety legislation and environmental good practice	9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 9.2 Describe how environmental damage can be minimised 9.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029NAHL29.1,2,3	

Supporting Unit Information

T/502/1219 Install hard standing sub-layers - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2, LO3, LO4 and LO5 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment for installing hard standing sub-layers

1.1&3 Select appropriate equipment for this area of work PPE selected and safely used e.g. gloves / anti vibration gloves, overalls, steel toe-capped boots with pierce resistant midsole, dust masks to required grade, goggles, ear defenders. CE marked. Tools / equipment selected e.g. marker pins, taut line, spirit level and straight edge, spade and rake, screed rails / bars, vibrating plate compactor / roller.

1.2&3 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation e.g. vibrating plate compactor - operating instructions followed, oil and fuel checked / topped up. Use e.g. regular breaks taken, vibration setting lowest for task, distance between machine and bystanders safe. Maintenance e.g. ensured engine cool first, cleaned by brushing / vacuum, lubricated moving parts, checked for loose or cracked parts. Storage e.g. stored on level surface with power switch and fuel turned off. Secure e.g. valuable tools locked away, fuel and oil clearly labelled and stored separately, shadow board - check return. Maintain records e.g. maintenance and repairs. Report faults to line manager. Refer to LO8.2.

Learning Outcome 2. Be able to install sub-layers

2.1 Prepare the area prior to installing sub layers Cleared e.g. vegetation / roots. Levelled e.g. major fluctuations in soil / surface levels addressed. CAT scanned for services e.g. depending on depth of excavations. Marked out e.g. pegs and string. Excavated e.g. to sub-grade level. Sub-grade made good e.g. soft areas addressed, tamping.

2.2 Install sub-layers to accurate levels and profiles Sub Individual sub-layers laid e.g. material tipped into excavated area, spread to level. Level determined

e.g. against form. Fall determined e.g. form laid to fall. Compaction e.g. required number of passes along and across sub-layer. Level checked e.g. above plus or minus 1cm appropriately adjusted. Camber checked e.g. against profile cut from plywood. Also checking by eye throughout.

2.3 Protect prepared sub-layers effectively against weather and use until they are in a suitable condition Prepared sub-layers protected against weather / use: Weather e.g. heavy/overnight rain**.** Type damage e.g. spattering/runs in sand sub-layer. Protection e.g. cover with plastic sheeting weighted with bricks. Sub-layer saturated - remove and replace. Stockpiles e.g. covered to prevent saturation. Use e.g. Area taped off, warning signs erected.

Learning Outcome 3. Be able to install laying courses

3.1 Set-out for line and level Line accurately set out e.g. marker pins and taut line set to shape, features, obstacles, corners. Level accurately set out e.g. screed rails placed to level or camber.

3.2 Place and prepare suitable laying courses Suitable laying courses placed and prepared: Suitable e.g. screeded sand layer used for block paving. Placed e.g. sand tipped, raked / shovelled to level. Prepared e.g. compacted lightly, screeded along lines of screed rails.

3.3 Manually agitate the laying course at edges and around obstructions such as drainage access covers laying courses manually agitated at edges and around obstructions: Purpose e.g. awkward areas compacted. Methods e.g. rubber mallet. Timing e.g. compacted as job progressed to avoid walking over screeded area.

3.4 Manually make good the channel left by screed rails with minimum disturbance to or compaction of adjacent screeded area Screed walked to retrieve screed rails e.g. along line of rail. Gap filled e.g. screed material poured into gap and compacted by foot. Screeded e.g. reverse out pulling narrow screeder board over disturbed area.

Learning Outcome 4. Be able to prepare individual course beds

4.1 Place and prepare a suitable laying course for an individual bed Laying course for an individual bed placed and prepared: Line set out - refer to LO3.1. Level e.g. marker pegs set to level at intervals along lines, planks attached inside pegs exactly level to prepare formwork. Suitable e.g. screeded sand layer used for block paving. Placed e.g. sand tipped inside forms, raked / shovelled to level. Prepared e.g. compacted lightly, rebated screeding board used between forms.

Learning Outcome 5. Be able to work safely and minimise environmental damage

5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable, risk assessment and additional requirements e.g. check with Local Authority (LPA) on position of services, requirements on paving over manhole covers, check with LPA / Environment Agency about run-off to foul water drains / sewers. Depending on depth of excavation may need to CAT scan / check position services.

5.2 Carry out work in a manner which minimises environmental damage Environmental damage minimised e.g. leave space around trees, care not to damage roots / grassed areas, use recycled aggregates for sub-bases preferably locally sourced.

5.3 Dispose of waste safely and correctly Waste disposed of correctly and safely: Waste e.g. organic - green or inorganic- excess concrete, stones, and topsoil/sub D soil. Correctly - refer to LO9.3. Safely e.g. PPE, safe lifting

5.4 Dispose of waste safely and correctly Site left safe, tidy, and suitable for intended use: Safe e.g. area taped off. Tidy e.g. concrete or sand cleared from edging. Intended use e.g. meets specification.

5.5 Maintain effective working relations with relevant people throughout: Communication with customer, staff, Local Planning Authority e.g. polite, respectful and keeping people informed. Respect for e.g. staff, property and grounds. Attitude to work e.g. keep promises, turn up on time, work to agreed plans and acceptable standard, tidy up afterwards.

LO6, LO7, LO8 and LO9 are the key areas of knowledge for this unit

Learning Outcome 6. Know the principles of sub-base function and aggregate compaction in sub-bases

6.1 Describe the importance of sub-layers e.g. spreading load from surface layer into sub-grade, prevention of unevenness developing in laid surface, raising / meeting levels.

6.2 Describe the impact that prevailing weather conditions may have on sub-layers during laying e.g. rain - refer to LO2.3, frost - cover to prevent expansion / disruption of surfaces. Longer term effects of frost e.g. cracking of paving, sub-base / sub-grade loosened after thawing.

6.3 Describe the impact of sub-grade conditions on the performance of overlying layers Sub-grade strength e.g. influenced by type of soil, moisture content. Testing sub-grade strength e.g. CBR test. What is a weak sub-grade and its affect e.g. weak sub-grade has CBR of less than 5% - capacity to bear load is affected.

6.4 List the sequence of layers that may be encountered within a typical installation and the relevance of each to the overall structure Sequence e.g. Sub-grade, capping layer(s), sub-base, base, working surface. Relevance

e.g. sub-base - spreads load borne by surface layer evenly into capping layers / sub-grade.

6.5 List the range of primary and secondary aggregates that are used in the installation of sub-layers: Primary aggregates e.g. rock types including igneous, sedimentary - limestone / sandstone, metamorphic rocks. Substitutes e.g. crushed concrete. Secondary aggregates including industrial by-products / waste materials / artificial aggregates e.g. quarry waste, demolition wastes, blast furnace slags.

6.6 Identify the range of conventional and permeable materials used in sub-layer installation Range of conventional and permeable materials: Conventional material types e.g. DTp1 and DTp2. Constituents: Types / sizes / proportions of solids to fines used. Permeable materials e.g. course graded aggregate (no fines - water storage between articles). Types, sizes and proportions. Other permeable materials e.g. no fines concrete. Sizes, proportions, cement content.

6.7 State the importance of sub-layer drainage and how this can be best achieved in a range of circumstances e.g. preventing or slowing run-off from paved areas into drains and water courses - Sustainable Urban Drainage Systems. Circumstances e.g. sub-base storage and release into sub-grade. Achievement of sub-layer drainage e.g. use of course graded aggregate sub-layer to store water between the particles and release it slowly into sub-grade.

6.8 Explain the importance of levelling and grading the aggregate within each sub-layer and of working to defined tolerances and profiles, **including the checks used to ensure compliance**: Levelling e.g. even layer of load bearing aggregate, variations in level may lead to stresses on surface layer such as tilt /sideways movement of blocks which may be magnified by traffic. Grading e.g. fall to drainage achieved with even base layer above and flat working surface. Working to defined tolerances and profiles - refer to LO2.2. Checks to ensure compliance e.g. level - straight edge across forms / kerbs and tape measure depth to aggregate.

6.9 Describe to what degree, and the importance of installing each sub-layer in stages with a specified maximum thickness: Overall thickness sub-layers determined e.g. depending on load spreading capability needed - type of traffic, type of surface to be laid, strength of sub-grade. Individual sub-layer thickness e.g. to maximum thickness of 150 mm per layer or capping layers maximum thickness 230 mm. Importance e.g. to allow adequate compaction each sub-layer added, surfaces finished with fines.

Learning Outcome 7. Know the principles of installing laying courses

7.1 Describe the weather conditions that are appropriate for screed preparation: Effect of different weather conditions such as temperature, rain, wind on screed preparation e.g. rain saturation of layer to be screeded will affect its compaction properties.

7.2 State how to measure to ensure work is within tolerances Tolerances e.g. final working surface within plus / minus 3 mm above edging. If below edging screed level adjusted upward. Level e.g. marked by screed rails or depth set by screed bar so accurate calculation of screed level necessary to establish working surface within tolerance and after compaction is essential - refer to LO7.3 and LO7.4. Measuring: Correct level of screed rail checked e.g. by measuring depth below a level taut line / boning rods / laser level.

7.3 Describe how falls, lines and levels are determined and set out Lines determined from plan e.g. calculations as necessary to accurately transpose, right angles / straight lines onto ground. Set out e.g. marker pins and taut line set to shape of area to be surfaced. Required falls determined e.g. by knowing requirements for drainage, position of drainage system relative to surface and any high or low points. Measurement e.g. as LO6.8 or use automatic / laser levels and calculate as appropriate. Falls set out e.g. by adjusting taut line on marker pins, transposed to kerbs, edgings, formwork, screed rails, trammel bars. Levels determined e.g. test on site how screed material to be used responds to compaction and set out level of screed rails accordingly - supported rails embedded in screed material (stability essential once screed rail set).

7.4 State how to calculate the expected surcharge and/or the screed depth required for a notched screed bar Use of tables e.g. thickness of blocks cross referenced to depth of screed required below finished level before compaction. Site test e.g. using table figures as starting point test small area to refusal - refer to LO7.3. Depth below kerbs / edging e.g. screed bar notched to depth before compaction - determined by result of test above.

7.5 State the importance of using the correct type of laying course material e.g. stability of sand types under pressure affected by grain shape and relates to use e.g. high stability sands used in heavy traffic areas such as bus stops. Sand categories and typical application e.g. 1A to IV. Suitability of sand from different sources e.g. naturally occurring silica sands versus crushed rock sands.

7.6 State the importance of laying course grain shape, grain size, and moisture content to overall performance Grain shape - interlock characteristics of sands e.g. naturally smoothed but not rounded or crushed sands with sharp features. Grain size e.g. sieve sizes of sands in categories 1A to IV and relationship of smaller particles to stability. Moisture content: Adverse effects when moisture content too high for specific laying course material e.g. movement of fine material, loss to underlying layers.

7.7 Identify the correct storage and protection conditions for laying course material: Storage e.g. type of storage area, protection from rain, precautions against mixing. Storage on site e.g. close to site of use, if space is tight order delivery as used - refer to LO2.3.

7.8 Describe how the laying course is placed and prepared manually, how it is shaped to follow summits and hollows, and how its compaction is pre-determined: Refer to LO4.1. Use of screeder bar e.g. number of operatives, contact with kerb, removing build-up of screed, precautions. How laying course shaped to follow summits / hollows: Use of screed rails e.g. set above or below taut line. Creating a rounded profile e.g. shaped screeder board. How compaction is pre-determined: Stages e.g. spread / level laying course, lightly compact, lay working course, and final compaction to required level.

7.9 Describe how channels formed by screed rails are made good refer to LO3.4.

7.10 Describe how screeding can be carried out using existing fixed edges and/or screed rails Types of screeding tools e.g. manually cut screeding board, proprietary adjustable to work across the top of screed rails or a fixed edge, hinged to facilitate shaping laying course to follow summits / hollows, machine operated. Speed of operation. Advantages/disadvantages to operator.

Learning Outcome 8. Know the types of equipment required and how to maintain them

8.1 Describe the equipment which will be required for the activity refer to LO1.1.

8.2 Describe methods of maintaining the equipment in a fit state for use - refer to LO1.2 and 3.

Learning Outcome 9. Know the current health and safety legislation and environmental good practice

9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations
Town and Country Planning, England e.g. Town and Country Planning (General Permitted Development) (Amendment) (No 2) (England) - refer to Class F
Environmental Protection e.g. Environmental Protection Acts covering waste disposal
Codes of Practice e.g. Protecting our Water, Soil and Air,
Additional requirements - refer to LO5.1.

9.2 Describe how environmental damage can be minimised - Refer to examples in LO5.2.

9.3 Describe the correct methods for disposing of organic and inorganic waste: Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor - refer to LO3.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 4 and 5
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised installation of hard standing sub-layers giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after laying hard standing sub-layers photographs or video could be taken to provide evidence of progress.

Learning Outcomes 6, 7, 8 and 9
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of laying hard standing sub-layers and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3, 4 and 5 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 6, 7, 8 and 9 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks/paving and sub-layer plans
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority web sites for Building Control Department
- The Paving Expert web site at http://www.pavingexpert.com/ provides comprehensive information about laying types of paving and related activities
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Maintain Drainage Systems

Unit Reference	**T/502/1222**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with knowledge, skills and understanding required to inspect and maintain drainage systems
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.3)** ***The learner can***
1. Be able to inspect and maintain drainage systems	1.1 Inspect and assess drainage systems according to agreed schedules 1.2 Restore drainage systems to full effectiveness and to agreed schedule 1.3 Record inspections and work undertaken 1.4 Maintain effective working relations with all relevant people throughout
2. Be able to work safely and minimise environmental d amage	2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 2.2 Carry out work in a manner which minimises environmental damage 2.3 Dispose of waste safely and correctly
3. Know how to inspect and mainta in drainage systems	3.1 Describe the schedule of inspections required to identify faults and problems

	3.2 Describe how to identify and correct impeded drainage and its causes 3.3 State how to identify and deal with any problems with drainage systems 3.3 Describe the main causes of drain malfunction, including leaks and blockages and methods that can be used to deal with them 3.4 Describe the factors affecting flow rates in the drains 3.5 State the importance of maintaining drainage systems so they work effectively and efficiently 3.6 Describe the principles of drainage design 3.7 State why it is important to keep working areas clean according to clients' requirements 3.8 State what records need to be kept and why
4. Know the current health and safety legislation and environmental practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 4.2 Describe how environmental damage can be minimised 4.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029NL21.1 L15.2	

Supporting Unit Information

T/502/1222 Maintain drainage systems – Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1 and LO2 are the key areas of competence for this unit

Learning Outcome 1. Be able to inspect and maintain drainage systems

1.1&2 Inspect and assess drainage systems according to agreed schedules / Restore drainage systems to full effectiveness and to agreed schedule Drainage systems safely inspected, assessed and restored to full effectiveness according to agreed schedules e.g. CCTV survey and remedial work to agreed dates, hours of work, parts of system to be inspected, section to be replaced, method and materials used, type of report, summary, certification of work completed.

1.3 Record inspections and work undertaken Inspections and work undertaken recorded e.g. CCTV survey results, interpretation of findings and recommendations for restorative work.

1.4 Maintain effective working relations with all relevant people throughout Effective working relations maintained e.g. by providing client with well presented, clear information about the findings of the inspection and work needed.

Learning Outcome 2. Be able to work safely and minimise environmental damage

2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO4.1.

2.2 Carry out work in a manner which minimises environmental damage e.g. by working in appropriate weather conditions. No dig repairs, careful planning of drainage outfall.

2.3 Dispose of waste safely and correctly: Waste e.g. organic - green or inorganic - stones / concrete, broken pipe sections, product cleared from pipes, sub-soil. Correctly- refer to LO4.3. Safely e.g. PPE, safe lifting.

LO3 and LO4 are the key areas of knowledge for this unit.

Learning Outcome 3. Know how to inspect and maintain drainage systems

3.1 Describe the schedule of inspections required to identify faults and problems e.g. timing, parts of drainage system to be covered and methods to be used during routine inspections to identify faults and problems.

3.2 Describe how to identify and correct impeded drainage and its causes Impeded drainage: Surface effects e.g. wet patches / standing water. Check e.g. dig hole, half fill with water and leave for 24 hours to drain. Correct e.g. by restoring effectiveness of existing drainage system, installing soakaway. Causes of impeded drainage e.g. heavy or compacted soils, naturally high water table, collapsed ground, faults in drainage system such as leaking pipes or ingress of roots.

3.3 Describe the main causes of drain malfunction, including leaks and blockages and methods that can be used to deal with them e.g. Rodding, CCTV surveys, sonar traces, pipe profiling. Determine if problem can be solved without loss of integrity of system e.g. check if outfall is being affected by blockages, clear blockages in system by rodding or jet washing. Integrity lost - e.g. no dig repair using various lining techniques such as spray, slip lining or cured in place pipe lining.

3.4 Describe the factors affecting flow rates in the drains e.g. pipes blocked by leaves, misaligned pipes with leakage causing soil loss below leaking joint, silting, roots entering and clogging pipe work. Methods to deal with problems e.g. above problems - place grid over entrance to pipe, restore support for pipe work, wrap pipe in Geo Textile fabric to slow ingress of roots and stop silt getting into pipe, lining techniques to allow existing pipe work to be restored if effective.

3.5 State the importance of maintaining drainage systems so they work effectively and efficiently e.g. water pressure, the fall, all trenches sloping downhill, size of pipes, groundwater levels, blockage, breakage or silting. e.g. to avoid wet soil, unsuitable for many flowers, shrubs, trees and affecting lawns with possibility of further damage to soil if walked on.

3.6 Describe the principles of drainage design e.g. normal pattern of drainage design, materials currently in use, depths, sizes, distances and falls of pipes, materials used around pipes, outflow or storage of water in soak-away systems, access /inspection facilities.

3.7 State why it is important to keep working areas clean according to clients' requirements Clean working areas e.g. possible dirt and biological agents in pipe work such as hepatitis types and leptospirosis, utility and aesthetic concerns. Client satisfaction.

3.8 State what records need to be kept and why e.g. contact details, inspection report and evidence such as camera inspection, contacts with Local Authorities or Environment Agency. Evidence of problem to justify work recommended and pricing.

Learning Outcome 4. Know the current health and safety legislation and environmental practice

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work
e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations
Environmental Protection e.g. Environmental Protection Acts covering waste disposal
Codes of Practice e.g. Protecting our Water, Soil and Air
Additional requirements: Contact Local Authority e.g. if working within a Conservation Area or close to a local Nature Reserve. Environment Agency notifications for activities affecting watercourses, groundwater.
Aquifers e.g. discharge of water into a brook
Working safely in trenches or confined spaces. Need for CAT scan if digging
Tractors - Safe Stop, ensure tetanus vaccination up to date
Hygiene precautions e.g. personal hygiene, protective barrier creams.
4.2 Describe how environmental damage can be minimised - refer to examples in LO2.
4.3 Describe the correct methods for disposing of organic and in organic waste Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste such as oil / filters from maintenance Tractors. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. If quantities justify check. Environment Agency procedures regarding hazardous waste e.g. blockage materials from pipe work, needles or syringes, waste oil**.** Refer to LO2.3.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1 and 2 link together and competence can be assessed practically by observation or by generation of diverse evidence. These

could also link to Learning Outcomes 3 and 4 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

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- Taped evidence (video or audio)
- Photographic evidence/CCTV survey results
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
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- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Installation of Edge Restraints

Unit Reference	**T/502/1284**
Level	**2**
Credit Value	**7**
Guided Learning Hours	**53**
Unit Summary	The aim of this unit is to provide the learner with the ability to demonstrate the knowledge and skills required to install various forms of edge restraints used within the hard-landscaping industry. The unit will provide a basis understanding of the materials, tools and techniques used to install both temporary and permanent hard surfaces
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.4)** ***The learner can***
1. Be able to select, use and maintain relevant equipment	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to relevant legislation and manufacturer's instructions 1.3 Prepare, maintain clean and store equipment in a safe and effective working condition
2. Be able to install kerbs, channels and edgings	2.1 Set-out for line and level 2.2 Place and prepare a suitable bed 2.3 Lay kerbs, channels and edgings to the correct line and level using at least three of the following materials • concrete road kerbs • stone road kerbs • concrete dished/fluted channels

	• stone dished/fluted channels • concrete flat channels • stone flat channels • concrete edgings • stone edgings • singe piece systems • multi-piece systems • small kerb units • small paving units • setts/cubes/cobbles 2.4 Carry out installation of kerbs, channels and edgings in all the following ways • place a suitable kerb race • lay units onto a mortar bed on a pre-existing race • lay units to a straight line (windrow) • lay units to a true arc • lay units to a free curve • install a dropped crossing • lay transitions between two different types of unit • lay an edge restraint to a right-angled return using angle units and quadrants • lay channels to an existing kerb line • lift and repair 2.5 Cut-in to required standard 2.6 Maintain correct joint width 2.7 Seal joints to specification as required 2.8 Connect the kerb-drains to suitable outfalls as required 2.9 Check completed work for compliance with specification and standards and rectify any problems if necessary 2.10 Haunch units 2.11 Keep damage to the surroundings to a minimum 2.12 Leave the site in a safe, clean and tidy condition, suitable for its intended use.

	2.13 Protect working areas effectively against weather and use until they are in a suitable condition 2.14 Maintain effective working relations with relevant people throughout
3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to install kerbs, channels and edgings	4.1 State the weather conditions that are appropriate for installation 4.2 Describe how to measure to ensure work is within tolerances 4.3 Outline how falls, lines and levels are determined and set-out 4.4 Describe the range of edge restraints and small kerb systems and other units available and their suitable applications 4.5 State the importance of robust edge restraints 4.6 State the importance of using the correct type of bed material 4.7 Describe how the bed is placed and prepared, and how it is shaped to follow summits, hollows, and transitions 4.8 State the pros and cons of using fresh windrow bedding and pre-placed races 4.9 State the pros and cons of both butt-joined and mortar jointed installations

	4.10 Describe how to calculate the quantity of units required 4.11 Describe how units should be stored on site, how they are delivered to the laying face, and how they are positioned for the laying operative 4.12 Describe how units are manoeuvred into position using mechanical and/or vacuum lifting aids 4.13 Describe how units are consolidated to the required line and level 4.14 Describe how edge restraints are checked for accuracy in alignment along both straights and curves 4.15 State how cutting is achieved, following the principles of minimum unit size 4.16 Describe how units are jointed and how systems are connected to outfalls 4.17 State the importance of using the correct jointing method and its role in the performance of the completed edge restraint 4.18 Outline the removal and replacement of defective units 4.19 Describe the dangers of underground services and how to take account of these when working
5. Know the types of equipment required and how to maintain them	5.1 Describe the equipment which will be required for the activity 5.2 Describe the methods of maintaining the range of equipment 5.3 State the importance of dust-suppression and RPE when using a cut-off saw
6. Know relevant health and safety legislation	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements

and environmental good practice	6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste 6.4 Outline the hazards and relevant legislation and codes of practice covering this area of work with particular reference to the use of PPE
Mapping to National Occupational Standards O29NL31.1, L31.2, L31.3	

Supporting Unit Information

T/502/1284 Installation of edge restraints – Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The examples used in this indicative content are kerbs.

LO1, LO2 and LO3 are the key areas of competence for this unit

Learning Outcome 1. Be able to select use and maintain relevant equipment

1.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, gloves, and face mask conforming to RPE regulations when using a cut off saw. Tools and equipment correctly selected and used e.g. spades, shovels, maul, wheelbarrows, tractor and trailer, mini-digger, CAT scan, mixer, cut-off saw, pegs, line and level; site plans and specifications, surveying kit and spirit level.

1.2 Use equipment according to relevant legislation and manufacturer's instructions: risk assessments studied and implemented, pre-start checks on machines and used in accordance with manufacturer, supervisor and relevant legislation e.g. Abrasive wheels certificate for changing blade on cut-off saw, Manual Handling, PUWER and Stop Safe. Refer to LO1.1 for examples.

1.3 Prepare, maintain clean and store equipment in a safe and effective working condition Pre and post-use checks on machines and hand tools including cleaning by washing off and storing away securely under lock and key. Re-charge batteries on CAT scan and change blade on cut off saw when worn. Check all hand tools for cracks and defects.

Learning Outcome 2. Be able to install kerbs, channels and edgings

2.1 Set-out for line and level setting up datum pegs, installing string lines at the correct dimensions and finished levels for kerbs, channels or edges. Set out straight lines and corners using the landscapers 3, 4, 5 triangle and for circles and curves use two pegs and a string line to mark out shape.

2.2 Place and prepare a suitable bed: taping off area from general public and digging out and installation of concrete bed foundation to receive kerbs which

should be between 100-150mm in depth below the kerb unit and 150mm behind the kerb unit leaving enough depth for another surface such as turf or tarmac to be laid flush with the top of the kerb.

2.3 Lay kerbs, channels and edgings to the correct line and level using at least three of the following materials at least three different products being: concrete road kerbs; stone road kerbs; concrete dished/fluted channels; stone dished/fluted channels; concrete flat channels; stone flat channels; concrete edgings; stone edgings; single piece systems; multi-piece systems; small kerb units; small paving units; setts, cubes or cobbles. All three products laid in a straight line, a curve or a circle ensuring levels and lines are correct and meet the landscape specification for the paving being laid including kerbs haunched in concrete, edges set in mortar and open channels set into tarmac or block paving on a bed on concrete. Refer to LO2.2 for details.

2.4 Carry out installation of kerbs, channels and edgings in all the following ways: place a suitable kerb race; lay units onto a mortar bed on a pre-existing race; lay units to a straight line (windrow), lay units to a true arc, lay units to a free curve, install a dropped crossing, lay transitions between two different types of unit, lay an edge restraint to a right-angled return using angle units and quadrants, lay channels to an existing kerb line and lift and repair kerbs, channels or edgings. Refer to LO2.2 and LO2.3 for details.

2.5 Cut-in to required standard cut in done to required standard to include: marking off and cutting kerbs to ensuring they butt up correctly without leaving gaps.

2.6 Maintain correct joint width Joint width consistent at 4mm across the kerb units being laid in a straight line and no more than 8-10mm gap for kerbs laid in a curve of circle.

2.7 Seal joints to specification as required sealed with sand, mortar, or sealant as required by the specification.

2.8 Connect the kerb-drains to suitable outfalls as required: Drainage connected up correctly and water is removed efficiently.

2.9 Check completed work for compliance with specification and standards and rectify any problems if necessary Specification checked and defects reported to Supervisor such as broken units; sinking of soft spots; poor drainage and uneven levels.

2.10 Haunch units: Kerbs haunched using concrete mix.

2.11 Keep damage to the surroundings to a minimum Environmental damage minimised by carefully planning site access such as the removal and delivery of materials, and not allowing run off from waste products into water courses. Refer to Environmental Agency guidelines.

2.12 Leave the site in a safe, clean and tidy condition, suitable for its intended use Site checked; customer requirements and quality of work completed to specification, company and legal requirements.

2.13 Protect working areas effectively against weather and use until they are in a suitable condition materials such as cement and kerbs protected

against adverse weather by plastic sheeting or stored inside away from damp conditions; protection of partially completed kerbs or edgings by temporary plastic covering.

2.14 Maintain effective working relations with relevant people Throughout customers, colleagues, line managers, council officials, other trades people and the general public including safe access to sites and meetings arranged at a mutually convenient time when certain elements of the work are completed. Regular meetings and communication between the relevant parties with decisions written down recorded for future reference.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with relevant legislation, codes of practice and any additional requirements: Work activities carried out consistently with current legislation e.g. Health and Safety at Work Act 1974; Environmental Protection legislation including Waste Acts and COP's such as soil, water and air; additional requirements such as customer regulations, environmental health requirements as well as LOLER, PUWER, Manual Handling and Stop Safe.

3.2 Carry out work in a manner which minimises environmental damage Minimise environmental damage by carefully planning site access such as the removal and delivery of materials, working in correct weather conditions and avoiding spillages.

3.3 Dispose of waste safely and correctly: organic wastes such as soil which can be stored and then re-used; vegetation that can be composted; wood that can be chipped. Inorganic wastes such as empty preservative containers that should be put in a skip, mortar and broken edgings which can be re-used as hardcore if appropriate or disposed of into a skip or disposed via the local authority waste recycling facility.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to install kerbs, channels and edgings

4.1 State the weather conditions that are appropriate for installation: Kerbs laid when it is dry and not wet or frosty conditions. Refer to LO2.13 for examples.

4.2 Describe how to measure to ensure work is within tolerances checking levels to ensure consistency and effective drainage; that kerbs are in a straight line, arc or curve according to site plans and specifications.

4.3 Outline how falls, lines and levels are determined and set-out following specifications and setting out from a plan using string, pegs and sand; setting out falls using pegs, straight edge, spirit level or laser level and surveying equipment; setting out lines using string and pegs.

4.4 Describe the range of edge restraints and small kerb systems and other units available and their suitable applications Range of edge restraints and small kerb systems to include: the suitable application and position of the following: concrete road kerbs; stone road kerbs; concrete dished/fluted channels; stone dished/fluted channels; concrete flat channels; stone flat channels; concrete edgings; stone edgings; singe piece systems; multi-piece systems; small kerb units; small paving units and either setts, cubes or cobbles.

4.5 State the importance of robust edge restraints restraints to include: maintaining the rigidity of block paving; essential supports for pavements and drainage outfalls; essential to contain gravel paving.

4.6 State the importance of using the correct type of bed material solid foundation to lay kerbs and edges on to avoid sinking; correct bedding material as per the specification.

4.7 Describe how the bed is placed and prepared, and how it is shaped to follow summits, hollows, and transitions excavation and grading of land to correct levels; installation of bedding material and graded to summits and hollows; consolidation of bedding followed by topping up levels and further consolidation.

4.8 State the pros and cons of using fresh windrow bedding and pre-placed races: strength; cost; time; amounts of concrete; different types of edging restraints used for each method. Fresh Windrow Bedding is quicker to lay with no extra materials but kerbs and edgings can move when laid. Pre-placed races take time and materials to put in place but kerbs and edges do not move when laid.

4.9 State the pros and cons of both butt-joined and mortar jointed installation specifications, spalling of products; gaps between edgings and kerbs; different types of kerbs and edgings. Mortar jointing takes more time and extra mortar for products to be laid. Butt jointed products are quicker to lay and use less materials but are not as strong or waterproof.

4.10 Describe how to calculate the quantity of units required: measuring the site area with a tape measure for smaller areas or a landscape wheel for larger areas and calculating the total perimeter of the edgings and then dividing by unit size to give number of units.

4.11 Describe how units should be stored on site, how they are delivered to the laying face, and how they are positioned for the laying operative protection and storage of unit materials by covering with plastic sheets; transport to work area including safe positioning for installation in the construction area by standing edging materials on boards and transporting them to site from the flatbed truck by using hydraulic grab or small crane to put them into position or using a rough terrain forklift truck to transport them.

4.12 Describe how units are manoeuvred into position using mechanical and/or vacuum lifting aids delivery of units to site and transport methods and equipment used to move units to the work area. Refer to LO4.11 for examples.

4.13 Describe how units are consolidated to the required line and level: tamping with rubber mallet or maul; haunching; use of pre-placed races; working to line and level.

4.14 Describe how edge restraints are checked for accuracy in alignment along both straights and curves spirit level, pegs and lines, site plans and specifications.

4.15 State how cutting is achieved, following the principles of minimum unit size: marking out and cutting with cut off saw to enable units to be butted up together flush when laid; cutting kerbs into smaller lengths to reduce gap between kerbs laid to a curve.

4.16 Describe how units are jointed and how systems are connected to outfalls: overlap jointing; installation of corner units; water tight joints with bituminous sealant; installation of outfall box and P trap connection to drainage system.

4.17 State the importance of using the correct jointing method and its role in the performance of the completed edge restraint mortar joints and pointing; butt jointing and sealing of gaps; avoidance of spalling.

4.18 Outline the removal and replacement of defective units removal of defective units without damaging the other units either side; installation to correct levels; depth and foundation of new units to match the other edging units.

4.19 Describe the dangers of underground services and how to take account of these when working use of CAT scan; reference to site plans to detect gas, water and electricity pipes and the dangers of pressure and explosion.

Learning Outcome 5. Know the types of equipment required and how to maintain them

5.1 Describe the equipment which will be required for the activity. Refer to LO1.1 for examples.

5.2 Describe the methods of maintaining the range of equipment Refer to LO1.2 and LO1.3 for examples.

5.3 State the importance of dust-suppression and RPE when using a cut-off saw. Refer to LO1.1 for examples.

Learning Outcome 6. Know relevant health and safety legislation and environmental good practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements refer to LO3.1 for examples.

6.2 Describe how environmental damage can be minimised Refer to LO3.2 for examples.

6.3 Describe the correct methods for disposing of organic and inorganic waste Refer to LO3.3 for examples.

6.4 Outline the hazards and relevant legislation and codes of practice covering this area of work with particular reference to the use of PPE Refer to LO1.1 and LO3.1 for examples.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2 and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical construction of at least three types of edge restraint giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of construction work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5 and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of construction work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.
Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, and 3 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6, and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

It is important that practical assessment activities are supervised appropriately.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority web sites for Building Control Department
- The Department for Environment, Food and Rural Affairs web site http://www.defra.gov.uk/ has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice: Protecting our Water, Soil and Air has a useful list of references in Section 9
- The web site http://thepavingexpert.com contains useful information and cross sectional diagrams of how to construct many landscape boundaries and paths

Construct and Maintain Boundaries

Unit Reference	**T/502/1429**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to construct and maintain boundaries. The types of boundaries are fences and walls
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.1)** ***The learner can***
1. Be able to construct and maintain boundaries	1.1 Check the selected materials meet the agreed specifications 1.2 Maintain one of the boundaries below within the tolerances specified for the site • fence • wall 1.3 Keep damage to other features, services and wildlife on site to a minimum 1.4 Carry out construction of boundaries efficiently, effectively and securely 1.5 Maintain the appearance and fabric of boundaries so that they are fit for their purpose
2. Be able to select, use and maintain relevant equipment	2.1 Select and use appropriate equipment for this area of work 2.2 Prepare, maintain and store equipment in a safe and effective working condition throughout

3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to construct and maintain boundaries	4.1 Outline the purpose of boundaries 4.2 State the advantages and disadvantages of different types of boundaries and the appropriate situations in which to use them 4.3 Describe the materials needed for construction and maintenance of boundaries 4.4 Describe how to measure to ensure work is within tolerances for the site 4.5 Describe the potential hazards presented by services and how to avoid these 4.6 Describe the type of problems that may occur and the actions required when constructing and maintaining boundaries 4.7 State what to look for in deciding whether the appearance and fabric of boundaries are fit for purpose
5. Know relevant health and safety legislation and environmental good practice	5.1 Outline the current health and safety legislation, codes of practice and any additional requirements 5.2 Describe how environmental damage can be minimised 5.3 Describe the correct methods for disposing of organic and inorganic waste
6. Know the types of equipment required and how to maintain them	6.1 Describe the methods of maintaining the range of equipment used
Mapping to National Occupational Standards O29NCU19.1	

Supporting Unit Information

T/502/1429 Construct and maintain boundaries - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content are post and panel fences and free standing double brick walls using English bond.

LO1, LO2 and LO3 are the key areas of competence for this unit.

Learning Outcome 1. Be able to construct and maintain boundaries

1.1 Check the selected materials meet the agreed specifications materials checked against the specification; materials inspected for defects before use ensuring that products match the existing products for size, standard and colour e.g. facing bricks used above ground level for walls with the specified coping stones and the correct sized panels for fencing painted in the correct colour.

1.2 Maintain one of the boundaries below within the tolerances specified for the site Boundaries maintained to include one of the following **Fences**: replacement of posts and panels, and coated with water based preservative. **Walls**: coping stones re-cemented on; walls repaired from damage by replacing bricks if necessary and pointing up.

1.3 Keep damage to other features, services and wildlife on site to a minimum environmental damage minimised to include: site access planned carefully such as the removal and delivery of materials; working in correct weather conditions; storage of products and materials is carried out safely; services checked using a CAT scan and no run off allowed from preservative or waste products. Wildlife to be protected in line with Environment Agency guidelines.

1.4 Carry out construction of boundaries efficiently, effectively and securely Walls: full bat walls using English bond on a foundation of concrete 150mm deep and 100mm wider than the wall on both sides with the structure being built with a suitable coping to finish. Fences: post and panel fences to be erected in a straight line and must be upright and level with posts set into 100mm of haunched concrete all around and at a depth of 600mm. Gravel boards may be used to prolong the life of the wooden panels. All boundaries must provide adequate security for the site and purpose to which they are constructed to deter entry to animals and humans.

1.5 Maintain the appearance and fabric of boundaries so that they are fit for their purpose Fences: wooden posts and panels to be replaced if broken or rotten; water based preservative applied to wooden posts and panels. Walls: broken or damaged bricks replaced; re-point walls to seal them and apply sealant as necessary.

Learning Outcome 2. Be able to select, use and maintain relevant equipment

2.1 Select and use appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, gloves, face mask, eye protection. Tools and equipment correctly selected and used e.g. spades, shovels, wheelbarrows, brick trowels, pointing trowels, spirit levels, mechanical auger, tractor and trailer, mini-digger, CAT scan, mixer, compressor and paint guns etc.

2.2 Prepare, maintain and store equipment in a safe and effective working condition throughout preparation, maintenance and storage of hand tools and machines including pre-start checks and Stop Safe. Lids secured onto paint tins, paint brushes washed out accordingly to environmental legislation, compressor to be drained correctly to avoid corrosion.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements Work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection legislation including Waste Acts and COSHH. COP's such as soil, water and air and additional requirements such as customer regulations, environmental health requirements as well as LOLER, PUWER, Manual Handling and Stop Safe.

3.2 Carry out work in a manner which minimises environmental damage minimise environmental damage by carefully planning site access such as the removal and delivery of materials, working in correct weather conditions and not allowing run off from chemicals or waste products including lids secured onto paint tins, paint brushes washed out accordingly to environmental legislation and following the guidelines set out by the Environmental Agency.

3.3 Dispose of waste safely and correctly organic wastes such as soil which can be stored and then re-used; vegetation that can be composted; wood that can be chipped. Inorganic wastes such as empty preservative containers that should be put in a skip, mortar and bricks which can be re-used as hardcore if appropriate or disposed of into a skip.

LO4, LO5 and LO6 are the key areas of knowledge for this unit

Learning Outcome 4. Know how to construct and maintain boundaries

4.1 Outline the purpose of boundaries screening; sound barrier, security, aesthetic, and support for plants. Refer to LO1.4 for examples.

4.2 State the advantages and disadvantages of different types of boundaries and the appropriate situations in which to use them advantages and disadvantages of boundaries to include two examples from each category: Fences: Post and Panel – used in domestic gardens and look attractive but not suitable for areas of high vandalism. Used as a dividing line between properties and to enclose a garden with an attractive appearance. Walls: English bond is a double or full bat wall used for external boundaries and retaining walls as security to a property but are more expensive to construct. Refer to LO1.4 and LO1.5 for examples.

4.3 Describe the materials needed for construction and maintenance of boundaries materials for construction and maintenance of boundaries to include: Fence posts, gravel boards and panels, builder's sand, stone and cement, bricks and coping stones. Tools and equipment correctly selected and used e.g. spades, shovels, wheelbarrows, brick trowels, pointing trowels, spirit levels, cement mixer, mechanical auger, tractor and trailer, mini-digger, CAT scan, compressor and paint guns. Refer to LO1.1, LO1.2 and LO1.4 for examples

4.4 Describe how to measure to ensure work is within tolerances for the site ensuring work is within tolerances to include: walls and fences are constructed to line and level; fences and walls provide suitable security and purpose; walls and fences are aesthetically pleasing; all fences and walls are constructed and maintained using the correct products to match the specification. Refer to LO1.4 for examples.

4.5 Describe the potential hazards presented by services and how to avoid these hazards of underground services to include: gas, water and electricity pipes; use of CAT scan to locate services; reference to site plans and specifications. Refer to LO1.3 for examples.

4.6 Describe the type of problems that may occur and the actions required when constructing and maintaining boundaries: lack of tools, equipment and materials; damage to underground services; vandalism and health and safety issues. Refer to LO1.3 for examples.

4.7 State what to look for in deciding whether the appearance and fabric of boundaries are fit for purpose Deciding whether fabric of boundaries are fit for purpose to include: visual inspection, check for rot and damage; checks for need of preservative and reporting poor boundaries to supervisor. Refer to LO1.5 for examples.

Learning Outcome 5. Know relevant health and safety legislation and environmental good practice

5.1 Outline the current health and safety legislation, codes of practice and any additional requirements: Risk assessments and accident reporting including RIDDOR. Refer to LO3.1 for examples.

5.2 Describe how environmental damage can be minimised Minimising environmental damage to include not allowing run off into water courses in line with Environmental Agency guidelines to avoid run off into water courses. Refer to LO3.2 for examples.

5.3 Describe the correct methods for disposing of organic and inorganic waste methods of disposing of organic and inorganic waste. Refer to LO3.3 for examples.

Learning Outcome 6. Know the types of equipment required and how to maintain them

6.1 Describe the methods of maintaining the range of equipment used: COSHH and PUWER. Refer to LO2.1 and LO2.2 for examples.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical construction of at least two types of boundary giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of construction work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 4, 5 and 6.
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of construction work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

Learning Outcomes (LO) 1, 2, and 3.
Delivery of these learning outcomes is by supervised practical work of clearing, excavating and levelling sites before constructing walls and fences. This unit also includes the maintenance of tools and machines used in the above tasks. All candidates need to be observed carrying out the above tasks competently to demonstrate achievement of the assessment criteria.

Learning Outcomes 4, 5, and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work such as selection and installation of products, construction and maintenance of fences and walls and storage of tools, machinery and equipment as well as evidence of good health and safety practices and minimal environmental damage on sites. Evidence can be gathered by answering oral or written questions or by assignments which could then be cross referenced to the knowledge evidence.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit
Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements

- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

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Additional Information

Useful sources of reference

- The Health and Safety Executive website http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information website http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority websites for Building Control Department
- The Department for Environment, Food and Rural Affairs website http://www.defra.gov.uk/ has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors.
- The Environment Agency website http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The website http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice: Protecting our Water, Soil and Air has a useful list of references in Section 9.

- The website http://thepavingexpert.com contains useful information and cross sectional diagrams of how to construct many landscape boundaries and paths.

Preparing and Transporting Plants and Resources

Unit Reference	**Y/502/0466**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required when preparing and transporting a range of plants and other resources without damage or deterioration
Learning Outcomes (1 to 9) ***The learner will***	**Assessment Criteria (1.1 to 9.1)** ***The learner can***
1. Be able to select, use and maintain equipment for preparing and transporting plants and resources	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to instructions 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Prepare plants and other resources for transportation	2.1 Identify and label plants and or resources to be transported 2.2 Check plants and resources are in suitable condition for use and transportation 2.3 Use safe lifting and handling techniques 2.4 Maintain the condition of plants and resources throughout 2.5 Complete all records and reports

3. Load plants and resources	3.1 Load and position plants and resources safely and securely for transportation
4. Transport a range of plants and other resources	4.1 Transport all types of plants (delicate, robust, safely lifted by one person and requiring more than one person to lift) and other resources (growing medium, containers, tools and equipment, supports, watering devices and chemicals) safely and efficiently to the correct location 4.2 Inspect the condition of plants and resources after transportation 4.3 Identify potential hazards and operate equipment safely
5. Be able to work safely and minimise environmental damage	5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements
6. Know how to prepare plants and other resources for transportation	6.1 State the importance of establishing the transport requirements for plants and other resources 6.2 Describe how to inspect and prepare plants and resources for transportation 6.3 Describe the appropriate records that need to be maintained
7. Know the principles of safe and effective transportation	7.1 Describe how to handle and transport plants and resources safely and efficiently covering • growing medium containers • tools and equipment • supports • watering devices • chemicals • delicate and robust plants plants which can be safely lifted by one person or need more than one person 7.2 Describe how to maintain the condition of plants during transportation 7.3 List the safety procedures to follow when transporting hazardous substances

	7.4 Describe safe lifting and handling techniques when working alone and with others
8. Know the types of equipment required and how to maintain them	8.1 Describe the equipment which will be necessary preparing and transporting plants and resources 8.2 Describe methods of maintaining the equipment ready for use
9. Know the current health and safety legislation and environmental good practice	9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work
Mapping to National Occupational Standards 029N L11.1, L11.2	

Supporting Unit Information

Y/502/0466 Preparing and transporting plants and resources - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

LO1, LO2, LO3, LO4 and LO5 are the key areas of competence for this unit.

Learning Outcome 1. Be able to select, use and maintain equipment for preparing and transporting plants and resources

1.1 Select appropriate equipment for this area of work PPE e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, hats, eye and ear protection;
Appropriate equipment e.g. tractors, trailers (covered or open), ATVs, fork lifts, road vehicles, pallets, crates and bulk boxes, trolleys, hand carts.

1.2 Use equipment according to instructions Equipment used only in appropriate conditions (e.g. avoiding frost, snow, heavy rain or muddy conditions especially on sloping sites) and for approved purpose, use of skilled and appropriately trained operatives, monitoring, securing loads during transportation, protection from adverse conditions (e.g. wet, cold, wind, heat) and contamination (e.g. mud, rain, other materials).

1.3 Prepare, maintain and store equipment in a safe and effective working condition. Refer to LO1.1 for range of equipment Methods of maintaining the equipment including - Daily checking and cleaning as required of all equipment to avoid contamination of the harvested product; lubrication of machinery as directed by manufacturer; periodic servicing of power units; checking equipment is clean during operation (to reduce contamination of resources or the environment (e.g. roads) checking and cleaning all equipment after use to ensure readiness for next operation. All equipment and machinery returned to safe and secure storage (e.g. secure yard, building or covered area).

Learning Outcome 2. Prepare plants and other resources for transportation

2.1 Identify and label plants and or resources to be transported Identified by – location, batch, and individual, as required for loading/transporting. Labelling by – marking of load or unit, marking of individual items; use of stick-on or tie-on labels, plant labels (handwritten, printed, pre-prepared and illustrated,

barcodes), labels information to include types, size, number, destination if appropriate.

2.2 Check plants and resources are in suitable condition for use and transportation Plants checked for type, container, freedom from contamination, pests, diseases, maturity, condition (e.g. watering, presence of flowers). Resources checked for condition (e.g. safe to handle, not contaminated), appropriate for requirements, correct number and type, timing.

2.3 Use safe lifting and handling techniques Use of appropriate PPE (e.g. gloves), correct and safe lifting techniques (e.g. checking load to lifted, clearing area as required, use of straight back, bending and lifting with legs), team work for loads that cannot safely be lifted by one person, use of lifting aids and carrying equipment (refer to codes of practice and relevant legislation e.g. LOLER, Manual Handling).

2.4 Maintain the condition of plants and resources throughout All resources; protect from contamination (e.g. rain, mud, dust), secure for transport, protect from physical damage by spillages, collision or impacts with vehicles, objects or people.

Plants; protect from adverse weather (e.g. wind, rain, sun, heat), ensure adequate water before transportation, keep journey time's short, water if required.

2.5 Complete all records and reports Records and reports; loading lists, weights, numbers, times, problems encountered, maintenance, deliveries and goods inward information. Records and reports – handwritten or electronic record on PC, Laptop or hand-held device.

Learning Outcome 3. Load plants and resources

3.1 Load and position plants and resources safely and securely for transportation Maintain all equipment in safe condition, (refer to LO1.1, LO1.2). Load e.g. onto hand carts, barrows, trolleys or trailers by hand, by using lifting aid to trailers, ATVs, road vehicles. Secure; e.g. using ropes, nets or straps, high sided trailers, curtain sides, bulk vehicles.

Learning Outcome 4. Transport a range of plants and other resources

4.1 Transport all types of plants (delicate, robust, safely lifted by one person and requiring more than one person to lift) and other resources (growing medium, containers, tools and equipment, supports, watering devices and chemicals) safely and efficiently to the correct location; (refer to LO3.1 for range of methods)

Resources to include: Growing medium containers (e.g. bulk, bulk bags, 40 and 70 litre bags)

Tools and equipment (e.g. hand tools, machinery for cultivations, pedestrian controlled equipment)

Supports (e.g. canes, nets, wire)

Watering devices (e.g. irrigation pipes, hoses, watering cans)
Chemicals (e.g. cleaning materials, pesticides, fertilizers)
Delicate plants (e.g. summer bedding, vegetable transplants
and Robust plants (e.g. hardy nursery stock in containers, bare-root trees)
Plants which can be safely lifted by one person (e.g. carry-trays of beddings, pots)
or Needing more than one person (e.g. specimen trees in root-balls, pallets of bedding.
Location – as required for collection or delivery by customer, for use, for storage, for maintenance or repair, to secure storage (e.g. of chemicals).

4.2 Inspect the condition of plants and resources after transportation
Inspected for condition, number/quantity, (refer to LO2.2 and LO2.4) Checking by – person delivering load, person receiving load. Records maintained (refer to LO2.5).

4.3 Identify potential hazards and operate equipment safely Risk assessment carried out or studied and implemented. Equipment operated safely (refer to LO1.2). Codes of practice and relevant legislation (e.g. LOLER, PUWER, Manual Handling, and StopSafe) adhered to.

Learning Outcome 5. Be able to work safely and minimise environmental damage

5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements
e.g. Management of Health & Safety at Work Regulations, Environmental Protection Acts; Waste Regulations, Code of Practice for Using Plant Protection Products, and other legislation/regulations. Additional requirements including customer regulations, environmental health requirements and certification and assured produce schemes (see also LO4.3).

LO6, LO7 and LO8 are the key area of knowledge for this unit

Learning Outcome 6. Know how to prepare plants and other resources for transportation

6.1 State the importance of establishing the transport requirements for plants and other resources to protect the resource being transported, to ensure efficient use of transport, to reduce risk to workers and third parties, to reduce damage to equipment, ensure correct resource is transported to correct destination at correct time.

6.2 Describe how to inspect and prepare plants and resources for transportation Inspect by – visual check on plants and resources, use of routine monitoring reports, use of measuring equipment (e.g. weighing scales, tape measures).
Preparation by resources – selecting and placing near transport equipment,

wrapping, forming to unit loads (e.g. pallets), labelling (Refer to LO2.1) Preparation of plants – watering, lifting to trays, removal of contamination and inappropriate growth (e.g. weeds), covering to protect (refer to LO2.2).

6.3 Describe the appropriate records that need to be maintained (refer to LO2.5)

Learning Outcome 7. Know the principles of safe and effective transportation

7.1 Describe how to handle and transport plants and resources safely and efficiently covering

- **growing medium containers**
- **tools and equipment**
- **supports**
- **watering devices**
- **chemicals**
- **delicate and robust plants**
- **plants which can be safely lifted by one person or need more than one person** (see LO4.1 for details)

7.2 Describe how to maintain the condition of plants during transportation (refer to LO2.4).

7.3 List the safety procedures to follow when transporting hazardous substances Adhere to all codes of practice and legislation (refer to LO5.1) e.g. Code of Practice for Using Plant Protection Products – use of enclosed, secure storage during transport (including the use of chemical safes), separation from people within the vehicle, maintaining records, need for appropriate training and certificates.

7.4 Describe safe lifting and handling techniques when working alone and with others (refer to LO2.3).

Learning Outcome 8. Know the types of equipment required and how to maintain them

8.1 Describe the equipment which will be necessary preparing and transporting plants and resources (refer to LO1.1, LO3.1).

8.2 Describe methods of maintaining the equipment ready for use (refer toLO1.2, LO1.3).

Learning Outcome 9. Know the current health and safety legislation and environmental good practice

9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work (refer to LO4.3, LO5.1)

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 4 and 5
Delivery of these learning outcomes is by supervised practical work preparing and transporting plants and resources giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of preparation work photographs or video could be taken to provide evidence of progress. Copies of records (as identified in LO2.5) can be used to provide evidence of quantity of work and of sufficiency of evidence.

Learning Outcomes 6, 7 and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work preparing and transporting plants and resources, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3, 4 and 5 link together and competence can be assessed practically by observation or by generation of diverse evidence. These

could also link to Learning Outcomes 6, 7 and 8 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

EVIDENCE OF ACHIEVEMENT

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations

Learners should be directed to relevant publications and web sites eg.

- Horticulture Week (www.hortweek.com*)*
- *DEFRA web site and publications (*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- *Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals* by R. Wills, et al / Paperback / Published 1998
- *Nursery Management* by Harold Davidson, et al / Hardcover / Published 1994
- *A Handbook for Horticultural Students* by Peter Dawson
- *Farm Horticulture* by George W. Wood
- *Farm Machinery (Resource Management)* (5th Edition) by Brian Bell ISBN 13:9781903366684
- *Profitable Farm Mechanization* by Claude Culpin ISBN-13: 9780258969847

Establish and Maintain Artificial Plant Displays

Unit Reference	**Y/502/1178**
Level	**2**
Credit Value	**6**
Guided Learning Hours	**45**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to establish and maintain artificial plant displays The learner will be able to select, handle and transport the necessary materials and will ensure displays have the required visual impact
Learning Outcomes (1 to 9) ***The learner will***	**Assessment Criteria (1.1 to 9.3)** ***The learner can***
1. Be able to select, use and maintain equipment for establishing and maintaining artificial plant displays	1.1 Select appropriate equipment for this area of work 1.2 Use equipment according to manufacturer's instructions and legal requirements 1.3 Prepare, maintain and store equipment in a safe and effective working condition
2. Be able to establish artificial plant displays	2.1 Select the required materials for the display • artificial plants • containers • supports 2.2 Handle and transport materials safely and efficiently 2.3 Ensure that grouping and positioning has the required visual impact

	2.4 Use methods of support which are consistent with the intended purpose of the display
3. Be able to maintain the appearance of artificial plant displays	3.1 Ensure that maintenance operations are appropriate to the plants and environmental conditions and the overall visual impact, including • cleaning • support • placement of plants, features or containers • removal of debris • redressing • fire retardant 3.2 Carry out maintenance operations safely and efficiently
4. Minimise damage to plants	4.1 Minimise the damage to plants, features and surrounding areas and reinstate the site to the client's satisfaction
5. Be able to work safely and minimise environmental damage	5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 5.2 Carry out work in a manner which minimises environmental damage 5.3 Dispose of waste safely and correctly
6. Know how to be able to establish artificial plant displays	6.1 Describe how to create visually appealing artificial plant displays 6.2 Describe how to all the select materials appropriate to different types of interior displays and sites • artificial plants • containers • supports 6.3 Describe how to handle and transport all the materials safely and efficiently • artificial plants • containers • supports

	6.4 Describe how to group position plants and features in a way which enhances the display and avoids damage to the environment and achieves the intended visual impact 6.5 Describe how to ensure support methods are consistent with the display and the health and vigour of the plants
7. Know how to be able to maintain the appearance of artificial plant displays	7.1 Describe the importance of maintaining the appearance of artificial plant displays 7.2 Describe how to carry out the maintenance operations safely and efficiently covering • cleaning • support • replacement of plants, features or containers • removal of debris • redressing • fire retardant 7.3 State why it is important to restore the site to the client's satisfaction and how to judge whether this has been achieved
8. Know the types of equipment required and how to maintain them	8.1 Describe the equipment which will be necessary for establishing and maintaining artificial plant displays 8.2 Describe methods of maintaining the equipment in a fit state for use
9. Know the relevant health and safety legislation and environmental good practice	9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 9.2 Describe how environmental damage can be minimised 9.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards O29NL10.1, L10.2	

Supporting Unit Information

Y/502/1178 Establish and maintain artificial plant displays - Level 2

Indicative Content

Note 1: Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2, LO3, LO4 and LO5 are the key areas of competence for this unit

Learning Outcome 1. Be able to select, use and maintain equipment for establishing and maintaining artificial plant displays

1.1&3 Select appropriate equipment for this area of work PPE selected and safely used e.g. overalls, gloves, and dust masks. CE marked. Tools, equipment and materials selected e.g. scissors, wire cutters, waterproof tape/clay, glue gun/melting pan for hot glue, containers, foundation materials, anchor pins, wire, flowers, greenery.

1.2&3 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / suppliers / supervisor's instructions, current legislation and codes of practice for safe: Preparation and maintenance e.g. scissors - clean/sharpen regularly. Use e.g. care not twist blades whilst cutting or to blunt blades on wire of stems. Storage e.g. shadow board - check return. Secure e.g. valuable tools, equipment and materials in locked storeroom. Report faults/shortages to line manager.

Learning Outcome 2. Be able to establish artificial plant displays

2.1 Select the required materials for the display

- **Artificial plants** e.g. plants, flowers, greenery. Type e.g. plastic, silk, dried, Quality e.g. durability, cleaning properties, colour fastness, fire retardance.
- **Containers** e.g. size, shape, material, colour in relation to artificial plant type, appropriate to position. Use e.g. shelved, styrofoam filled and weighted
- **Supports** e.g. foundation, wire and anchoring materials, plant supports Refer to LO6.2 (i), (ii) and (iii)

2.2 Handle and transport materials safely and efficiently: Handled e.g. good manual handling practices, correct handling to avoid damage of plant / display. Transported safely e.g. vehicle or manual barrow loaded and driven to ensure stability of plant / materials load. Efficiently e.g. packing in boxes or containers and stacked / ordered to prevent damage and allow removal to site in order required.

Artificial plants e.g. pick displays or individual potted plants up by their base/pot, flat pack for efficient transport, load to avoid crushing
Containers e.g. securely packed / stacked to avoid chipping / breakage / falling
Supports e.g. boxed and packed to protect, placed in transport to prevent movement / crushing / disarrangement. Heavy materials placed low down.

2.3 Ensure that grouping and positioning has the required visual impact grouped e.g. plants with harmonising or contrasting flowers, foliage, heights. Positioned to plan, instructions or by eye to create e.g. focal point for reception area - refer to LO6.4.

2.4 Use methods of support which are consistent with the intended purpose of the display e.g. trees supported in supply pot with cement and bedded into display container using builder's expanding foam products covered with river rocks / glass marbles, silk flower arrangements supported in styrofoam configurations.

Learning Outcome 3. Be able to maintain the appearance of artificial plant displays

3.1 Ensure that maintenance operations are appropriate to the plants and environmental conditions and the overall visual impact Appropriate to the plants e.g. silk, plastic or dried flowers, quality of display material, number and size of leaves. Environmental conditions e.g. that lead to the accumulation of dust / grime. Overall visual impact e.g. cleanliness of flowers, shine and healthy feel of leaves.

- **Cleaning** Checking e.g. leaf /flower response to water / cleaning agent. Cleaning methods e.g. dusting, spraying, wash in container of soapy water, cleaning large leaves individually. Rinsing and drying. Where to clean e.g. indoors / outdoors
- **Support** Foam support e.g. cut to size / shape, add/replace foam block(s) to container, secure with waterproof tape / hot glue.
- **Replacement of plants, features or containers** Plants e.g. removing flowers / greenery from foam base - hold near base and pull out firmly, replace with flowers / greenery in desired arrangement, cover support with moss to hide. Feature / container e.g. damaged or tarnished container - clear covering materials and store for reuse, remove feature plant in its supply pot / with disc stand, replace with container of suitable depth for pot or suitable depth inner shelf for disc stand, return covering materials.
- **Removal of debris** checking e.g. routine checking of base covering and foliage for litter, cans, plastic cups, spillages. Remove and dispose of debris - refer to LO5.3 and LO9.3. Clean stains e.g. wash pebbles, foliage - refer to LO3.1 (i).
- **Redressing** e.g. arrange any disarranged stems / leaves / flowers to look lifelike, realistic, fill gaps and complement the display

- **Fire retardant**: Reinstatement e.g. spray on fire retardant suitable for artificial plant materials and complying with relevant British Standards. When to apply e.g. check manufacturer's instructions for how many washes fire retardant can stand before effectiveness diminished
- **Carry out maintenance operations safely and efficiently** safely e.g. manual handling - correct handling / moving and placement of containers. PPE - dust mask worn when dusting, suitable gloves for handling debris or materials impregnated with fire retardant. Practices e.g. plants dusted outside if possible, record when plants washed - refer to LO 3.1(vi). Efficiently e.g. clean plants in batches, move batch to cleaning point using aid - trolley

Learning Outcome 4. Minimise damage to plants

4.1 Minimise the damage to plants, features and surrounding areas and reinstate the site to the client's satisfaction e.g. damage from knocks or passers-by handling minimised by careful positioning, position containers to minimise damage - out of way from traffic such as storeroom sack barrows. Site reinstated to client's satisfaction e.g. furniture replaced, site function fully restored, left tidy and clean.

Learning Outcome 5. Be able to work safely and minimise environmental damage

5.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable, risk assessment and additional requirements e.g. need to retain fire retardant properties after cleaning.

5.2 Carry out work in a manner which minimises environmental damage e.g. recycling / reuse of plants, materials, containers, follow cemetery guidelines regarding use of plastic / artificial flowers at graveyard where mowing / strimming operations may scatter sliced up components over ground.

5.3 Dispose of waste safely and correctly e.g. organic - green or inorganic - old plastic / silk flowers or foliage, broken pots or containers. Refer to LO3.1 (iv) and LO9.3.

LO6, LO7, LO8 and LO9 are the key areas of knowledge for this unit

Learning Outcome 6. Know how to be able to establish artificial plant displays

6.1 Describe how to create visually appealing artificial plant displays Clarity about what display is to achieve e.g. create a feeling of flow along a corridor.

Principles: Cover at least unity, balance, emphasis, proportion, rhythm or sequence, simplicity e.g. emphasis - select / position visually strong feature to create point of focus that draws the interest / eye. In relation to principles cover aspects of individual component function e.g. height, width, colour matching, contrast, shape, texture, depth, density, balance of flowers /foliage

6.2 Describe how to all the select materials appropriate to different types of interior displays and sites

- **Artificial plants**: purpose e.g. plant to provide focal point in large space - select tall tree such as Banana Palm. Type in relation to purpose e.g. dried flower dining table display. Individual feature or composite arrangement. Select components of display to satisfy requirements referred to in LO6.1
- **Containers** - refer to LO2.1 (ii)
- **Supports**: Foundation materials e.g. cement / expanding foam products to support trees, shrubs supplied in supply pot, Styrofoam products to support silk plant displays. River rocks to steady disc stand. Plant supports e.g. for standards, hanging baskets

6.3 Describe how to handle and transport all the materials safely and efficiently- refer to LO2.2.

6.4 Describe how to group position plants and features in a way which enhances the display and avoids damage to the environment and achieves the intended visual impact: Apply design principles referred to in LO6.1 to wider aspects of grouping and positioning e.g. A simple tree with uncomplicated lines may contribute to the unity of a reception area but if the tree was surrounded by flowers unnecessary changes in colour and direction may detract from the simplicity. Avoid environmental damage e.g. positioning to direct people away from sensitive area.

6.5 Describe how to ensure support methods are consistent with the display and the health and vigour of the plants Foundation materials suitable to retain shape of display and hold larger plants in upright position e.g. refer to LO2.4. Apparent health and vigour of plants e.g. appropriate size containers in proportion to plant size - small container with large plant suggests roots binding, lack of water / nutrients.

Learning Outcome 7. Know how to be able to maintain the appearance of artificial plant displays

7.1 Describe the importance of maintaining the appearance of artificial plant displays: Practical e.g. appearance declines over time as foliage / flowers disarranged / knocked off / colours fade. Following benefits lost: Good reflection on business / office e.g. faded, litter strewn display will not impress clients / colleagues. Aesthetic e.g. display needs to look attractive / fresh / capture the interest. Mood uplifting e.g. display / feature needs to lift the mood / inspire.

7.2 Describe how to carry out the maintenance operations safely and efficiently - refer to LO3.1.

7.3 State why it is important to restore the site to the client's satisfaction and how to judge whether this has been achieved e.g. fully meet specification, reputation, likelihood of ongoing maintenance work, health and safety - not leaving tripping hazards. Judge client's satisfaction using formal procedures such as check against specification, questionnaire, checklist tick off and customer's verbal response and body language.

Learning Outcome 8. Know the types of equipment required and how to maintain them

8.1 Describe the equipment which will be necessary for establishing and maintaining artificial plant displays - refer to LO1.1.

8.2 Describe methods of maintaining the equipment in a fit state for use refer to LO1.2&3.

Learning Outcome 9. Know the relevant health and safety legislation and environmental good practice

9.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations Environmental Protection e.g. Environmental Protection Acts covering waste disposal and additional requirements e.g. fire emergency planning - positioning of artificial plant displays in areas where access might be affected / greater risk of combustion. Refer to LO 5.1.

9.2 Describe how environmental damage can be minimised - refer to examples in LO5.2.

9.3 Describe the correct methods for disposing of organic and inorganic waste Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor. Refer to LO5.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3, 4 and 5
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised maintenance of activities to establish and maintain artificial plant displays giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after completion of activities to establish and maintain artificial plant displays photographs or video could be taken to provide evidence of progress.

Learning Outcomes 6, 7, 8 and 9
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of supervised activities to establish and maintain artificial plant displays and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3, 4 and 5 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 6, 7, 8 and 9 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations

Remove Unwanted Plant Growth To Maintain Development

Unit Reference	**Y/502/1214**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**38**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to identify and remove unwanted plant growth to maintain development
Learning Outcomes (1 to 8) ***The learner will***	**Assessment Criteria (1.1 to 8.3)** ***The learner can***
1. Know the different types of unwanted plant growth	1.1 Identify different types of plant material and explain why it must be removed covering • damaged plants • diseased material • weeds • plant debris • non-typical • dead • excessive growth • badly positioned
2. Know how to maintain plant development	2.1 Describe how all the following methods can be used to maintain/control plant development • trimming • supporting • thinning • spacing • irrigation • growth regulators • lighting and shading • protection • pruning

3. Know the types of equipment required and how to maintain them	3.1 Describe the equipment which will be necessary for maintaining plant development 3.2 Describe methods of maintaining the equipment ready for use
4. Know the current health and safety legislation and environmental good practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work 4.2 Describe how environmental damage can be minimised 4.3 Describe the correct methods for disposing of organic and inorganic waste 4.4 Describe why it is important to maintain hygiene and how this is achieved
5. Be able to select, use and maintain equipment	5.1 Select appropriate equipment for this area of work 5.2 Use equipment according to manufacturer's instructions and legal requirements 5.3 Prepare, maintain and store equipment in a safe and effective working condition
6. Be able to identify unwanted plant growth	6.1 Recognise unwanted plant material as appropriate
7. Be able to remove unwanted plant growth	7.1 Remove unwanted plant material using appropriate techniques according to the species, time of year, stage of development 7.2 Maintain the growing environment in a hygienic condition
8. Be able to work safely and minimise environmental damage	8.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 8.2 Carry out work in a manner which minimises environmental damage 8.3 Dispose of waste safely and correctly

Mapping to National Occupational Standards
O29NPH 3.3 (CU76.2)

Supporting Unit Information

Y/502/1214 Remove unwanted plant growth to maintain development - Level 2

Indicative Content

Note 1: Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1, LO2, LO3 and LO4 are the key areas of knowledge for this unit.

Learning Outcome 1. Know the different types of unwanted plant growth

1.1 Identify different types of plant material and explain why it must be removed

- **covering damaged plants** e.g. more prone to disease, unsightly
- **diseased material** e.g. to prevent spread of disease to other plants
- **weeds** e.g. competition for water and nutrients, smothering adjacent plants
- **plant debris** e.g. harbours insect and rodent pests and also diseases
- **non-typical** e.g. looks out of place, not the intended feature / display
- **dead** e.g. detracts from display, harbours pests and disease
- **excessive growth** e.g. shading or smothering of other plants
- **badly positioned** e.g. to prevent cluttering, rubbing and allow air and light in

Learning Outcome 2. Know how to maintain plant development

2.1 Describe how all the following methods can be used to maintain/control plant development

- **trimming** e.g. to maintain even surface or control growth to form shapes
- **supporting** e.g. direct growth upwards, support heavy flowers in upright position
- **thinning** e.g. prevents seedlings / plants becoming thin and straggly
- **spacing** e.g. determines individual plant growth before competition neighbours
- **irrigation** e.g. allows growth potential to be realised at key growth stages
- **growth regulators** e.g. rooting compounds to encourage root growth in cuttings
- **lighting and shading** e.g. more growth on light side of plants than shady side
- **protection** e.g. may encourage upward growth at expense of lower bushiness
- **pruning** e.g. improves shape and spacing of branches, training

Learning Outcome 3. Know the types of equipment required and how to maintain them

3.1 Describe the equipment which will be necessary for maintaining plant development - refer to LO5.1.

3.2 Describe methods of maintaining the equipment ready for use - refer to LO5.2.

Learning Outcome 4. Know the current health and safety legislation and environmental good practice

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements, which apply to this area of work e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations.
Environmental Protection e.g. Environmental Protection Acts covering waste disposal
Codes of Practice e.g. Protecting our Water, Soil and Air, Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
Additional requirements e.g. ATV's - Safe Stop, ensure tetanus vaccination up to date.

4.2 Describe how environmental damage can be minimised - refer to examples in LO8.2.

4.3 Describe the correct methods for disposing of organic and inorganic waste: Duty of care - controlled wastes. Where to dispose e.g. check costs, procedures and which Local Authority sites accept types of waste. Method of disposal e.g. recycle / reuse - bag / bin or consider skip hire / private disposal with a licensed contractor.

4.4 Describe why it is important to maintain hygiene and how this is achieved e.g. to reduce pests / diseases. Achieved e.g. by removing diseased parts / whole plants and correct disposal by bonfire / incinerator to prevent survival over winter.

LO5, LO6, LO7 and LO8 are the key areas of competence for this unit

5.1 Select appropriate equipment for this area of work PPE selected and safely used e.g. steel toe-capped boots, overalls, gloves. CE marked. Tools and equipment selected e.g. pruning saws, secateurs, long handled loppers, shears, brush, leaf blower, ATV and trailer.

5.2&3 Use equipment according to manufacturer's instructions and legal requirements / Prepare, maintain and store equipment in a safe and effective working condition Equipment used only for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's

instructions, current legislation and codes of practice for safe: Preparation e.g. secateurs blades sharpened. Use e.g. do not cut above recommended thickness or twist secateurs when cutting. Maintenance e.g. clean blades after use to remove sap, oil blades and mechanism. Storage e.g. hanging up in dry area, accessible. Secure e.g. valuable tools locked away. Maintain records e.g. maintenance and repairs. Report faults to line manager.

Learning Outcome 6. Be able to identify unwanted plant growth

6.1 Recognise unwanted plant material as appropriate unwanted plant material representing each of the categories specified in LO1.1, correctly recognised. Extent of material to be removed identified.

Learning Outcome 7. Be able to remove unwanted plant growth

7.1 Remove unwanted plant material using appropriate techniques according to the species, time of year, and stage of development e.g. pruned, clipped or trimmed, deadheaded, stopped. According to species - technique and timing appropriate e.g. for fruit trees, roses, clematis, hedges, shrubs. Time of year e.g. many untrained fruit trees winter pruned, spring flowering shrubs spring pruned or trained tree fruits summer pruned. Stage of development e.g. pruned at time of planting, after flowering, or before new leaf growth begins in spring.
For example - Newly planted roses (not climbing) pruned back to 7.5 - 9 cm - promote growth roots / shoots. Established roses pruned when dormant, autumn or spring, if winters are severe spring pruned so any shoots damaged by frost cut back. Pruned suitably for type of rose and climate where growing e.g. Hybrid tea rose pruned back to 20 cm in temperate climates but only to 40 cm plus in milder parts.

7.2 Maintain the growing environment in a hygienic condition removal of unwanted growth e.g. dead, damaged, diseased, stems / leaves promptly removed. Correct technique used e.g. cuts avoid die back and encourage open, well-shaped growth. Implements clean and sharp - refer to LO5.2&3. Debris removed e.g. fallen stems / leaves tidied. Correct disposal e.g. any diseased materials burned.

Learning Outcome 8. Be able to work safely and minimise environmental damage

8.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection Acts, COPs as applicable, risk assessment and additional requirements. Refer to LO4.1.

8.2 Carry out work in a manner which minimises environmental damage e.g. by working in appropriate weather conditions, careful approach to plant to be pruned / trimmed, shredding / composting of pruned materials, care not to spread invasive weeds such as Japanese knotweed.

8.3 Dispose of waste safely and correctly: Waste e.g. organic - green cuttings, dead material, sweepings or inorganic - stones, twine, plastic bags. Correctly - refer to LO4.3. Safely e.g. PPE, safe lifting.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of pruning or trimming activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learning Outcomes 5, 6, 7 and 8

Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised removal of unwanted plant growth giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of unwanted plant growth removal work photographs or video could be taken to provide evidence of progress.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6, 7 and 8 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/planting plans/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Monitoring and Maintaining Health and Safety

Unit Reference	**Y/501/6353**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, understanding and skills required to maintain a healthy and safe working environment under minimal guidance or direction. Learners should be familiar with the health and safety policy and understand their responsibilities under the policy
Learning Outcomes (1 to 9) ***The learner will***	**Assessment Criteria (1.1 to 9.4)** ***The learner can***
1. Be able to maintain health, safety and security in the workplace	1.1 Identify health and safety risks in relation to the workplace covering the following • people • equipment and materials • the work area 1.2 Carry out specified measures to control risks and keep the appropriate people fully informed 1.3 Seek guidance on measures to control unfamiliar risks arising from non-routine work situations 1.4 Relay health and safety information to others in a manner likely to be understood 1.5 Take the appropriate action without delay as soon as an emergency is suspected

	1.6 Dispose of hazardous and non-hazardous waste safely and appropriately 1.7 Maintain the security of the workplace in accordance with organisational requirements
2. Be able to use equipment and materials safely	2.1 Use equipment and materials in accordance with manufacturers' instructions and any training provided 2.2 Transport any equipment and materials safely and store them correctly at an approved location when not in use
3. Know the systems and procedures for maintaining health, safety and security	3.1 State the organisational requirements with regard to ensuring the security of the workplace 3.2 Describe the roles and responsibilities for health and safety in the workplace under organisational policy and legislation 3.3 State why inadequate measures to control risks should be reported 3.4 Describe procedures for different types of emergencies appropriate to the relevant industry 3.5 Explain how the procedures for specific emergencies may be affected by location 3.6 Describe the different types of fire extinguishers and their use, relevant to the work area 3.7 Describe the different forms of waste and appropriate methods of disposal 3.8 Explain the relationship between security and safety within the workplace 3.9 List any specific risks relevant to child safety in the workplace 3.10 State why accidents should be reported and to whom

4. Understand why equipment is transported and stored safely	4.1 Explain how to transport and store equipment and materials safely
5. Know the reason for following manufacturers' guidance	5.1 State the importance of following manufacturers' and organisational training instructions and the potential consequences and risks of not doing so
6. Be able to maintain good standards of health and safety for self and for others	6.1 Supply the necessary personal medical information in accordance with organisational requirements 6.2 Use and care for the correct personal protective equipment and clothing necessary for work 6.3 Use an approved method of handling when moving and lifting items 6.4 Use the appropriate personal and workplace hygiene at all times 6.5 Provide accurate information about location so that contact can be made if necessary 6.6 Work in a way which minimises risk to self, others and the environment 6.7 Take appropriate action where incidents affect the health and safety of workers 6.8 Report incidents without delay and complete records accurately, legibly and completely
7. Understand how to maintain the health and safety of self and others	7.1 Explain own roles in maintaining health and safety 7.2 Explain the reasons for leaving information about location when working in isolation or in remote areas 7.3 Explain why accidents should be reported without delay and recorded in the appropriate document 7.4 Explain the methods of minimising environmental damage during work
8. Know the safe lifting techniques	8.1 Describe the safe methods for moving and lifting items

9. Know how to maintain health and safety	9.1 Describe the reasons for maintaining good personal and workplace hygiene 9.2 State own limitations in dealing with health and safety emergencies (e.g. not carrying out actions beyond capabilities) 9.3 Describe basic emergency first aid procedures 9.4 Describe the types of personal protective equipment and clothing suitable for the tasks and how they must be used, cleaned, stored, inspected and replaced
Mapping to National Occupational Standards CU 2.1, 2.2	

Supporting Unit Information

Y/501/6353 Monitoring and maintaining health and safety - Level 2

Indicative Content

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

Indicative content is offered as guidance to aid delivery of the unit and to set the learning outcomes and assessment criteria in context.

Note 1: Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

Note 2: The example of Monitoring and maintaining Health and Safety in this case will be in the workplace. Activities need to follow this example.

LO1, LO2 and LO6 are the key areas of competence for this unit.

LO3, LO4, LO5, LO7, LO8 and LO9 are the key areas of knowledge for this unit.

Learning Outcome 1. Maintain health, safety and security in the workplace

1.1 Identify health and safety risks in relation to the workplace covering people e.g. Injuries, Slips trips and falls, moving plant and machinery, industrial injuries, manual handling, dust and noise. **Equipment and materials** e.g. operator trained, correct tools for task, checks in place, COSSH and the **work area** e.g. moving vehicles, underground and overhead services, confined spaces, and ground conditions. Also refer to satisfying contractual requirements if appropriate.

1.2 Carry out specified measures to control risks and keep the appropriate people fully informed Implement some of the above in L.O.1.1. Carry out activities involving third parties such as other departments or organisations and gaining permissions or authorisations to undertake tasks.

1.3 Seek guidance on measures to control unfamiliar risks arising from non-routine work situations e.g. Risk Assessments, works instructions and guidance from person in charge of workplace such as a supervisor.

1.4 Relay health and safety information to others in a manner likely to be understood Refer to L.O.3 and demonstrate that the above has been relayed in timely manner and within the regulations and policies of the organisation, ensuring legal compliance at all times.

1.5 Take the appropriate action without delay as soon as an emergency is suspected Take action within current health and safety guidelines e.g. report to an appropriate person.

1.6 Dispose of hazardous and non-hazardous waste safely and appropriately Identify organic and inorganic waste and dispose of in correct manner. Store in suitable containers and use licensed carriers where appropriate.

1.7 Maintain the security of the workplace in accordance with organisational requirements e.g. visitors to site accompanied, security fencing intact, tools stored correctly, vehicles and premises secure - and follow organisational requirements.

Learning Outcome 2. Be able to use equipment and materials safely

2.1 Use equipment and materials in accordance with manufacturers' instructions and any training provided Use equipment and materials and follow manufactures instructions referring to correct usage, regular checking of equipment to check efficiency and checking the use of materials refer to guidance e.g. cement (correct PPE used and all precautions in place) e.g. gloves, eye protection, safety boots.

2.2 Transport any equipment and materials safely and store them correctly at an approved location when not in use e.g. pre-transport checks, consider load, method of transportation, safe routes, no cross contamination and undertake PUWER check. Ensure equipment and materials are in the designated area when stored.

Learning Outcome 3. Know the systems and procedures for maintaining health, safety and security

3.1 State the organisational requirements regarding ensuring the security of the workplace e.g. Health and Safety e.g. Management of Health & Safety at Work Regulations, Codes of Practice. Additional requirements including, correct signage, work area isolated and no unauthorised access. Fencing, barriers, signing in procedures.

3.2 Describe the roles and responsibilities for health and safety in the workplace under organisational policy and legislation e.g. HASAWA, PUWER, COSHH.

3.3 State why inadequate measures to control risks should be reported e.g. safety of staff and others, maintain maximum performance of equipment and to prevent damage to equipment and the environment.

3.4 Describe procedures for different types of emergencies appropriate to the relevant industry e.g. Fire, Employee injury, power cut - Evacuation, deal with patient or activating emergency supply.

3.5 Explain how the procedures for specific emergencies may be affected by location e.g. indoors, outdoors, weather, temperature, visibility, noise.

3.6 Describe the different types of fire extinguishers and their use, relevant to the work area e.g. Water, Foam, Powder, Carbon Dioxide.

3.7 Describe the different forms of waste and appropriate methods of disposal Refer to LO 1.5.

3.8 Explain the relationship between security and safety within the workplace Refer to LO 1.6 and explain the relationship e.g. good security ensures a safer workplace.

3.9 List any specific risks relevant to child safety in the workplace e.g. children may not be able to read and understand signs.

3.10 State why accidents should be reported (legal requirement) **to and whom** (supervisor or person in charge) e.g. see LO 3.3 and refer to RIDDOR and legal requirements.

Learning Outcome 4. Understand why equipment is transported and stored safely

4.1 Explain how to transport and store equipment and materials safely (e.g. Refer to LO2.2).

Learning Outcome 5. Know the reason for following manufacturers guidance

5.1 *S*tate the importance of following instructions and potential risks and consequences of not doing so e.g. actions beyond capability could lead to accidents, injury to personnel, damage to property, equipment or the environment.

Learning Outcome 6. Be able to maintain good standards of health and safety for self and for others

6.1 Supply the necessary personal medical information in accordance with organisational requirements e.g. supply as requested, results of any health screening.

6.2 Use and care for the correct PPE and clothing necessary for work e.g. correct storage, regular checks to ensure compliance, report any damage or faults to appropriate person in charge.

6.3 Use an approved method of handling when moving and lifting items e.g. correct methods demonstrated, training undertaken and kept updated, selection of correct aids and equipment to reduce manual handling, trucks, trolleys etc

6.4 Use the appropriate personal and workplace hygiene at all times e.g. demonstrate washing of hands, cleaning of contaminated PPE.

6.5 Provide accurate information about location so contact can be made if necessary e.g. work plans, emergency plans, mobile phone number report in

time of arrival at site and time of leaving, consider lone working policy if applicable.

6.6 Work in a way that minimises risk to self, others and the environment e.g. follow instructions, refer to LO 1.1, stop work if any unsafe act seen.

6.7 State why it is important to report incidents without delay and complete records accurately, legibly and completely e.g. refer to LO 3.3.

Learning Outcome 7. Understand how to maintain health and safety of self and others

7.1 Explain own roles in maintaining health and safety e.g. refer to own role and the fact all are responsible for Health and Safety, refer to organisational policy.

7.2 Explain the reason for leaving information about location when working in isolation or in a remote area e.g. refer to lone worker policy, refer to need to get emergency services quickly on site if incident occurred, refer to tasks that legally require information relayed such as confined space entry.

7.3 Explain why accidents should be reported without delay and recorded on the appropriate document e.g. ensures correct information is recorded, helps to prevent an occurrence, avoids confusion in future if subject to further investigation - refer to LO3.3 and LO6.7.

7.4 Explain the methods of minimising environmental damage during work e.g. correct equipment used, preventative measures in place, disposal of waste in correct manner, spill mats, absorbent cloths, drip trays etc - refer to LO1.5.

Learning Outcome 8. Know the safe lifting techniques

8.1 Describe the safe methods for moving and lifting items e.g. refer to Load, Individual Capability, Task and Environment - refer to LO6.3.

Learning Outcome 9. Know how to maintain health and safety

9.1 Describe the reason for maintaining good personal and workplace hygiene - refer to AC 6.4.

9.2 State own limitations in dealing with Health and Safety emergencies (e.g. undertaking actions beyond your own capability could lead to injury to persons or damage to equipment and environment) refer to LO3.3, LO6.7, LO7.3.

9.3 Describe basic first aid procedures (e.g. how to deal with a minor injury, cuts, bruises slips trips, falls etc. who to inform and why)

9.4 Describe the types of PPE and how they must be used, cleaned, stored. inspected and replaced refer to LO 's 2.1 and 6.2

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1,2and 6
Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in monitoring and maintaining health and safety and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 3,4,5,7,8 and 9
Delivery of this learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony.
Answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 6 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 3, 4,5,7,8 and 9 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive website http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information website http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The website http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- The Provision and Use of Work Equipment Regulations PUWER. All plant or equipment used at work, either in the office or in the field, comes under PUWER.

Prepare and Operate a Tractor and Attachments

Unit Reference	**H/501/0457**
Level	**2**
Credit Value	**5**
Guided Learning Hours	**38**
Unit Summary	The learner will prepare and operate a tractor and attachments
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.9)** ***The learner can***
1. Understand how to prepare and operate and tractor and attachments for operation	1.1 List the required pre-start checks and adjustments 1.2 Identify health and safety issues in relation to the preparation and use of tractors 1.3 Describe different types of attachments and how they should be secured 1.4 Identify types of attachments that are safe for use and compatible with the tractor and those that are not 1.5 Describe conditions which should be taken into account when considering the use of attachments 1.6 Describe adjustment requirements for different attachments and operations 1.7 Explain the correct use and duration of warning signals and indicators
	2.1 Carry out pre-start checks in accordance with standard procedure

2. Prepare a tractor and attachments for operation	2.2 Carry out adjustments to attachment in accordance with instructions to meet operational requirements 2.3 Check the immediate work area for hazards and obstacles and take the appropriate action 2.4 Ensure attachments are compatible with the tractor 2.5 Make sure the attachments are secure and safe 2.6 Carry out preparation of tractor and attachments in accordance with health and safety legislation and codes of practice
3. Understand how to operate a power vehicle	3.1 Describe the ways in which the tractor should be manoeuvred, and how different weather and ground conditions must be taken into account 3.2 List the types of hazards which may be encountered and how these should be dealt with 3.3 Describe the capabilities of the tractor and expected efficiency of tractor operation 3.4 Explain the safe use of attachments 3.5 List the reasons why the tractor should be left in a condition suitable for future use 3.6 Identify health and safety legislation and codes of practice in relation to the preparation and use of tractors
4. Operate a tractor with attachments	4.1 Conduct all movements of the tractor safely and consistent with the type of tractor, attachment and operation 4.2 Assess and modify operating procedures to take into account any changes in weather and ground conditions, and types of terrain 4.3 Assess and deal with any hazards and obstacles encountered during the operation in accordance with standard practice 4.4 Maintain the efficiency of tractor attachment performance through the appropriate operation of the tractor

	4.5 Use attachments to the tractor safely at all times 4.6 Leave the tractor safe after use and in a condition suitable to its future use 4.7 Operate the tractor in accordance with current health and safety legislation and codes of practice 4.8 Carry out all work activities to meet current environmental and legislative requirements 4.9 Assist in maintaining records to meet organisational requirements

Mapping to National Occupational Standards
Element CU11.1 and CU11.2 of Agriculture Livestock NOS

Supporting Unit Information

H/501/0457 Prepare and operate a tractor and attachments - Level 2

Indicative Content

Note: Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

The example of an attachment is for one attachment in this case a trailer. Activities for other attachments need to follow this example.

These are the key areas of competence for this unit.

LO1, LO2 and LO6 are the key areas of competence for this unit.

LO3, LO4, LO5, LO7, LO8 and LO9 are the key areas of knowledge for this unit.

Learning Outcome 1. Understand how to prepare and operate and tractor and attachments for operation

1.1 List the required pre-start checks and adjustments - Refer to LO's 2 & 4. Correct pre-use checks undertaken to ensure the safety of operator and tractor and trailer. E.g. Wheel nuts secure, visual inspection of tyres, Stop control, Lights functioning correctly, function of seat belts if fitted. Fuel Levels, oil levels, Coolant levels, Engine air filter, Joints lubricated. Report any faults to person in charge.

1.2 Identify health and safety issues in relation to the preparation and use of tractors (same as AC3.6).

1.3 Describe different types of attachments and how they should be secured refer to LO2.1 e.g. trailers, flail mower arm, three point linkage, excavator bucket, weed clearance bucket (Bradshaw). Describe the different methods of attaching safely different attachments and e.g. knowledge of factors to consider when lengthening draw bar from short to long reach positions on a trailer.

1.4 Identify types of attachments that are safe for use and compatible with the tractor and those that are not - according to manufacturer's instructions and schedules.

1.5 Describe conditions which should be taken into account when considering the use of attachments e.g. Weather, ground conditions (wet, dry, frost, hard surfaces, soft surfaces, slopes). Weight bearing loads. Working in or near hazards such as underground and overhead services, in or near watercourses.

1.6 Describe adjustment requirements for different attachments and operations refer to LO2. E.g. knowledge of factors to consider when lengthening draw bar from short to long reach positions on a trailer. Loading a trailer with a bucket/loader, forklift, or manually.

1.7 Explain the correct use and duration of warning signals and indicators explain the correct use and duration of warning signals and indicators e.g. hazard lights, flashing beacon and refer to L.O. 1.1.

Learning Outcome 2. Prepare a tractor and attachments for operation

2.1 Carry out pre-start checks in accordance with standard procedure adopt Safe Stop methods (See guidance in teaching strategy and learning activities) Check statutory Guarding requirements, Check brakes and operation of same. Check roadworthiness, current road fund licence, minimum of third party insurance, hold suitable driving licence, orange flashing beacon if driven on dual carriageways, erection of warning signs. Selection of correct PPE e.g. Safety boots (free from mud or oil) ear defenders, eye protection, gloves etc. Consider fuel storage. Ensure PUWER checks undertaken. Report any faults identified on relevant documentation to person in charge.

2.2 Carry out adjustments to attachment in accordance with instructions to meet operational requirements Refer to L.O 1.6

2.3 Check the immediate work area for hazards and obstacles and take the appropriate action. Walk site and identify hazards such as obstacles and slopes and remove or mark with warning signs (high visibility tape, cones or similar).

2.4 Ensure attachments are compatible with the tractor Refer to L.O 1.1 and L.O.1.4.

2.5 Make sure the attachments are secure and safe Follow PUWER guidance and if required LOLER guidance refer to LO 2.4 and never place any part of the body in between any tractor and mounted implement when operating the controls.

2.6 Carry out preparation of tractor and attachments in accordance with health and safety legislation and codes of practice Refer to L.O.1.1

Learning Outcome 3. Understand how to operate a power vehicle

3.1 Describe the ways in which the tractor should be manoeuvred, and how different weather and ground conditions must be taken into account Describe the different manoeuvres with different attachments such as trailers, flail mower side mounted and rear mounted and loader. Consider ground conditions taking into account e.g. Weather, ground conditions (wet, dry, frost, hard surfaces, soft surfaces, slopes). Weight bearing loads. Working in or near hazards such as underground and overhead services, in or near watercourses.

3.2 List the types of hazards which may be encountered and how these should be dealt with e.g. asbestos, batteries, waste oil. Hazards may include e.g. ground conditions, slopes, and dry, wet. Unauthorised access to site. Incorrect attachment for task. Overturning and unsafe loads etc. Walk site and mark or remove hazards.

3.3 Describe the capabilities of the tractor and expected efficiency of tractor operation etc Refer to LO2. Consider efficiency, gear ratio, speed, differential lock, Coverage of ground and ground conditions.

3.4 Explain the safe use of attachments Refer to L.O.1.3.

3.5 List the reasons why the tractor should be left in a condition suitable for future use Safe Stop Refer to LO2.5. List reasons such as left in condition for future use, ready to use, safely parked, fuelled, clean and any faults identified and notified and repaired prior to next user.

3.6 Identify health and safety legislation and codes of practice in relation to the preparation and use of tractors e.g. Management of Health & Safety at Work Regulations
Environmental Protection e.g. Environmental Protection Acts
Waste e.g. Hazardous Waste Regulations
Codes of Practice e.g. Protecting our Water, Soil and Air.
Additional requirements including Local Authority permissions e.g. planning permission and Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers. Safe Stop, PUWER, LOLER.

Learning Outcome 4. Operate a tractor with attachments

4.1 Conduct all movements of the tractor safely and consistent with the type of tractor, attachment and operation refer to L.O. 1.1 and L.O 1.3 and L.O.2.1.

4.2 Assess and modify operating procedures to take into account any changes in weather and ground conditions, and types of terrain Follow manufacturer's / supplier's / supervisor's instructions for preparation, use, maintenance, storage of tools / equipment / guidance for working on slopes etc including differing ground conditions and different types of terrain.

4.3 Assess and deal with any hazards and obstacles encountered during the operation in accordance with standard practice complete Dynamic Risk Assessment. Take account of changing ground conditions such as wet and slippery following rain, ruts muddy etc.

4.4 Maintain the efficiency of tractor attachment performance through the appropriate operation of the tractor Operate in a safe manner e.g. use correct attachment for each task and follow manufacturer's instructions.

4.5 Use attachments to the tractor safely at all times Refer to L.O. 2.4

4.6 Leave the tractor safe after use and in a condition suitable to its future use Adopt Safe/Stop. Park tractor and trailer in safe location. Apply brakes to tractor and trailer. Chock Wheels (if applicable). Disconnect and store

all hydraulic pipes and other connections. Unhitch trailer, check for any damage and apply brake and secure with locking devise (if applicable).

4.7 Operate the tractor in accordance with current health and safety legislation and codes of practice Refer to L.O. 3.1 and 3.3.

4.8 Carry out all work activities to meet current environmental and legislative requirements e.g. by carefully planning site access, working in appropriate weather conditions, care not to discharge pollutants into controlled waters. Waste disposed of correctly and safely identify difference between organic - green or inorganic - building, asbestos, metal, batteries, sharps, fly tipped waste, sub-soil, and top-soil. Refer to LO 6.1. If contaminated waste carried ensure that correct documentation and records are kept up to date and accurate. Ensure that tractor and trailer are cleaned after operation to prevent e.g. Corrosion, personal contamination, soiling of roads and any cross contamination of land. Remove unwanted residues safely using appropriate methods e.g. compressed air, water and brush.

4.9 Assist in maintaining records to meet organisational requirements e.g. Dynamic Risk Assessment (D.R.A.), PUWER checks. LOLER checks if applicable. Time usage records. Complete any relevant reports (faults etc- and report these. Stop operations if faults found).

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1, 2, 3, and 4

Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in preparing a tractor and attachment for operation and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 5 , 6 and 7

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Trailers only

Note that there is an exemption for any candidates who has passed their driving test prior to January 1997 as the categories B, E will already be on their driving licence when it comes to towing trailers on the highway.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements

- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9.
- The leaflet from HSE Books Tractor Action ISBN 0 7176 2711X.
- **SAFE STOP**
    - Make sure the handbrake is fully applied
    - Make sure all controls and equipment are left safe
    - Stop the Engine
    - Remove the key

- The Provision and Use of Work Equipment Regulations **PUWER**. All plant or equipment used at work, either in the office or in the field, comes under **PUWER.**
- The Lifting Operations and Lifting Equipment Operations **LOLER. LOLER** regulations apply in all premises and work situations. There are responsibilities for those in control of equipment, employers and employees.
- SSSI- Site of Scientific Interest.
- SAC- Special Area of Conservation
- The Society of Motor Manufacturers and Traders Ltd (SMMT) Guide-**Towing and the Law.**

Establish Planted Areas

Unit Reference	**D/502/0856**
Level	**3**
Credit Value	**3**
Guided Learning Hours	**19**
Unit Summary	This unit provides the learner with the knowledge, skills and understanding to identify and establish planted areas
Learning Outcomes (1 to 9) ***The learner will***	**Assessment Criteria (1.1 to 9.3)** ***The learner can***
1. Understand how to establish planted areas	1.1 Explain the factors affecting the timing and method of planting 1.2 Describe methods of support and protection and how to apply them 1.3 Explain the initial maintenance requirements for newly established planted areas covering • trees • shrubs • container grown • root grown 1.4 Explain potential problems which may occur and how to deal with these effectively
2. Be able to identify a range of plants	2.1 Describe how to identify the plants to be established 2.2 Identify a minimum of 80 different plants to be established by common and botanical names

3. Understand the principles of selecting plants	3.1 Explain the principles of selecting and combining plants for different applications
4. Understand the methods of assessing plant health	4.1 Review the methods of assessing plant health 4.2 Explain the damage which may occur when handling and during the establishment of plants and how to minimise this
5. Be able to establish planted areas	5.1 Identify and mark out planting sites accurately 5.2 Check the specification and health of plants before planting, and reject unacceptable specimens 5.3 Ensure the quality of plants is maintained throughout handling and planting 5.4 Establish at least three different types of plants from • trees • shrubs • container grown • root grown 5.5 Provide support and protection to the plants if required 5.6 Ensure the site is left in a tidy and safe condition following operations 5.7 Maintain effective working relations with all relevant people
6. Understand the reasons for maintaining equipment	6.1 Explain the importance of maintaining equipment 6.2 Describe the methods of maintaining the range of equipment used
7. Be able to maintain and use relevant equipment	7.1 Ensure equipment is prepared, used and maintained in a safe and effective condition
	8.1 Summarise current health and safety legislation, codes of practice and organisational requirements

8. Understand relevant health and safety legislation and environmental good practice	8.2 Describe the possible environmental damage that could occur and how to respond appropriately 8.3 Explain the correct and appropriate methods for disposing of organic and inorganic waste 8.4 Explain the records required for management and legislative purposes and the importance of maintaining them
9. Be able to promote health and safety and environmental good practice	9.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements 9.2 Ensure work is carried out in a manner which minimises environmental damage 9.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice
Mapping to National Occupational Standards O29NL19.4	

Supporting Unit Information

D/502/0856 Establish planted areas - Level 3

Indicative Content

Note 1 - Cross references are first to the learning Outcome (LO) e.g. LO1 and then to the assessment criteria number listed e.g. LO 1.3.

Note 2 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

The following units 1, 3, 4, 6 and 8 are the key areas of knowledge for this unit.

Learning Outcome 1. Understand how to establish planted areas

1.1 Explain the factors affecting the timing and method of planting e.g. container or bare root, drought or wet conditions, snow covered or frozen ground, hardiness or softness of growth (winter/summer bedding), size of plant (small root ball or large container or bare root) will require planting hole / pit / notch to match.

1.2 Describe methods of support and protection and how to apply them e.g. support by cane (pushed firmly into ground) with tie, stake (hammered into ground) with strap tie, mesh netting, wall / pergola mounted wires; protect by ground mulch (retain moisture, restrict growth competition), rabbit / animal guards (fitted to plant), metal / wooden structures placed around plant.

1.3 Explain the initial maintenance requirements for newly established planted areas covering

- **Trees** e.g. irrigate if required, clear competing growth, check support effective (if fitted), ensure plant firm in ground, check for and treat any pests and remove any diseased / damaged material, fertilise, ensure sufficient mulch, refer to LO 4.2
- **Shrubs** e.g. refer to trees above.
- **Container grown** e.g. refer to trees above.
- **Root grown** e.g. refer to trees above.

1.4 Explain potential problems which may occur and how to deal with these effectively e.g. dry root ball would need watering, lightly diseased plants would need to be cleaned, heavily diseased plant would need to be discarded, lightly damaged plants would need to be trimmed, heavily damaged plants would need to be rejected, dry soil would need to be watered, snow covered or frozen ground and planting would not take place, insufficient plants available would need adjustment to plan (see line manager) or additional supply obtained, heavy rain causing soil to become waterlogged would require planting to stop.

Learning Outcome 3. Understand the principles of selecting plants

3.1 Explain the principles of selecting and combining plants for different applications e.g. selecting trees for wooded amenity / forestry / specimen, shrubs for (evergreen, deciduous, flowers, coloured leaves / stems) borders, hedging for boundary or stock control, summer / winter bedding, herbaceous for foliage / flowers; combining for colour (use colour wheel) leaf / flowering period / height differential, visual landscape effect.

Learning Outcome 4. Understand the methods of assessing plant health

4.1 Review the methods of assessing plant health e.g. visual observation, check against written / photographic examples, consult colleagues, consult trade representatives, and send pest / disease sample to laboratory.

4.2 Explain the damage which may occur when handling and during establishment of plant and how to minimise this e.g. Drying out of root ball – cover with protective material, bare roots may be damaged – cover with protective material, long stems may be damaged – support as necessary, stems / branches may be damaged – protect with wrapping and handle carefully, pests and diseases – monitor for signs and treat quickly, drying out of soil – apply water to field capacity.

Learning Outcome 6. Understand the reasons for maintaining equipment

6.1 Explain the importance of maintaining equipment e.g. safety in use, prevention of wear, availability, high quality of performance.

6.2 Describe methods of maintaining equipment e.g. clean off dirt and debris, safety check for damage, routine for machinery (check oil level, grease), periodic (oil change), following manufacturer's / supplier's recommendations and codes of practice. For hand tools apply oil to bare metal parts, place in weather proof store on shadow board or fitted racks.

Learning Outcome 8. Understand relevant health and safety legislation and environmental good practice

8.1 Summarise current health and safety legislation, codes of practice and organisational requirements Health and Safety at Work etc Act 1974 e.g. management of health and safety and safety at work
Risk assessments e.g. working practices.
Codes of practice e.g. pesticide application, use of equipment.
Exposure records e.g. noise, vibration, pesticides.
COSHH Regulations e.g. risk assessment and use, fuel, marking materials.
Hazardous Waste Regulations e.g. waste disposal.

Storage e.g. pesticides, fuels, materials.
PPE e.g. safety boots, ear defenders, protective clothing.
Environmental Protection Act e.g. environmental protection.
Water Pollution Act e.g. water protection.
RIDDOR e.g. reporting requirements.
PUWER e.g. use of plant and equipment.
LOLER e.g. lifting operations and lifting equipment.
Working at Height Regulations e.g. use of step ladder.
Welfare at Work e.g. staff facilities.
Any additional requirements.
Organisational requirements e.g. follow risk assessments, follow work place procedures.

8.2 Describe the possible environmental damage that could occur and how to respond e.g. damage to soil structure – only work in appropriate conditions, washings contaminating drains – have appropriate interceptor system in place, damage to underground services – (CAT scan) check with supply services, spillage of petroleum products – avoid filling on soil areas, spillage of fertiliser – handle carefully and do not damage bag. Use skilled staff, dispose of waste – refer to LO 8.3 and report serious matters to line manager.

8.3 Explain the correct and appropriate methods for disposing of organic and inorganic waste e.g. to current waste storage and disposal legislation for pesticides, batteries and oil, follow COSHH and hazardous waste regulations. Organic waste e.g. weed growth (perennial weeds to be destroyed), turf – composting, branches – chipped for mulching. Inorganic waste – mineral / metal / plastic / glass waste e.g. recycle. Other methods e.g. specialist waste disposal contractor - skip, oil collection contractor, Local Authority arrangements.

8.4 Explain the records required for management and legislative purposes and the importance of maintaining them e.g. staff attendance hours, hours of equipment use, risk assessments, staff competence achievements, RIDDOR, accidents, maintenance of equipment, fire drill, waste disposal, drawings, contract details and any other requirements. Importance of records for e.g. proof of competence, approved working practices, codes of practice followed, insurance purposes, health and safety requirements followed, waste regulations, accountants (wages), Environmental Protection services, comply with required legislation, proof of compliance with requirements and any other designated requirement.

The following units 2, 5, 7 and 9 are the key areas of competence for this unit

Learning Outcome 2. Be able to identify a range of plants

2.1 Describe how to identify the plants to be established e.g. refer to planting plan / inventory list, check labels with plants, and check with supervisor.

2.2 Identify a minimum of 80 different plants to be established by common and botanical names e.g. these should be across the range of plants that could be used by a learner, be whole specimens (not small pieces) from any time in the growing cycle and include – trees (ACER pseudoplatanus – Sycamore), shrubs (CORNUS alba – Red-barked dogwood), herbaceous (ACHILLEA ptarmica – Sneezewort) and annual bedding (ANTIRRHINUM majus – Snapdragon).

Learning Outcome 5. Be able to establish planted area

5.1 Identify and mark out planting sites accurately e.g. use planting plan, scale measurements from plan to planting area, mark boundary outline with hose / sawdust/ whiting / spade, mark planting position with cane / plant.

5.2 Check the specification and health of plants before planting and reject unacceptable specimens e.g. compare planting plan with delivery list – return to supplier non-complying, check for pests / diseases / damage - reject any that do not match requirements, ensure soil in containers is wet – water, if bare rooted and roots dry return to supplier, refer to LO 1.4

5.3 Ensure the quality of plants is maintained throughout handling and planting e.g. handle / transport carefully to avoid damage, maintain root ball / roots moisture at all times (cover as necessary), support long stemmed specimens, and remove damaged / dead / diseased material.

5.4 Establish at least 3 different types of plants from

- trees
- shrubs
- container grown
- root grown

Refer to LO 1.3 & 1.4

5.5 Provide support and protection to the plants if required e.g. refer to LO 1.2

5.6 Ensure site is left in a tidy and safe condition e.g. remove surplus plants / materials / tools / equipment to stores, remove waste and dispose of - refer to LO 8.3, leave planting area level and free from debris.

5.7 Maintain effective working relations with all relevant people e.g. liaise with suppliers on requirements, communicate required standards to colleagues, discuss work programme with all relevant persons, inform all relevant persons of time scale and expected results, complement others on a good job.

Learning Outcome 7. Be able to maintain and use relevant equipment

7.1 Ensure equipment is prepared, used and maintained in a safe and effective condition e.g. equipment pre start safety checks, adjustments according to manufacturer's instructions and guidance, check hand tools to ensure free from defects, clean and in good working order. Use equipment / tools e.g. only for the operation and in situations as detailed by the manufacturer and in accordance with the manufacturer's / supplier's / supervisor's instructions, use PPE as required (safety boots, eye protection, gloves, protective clothing), be trained to correct level or supervised, carry out operations to current legislation and codes of practice. Be aware of others working nearby. Maintenance of equipment / tools e.g. cleaning as recommended by manufacturer, routine (check oil levels, grease), and periodic (change oil) as recommended by manufacturer, disposal refer to LO 8.3, apply oil to bare metal parts. Range from e.g. hand tools, mechanical equipment, power units (vehicles, quad bikes). Store safely refer to LO 6.2, maintain records refer to LO 8.4 (maintenance, repairs) and report faults to line manager.

Learning Outcome 9. Be able to promote health and safety and environmental good practice

9.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements e.g. health and safety, codes of practice refer to LO 8.1, PPE used refer to LO 7.1, materials used only as directed by manufacturer, risk assessments followed. Equipment and tools to be used and maintained only as detailed by the manufacturer refer to LO 7.1 and any additional requirements.

9.2 Ensure work is carried out in a manner which minimises environmental damage e.g. Refer to LO 8.2.

9.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice e.g. minimise waste wherever possible, follow current legislation refer to LO 8.1, disposal of waste refer to LO 8.3.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners.

The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO) 1, 3 4, 6 and 8
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learning Outcomes (LO) 2, 5, 7 and 9
Delivery of these learning outcomes is by supervised practical work activities giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence and achievement of the assessment criteria.

Learners not holding statutory qualifications to use equipment and materials to be supervised by person who is qualified to do so.

Prior to, during and after completion of activities, photographs or video could be taken to provide evidence of progress.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 2, 5, 7 and 9 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 1, 3, 4, 6 and 8 to allow knowledge evidence to be gathered during the practical activities.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It could typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/planting plans/workbooks
- Witness statements

- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations.
- Institute of Groundsmanship http://www.iog.org
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Plan and Maintain Planted Areas

Unit Reference	**D/502/0498**
Level	**3**
Credit Value	**3**
Guided Learning Hours	**19**
Unit Summary	This unit will provide the learner with the skills, knowledge and understanding for planning and maintaining planted areas
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.1)** ***The learner can***
1. Plan and maintain planted areas	1.1 Ensure plans are consistent with the purpose, function, standards and objectives of planted areas – e.g. shrub areas, scrub, bedding, herbaceous, hedges and amenity turf 1.2 Carry out maintenance operations to the planted area as planned eg. • pruning • feeding • weed control • mulching • soil amelioration • removal and replacement of plants • mowing 1.3 Assess the results of maintenance operations, ensuring objectives, standards and safety requirements have been achieved 1.4 Leave the site in an undamaged and tidy condition following operations

	1.5 Deal with problems effectively, efficiently and safely when maintaining planted areas 1.6 Maintain effective working relations with relevant people throughout
2. Be able to promote health and safety and environmental good practice	2.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements 2.2 Ensure work is carried out in a manner which minimises environmental damage 2.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice
3. Understand how to plan and maintain planted areas	3.1 Explain the principle purposes and functions of planted areas in amenity settings and how these affect their maintenance 3.2 Explain the principles and methods of pruning and its effects on plant growth 3.3 Describe the significance of growing habits for timing and method of pruning 3.4 Define the principles of maintenance operations covering • pruning • feeding • weed control • mulching • soil amelioration • removal and replacement of plants • mowing 3.5 Compare methods of analysing soil condition and nutritional status 3.6 Describe the symptoms of nutritional deficiency
4. Understand the effects of nutrients and climate on plant growth	4.1 Describe the effects of the main macro and micro nutrients on plant health and growth 4.2 Describe the effects of pollutants, climatic conditions and soil/water relations on plant growth

5. Understand relevant health and safety legislation and environmental practice	5.1 Explain current health and safety legislation, codes of practice and any additional requirements which apply to this area of work 5.2 Describe the possible environmental damage and how to respond appropriately 5.3 Explain the correct and appropriate methods for disposing of waste
6. Know how to deal with problems	6.1 Give a range of the typical problems that may occur and how to deal with these effectively
Mapping to National Occupational Standards 029NL22.1	

Supporting Unit Information

D/502/0498 Plan and maintain planted areas – Level 3

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The examples used in this indicative content is summer bedding. The same approach should be used for other situations.

LO1 and LO2 are the key areas of competence for this unit.

Learning Outcome 1. Plan and maintain planted areas

1.1 Ensure plans are consistent with the purpose, function, standards and objectives of planted areas – e.g. shrub areas, scrub, bedding, herbaceous, hedges and amenity turf. Plans e.g. location, layout, plant combinations and numbers; Purpose/function e.g. decorative, food production, screening, shelter, biodiversity; Standards e.g. as required by client, contract, planning or legislative requirements; Objectives e.g. management plan, financial constraints/targets.
Summer bedding - to meet objectives/function e.g. to provide summer colour in high impact locations; Standards/specification e.g. Location according to plans, plant combination (varieties, size, colour, growth stage), preparation (clearing, ground preparation, soil improvement) Planting e.g. spacing, timing; Maintenance e.g. watering, weed control, trimming; Timing – planting, removal, replacement. Personnel issues e.g. adequacy of training and qualifications, health and safety (e.g. policies, procedures, training, equipment, monitoring, exclusion zones round working areas); Financial e.g. budget, contingencies.

1.2 Carry out maintenance operations to the planted area as planned – e.g.

- **Pruning** e.g. removal of damaged, diseased, excessive or inappropriate growth.
- **Feeding** e.g. application of granular or liquid organic or inorganic fertilizers or bulky organic manures and composts during ground preparation or maintenance.
- **Weed control** e.g. use of translocated herbicides before cultivation, ploughing, digging and cultivation, stale seed-beds, contact herbicides, flame weeders.

- **Mulching** e.g. application of bulk organic materials (e.g. wood chips, straw, green waste), plastic (e.g. weed control membranes, mulch mats), inorganic materials (e.g. gravels).
- **Soil amelioration** e.g. addition of bulky organic matter, lime, fertilizers,
- **Removal and replacement of plants**; Removal of e.g. damaged, diseased dead plants, inappropriate mixtures, over-sized or over-mature. Replacement e.g. like-for-like, to adjust mix or to meet change in purpose/function (Refer to LO1.1).
- **Mowing** e.g. to appropriate height, frequency, with or without removal of grass.

1.3 Assess the results of maintenance operations, ensuring objectives, standards and safety requirements have been achieved Assess by e.g. observation, recording, audit of records, measurement, tracking against plan, health and safety monitoring and recording of incidents (refer to LO1.1)

1.4 Leave the site in an undamaged and tidy condition following operations
Site e.g. planted area including plants, soil and features, immediate surrounds, access routes and storage areas,
Undamaged e.g. plants, soil and other features not adversely affected by operations,
Tidy e.g. unused, waste materials (see LO2.3), machinery and equipment removed from site

1.5 Deal with problems effectively, efficiently and safely when maintaining planted areas Problems e.g. spillages and accidental damage, shortage of materials or plants, equipment malfunctions, changes to weather or ground conditions, external influences (e.g. arrival of unauthorised persons on site), work or resources not according to specification;
Dealt with e.g. creating exclusion zones, take immediate action to prevent damage or injury, notify supervisor, manager, client, reporting to appropriate authority (e.g. police, environment agency), monitoring of deliveries, storage, work in progress.

1.6 Maintain effective working relations with relevant people throughout maintained by e.g. clear roles and responsibilities, regular and effective communication (e.g. face-to-face, one-to-one, groups, by telephone including mobile and text, email, written notes) with managers, colleagues, clients, third parties.

Learning Outcome 2. Be able to promote health and safety and environmental good practice

2.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements
Appropriate PPE is made available, selected and safely used by all persons e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, aprons, hats.

Tools and equipment are made available, made ready for use and safely and effectively used, manufacturer's / supervisor's instructions followed for use of tools / equipment;

Complying with relevant legislation e.g. Management of Health & Safety at Work Regulations; Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, LOLER, PUWER, StopSafe, Manual Handling, planning and building regulations, felling licenses, access agreements.

2.2 Ensure work is carried out in a manner which minimises environmental damage e.g. planning of work to avoid adverse conditions, site monitoring to avoid damage to habitats and nesting sites, avoiding run-off from erosion and roads or tracks, recycling and reusing packing material and containers, control of unused packing material and labels, disposal of unwanted plant material (refer to LO2.3).

2.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice e.g. reduce waste removed from growing area, unwanted plant material composted (unless the material poses a threat to plant health e.g. diseased material or perennial weeds). Inorganic waste e.g. from servicing and maintenance of equipment disposed of in appropriate container; packages and containers recycled or disposed of in appropriate container; inorganic waste is carefully controlled, disposed of through licensed contractor.

LO3, LO4, LO5 and LO6 are the key area of knowledge for this unit.

Learning Outcome 3. Understand how to plan and maintain planted areas

3.1 Explain the principle purposes and functions of planted areas in amenity settings and how these affect their maintenance Refer to LO1.1 for types of planting and purpose/function e.g. decorative, food production, screening, shelter, biodiversity.

Impact on maintenance. e.g. bedding regular replanting, ground preparation (e.g. removal of plants and weeds, cultivation, incorporation of organic manures, levelling, breaking down to appropriate tilth); addition of plant nutrients (e.g. manures, organic or artificial fertilizers), frequent hoeing to control weeds, watering to establish and maintain vigour, deadheading to maintain appearance and encourage flowering.

3.2 Explain the principles and methods of pruning and its effects on plant growth

Reasons for pruning e.g. to promote new growth, remove damaged or diseased growth, remove inappropriate growth (e.g. deadheading, excessively long branches), to maintain shape, prevent encroachment.

Methods e.g. *shrub roses* – cut hack to half in autumn to reduce wind-rock, leave looking tidy for winter, allow access for other operations, cut back in spring to leave decorative hips for winter, remove damaged branches, encourage new growth and stronger flowering; e.g. *Cornus alba* – cut back very hard in late spring (just before leaves appear) to maintain stem colour (annually in small space, biennially if more space available); e.g. *Lonicera nitida* – regular trimming in growing season to maintain shape and prevent leggy growth.

3.3 Describe the significance of growing habits for timing and method of pruning Timing e.g. most flowering shrubs are pruned back after flowering, conifers cut back when actively growing for quick recovery. Methods e.g. shrubs that flower or fruit only on second year wood – all branches removed after flowering, shrubs that flower on older wood – renewal pruning with quarter to third of all branches removed each year. (Refer to LO3.2).

3.4 Define the principles of maintenance operations covering

- **Pruning** refer to LO3.2 and LO3.3
- **Feeding** e.g. application of additional plant nutrients as base or top dressing, use of organic and non-organic fertilizers, bulky organic materials
- **Weed control** e.g. removal of unwanted plants by cultivation, herbicides, flame weeders
- **Mulching** e.g. spreading of material (e.g. green waste, plastic, gravel) to smother weeds and retain moisture.
- **soil amelioration** e.g. adding of organic matter to improve water and nutrient retention
- **Removal and replacement of plants** e.g. refer to LO1.2
- **Mowing** e.g. regular cutting of grass using rotary, cylinder or flail mower to allow access, maintain appearance or control weeds within the grass.

3.5 Compare methods of analysing soil condition and nutritional status

Analysis by e.g. observation of condition, hand testing for texture, simple soil test kits, laboratory testing for texture, major nutrients, trace elements, nutrient budgeting; Comparison e.g. observation is quick, free, immediate, requires experience, not accurate; lab tests no immediate results, cost, accurate and reliable.

3.6 Describe the symptoms of nutritional deficiency e.g.

Plant nutrients required for normal plant functions; Macro nutrients e.g. Nitrogen, Phosphorous, Potassium, Magnesium; Micro nutrients e.g. Boron, copper, manganese, iron.

General nutrient deficiency - plants are weak, pale, growth is slow, susceptible to disease

Nitrogen (usually as nitrates) promotes vigorous leaf growth, strong leaf colour; deficiency e.g. small pale leaves and shoots, leaves yellow or red, subject to early defoliation

Phosphorous (phosphates) – promotes root growth

Potassium (potash) – promotes flowering and fruiting

Magnesium – can be deficient in wet soils due to leaching or in alkaline soils,

high potash or acid soils (plants unable to absorb); deficiency e.g. yellowing then browning of leaves, mainly in older leaves
Boron – required only in small quantities, can be deficient in some soils, serious impact on some plants.

Learning Outcome 4. Understand the effects of nutrients and climate on plant growth

4.1 Describe the effects of the main macro and micro nutrients on plant health and growth Refer to LO3.6.

4.2 Describe the effects of pollutants, climatic conditions and soil/water relations on plant growth Pollutants e.g. mineral oil spillages from vehicles (kills of parts of plant affected, if root is affected will kill plants), dust in the air can cover leaves and reduce photosynthesis. Climatic conditions e.g. sheltered location will reduce damage from wind, reduce transpiration loss, increases air-bourn disease risk; Soil/water e.g. water logging because of high water table or compaction will reduce oxygen levels in soil and impair root function, can cause root death.

Learning Outcome 5. Understand relevant health and safety legislation and environmental practice

5.1 Explain current health and safety legislation, codes of practice and any additional requirements which apply to this area of work (Refer to LO2.1)

5.2 Describe the possible environmental damage and how to respond appropriately
Environmental damage e.g. spillages, damage to features and buildings, plants, soil (refer to LO2.2) Response e.g. take immediate action to stop the cause of the damage (machine, activity, person), local action to contain and prevent spread of damage, notify manager, client, land-owner, other relevant bodies (Environment Agency, Local Authority, Fire Service).

5.3 Explain the correct and appropriate methods for disposing of waste. (Refer LO2.3).

Learning Outcome 6. Know how to deal with problems

6.1 Give a range of the typical problems that may occur and how to deal with these effectively Problems e.g. Ground not appropriate to work on (e.g. waterlogged or frozen) Action defer maintenance until conditions improve; Weather conditions – too hot, cold, windy or dry, changes during planting operations. Action – stop work if inappropriate to continue, wait until conditions improve, Equipment unsuitable or not in proper working order Action – carry out repair, setting up or calibration of equipment, on site if possible or return to workshop; Staff problems – insufficient numbers, lack of skill. Action – better planning of activities, training, selection, improve monitoring of operations.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners.

The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

LO1 and LO2 (key areas of competence)
Delivery of this learning outcome is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work planning and maintaining planted areas, copies of records, or reporting forms and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

LO3, LO4, LO5 and LO6 (key areas of knowledge)
Delivery of this learning outcome is by assessment of competence for those who have experience in this area of work or by supervised practical planning and maintaining planted areas giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of work planning and maintaining planted areas management photographs or video could be taken to provide evidence of progress. Copies of monitoring record can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes, worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a list of references in Section 9

  Learners should be directed to relevant publications and web sites eg
- Horticulture Week (www.hortweek.com*)*
- *DEFRA web site and publications (*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- *Principles of Horticulture* by C.R.BSc Adams, et al / Paperback / Published 1998
- *A Handbook for Horticultural Students* by Peter Dawson
- *Soil Science and Management* by Edward J. Plaster

Prepare and Construct New Structures or Surfaces

Unit Reference	**J/502/1452**
Level	**3**
Credit Value	**5**
Guided Learning Hours	**33**
Unit Summary	The aim of this unit is to provide the learner with the understanding, knowledge and skills required to construct new structures and surfaces on land-based sites. Structures may be permanent or temporary and could include: drains, permanent drainage systems, boundaries, animal holding pens and poly tunnels etc. Surfaces may include: standing areas, container beds and pathways
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.1)** ***The learner can***
1. Prepare to construct new structures and surfaces	1.1 Prepare the site in a manner appropriate for the structure or surface and which minimises the effects on the surrounding environment 1.2 Prepare the necessary materials for construction
2. Construct new structures and/or surfaces	2.1 Construct the structure or surface in accordance with the specification • setting out and location • materials and resources • timescale • working methods • waste management • restitution of site • the relationship of the structure and surface to its context

	2.2 Ensure the structure or surface meet the specification and is fit for purpose on completion of the work
3. Be able to promote health and safety and environmental good practice	3.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements 3.2 Ensure work is carried out in a manner which minimises environmental damage 3.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice
4. Be able to maintain and use relevant equipment	4.1 Ensure equipment is prepared, used and maintained in a safe and effective condition throughout
5. Understand how to construct new structures and surfaces	5.1 Explain how to interpret specifications and the importance of following them covering • setting out and location • materials and resources • timescale • working methods • waste management • restitution of site • the relationship of the structure and surface to its context 5.2 Explain the problems that may arise and how to minimise and the appropriate action to take including; remedying the situation and/or informing those who need to act 5.3 Describe methods of constructing the structure or surface and the relationship of this to its planned use. 5.4 Explain how the planned use of the surface or structure may affect the methods of construction used
6. Understand relevant health and safety legislation and environmental good practice	6.1 Summarise current health and safety legislation, codes of practice and any additional requirements 6.2 Describe the possible environmental damage that could occur and how to respond appropriately

	6.3 Explain the correct and appropriate methods for disposing of waste
7. Understand the reasons for maintaining equipment	7.1 Explain the importance and methods of maintaining equipment for use
Mapping to National Occupational Standards O29NCU21.1,2	

Supporting Unit Information

J/502/1452 Prepare and construct new structures or surfaces – Level 3

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is construction of a polythene tunnel on a nursery. The same approach should be used for other structures and surfaces.

LO1, LO2, LO3 and LO4 are the key area of competence for this unit

Learning Outcome 1. Prepare to construct new structures and surfaces

1.1 Prepare the site in a manner appropriate for the structure or surface and which minimises the effects on the surrounding environment by

- Setting out and location; identification of site, existing features, shape, height, gradients, access routes, drainage feature, (to ensure positioning correct, services link to existing, access is as planned)
- Materials and resources; types and quantities, containers and delivery method (available on time, match to existing and planned use, within cost)
- Timescale; start date, significant points within project, duration/end-date (ensure access to site available, timing to meet project plan or contract, control costs, plan resource use)
- Working methods; manual, mechanised, (to identify resources needed)
- Waste management; unwanted materials on site, routes, storage available on site, specific policies, recycling opportunities (legal or contractual requirement, good working practice, to control costs)
- Restitution of site; features to be retained or replaced, standards and materials to be used, timescale, maintenance (legal or contractual requirement, good practice)
- The relationship of the structure and surface to its context; proposed use, links to existing structures and materials, (ensure use and appearance links to existing)

1.2 Prepare the necessary materials for construction e.g. frame and fittings is unloaded and checked, concrete (wet or dry) mixed for footings and ground posts (see also LO2.1).

Learning Outcome 2. Construct new structures and/or surfaces

2.1 Construct the structure or surface in accordance with the specification
e.g.
Construction according to layout, slope and orientation
Type of structure relates to material, size, length, method of anchorage
Cover selected from clear, coloured film, netting
Floor – soil, sand/gravel/mypex, concrete, slabs
(refer to LO1.1 for details, refer to LO5.3 for impacts of specification on use)

2.2 Ensure the structure or surface meet the specification and is fit for purpose on completion of the work. (Refer to LO5.1).

Learning Outcome 3. Be able to promote health and safety and environmental good practice

3.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements
Health and Safety e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, LOLER, PUWER, Manual Handling, Environmental Protection e.g. Environmental Protection Acts; Waste e.g. Hazardous Waste Regulations; Codes of Practice e.g. Protecting our Water, Soil and Air; Additional requirements including customer regulations, assured produce schemes, certification, Town and Country Planning, England e.g. Town and Country Planning (General Permitted Development) (Amendment) (No 2) (England).

3.2 Ensure work is carried out in a manner which minimises environmental damage; Run-off of water or and sediments from working areas causing pollution of controlled water (Action – bunds and lagoons to retain water, avoid working in adverse conditions, use of permeable surfaces, in event of run-off take steps at a local level to contain pollution, notify appropriate bodies e.g. Environment Agency).
Use of non-sustainable materials (action – check source of all materials, reduce use of materials, reduce usage and wastage of all materials, recycle and re-use).

3.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice Organic waste – reduce waste removed from growing area, unwanted plant material composted (unless the material poses a threat to plant health or production process e.g. diseased material or perennial weeds). Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packing material and containers minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

Learning Outcome 4. Be able to maintain and use relevant equipment

4.1 Ensure equipment is prepared, used and maintained in a safe and effective condition throughout Appropriate PPE is made available, selected and safely used by all persons e.g. waterproof clothing, steel toe-capped boots, safety helmet, eye and ear protection, Hi-vis jackets, UV Protection, gloves, aprons, hats.

Tools and equipment are made available, made ready for use and only used for the operation and in situations as detailed by the manufacturer's / supplier's / supervisor's instructions, current legislation and codes of practice for safe (refer to LO7.1).

Tools and equipment are stored safely and securely in accordance with manufacturer's instructions and current legislation, records of maintenance and repairs are maintained, faults reported to line manager.

LO5, LO6 and LO7 are the key area of knowledge for this unit.

Learning Outcome 5. Understand how to construct new structures and surfaces

5.1 Explain how to interpret specifications and the importance of following them refer to LO1.1

5.2 Explain the problems that may arise and how to minimise and the appropriate action to take including; remedying the situation and/or informing those who need to act e.g. Limited access to site (e.g. unsuitable for vehicles or machines) Action – site survey, manual operations only, discuss with client, line manager

Resources not available (e.g. materials, machinery) Action – project planning, report to supplier, line manager

Damage to site or existing structures (making restitution difficult) Action – protecting features, remedial action, report to manager/supervisor, discuss with client.

5.3 Describe methods of constructing the structure or surface and the relationship of this to its planned use refer to LO2.1 for specifications

Construction has impact on shading, ventilation, drainage, irrigation; e.g. shading useful for propagation of evergreen crops, minimal shading for winter production, larger structures require additional (roof, side) ventilation,

Type of structure has impact on cropping area, layout of crops; e.g. narrow structure limit flexibility of row/bed width, tall crops (e.g. tomatoes) will require headroom and supports.

Type of cover has impact on life of cover, temperature regime, ventilation, pest and disease (e.g. double skinning for greater heat retention, clear polythene gives 91% light transmission, white polythene gives 68%, luminance gives 90% provides thermal barrier and anti-condensation,

Type of floor has impact on type of cropping, access, use of machinery e.g. soil floor for growing in organic systems, Mypex over sand/gravel for plants in pots or containers, benches for pot plants.

5.4 **Explain how the planned use of the surface or structure may affect the methods of construction used**. (Refer to LO5.3).

Learning Outcome 6. Understand relevant health and safety legislation and environmental good practice

6.1 Summarise current health and safety legislation, codes of practice and any additional requirements (refer to LO3.1).

6.2 Describe the possible environmental damage that could occur and how to respond appropriately (Refer to LO3.2).

6.3 Explain the correct and appropriate methods for disposing of waste (Refer to LO3.3).

Learning Outcome 7. Understand the reasons for maintaining equipment

7.1 Explain the importance and methods of maintaining equipment for use
Importance; improved performance, ensuring correct operation and output, prolonged life, greater reliability and reduced breakdown time and cost, available for next time required, reduced contamination and damage to materials and structures, reduced wastage.
Methods; Routine checking and calibration of all equipment to ensure effective and efficient operation, lubrications of machinery as directed by manufacturer, periodic servicing of power units; checking and cleaning all equipment (and recharge batteries if appropriate) after use to ensure readiness for next operation.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical activities preparing and constructing new structures or surfaces giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Learning Outcomes 5, 6 and 7

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work preparing and constructing new structures or surfaces, copies of plans or records, or reporting forms and witness testimony, answering oral or written questions, or assignments referenced to the knowledge evidence.

Prior to, during and after completion of work preparing and constructing new structures or surfaces photographs or video could be taken to provide evidence of progress. Copies of monitoring record can be used to provide evidence of quality and rate of work and of sufficiency of evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and competence can be assessed practically by observation competent performance or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6 and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are competently supervised.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence

- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

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- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The Department for Environment, Food and Rural Affairs web site has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides guidance about environmental regulations.

- The Code of Practice - Protecting our Water, Soil and Air has a list of references in Section 9
- Local Authority web sites for Building Control Department
- The Paving Expert web site at http://www.pavingexpert.com/ provides comprehensive information about foundations and laying types of paving
  Learners should be directed to relevant publications and web sites eg. –
- Horticulture Week (www.hortweek.com)
- The Landscaper (www.landscapermagazine.com)
- *DEFRA web site and publications (*http://www.defra.gov.uk/hort/index.htm*)*
- *Principles of Horticulture* by C.R. Adams, et al / Paperback / Published 1998
- *The Complete Book of the Greenhouse by* Ian G. Walls, et al / Paperback / Published 1996
- *A Handbook for Horticultural Students* by Peter Dawson
- *The Commercial Greenhouse* by James William Boodley
- *Greenhouse Operation and Management* by Paul Nelson
- *Farm Horticulture* by George W. Wood

Repair and Maintain Structures or Surfaces

Unit Reference	**F/502/1451**
Level	**3**
Credit Value	**2**
Guided Learning Hours	**13**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, understanding and skills required for repairing and maintaining structures or surfaces to meet specifications and ensuring the site is restored to a safe condition
Learning Outcomes (1 to 7) ***The learner will***	**Assessment Criteria (1.1 to 7.1)** ***The learner can***
1. Be able to prepare for the repair and maintenance	1.1 Ensure the necessary materials are available and prepared for the work 1.2 Prepare the structure or surface and the surrounding site in an appropriate manner
2. Be able to repair and maintain structures or surfaces	2.1 Maintain the structure or surface to all the specifications below at the appropriate time • security • quality • design • construction 2.2 Repair the structure or surface to all the specifications at the appropriate time in relation to • security • quality • design • construction

	2.3 Provide clear and accurate information for recording purposes 2.4 Ensure the site is restored to a safe condition which is consistent with the surrounding environment and is clear of unwanted materials
3. Be able to maintain and use relevant equipment	3.1 Ensure equipment is prepared, used and maintained in a safe and effective condition throughout
4. Be able to promote health and safety and environmental good practice	4.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements 4.2 Ensure work is carried out in a manner which minimises environmental damage 4.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice
5. Understand the principles of maintaining structures and surfaces	5.1 Explain why surfaces and structures must be repaired and maintained and potential problems if not carried out 5.2 Explain the preparation required prior to repairing and maintaining structures and surfaces 5.3 Explain how to finish the structure or surface so that it meets the specification covering all of • security • quality • design • construction 5.4 Describe different maintenance and repair methods which would achieve the specification covering all • security • quality • design • construction 5.5 Describe the types of problems which may occur, including

	• accidental damage • pollution • not meeting the specification and the actions to take
6. Understand relevant health and safety legislation and environmental good practice	6.1 Summarise current health and safety legislation, codes of practice and any additional requirements 6.2 Describe the possible environmental damage that could occur and how to respond appropriately 6.3 Explain the correct and appropriate methods for disposing of organic and inorganic waste
7. Understand the reasons for maintaining equipment	7.1 Explain the methods and importance of maintaining equipment for use

Mapping to National Occupational Standards
O29NCU20.1,2

Supporting Unit Information

F/502/1451 Repair and maintain structures or surfaces - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g.) LO1 and then to Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content are post and panel fences.

LO1, LO2, LO3 and LO4 are the key areas of Competence for this uni.t

Learning Outcome 1. Be able to prepare for the repair and maintenance

1.1 Ensure the necessary materials are available and prepared for the work: ordering or obtaining the materials for the job including tools and equipment needed to repair or maintain structures or surfaces such as mixer, sand, gravel, cement, fence posts, fence panels, spades, shovels, wheelbarrows, spirit levels, mechanical auger, tractor and trailer, CAT scan, compressor and paint guns and water based preservatives.

1.2 Prepare the structure or surface and the surrounding site in an appropriate manner site marked out for construction and fenced and taped off with signs from public as necessary having safe entrances and exits for deliveries of materials and collection of waste. C.A.T scan used to check sites for water, gas and electricity where holes or excavations are dug.

Learning Outcome 2. Be able to prepare and maintain structures or surfaces

2.1 Maintain the structure or surface to all the specifications below at the appropriate time: Security – fences to provide security to site and purpose to which they are constructed to deter entry to animals and humans. All panels and gravel boards to fit tightly into posts using wedges if necessary to prevent wind rock and deter theft. **Quality** – all materials used in the maintenance of the fence must comply with the specification such as the replacement of concrete posts, close-board panels, gravel boards and painting with water-based preservative. **Design and Construction** – Post and panel fences to be maintained to the specification and are to be erected in a straight line and must be upright and level with posts set into 100mm of haunched concrete all around and at a depth of 600mm. Gravel boards may be used to prolong the life of the wooden panels.

2.2 Repair the structure or surface to all the specifications at the appropriate time Refer to LO2.1 for details.

2.3 Provide clear and accurate information for recording purposes Clear and accurate information for recording must include: producing receipts for additional costs and expenses; site visits books to be signed by the client to include details of work carried out; accurate time sheets of hours worked and copies of invoices for materials for the contracted work.

2.4 Ensure the site is restored to a safe condition which is consistent with the surrounding environment and is clear of unwanted materials Site checks to include: sites are left clean, tidy and presentable immediately after construction or maintenance with any minor work being identified by site checks before site is handed back to the client and final payment requested.

Learning Outcome 3. Be able to maintain and use relevant equipment

3.1 Ensure equipment is prepared, used and maintained in a safe and effective condition throughout PPE selected and safely used e.g. steel toe-capped boots, gloves, and face mask. Tools and equipment correctly selected and checked using pre-start checks including spades, shovels, rakes, wheelbarrows, tractor and trailer, mechanical auger, CAT scan and mixer conforming to LOLER, PUWER, Manual Handling and Stop Safe to prevent accidents and to keep equipment in good working order.

Learning Outcome 4. Be able to promote health and safety and environmental good practice

4.1 Work in a way which promotes health and safety, is consistent with relevant legislation, codes of practice and any additional requirements work activities carried out consistently with current legislation e.g. Health and Safety, Environmental Protection legislation including Waste Acts and COP's such as soil, water and air and additional requirements such as customer regulations, environmental health requirements as well as LOLER, PUWER, Manual Handling and Stop Safe.

4.2 Ensure work is carried out in a manner which minimises environmental damage by carefully planning site access such as the removal and delivery of materials, working in correct weather conditions and not allowing run off from chemicals or waste products into water courses in line with Environmental Agency guidelines.

4.3 Manage and dispose of waste in accordance with legislative requirements and codes of practice organic wastes such as soil which can be stored and then re-used; vegetation that can be composted; wood that can be chipped. Inorganic wastes such as empty preservative containers mortar and concrete can be re-used as hardcore if appropriate or disposed of into a skip. The local authority waste recycling facility is another alternative for disposing of waste. Refer to LO4.1 and LO4.2 for further examples.

LO5, LO6, and LO7 are the key areas of knowledge for this unit

Learning Outcome 5. Understand the principles of maintaining structures and surfaces

5.1 Explain why surfaces and structures must be repaired and maintained and potential problems if not carried out Post and panel fences: preservation of wood to prolong life and to improve appearance as well as maintaining security and to prevent them falling down and causing an accident as well as improving their appearance.

5.2 Explain the preparation required prior to repairing and maintaining structures and surfaces Refer to LO1.1 and LO1.2

5.3 Explain how to finish the structure or surface so that it meets the specification covering all of

- **security**
- **quality**
- **design**
- **construction**

Refer to LO2.1.

5.4 Describe different maintenance and repair methods which would achieve the specification covering all Refer to LO2.1

5.5 Describe the types of problems which may occur Bad weather – protect work partially completed together with materials such as bags of cement and disconnect any electrical appliances. Accident – stop work, report to Supervisor and cordon off area giving First Aid treatment if needed and then risk assess the area before work recommences.

Accidental damage and pollution – report to supervisor and then try and contain. Dangers of underground services to include: use of CAT scan; reference to site plans to detect gas, water and electricity pipes and the dangers of pressure and explosion. Penalties for not meeting the specification include fines and withheld payments.

Learning Outcome 6. Understand relevant health and safety legislation and environmental good practice

6.1 Summarise current health and safety legislation, codes of practice and any additional requirements refer to LO4.1 for examples.

6.2 Describe the possible environmental damage that could occur and how to respond appropriately Refer to LO4.2 for examples.

6.3 Explain the correct and appropriate methods for disposing of organic and inorganic waste Refer to LO4.3 for examples.

Learning Outcome 7. Understand the reasons for maintaining equipment

7.1 Explain the methods and importance of maintaining equipment for use

Refer to LO3.1 for examples.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, 3 and 4

Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical construction of at least two types of structure or surface giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of construction work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 5, 6, and 7

Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of construction work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2, 3 and 4 link together and competence can be

assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 5, 6, and 7 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- Local Authority web sites for Building Control Department
- The Department for Environment, Food and Rural Affairs web site http://www.defra.gov.uk/ has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency web site http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The web site http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice: Protecting our Water, Soil and Air has a useful list of references in Section 9
- The web site http://thepavingexpert.com contains useful information and cross sectional diagrams of how to construct many landscape boundaries and paths.

Communicate Information within the Workplace

Unit Reference	**Y/502/1195**
Level	**3**
Credit Value	**2**
Guided Learning Hours	**13**
Unit Summary	The aim of this unit is to provide the learner with the knowledge, understanding and skills required to communicate information within the workplace. It is about maintaining the 'flow' of information internally and externally to the organisation. It will entail passing on messages accurately, receiving and forwarding on information
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.1)** ***The learner can***
1. Be able to receive information within the workplace	1.1 Identify information required, timescales and source 1.2 Request information using appropriate methods 1.3 Receive and record information accurately according to organisational requirements
2. Be able to transmit information within the workplace	2.1 Transmit information accurately and timely and using appropriate methods 2.2 Confirm receipt of information
3. Understand how to receive and transmit information within the workplace	3.1 Give examples of when information may be required urgently 3.2 Explain why it is important to take messages accurately and the potential effects of not doing so

	3.3 Explain the importance of confirming information and why this should be acknowledged and accurately recorded 3.4 Explain the situations in which confidentiality needs to be maintained
4. Understand the relevant legislation in receiving and sending information	4.1 Summarise the legislation which relates to communicating information within the workplace
Mapping to National Occupational Standards O29NCU7.1	

Supporting Unit Information

Y/502/1195 Communicate information within the workplace – Level 3

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1 and LO2 are the key areas of competence for this unit

Learning Outcome 1. Be able to receive information within the workplace

1.1 Information required identified e.g. administrative - dates of meetings; financial - budget, income, expenditure; policy - data protection, use of company computers to access internet; procedure - complaints procedure; process - stock rotation; product or service details; staff - roles and responsibilities, technical - nutrient / temperature / packaging requirements, legislative - health & safety, copyright, environmental / waste.
Preferred method of provision identified e.g. demonstration, verbal, written; paperwork or computer system of provision. Preferred presentation of information e.g. reports, spreadsheets, diagrams, pictures, photographs, specifications, product leaflets.
Timescales e.g. information received in time to prepare for meetings, to correctly care for product or provide service, to meet deadlines, project management stages, customer service response targets, to avoid transgressing legislative requirements or putting people's health and safety at risk. Speed of transfer e.g. postal / telephone / fax / texting / email / permanently available on organisation intranet.
Source: Internal to organisation e.g. policies / procedures / processes, products or services to be provided. External to organisation e.g. technical / legislative, products or services to be purchased.

1.2 Information requested using appropriate methods: Purpose of the information e.g. accurately identify why the information is needed and how it will be used, what facts are needed and at what level of detail. Methods of requesting information e.g. memo's, requisitions, formal letter, email, telephone, ask somebody who knows. Appropriate: Construction of request e.g. purpose of request, keep it simple, brief and accurately identify what information is needed and reason / incentive for sending it - refer to LO1.1 for preferred method of provision, preferred presentation of information to be requested and timescales. According to organisation guidelines / procedures e.g. forms or letter templates to use, protocols for constructing and signing off emails

1.3 Information received: System of receipt e.g. date stamp, acknowledgement, logging and prioritisations systems. Holding system prior to use / action e.g.

in-tray for paperwork, period folders for emails, related / project management folders, daily log of phone calls and conversations. Categorisation of information received e.g. urgent, important, part of audit trail, nice to do, file in recycle bin. Recorded accurately according to organisational requirements e.g. in diary, job sheet, day file, report, upgraded specifications, spreadsheet. Records clear, legible, brief and accurate and held to meet organisational requirements.

Learning Outcome 2. Be able to transmit information within the workplace

1.4 Transmit information accurately and timely and using appropriate methods e.g. correct information transmitted, purpose identified, key / important / background information separated / headed, succinct, clear, blocks easily digestible / to assist concentration, clear use of language free of acronyms / complicated sentences and unnecessary information.
Physical aspects e.g. all pages present / numbered, writing legible, copy readable, flipcharts or slides big enough to read, no obstructions to view, speaking voice loud enough for people to hear
Timely e.g. to fulfil a customer order each person / group of people in the process must receive the details they need to complete the order at the time specified by the customer - this involves communication in time to allow staff responsible for ordering raw materials, production, administration etc to carry out their function within the overall timescale and with sufficient time to do the task to the specified standard, allow for delays / absences, minimise mistakes and stressful working conditions. Appropriate methods e.g. appropriate to conditions of working / use of information, outdoors - verbal / laminated, indoors - procedures / IT, noisy environment - posters / written, timescale - refer to LO1.1, amount of information to be transmitted - text / fax / email, whether information is needed in pictorial / diagrammatic / written / verbal form, number of people information is transmitted to - memo / email circulation list. Check whether there are any impediments to people receiving messages e.g. reading or hearing difficulties. Follow organisation procedures/guidelines for correct method of transmission at each stage.

2.1 Confirm receipt of information Receipt of information confirmed e.g. written / verbal / email acknowledgement requested, receipt checked by questions, requests for confirmation of points / actions, clarification. Follow organisation procedures/guidelines for receipt relating to key process stages.

LO3 and LO4 are the key areas of knowledge for this unit.

Learning Outcome 3. Understand how to receive and transmit information within the workplace

3.1 Give examples of when information may be required urgently e.g. administrative - date of training day changed; financial - budget being exceeded; policy - update to prevent discriminatory practices; procedure - complaint from key customer; process - stock shortfall or spoilage; product or service details - pest control products / services to control an infestation; staff roles and responsibilities - staff overload and process breaking down; technical - to mend broken down machinery, legislative - e.g. check staff appropriately competent to use machinery.

3.2 Explain why it is important to take messages accurately and the potential effects of not doing so e.g. organisations / departments / person's reputation, trust and confidence are at stake, efficiency and effectiveness depend on accurate information. Potential effects of not taking messages accurately: Efficiency reduced e.g. unnecessary work caused, time wasted during clarification. Effectiveness reduced e.g. an inaccurately taken message may cause confusion, delivery of the wrong product or service, failure to identify the true cause of a problem.

3.3 Explain the importance of confirming information and why this should be acknowledged and accurately recorded e.g. to check correct understanding and clarify before work starts and costs are incurred, to confirm that the required actions will be taken / issues addressed / products or services delivered. Acknowledgement e.g. to let the sender know that the information has been received, to foster two way communication, encourage buy in / ownership of information. Accurately recorded e.g. in case of any dispute about the content of the information or the timeliness of actions taken, information types that form part of evidence of compliance with legislative / quality assurance requirements.

3.4 Explain the situations in which confidentiality needs to be maintained e.g. protection of individuals personal, financial, medical, religious, racial, sexual, employment details, development of new products / services / systems of operation that give competitive edge or have commercial value, sensitive aspects of organisational strategy, finance, staff recruitment, security information - CCTV / internet usage monitoring, pest infestations, handling of complaints or appeals.

Learning Outcome 4. Understand the relevant legislation in receiving and sending information

4.1 Summarise the legislation which relates to communicating information within the workplace Legislation which relates to communicating information within the workplace e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations,
Provision and Use of Work Equipment Regulations, Health and Safety (Display Screen Equipment) Regulations as amended
Data Protection Act, Copyright, Designs and Patents Act

Various acts relating to discrimination e.g. Disability Discrimination Act, Race Relations Act, Sex Discrimination Act.
Briefly summarise the key points of each item of legislation considered - for example: The Data Protection Act applies to all businesses that keep information or personal data about identifiable people. It sets out a number of key data protection principles such as to process only as much information as needed, to keep individuals properly informed about what their information will be used for, to ensure that it is kept accurate and up to date, to hold it securely, to delete information as soon as there is no reason to keep it and to observe the rights of an individual. Businesses may be required to notify that they hold and use personal information.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1 and 2
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised communication activities to give learners the opportunity to practice the various tasks involved and develop competence in each assessment criteria. Many of the communication methods and types of presentation referred to in the indicative content will readily contribute to the assessment of competence using diverse evidence.

Communication is an important aspect of level 3 units and opportunities to observe competent performance of communication tasks will arise during the observation of aspects of competence in other units. Recording and cross referencing such observations will provide a cost effective way of gathering evidence of competence for this unit.

Learning Outcomes 3 and 4
Delivery of these learning outcomes is by generation of knowledge evidence. This could be linked to the practical work by cross referencing to the diverse evidence generated by the practical activities e.g. by learners reviewing communications sent or received and providing written notes / comments about how assessment criteria aspects such as presentation, clarity, accuracy etc were effective or could be improved, by answering oral or written questions, by assignments or internet research. Direct observation and questioning may also be appropriate in some situations.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1 and 2 link together and competence can be assessed practically by generation of diverse evidence or observation if appropriate. These could also link to Learning Outcomes 3 and 4 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit
Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules

- Reviews/staff appraisals/minutes of meetings
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive web site http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information web site http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments

Carry Out Harvesting Operations by Mechanical Means

Unit Reference	**H/502/0244**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the skills and knowledge required to carry out harvest operations by mechanical means. The units may cover the harvesting of any of the types of crops; grass, arable, vegetables, fruit or plants
Learning Outcomes (1 to 6) ***The learner will***	**Assessment Criteria (1.1 to 6.3)** ***The learner can***
1. Be able to harvest crops	1.1 Identify crops to be harvested 1.2 Harvest crops in a way which minimises damage to the crop and the environment 1.3 Identify and carry out two adjustments to take account of the following • crop density • crop condition • prevailing weather • ground condition 1.4 Handle harvested crop in a way that maintains quality and minimises damage
2. Be able to prepare, use and maintain equipment for harvesting crops	2.1 Select and use appropriate equipment for this area of work 2.2 Prepare, maintain and store equipment in a safe and effective working condition

3. Be able to work safely and minimise environmental damage	3.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements 3.2 Carry out work in a manner which minimises environmental damage 3.3 Dispose of waste safely and correctly
4. Know how to harvest crops mechanically	4.1 Describe the methods of harvesting crops 4.2 Describe adjustments to the harvesting process stating why these must be made covering all of the following • crop density • crop condition • prevailing weather • ground condition 4.3 Outline the types of problems which may arise during harvesting and to whom these should be reported 4.4 Describe how to recognise and minimise crop damage
5. Know the types of equipment required and how to prepare and maintain them	5.1 Describe the equipment which will be necessary for harvesting crops 5.2 Describe methods of preparing and maintaining the equipment ready for use
6. Know the relevant health and safety legislation and environmental practice	6.1 Outline the current health and safety legislation, codes of practice and any additional requirements 6.2 Describe how environmental damage can be minimised 6.3 Describe the correct methods for disposing of organic and inorganic waste
Mapping to National Occupational Standards 029N Agc7.1, 7.2	

Supporting Unit Information

H/502/0244 Carry out harvesting operations by mechanical means - Level 2

Indicative Content

Note 1 – Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number listed e.g. LO1.3.

Note 2 – Examples are indicative of the range of considerations for assessment criteria but are by no means exclusive.

Note 3 – The example used in this indicative content is carrots or parsnip. The same approach should be used for other crops.

LO1, LO2 and LO3 are the key areas of competence for this unit.

Learning Outcome 1. Be able to harvest crops

1.1 Crops to be harvested identified;
Identified for; location, access to site, size of area, condition of crop.

1.2 Crops harvested in a way which minimises damage to the crop and the environment. Minimising crop damage. Crop damage recognised by monitoring of the crop on harvester or in trailer or bulk box (e.g. looking for broken roots, cuts or bruising of the crop, contamination with stones, clods or weeds), monitoring of weather and soil conditions (e.g. rain – making ground conditions more difficult to harvest or hazardous on sloping sites, high temperatures exposing workers to UV radiation and dehydration). Minimised by; appropriate choice of, checking and setting up of equipment, reporting problems to machine operator, adjusting machine (refer to LO1.3), postponing operations until conditions improve (refer to LO1.3) Damage to the environment: Preventing soil damage, erosion and run-off to avoid pollution of controlled waters from access routes and crop areas by use of appropriate equipment (e.g. track-laying vehicles) and avoiding adverse conditions (e.g. frost, heavy rain); avoiding leaving mud on road by washing and cleaning equipment prior to using on road, use of separate vehicles for field and road operations, routine brushing; careful disposal of unwanted plant material by minimising waste material removed from field, compliance with Environment Agency requirements and advice, staff training.

1.3 Need for adjustments identified and adjustments carried out taking account at least two of the following conditions; crop density, crop condition, prevailing weather, ground condition.
Crop density: affects yield (relates to number and size of product), operating speed of equipment, harvesting rates; adjustments – gear selection on tractor,

gear setting on machine, depth setting

Crop condition: affected by condition of tops e.g. suitable for top lifting, requiring use of topper to remove), length of roots (impact on depth setting of machine)

Prevailing weather: impacts on the effectiveness of lifting machinery (links to soil type e.g. sandy soil drains quicker and harvesting can be resumed sooner after rain), wet conditions make operation slower, increase weight of soil on machinery, increase blockages, can contaminate crop, frost can make lifting impossible. Adjustments; type of equipment used, timing of field operations, choice of fields for winter harvesting

Ground conditions: slope affects use of machinery, crop lifting easier in sandy soils than heavier clay soils, harvesting in extreme wet conditions will be difficult and cause soil damage, dry conditions can increase bruising of the crop, stones or clods in soil will increase weight on harvesters and tend to blockages, frost will prevent harvesting

1.4 Crop harvested is handled in a way that maintains quality and minimises damage (refer to LO4.1 and LO.4)

Crop is harvested by; top lifter (crops with tops only), topper (if required), root lifter followed by hand picking, complete harvester into trailers or bulk boxes; quality is maintained and damage minimised by choosing, setting up, operating and adjusting equipment according to conditions (refer to LO1.2 and LO1.3 for details).

Learning Outcome 2. Be able to prepare use and maintain equipment for harvesting crops

2.1 Appropriate equipment for this area of work selected and used

PPE e.g. waterproof clothing, steel toe-capped boots, UV Protection, gloves, hats.

Topping equipment (flail or rotary) – for removing tops and weeds prior to harvesting

Root lifters (Single row, twin row, bed) followed by hand picking

Complete harvester (Single row, twin row, bed) for lifting whole crop to bulk boxes or trailers.

Tractors and trailers for collecting and transporting the crop.

All terrain lifting equipment for handling bulk boxes.

2.2 Manufacturer's / supplier's / supervisor's instructions followed for preparation and maintenance of tools / equipment; e.g. cleaning and checking, routine servicing of power units, oiling and greasing prior to use, attaching and setting up of toppers, harvesters and trailers, lifting equipment. Equipment cleaned and checked after use and safely returned to appropriate storage area.

Learning Outcome 3. Be able to work safely and minimise environmental damage

3.1 Risk assessment carried out or studied and implemented. Work activities carried out consistently with current legislation.
Health and Safety e.g. Management of Health & Safety at Work Regulations; Environmental Protection Acts; Waste Regulations. Codes of Practice e.g. protecting our Water, Soil and Air; Additional requirements including certification schemes, customer regulations, assured produce schemes, LOLER, PUWER, Manual Handling, Stop Safe.

3.2 Environmental damage minimised. Refer to LO1.2.

3.3 Waste disposed of correctly and safely.
Organic waste – reduce waste removed from cropping area (by careful selection of cop, waste material returned to the field (unless the material poses a threat to plant health e.g. diseased material and perennial weeds).
Inorganic waste – wastes from servicing and maintenance of equipment disposed of in appropriate container; wastage of packaging minimised and where unavoidable recycled or disposed of in appropriate container; inorganic waste is carefully controlled until disposed of through licensed contractor.

LO4, LO5 and LO6 are the key area of knowledge for this unit
Learning Outcome 4. Know how to harvest crops mechanically

4.1 Describe the methods of harvesting crops;
Removal of tops, weeds and debris by use of flail and rotary mowers, separate operation or carried on harvester.
Machine assisted hand picking; use of root lifters (Single row, twin row, and bed) followed by hand picking (into bags, baskets or bulk boxes).
Complete harvester (Single row, twin row, bed) for lifting whole crop to bulk boxes or trailers, removal of excess soil and stones by use of cleaners and rollers, selection by operators or magic eye (electronic sensors).
Collecting the crop using tractors and trailers, or bulk boxes
Transporting the crop using tractors and trailers, all terrain lifting equipment for handling bulk boxes; transport to field storage area, packhouse and storage.

4.2 Describe adjustments to the harvesting process stating why these must be made covering all of the following conditions; crop density, crop condition, prevailing weather, ground condition -; (refer to LO1.3).

4.3 Outline the types of problems which may arise during harvesting and to whom these should be reported.
Problems during harvesting; machinery breakdown or malfunction, machinery damaging the crops, adverse soil conditions (refer to LO1.3), crop not in appropriate condition (e.g. too small, damaged by pest or disease) reporting to line manager, supervisor or machine operator.

4.4 Describe how to recognise and minimise crop damage; (refer to LO1.2).

Learning Outcome 5. Know the types of equipment required and how to prepare and maintain them

5.1 Describe the equipment which will be necessary for harvesting crops (refer to LO2.1).
5.2 Describe methods of preparing and maintaining the equipment ready for use (refer to LO2.2).

Learning Outcome 6. Know the relevant health and safety legislation and environmental practice

6.1 Outline the current health and safety legislation, codes of practice and any additional requirements (refer to LO3.1).
6.2 Describe how environmental damage can be minimised (refer to LO1.2).
6.3 Describe the correct methods for disposing of organic and inorganic waste (refer to LO3.3).

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1, 2, and 3,
Delivery of these learning outcomes is by supervised practical work carrying out harvesting operations by mechanical means, giving learners the opportunity, first to practice the various tasks involved and then to be observed competently doing each task to demonstrate achievement of the assessment criteria.

Learning Outcomes 4, 5, and 6
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of work carrying out harvesting operations by mechanical means, records and witness testimony, answering oral or written questions, referenced to the knowledge evidence.

Prior to, during and after completion of work carrying out harvesting operations by mechanical means photographs or video could be taken to provide evidence of progress. Copies of packhouse or field records can be used to provide evidence of quantity of work and of sufficiency of evidence.
Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.
All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, 2 and 3 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 4, 5 and 6 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

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- Witness statements
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This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

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- The Environment Agency website http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc
- The website http://www.netregs.gov.uk/ provides guidance about environmental regulations.
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9

Learners should be directed to relevant publications and websites eg

- Horticulture Week (www.hortweek.com*)*
- DEFRA website and publications *(*https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs*)*
- Principles of Horticulture by C.R. Adams, et al / Paperback / Published 1998
- Postharvest: an Introduction to the Physiology and Handling of Fruit, Vegetables and Ornamentals by R. Wills, et al / Paperback / Published 1998
- Nursery Management by Harold Davidson, et al / Hardcover / Published 1994
- A Handbook for Horticultural Students by Peter Dawson
- Vegetable Brassicas and Related Crucifers by G.R. Dixon and M.H. Dickson
- Greenhouse Operation and Management by Paul Nelson

Promote Responsible Public Use of the Environment

Unit Reference	**H/502/3161**
	2

Level	
Credit Value	**4**
Guided Learning Hours	**30**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to safeguard members of the public and the environment
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.1)** ***The learner can***
1. Be able to safeguard members of the public and others	1.1 Maintain the safety of the public and others during visits to the site 1.2 Work safely encouraging everyone throughout all activities to follow current legislation, codes of practice, organisational policies and procedures
2. Be able to safeguard the environment	2.1 Provide information and advice to encourage members of the public to use the site in a way which is consistent with its purpose and condition 2.2 Identify visitors and others who may cause a threat and take the appropriate action to minimise any damage or risk, covering two of the following • to the site and its contents • to flora and fauna • to own personal health and safety • to other people's health and safety
3. Know how to safeguard members of the public and the environment	3.1 Outline organisational codes of practice and requirements about the care of visitors and other members of the public, e.g. supporting people in terms of their safety and welfare by providing information and advice 3.2 State the needs of the public and others, and when to influence their use of the site and offer advice or help

	3.3 State why the organisation may have certain access policies or specific areas for public access 3.4 Explain the importance of balancing the needs of the site with the needs of the public and others 3.5 Describe the features of the site and the effects the public and others may have on it 3.6 Outline threats the public may pose to • the site and its contents • flora and fauna • own personal health and safety • other people's health and safety 3.7 Explain how to handle people who cause a threat to sites in an effective, safe and courteous way
4. Know relevant health and safety legislation and environmental good practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements

Mapping to National Occupational Standards
O29NEC1.2

Supporting Unit Information

H/502/3161 Promote responsible public use of the environment - Level 2

Indicative Content

Note 1 - Examples are indicative of the range of considerations for assessment criteria but are by no means all inclusive.

LO1 and LO2 are the key areas of competence for this unit.

Learning Outcome 1. Be able to safeguard members of the public and others.

1.1 Maintain the safety of the public and others during visits to the site. Signs established to manage access in acceptable directions, information boards to encourage careful use. Members of public and others to be instructed to stay on recognised walkways. Signage in place to warn members of the public and others of any work in progress. Instructions given clearly and any dangers identified. Examples could be deep waters or unprotected edges and any stock or wildlife known to be present in the area.

1.2 Work safely encouraging everyone throughout all activities to follow current legislation, codes of practice, organisational policies and procedures e.g. Health and Safety, Environmental Protection and Wildlife and Countryside Acts, COPs as applicable, risk assessment. Additional requirements such as vaccination against tetanus, precautions against ticks etc. Work in a way that minimises risk to self-other and the environment (e.g. follow instructions, refer to LO 1.1, stop work if any unsafe act seen). Fence off any areas of danger or areas that require protection. Risk assessments in place. Ensure that the correct PPE is worn for relevant tasks such as Eye Protection (safety goggles) Ear Protection (Ear defenders) safety boots and gloves etc. Minimise disturbance by using hand tools rather than powered tools. Ensure correct disposal of differing waste according to type. (Organic (grass cuttings, timbers or non-organic, plastics or fuel wastes).

Learning Outcome 2. Be able to safeguard the environment

2.1 Provide information and advice to encourage members of the public to use the site in a way which is consistent with its purpose and condition. Signs in place to identify site status such as SSSI or SAC. Refer to L.O 1.1.

2.2 Identify visitors (authorised /invited) and others(uninvited /trespassers) who may cause a threat and take the appropriate action to minimise any damage or risk, covering two of the following

- **Visitors to the site and its contents** e.g. visitors to keep to authorised areas and not to disturb or remove any contents. Out of control dogs.
- **to flora and fauna** e.g. carefully planning site access, correct timing of cutting to avoid nesting birds / favour identified target species, grazing and / or browsing with species and stocking densities to achieve conservation aims, working in accordance with local biodiversity plans, awareness of rare species
- **to own personal health and safety** e.g. correct choice and use of PPE refer to L.O.1.2
- **to other people's health and safety** e.g. Ensure others have correct PPE and keep others away by correct signage and warnings refer to L.O.1.1

LO3 and LO4 are the key areas of knowledge for this unit

Learning outcome 3. Know how to safeguard public and others

3.1 Outline organisational codes of practice and requirements about the care of visitors and other members of the public e.g. supporting people in terms of their safety and welfare by providing information and advice (leaflets, spoken word).

3.2 State the needs of the public and others, and when to influence their use of the site and offer advice or help E.g. public access, grazing rights etc, timings to prevent and minimise damage to resident stock and plant species.

3.3 State why the organisation may have certain access policies or specific areas for public access e.g. protected sites such as SSSI, SAC etc, sensitive times such as known breeding times or close seasons and times when flora and fauna at most vulnerable refer to L.O.2.2.

3.4 Explain the importance of balancing the needs of the site with the needs of the public and others e.g. local usage such as grazing rights, rights of way, migratory animals and birds, minimal disturbance to site, emergency procedures.

3.5 Describe the features of the site and the effects the public and others may have on it e.g. SSSI, SAC, other designated area. Sensitive areas and any damage to rare plants or the balance of the site and human impact by indiscriminate waste disposal or other intrusive activities.

3.6 Outline threats the public may pose to

- **the site and its contents**-refer to L.O. 2.2
- **flora and fauna**- refer to L.O.2.2
- **own personal health and safety**- refer to L.O.2.2
- **other people's health and safety**- refer to L.O.2.2

3.7 Explain how to handle people who cause a threat to sites in an effective, safe and courteous way e.g. be firm but fair, be polite, call for help if required. Note car registration numbers and report to appropriate person

such as supervisor or site controller. Explain your own legal rights and responsibilities.

Learning outcome 4. Know relevant health and safety legislation and environmental good practice

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements e.g. Health and Safety at Work Act, Management of Health & Safety at Work Regulations, Provision and Use of Work Equipment Regulations,
Environmental Protection e.g. Environmental Protection Acts covering waste disposal
Wildlife and conservation e.g. Wildlife and Countryside Act, Conservation (Natural Habitats &c.) Regulations (as amended), Habitats Directive
Health and Safety Executive guidance - Cattle and public access in England / Wales
Additional requirements including e.g. LBAP's
Natural England and Countryside Council for Wales notifications e.g. SSSI's (and SPA's SAC's) - notification of listed operations.
Environment Agency notifications e.g. activities affecting watercourses, groundwater.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes 1 and 2
Delivery of these learning outcomes is by assessment of competence for those who have experience in this area of work or by supervised practical environmental management work giving learners the opportunity, first to practice the various tasks involved and then to be observed correctly doing each task to demonstrate competence in each of the assessment criteria.

Prior to, during and after completion of environmental habitat management work photographs or video could be taken to provide evidence of progress.

Learning Outcomes 3 and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of environmental habitat management activities and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Learners who have not yet completed the necessary training or certification to use machinery, equipment and materials must be supervised by a suitably qualified person.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1and 2 link together and can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 3 and 4, to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include some of the following

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes/diaries/reflective accounts
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory and safety checklists / maintenance schedules

- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive website http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- National Federation of Biological Recording website http://www.nbn-nfbr.org.uk/nfbr.php lists all Local / Biological Recording Centres - Useful to find local Biodiversity Action Plans
- The Natural England website http://www.naturalengland.org.uk/ has information about countryside protection schemes and land management for the benefit of wildlife the public and landscape. Also licences and enforcement
- Local Authority websites for Local Planning Authority permissions and LBAP's
- County Council websites for historic, environmental and archaeological services
- Internal Drainage Board websites to check compliance with by-laws
- The Department for Environment, Food and Rural Affairs website has up to date information about legislation, codes of practice and consultations in the horticultural / agricultural sectors
- The Environment Agency website http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, hazardous waste, water etc

- Horticultural Code of Practice - Helping to prevent the spread of invasive non-native species
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9
- BTCV Footpaths, Fencing and Dry Stone Walling - practical handbooks

Use and Maintain Chippers and/or Shredders

Unit Reference	**T/502/0443**
Level	**2**
Credit Value	**3**
Guided Learning Hours	**23**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to use and maintain chippers and / or shredders
Learning Outcomes (1 to 4) ***The learner will***	**Assessment Criteria (1.1 to 4.2)** ***The learner can***
1. Be able to use and maintain chippers and/or shredders	1.1 Make sure that the chippers and/or shredders are in safe and good working order 1.2 Select and use the correct personal protective clothing and equipment 1.3 Set up and use the chippers and or shredders in accordance with the manufacturer's instructions and legal requirements 1.4 Maintain chippers and/or shredders in accordance with manufacturer's instructions 1.5 Identify any problems with the chippers and/or shredders and take the correct action 1.6 Clean and store the equipment correctly after use
2. Be able to work safely and minimise environmental damage	2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements

	2.2 Carry out work in a manner which minimises environmental damage 2.3 Dispose of waste safely and correctly
3. Know how to use and maintain chippers and/or shredders	3.1 List the main hazards and risks associated with using chippers and/or shredders and action to be taken 3.2 Explain the importance of operating equipment in line with manufacturer's instructions 3.3 Describe methods of preparing and maintaining the equipment for use covering • correct pre-use checks • correct start-up procedure • use appropriate work method • correct stopping procedure • correct post-use maintenance • reporting problems to the appropriate person 3.4 Describe the types of problems that may occur with the equipment and describe how to deal with each of these correctly 3.5 Describe types of protective clothing and explain why it must be worn
4. Know the current health and safety legislation and environmental good practice	4.1 Outline the current health and safety legislation, codes of practice and any additional requirements 4.2 Describe how environmental damage can be minimised
Mapping to National Occupational Standards O29NL27.1, 2	

Supporting Unit Information

T/502/0443 Use and maintain chippers and/or shredders – Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. LO1.3.

The example of chippers or shedders in this case will be a tractor mounted chipper. Activities for other chippers or shedders need to follow this example.

LO1 and LO2 are the key areas of competence for this unit

Learning Outcome 1. Be able use and maintain chippers and/or shedders
Cross reference to L.O.3

1.1 Make sure that the chippers and/or shredders are in safe and good working order Check that the chipper and/or shedder is safe and not damaged in any way. Undertake PUWER check. Undertake a Dynamic Risk Assessment (DRA).

1.2 Select and use the correct personal protective clothing and equipment Correct PPE worn including e.g. Safety boots (free from mud or oil) ear defenders, eye protection, non-slip gloves, non-snag overalls, high visibility clothing etc. Report any faults identified (such as loose guarding) on relevant documentation. Ensure each operative carries a personal first –aid kit including a large wound dressing and hand cleaning material such as waterless skin cleanser or soap and water and paper towels.

1.3 Set up and use the chippers and or shredders in accordance with the manufacturer's instructions and legal requirements Undertake a Site Specific Risk Assessment. Use the chipper and /or shedder in a safe manner and following manufactures' Instructions. Ensure all guarding is in place and protective devises such as the in feed control bar are working correctly. Ensure the PTO speed is suitable for the chipper. Ensure any push sticks used are at least 1.5m long for both short produce and the last piece of produce to be chipped. Keep the area clear of any obstructions or waste product in front of the in feed hopper. Always follow the manufactures instructions for dealing with a blockage of the chipper. Consider weather conditions and ground conditions such as degree of slopes and ground conditions such as wet ground, on site hazards which need to be identified and if possible removed. Ensure signage is in place to prevent unauthorised access to site.

1.4 Maintain chippers and/or shredders in accordance with manufacturer's instructions Regular checks of chipper and /or shedder to ensure it is fully efficient. E.g. if chipper and /or shedder becomes unsafe to use take out of

service and report to appropriate person in charge. Check the chipping components and knives each day for damage and wear. When new/sharpened knives are fitted ensure there is the recommended clearance between the knives and the anvil.

1.5 Identify any problems with the chippers and/or shredders and take the correct action refer to LO1.4 above and report any faults to person in charge identified on relevant documentation.

1.6 Clean and store the equipment correctly after use Ensure all chippers and /or shedders used on site are left in clean and serviceable conditions and are stored in correct place. E.g., has protective cover on (if applicable). Is wiped clean and wiped with oily rag or sprayed with WD40 or similar protective film to prevent rusting, deterioration etc. Clean all excess waste and sawdust etc off. Adopt Safe Stop principles, remove key and park safely and securely.

Learning Outcome 2. Be able to work safely and minimise environmental damage Cross reference to L.O.1.2

2.1 Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and any additional requirements e.g. Health and Safety, Environmental Protection and Waste Acts, COPs as applicable and additional requirements. Ensure correct PPE selected and used in safe manner) Safety boots, overalls, gloves, ear and eye protections, high visibility clothing. Ensure site is secure and free from any unauthorised access. Signage in place whilst work being undertaken. Communications systems in place (such as agreed hand signals, mobile phones etc). Ensure correct manual handling techniques adopted. Safe working distances adhered to.

2.2 Carry out work in a manner which minimises environmental damage Check the material to be chipped is free from stones, metals and foreign objects. Consider any protected species and any SSSI or SAC requirements at the site. Be able to identify invasive species e.g. Japanese Knot weed, Giant Hogweed and Himalayan Balsam. Only chip the identified product. Cross reference to L.O.4.

2.3 Dispose of waste safely and correctly i.e. Identify organic and inorganic waste and dispose of in correct manner. Note the importance of L.O. 2.2 with reference to checking the material to be chipped (Note also disposal of waste generated from chippers such as spill mats following refuelling or oily rags etc dispose of in suitable container).

LO3 and LO4 are the key areas of knowledge for this unit

Learning Outcome 3. Know how to use and maintain chippers and/or shedders Cross reference to L.O.1.

3.1 List the main hazards and risks associated with using chippers and/or shredders and action to be taken e.g. Undertake Dynamic Risk Assessment take into account ground conditions, weather conditions, and unauthorised access to site, livestock present, slips, trips, and falls. Poisonous vegetation. Cuts, sprains etc. Flying debris Manual handling techniques will also need to be considered.

3.2 Explain the importance of operating equipment in line with manufacturer's instructions Explain correct use of chippers and/or shredders- refer to manufacturer's instructions. Explain the need for pre-use checks. Refer to LO1 PUWER checks. Correct start up procedures (on flat surface, neutral gear, position of discharge chute, adequate ventilation etc). Describe appropriate work method (chipping and removal and disposal of waste). Describe Safe Stop method. Describe who to report any problems to (Supervisor, person in charge).

3.3 Describe methods of preparing and maintaining the equipment for use Describe the importance of operating chippers and/or shedders in line with manufactures' instructions (e.g. Operating on slopes, PTO speed, and no unauthorised access to work area.) refer to L.O. 1.3.

3.4 Describe the types of problems that may occur with the equipment and describe how to deal with each of these correctly explain the types of problems that may occur with the chipper and/or shredder e.g. runs out of fuel, electrical failure, blocked chute, blunt knives. If becomes unsafe to use take out of service and report to appropriate person .If using chippers and/or shedders equipment refer to manufactures recommended time usage.

3.5 Describe types of protective clothing and explain why it must be worn Describe the correct PPE that should be worn including e.g. Safety boots (free from mud or oil) ear defenders, eye protection, non-slip gloves, non-snag overalls, high visibility clothing etc. Dependant on the type of work being undertaken. Cross reference to L.O.1.2.

Learning Outcome 4. Know the current health and safety legislation and good environmental practise

4.1 Outline the current health and safety legislation, codes of practice and any additional requirements Health and Safety e.g.
Management of Health and Safety at Work Regulations
Environmental Protection e.g. Environmental Protection Acts
Waste e.g. Hazardous Waste Regulations
Codes of Practice e.g. Protecting our Water, Soil and Air.
Additional requirements including Local Authority permissions e.g. planning permission and Environment Agency notifications e.g. activities affecting watercourses, groundwater, aquifers. PUWER, Correct signage, Directional signs in place, Work area isolated and no unauthorised access. Identify hazards

and take appropriate actions. Describe an emergency plan and why this has to be in place.

4.2 Describe how environmental damage can be minimised e.g. only chip identified produce, consider status of Site SSSI, SAC or similar, safe removal of any waste etc. Don't operate if damage to ground is occurring and evident

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1 and 2
Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in using and maintaining chippers and /or shedders and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress and therefore competence.

Learning Outcomes (LO) 3 and 4
Delivery of these learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1, and 2 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 3, 4 and 5 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence
- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive website http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information website http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The website http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations
- The Environment Agency website http://www.environment-agency.gov.uk provides guidance about environmental permitting, pollution and emissions, waste and water etc
- The Code of Practice - Protecting our Water, Soil and Air has a useful list of references in Section 9
- The leaflet from HSE Books Tractor Action ISBN 0 7176 2711X. Gives advice on attachments such as chippers driven by a PTO shaft
- The leaflet from HSE Books AFAG 604 Wood chippers gives advice on chippers
- The leaflet from HSE Books AFAG 802 Emergency planning gives advice on emergency planning and ensuring a designated person is in charge of the site
- **SAFE STOP**
  - Make sure the handbrake is fully applied
  - Make sure all controls and equipment are left safe
  - Stop the Engine
  - Remove the key
- The Provision and Use of Work Equipment Regulations PUWER. All plant or equipment used at work, either in the office or in the field, comes under PUWER.

Process Payments for Purchases in a Retail Environment

Unit Reference	**L/503/5689**
Level	**2**
Credit Value	**4**
Guided Learning Hours	**17**
Unit Summary	This unit assesses the occupational competence of cashiers in a retail environment.
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.7)** ***The learner can***
1. Understand legal and organisational requirements for processing payments in a retail environment	1.1 Explain the customer's rights and the organisation's duties and responsibilities in relation to the pricing of goods 1.2 Explain how own organisation deals with suspected fraud
2. Be able to process payments for purchases in a retail environment	2.1 Resolve pricing problems by • referring to reliable pricing information • seeking advice from the person who can provide clarification when pricing information is unclear or unavailable 2.2 Tell customers the correct amount to pay, taking account of any special offers or discounts that apply 2.3 Process payments in line with organisational procedures, where the payment is acceptable 2.4 Explain how to tell customers tactfully that payment cannot be approved 2.5 Offer any additional services to customers

	2.6 Treat customers politely throughout the payment process 2.7 Acknowledge other customers who are waiting to pay or to be helped in some other way

Mapping to National Occupational Standards
There is a one-to-one relationship with the following Retail NOS
C.213, C.214

Mapping to Key Skills
This unit could provide evidence for the following key skills
Level 1 Application of Number –N1.2
Level 1 Communication – C1.1

Supporting Unit Information

L/503/5689 Process payments for purchases in a retail environment - Level 2

Indicative Content

To successfully achieve this unit, learners need to provide evidence that they have met the learning outcomes and assessment criteria for the unit.

AC 2.6: 'Politely' means demonstrating respect and consideration for other people through the use of appropriate body language, verbal language, tone of voice (or the sign language equivalent) and facial expressions.

Skills and Education Group Awards will provide specialist support for providers wishing to use this unit in order to develop and agree customised delivery and assessment regimes that maximise access and opportunities for the target learners and employers in this sub-sector and ensure that all aspects of content, delivery and assessment are fit for purpose and promote best practice in the sector.

Teaching Strategies And Learning Activities

The delivery of this unit needs to be closely linked with the workplace and assessment of this unit must take place in the workplace.

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

It is hoped that opportunities provided by the specification will be fully used to introduce related and general / key skills studies.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

Minimum requirements when assessing this unit
Skills and Education Group Awards expects that staff are appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching / supporting.

Individual units and qualifications are subject to specific additional requirements as stipulated by the Skillsmart Assessment Strategy.

Specific Evidence Requirement for this unit

Simulation is **not** allowed for any performance evidence within this unit.

Evidence of achievement

All learners must compile a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria. Evidence is not prescribed but may include any or all of the following*

- product evidence
- observation reports
- oral / written questions and answers
- reports / notes
- worksheets / workbooks
- witness statements
- taped evidence (video or audio)
- photographic evidence
- case studies / assignments
- other suitable supplementary evidence
- simulation (see specific evidence requirement above)
- interview / discussion

*The most appropriate evidence for the qualification should be used.

Portfolios do not need to be very large and must contain the learners' own work, not an abundance of tutor handouts.

Assessors may use any method that is reliable, valid and fit for purpose. Units should only be signed off once all the requirements of the unit are met.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Establish and Maintain Effective Working Relationships with Others

Unit Reference	**T/502/1690**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills required to work effectively with others under minimal direction through clear communication and co-operation The learner will establish and maintain effective working relationships with the colleagues, supervisors and managers, persons external to the team, department or organisation
Learning Outcomes (1 to 2) ***The learner will***	**Assessment Criteria (1.1 to 2.7)** ***The learner can***
1. Maintain working relationships with others	1.1 Identify opportunities to improve working practices with the appropriate person 1.2 Carry out activities requiring co-operation with others in accordance with required procedures 1.3 Communicate with others in a way which promotes effective working relationships 1.4 Keep others informed about work plans or activities which affect them 1.5 Seek assistance from others without causing undue disruption to normal work activities

	1.6 Respond in a timely and positive way when others ask for help or information
2. Understand why good working practices are important.	2.1 State why good working relationships are important 2.2 Suggest ways in which good working relationships can be maintained 2.3 State the methods of dealing with disagreements within the workplace 2.4 Describe own level of responsibility in relation to dealing with disagreements 2.5 State why effective communication is important
Mapping to National Occupational Standards O239NCU 5.2	

Supporting Unit Information

T/502/1690 Establish and maintain effective working relationships with others - Level 2

Indicative Content

Note: Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. AC 1.3

The example of establish and maintain effective working relationships with others in this case will be in the workplace. Activities for effective working relationships need to follow this example.

LO1 is the key area of competence for this unit

Learning Outcome 1. Maintain working relationships with others.

1.1 Identify opportunities to improve working practices with the appropriate person Identify opportunities within the workplace where working practices could be improved (e.g. Health and Safety, types of PPE, methods of operation, and allocation and use of resources) and identify appropriate persons such as work colleagues, supervisors and customers or partners who these may benefit. Also refer to satisfying contractual requirements if appropriate.

1.2 Carry out activities requiring co-operation with others in accordance with required procedures Implement some of the above in LO1.1. Carry out activities involving third parties such as other departments or organisations and gaining permissions or authorisations to undertake tasks.

1.3 Communicate with others in a way which promotes effective working relationships Demonstrate different communication skills e.g. e-mails, written, verbal, hand signals.

1.4 Keep others informed about work plans or activities which affect them Refer to LO3 and demonstrate that the above have been undertaken in timely manner and within the regulations and policies of the organisation, ensuring legal compliance at all times.

1.5 Seek assistance from others without causing undue disruption to normal work activities Demonstrate a cross department or within department agreement and provide evidence of assistance being given (written, verbal) whilst maintaining efficiency within the workplace.

1.6 Respond in a timely and positive way when others ask for help or information Provide evidence and demonstrate that information's requested have been delivered in a timely and positive manner.

LO2 is the key area of knowledge for this unit.

Learning Outcome 2. Understand why good working practices are important

2.1 State why good working relationships are important State evidences of good working relationships and the importance of them through written and verbal communications. Demonstrate knowledge of why this is good e.g. Efficiency, cost effectiveness, trust, building relationships that benefit all parties involved etc.

2.2 Suggest ways in which good working relationships can be maintained Communications, openness, honesty, timing of works, taking into account others needs of customers and clients.

2.3 State the methods of dealing with disagreements within the workplace Demonstrate knowledge of the organisations policy and procedures. Reporting procedures and hierarchy of control such as who you report to.

2.4 Describe own level of responsibility in relation to dealing with disagreements Describe where you are in terms of organisational chart and the hierarchy (note legislation and roles and responsibilities dependent upon the type of disagreement).

2.5 State why effective communication is important as in LO1.3

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1

Delivery of this learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in establishing and maintaining effective working relationships with others and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence. Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO) 2

Delivery of this learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

The assessment of some knowledge and understanding may take place in a non-work based environment e.g. training centre, however it must link directly to workplace performance and include performance evidence.

All learners must complete a portfolio of evidence that shows achievement of all the relevant learning outcomes and assessment criteria.

Centres will need to devise assessment tasks which should be practical where possible e.g. Learning Outcomes 1 and 2 link together and competence can be assessed practically by observation or by generation of diverse evidence. These could also link to Learning Outcomes 3 and 4 to allow knowledge evidence to be gathered during the practical activities.

It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

Skills and Education Group Awards expects that staff will be appropriately qualified to assess learners against the outcomes and criteria within the units. Generally teaching staff should be qualified and/or vocationally experienced to at least a level above that which they are teaching.

Individual units and qualifications are subject to specific additional requirements as stipulated by SSC Assessment Strategy.

Evidence Of Achievement

Evidence presented to support achievement is not prescribed for each learning outcome. It **could** typically include

- Product evidence
- Observation reports
- Oral/written questions and answers
- Reports/notes
- Worksheets/job sheets/workbooks
- Witness statements
- Taped evidence (video or audio)
- Photographic evidence

- Case studies/assignments/projects
- Interview/professional discussion
- Site risk assessment
- Tool / equipment inventory lists / maintenance schedules
- Pictorial identifications
- Letters / emails seeking clarification / confirmation of understanding
- Internet research / copies of items with relevant knowledge highlighted

This is not an exhaustive list and learners should be encouraged to develop the most appropriate evidence to demonstrate their achievement of the learning outcomes and assessment criteria.

All evidence must be clearly signposted and made available for the external moderator upon request.

All internal assessments must be accompanied by a signed Declaration of Authenticity (this document is available on the Skills and Education Group Awards web site).

Additional Information

Useful sources of reference

- The Health and Safety Executive website http://www.hse.gov.uk/ has useful information about identifying what health and safety legislation applies to areas of work and lists of Acts, Statutory instruments and legal publications
- The Office of Public Information website http://www.opsi.gov.uk has year by year lists of UK Acts and Statutory Instruments
- The website http://www.netregs.gov.uk/ provides helpful guidance about environmental regulations

Maintain and Develop Personal Performance

Unit Reference	**F/502/1689**
Level	**2**
Credit Value	**2**
Guided Learning Hours	**15**
Unit Summary	The aim of this unit is to provide the learner with the knowledge and skills to be able to agree and develop their own personal performance with an appropriate person The learner will maintain and develop personal performance with regard to • working to targets and completing specific tasks • quality of work
Learning Outcomes (1 to 3) ***The learner will***	**Assessment Criteria (1.1 to 3.6)** ***The learner can***
1. Maintain personal performance	1.1 Identify current competence and areas for development using relevant techniques and processes 1.2 Carry out work in accordance with responsibilities and organisational requirements
2. Develop personal performance	2.1 Agree personal performance and targets with an appropriate person 2.2 Review performance and progress regularly and use the outcome to plan future development activities 2.3 Seek advice from an appropriate person if clarification is required concerning specific tasks

	2.4 Seek constructive feedback and advice from others and use it to help maintain and improve performance
3. Know how to develop personal performance	3.1 State own limits of responsibility in relation to specific tasks and activities 3.2 State who to obtain advice from in relation to specific tasks and activities 3.3 List the correct procedures for obtaining advice 3.4 State the risks involved in not obtaining advice where specific tasks and activities are unclear 3.5 Describe how to determine and agree development needs and personal targets 3.6 State why personal performance should be reviewed
Mapping to National Occupational Standards O29NCU5.1	

Supporting Unit Information

F/502/1689 Maintain and develop personal performance - Level 2

Indicative Content

Note 1 - Cross references are first to the Learning Outcome (LO) e.g. LO1 and then to the Assessment Criteria number on the left e.g. A.C1.3.

The example of maintaining and developing personal performance in this case will be in the workplace. Activities for maintaining and developing personal performance need to follow this example.

LO1 and LO2 are the key areas of competence for this unit.

Learning Outcome 1. Maintain personal performance

1.1 Identify opportunities within the workplace where current competence can be proven e.g. certification of previous qualifications and training events attended etc. identify areas for development within the workplace by identifying skills lacking possibly using personal performance targets already agreed with line mangers. Refer to Staff Appraisals, reviews and peer observations.

1.2 Carry out work in accordance with responsibilities and organisational requirements Carry out works to agreed standard and within the responsibilities of own role and to organisational requirements through both written and verbal instruction. Retention of records could be a useful source of evidence for this along with any feedbacks on performance from line managers or customers or fellow workers in the form of witness testimony.

Learning Outcome 2. Develop personal performance

2.1 Agree personal performance and targets with an appropriate person Agree and document a personal development plan and identify targets for a set period of time.

2.2 Review performance and progress regularly and use the outcome to plan future development activities This LO will be achieved by regular reviews probably either 6 monthly or quarterly and these will need to be documented. Take the opportunity to plan any future identified needs.

2.3 Seek advice from an appropriate person if clarification is required concerning specific tasks Will be achieved by demonstrating communications either verbally or in writing if clarification on anything agreed in LO2 above.

2.4 Seek constructive feedback and advice from others and use it to help maintain and improve performance Constructive feedback may be

evidenced at LO2 above or from feedback from colleagues and peers and customers or partner organisations.

LO3 is the key area of knowledge for this unit.

Learning Outcome 3. Know how to develop personal performance

3.1 State own limits of responsibility in relation to specific tasks and activities be able to state the roles and responsibilities of own role for identified tasks and activities. Give details of own role from job description.

3.2 State who to obtain advice from in relation to specific tasks and activities this will be from for example a supervisor or technical expert for the field in which advice is required.

3.3 List the correct procedures for obtaining advice Be able to list correct procedures for obtaining advice for example on Health and Safety issues identified in the workplace maybe faulty equipment and to know who to go to obtain the correct advice such as a line manager or supervisor .

3.4 State the risks involved in not obtaining advice where specific tasks and activities are unclear be able to demonstrate the risks to the individual and the organisation when task outcomes are unclear and give an example of what could go wrong if acting on unsound or inaccurate advice. Example such as a faulty machine or equipment not being repaired and the possible dangers and consequences to self and others in workplace.

3.5 Describe how to determine and agree development needs and personal targets Refer to L.O. 2.1 and describe the process.

3.6 State why personal performance should be reviewed be able to state the reasoning behind reviewing the objectives and targets set and understand the need to ensure that the organisations and the individual's targets are met. Example as for Health and Safety issues identified that require action to ensure staff safety and legal requirements of the organisation.

Teaching Strategies And Learning Activities

Centres should adopt a delivery approach which supports the development of their particular learners. The aims and aspirations of all learners, including those with identified special needs, including learning difficulties/disabilities, should be considered and appropriate support mechanisms put in place.

Learning Outcomes (LO)1 and 2

Delivery of these learning outcomes is by supervised practical operational work giving learners the opportunity, first to practice the various tasks involved in maintaining and developing personal performance and then to be observed correctly doing each task to demonstrate achievement of the assessment criteria and therefore competence.

Prior to, during and after completion of practical operational work photographs or video could be taken to provide evidence of progress.

Learning Outcomes (LO)3
Delivery of this learning outcomes is by generation of knowledge evidence which could be linked to the practical work e.g. by observation of operational work and witness testimony, answering oral or written questions, assignments or internet research cross referenced to the knowledge evidence.

Methods Of Assessment

This unit will be internally assessed, internally and externally moderated via a learner's portfolio and other related evidence, against the unit outcomes and assessment criteria.

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It is important that practical assessment activities are supervised appropriately.

Minimum requirements when assessing this unit

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Recognition of Prior Learning (RPL), Exemption, Credit Transfer and equivalencies

Skills and Education Group Awards policy enables learners to avoid duplication of learning and assessment in a number of ways:

- Recognition of Prior Learning (RPL) – a method of assessment that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and do not need to develop through a course of learning.
- Exemption - Exemption applies to any certificated achievement which is deemed to be of equivalent value to a unit within Skills and Education Group Awards qualification but which does not necessarily share the exact learning outcomes and assessment criteria. It is the assessor's responsibility, in conjunction with the Internal Moderator, to map this previous achievement against the assessment requirements of the Skills and Education Group Awards qualification to be achieved in order to determine its equivalence.
  Any queries about the relevance of any certificated evidence, should be referred in the first instance to your centre's internal moderator and then to Skills and Education Group Awards.
  It is important to note that there may be restrictions upon a learner's ability to claim exemption or credit transfer which will be dependent upon the currency of the unit/qualification and a learner's existing levels of skill or knowledge.
  Where past certification only provides evidence that could be considered for exemption of part of a unit, learners must be able to offer additional evidence of previous or recent learning to supplement their evidence of achievement.
- Credit Transfer – Skills and Education Group Awards may attach credit to a qualification, a unit or a component. Credit transfer is the process of using certificated credits achieved in one qualification and transferring that achievement as a valid contribution to the award of another qualification. Units/Components transferred must share the same learning outcomes and assessment criteria along with the same unit number. Assessors must ensure that they review and verify the evidence through sight of:
  - Original certificates OR
  - Copies of certificates that have been signed and dated by the internal moderator confirming the photocopy is a real copy and make these available for scrutiny by the External Moderator.
- Equivalencies – opportunities to count credits from the unit(s) from other qualifications or from unit(s) submitted by other recognised organisations towards the place of mandatory or optional unit(s) specified in the rule of combination. The unit must have the same credit value or greater than the unit(s) in question and be at the same level or higher.

Skills and Education Group Awards encourages its centres to recognise the previous achievements of learners through Recognition of Prior Learning (RPL), Exemption, Credit Transfer and Equivalencies. Prior achievements may have resulted from past or present employment, previous study or voluntary activities. Centres should provide advice and guidance to the learner on what is appropriate evidence and present that evidence to the external moderator in the usual way.

Further guidance can be found in 'Delivering and Assessing Skills and Education Group Awards Qualifications' which can be downloaded from
https://skillsandeducationgroupawards.co.uk/for-centres/

Certification

Learners will be certificated for all units and qualifications that are achieved and claimed.

Skills and Education Group Awards' policies and procedures are available on the Skills and Education Group Awards web site www.skillsandeducationgroupawards.co.uk

Exemptions

This qualification contains exemptions. For further details see Recognition of Prior Learning (RPL), Exemptions, Credit Transfers and Equivalencies.

GL (Guided Learning)

GL is where the learner participates in education or training under the immediate guidance or supervision of a tutor (or other appropriate provider of education or training). It may be helpful to think – 'Would I need to plan for a member of staff to be present to give guidance or supervision?'
GL is calculated at qualification level and not unit/component level.

Examples of Guided Learning include:

- Face-to-face meeting with a tutor
- Telephone conversation with a tutor
- Instant messaging with a tutor
- Taking part in a live webinar
- Classroom-based instruction
- Supervised work
- Taking part in a supervised or invigilated formative assessment
- The learner is being observed as part of a formative assessment.

TQT (Total Qualification Time)

'The number of notional hours which represents an estimate of the total amount of time that could reasonably be expected to be required, in order for a learner to achieve and demonstrate the achievement of the level of attainment necessary for the award of a qualification.' The size of a qualification is determined by the TQT.

TQT is made up of the Guided Learning (GL) plus all other time taken in preparation, study or any other form of participation in education or training but not under the direct supervision of a lecturer, supervisor or tutor.

TQT is calculated at qualification level and not unit/component level.

Examples of unsupervised activities that could contribute to TQT include:

- Researching a topic and writing a report
- Watching an instructional online video at home/e-learning
- Watching a recorded webinar
- Compiling a portfolio in preparation for assessment
- Completing an unsupervised practical activity or work
- Rehearsing a presentation away from the classroom
- Practising skills unsupervised
- Requesting guidance via email – will not guarantee an immediate response.