

Level 2 Certificate, Extended Certificate and Diploma in Horticulture (0078-02)



Qualification handbook for centres
500/8577/3
500/8582/7
500/8576/1

www.cityandguilds.com
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Version 2.1

A large, stylized graphic of the word 'HORTICULTURE' in a bold, white, sans-serif font. The letters are set against a background of radiating yellow and gold lines, resembling a sunburst or a stylized plant. The text is centered and has a slight 3D effect with a dark shadow underneath.

HORTICULTURE

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Level 2 Certificate, Extended Certificate and Diploma in Horticulture (0078-02)

Qualification handbook for centres

Qualification title	Number	QAN
Level 2 Certificate in Horticulture	0078-02	500/8577/3
Level 2 Extended Certificate in Horticulture	0078-02	500/8582/7
Level 2 Diploma in Horticulture	0078-02	500/8576/1

Version and date	Change detail	Section
2.1 September 2017	Added GLH and TQT details Removed QCF	Error! Reference source not found. to the qualifications Summary of Units, qualification structure, unit 219, Appendix 2

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Unit 235	Maintain Sports Turf Surfaces - Association Football	255
Unit 236	Maintain Sports Turf Surfaces - Golf	262
Unit 237	Maintain Sports Turf Surfaces - Horseracing	269
Unit 238	Maintain Sports Turf Surfaces - Bowling Greens	276
Unit 239	Maintain Sports Turf Surfaces - Rugby Pitches	283
Unit 240	Maintain Sports Turf Surfaces - Tennis	290
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1 Introduction to the qualifications

This document contains the information that centres need to offer the following qualifications:

Qualification title and level	GLH	TQT	City & Guilds qualification number	Qualification accreditation number
Level 2 Certificate in Horticulture	90	150	0078-02	500/8577/3
Level 2 Extended Certificate in Horticulture	180	300	0078-02	500/8582/7
Level 2 Diploma in Horticulture	360	600	0078-02	500/8576/1

Qualification summary

Qualification title and level	Credits	Guided Learning Hours (GLH)
Level 2 Certificate in Horticulture	15	90
Level 2 Extended Certificate in Horticulture	30	180
Level 2 Diploma in Horticulture	60	360

These qualifications meet the needs of learners in a centre-based environment who may wish to work within the horticultural industry or progress to further learning and/or training. These qualifications allow learners to develop underpinning knowledge whilst practising skills that could be used within employment in the horticulture industry. These qualifications replace the Level 2 National Certificate in Horticulture (0345-21-24 & 42) which expired on 31 July 2010 (QAN 500/1111/3).

These qualifications were developed in association with Lantra SSC, Landex and the industry.

Specialist Learning (SL)

Specialist Learning (SL) offers young people the opportunity to study a particular topic in more depth or broaden their studies through complementary learning. The Level 2 Certificate and Extended Certificate in Horticulture have been approved as SL by the Environmental and Land-based Diploma DDP and Ofqual for the Higher Diploma in Environmental and Land-based Studies. They have been designed to:

- complement principal learning within the Higher Diploma in Environmental and Land-based Studies
- provide a broad background understanding of the Environmental and Land-based sector and an introduction to the practical skills and knowledge required
- provide an awareness of the range of jobs and work settings in the horticultural sector
- enable learners to make an informed assessment of their own aptitude for work in this sector and to make informed decisions about careers
- encourage learners to reach a level of knowledge and skills that will facilitate progress into further vocational learning or to potential employment in the sector
- introduce learners to the discipline of the working environment and to encourage mature attitudes to the community in general
- encourage learners to value continued learning and remain in the learning process
- allow learners to learn, develop and practise selected skills required for progression in the sector
- provide opportunities for progression to the Higher Diploma in Environmental and Land-based and other related qualifications in the sector.

1.1 Qualification structure

Level 2 Certificate

To achieve the **Level 2 Certificate in Horticulture**, learners are required to achieve 5 credits from the units in the Mandatory group and 10 credits from the units in the Optional group. A total of 15 credits are required to achieve the qualification.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Mandatory group				
T6009808	Unit 201	Understand the Basic Principles of Plant Science OR	5	
H6009819	Unit 202	Understand the Basic Principles of Soil Science OR	5	
D6009866	Unit 203	Setting out from a Plan	5	
Optional group				
T6009808	Unit 201	Understand the Basic Principles of Plant Science	5	
H6009819	Unit 202	Understand the Basic Principles of Soil Science	5	
D6009866	Unit 203	Setting Out from a Plan	5	
T6009968	Unit 205	Establish and Maintain Plants Outdoors	10	
Y6009977	Unit 218	Participate in Protected Horticultural Plant Production	10	
D6009978	Unit 219	Identification and Control of Plant Problems in the Land-based Sector	10	

T6009596	Unit 220	Introduction to Land-based Machinery Operations	10
A6009924	Unit 223	Introduction to Plant Nomenclature, Terminology and Identification	5
A6010023	Unit 224	Introduction to Plant Selection	5
Y6009865	Unit 229	Participate in Propagation Techniques	10
A6009972	Unit 242	Maintain Winter and Summer Sports Turf Surfaces	10

Level 2 Extended Certificate

To achieve the **Level 2 Extended Certificate in Horticulture**, learners are required to achieve 10 credits from the units in the Mandatory group and 20 credits from the units in the Optional group. A total of 30 credits are required to achieve the qualification.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Mandatory group				
T6009808	Unit 201	Understand the Basic Principles of Plant Science	5	
OR				
H6009819	Unit 202	Understand the Basic Principles of Soil Science	5	
OR				
D6009866	Unit 203	Setting out from a Plan	5	
Optional group				
T6009808	Unit 201	Understand the Basic Principles of Plant Science	5	
H6009819	Unit 202	Understand the Basic Principles of Soil Science	5	
D6009866	Unit 203	Setting Out from a Plan	5	
T6009968	Unit 205	Establish and Maintain Plants Outdoors	10	
Y6009932	Unit 206	Construct and Maintain Garden Fences	5	
H6009951	Unit 207	Construct Alpine and Water Features	5	
K6009952	Unit 208	Construct Garden Walls	5	

R6009959	Unit 209	Construct Landscape Foundations and Surfaces	10
D6009964	Unit 210	Introduction to the Cultivation of Decorative Plants by Organic Methods	5
K6009966	Unit 211	Contribute to Establishing and Maintaining Amenity Turf	10
A6009969	Unit 212	Contribute to Establishing and Maintaining Specialist Horticultural Features	10
Y6009364	Unit 213	Participate in Providing Estate Maintenance	10
F6009357	Unit 214	Environmental and Land-based Business	10
K6009983	Unit 215	Contribute to Fruit and Vegetable Cultivation	10
M6009984	Unit 216	Contribute to Fruit Production by Organic Methods	5
H6009979	Unit 217	Participate in Horticultural Crop Production Outdoors	10
Y6009977	Unit 218	Participate in Protected Horticultural Plant Production	10
D6009978	Unit 219	Identification and Control of Plant Problems in the Land-based Sector	10
T6009596	Unit 220	Introduction to Land-based Machinery Operations	10
K6009594	Unit 221	Introduction to the Principles of Land-based Machinery	5

L6009913	Unit 222	Undertake Nursery Stock Production	10
A6009924	Unit 223	Introduction to Plant Nomenclature, Terminology and Identification	5
A6010023	Unit 224	Introduction to Plant Selection	5
A6009356	Unit 225	Presentation and Service for Retailing in the Land-based Sector	10
Y6009851	Unit 227	Understand the Principles of Organic Horticulture	5
T6009856	Unit 228	Understand the Principles of Sustainability in Horticulture	5
Y6009865	Unit 229	Participate in Propagation Techniques	10
H6009884	Unit 230	Undertake Soil Management in Organic Horticulture	10
H6009903	Unit 231	Undertake Surveying and Site Appraisal	5
F6010024	Unit 232	Undertake Techniques in Organic Horticulture	10
D6009835	Unit 233	Tractor Driving	5
A6009972	Unit 242	Maintain Winter and Summer Sports Turf Surfaces	10
K6009854	Unit 243	Understand the Principles of Sports and Amenity Turf Maintenance	10

Y6009915	Unit 245	Contribute to Vegetable Production by Organic Methods	5
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Level 2 Diploma

To achieve the **Level 2 Diploma in Horticulture**, learners are required to achieve 20 credits from the units in the Mandatory group, 10 credits from the units in Optional group 1 and a further 30 credits from the units in Optional group 2. A total of 60 credits are required to achieve the qualification.

Unit accreditation number	City & Guilds unit number	Unit title	Credit value	Excluded combination of units (if any)
Mandatory group				
H6009335	Unit 204	Undertake Work Related Experience in the Land-based Industries	10	
T6009968	Unit 205	Establish and Maintain Plants Outdoors	10	
Optional group 1				
T6009808	Unit 201	Understand the Basic Principles of Plant Science	5	
OR				
H6009819	Unit 202	Understand the Basic Principles of Soil Science	5	
OR				
D6009866	Unit 203	Setting out From a Plan	5	
Optional Group 2				
T6009808	Unit 201	Understand the Basic Principles of Plant Science	5	
H6009819	Unit 202	Understand the Basic Principles of Soil Science	5	
D6009866	Unit 203	Setting Out From a Plan	5	
Y6009932	Unit 206	Construct and Maintain Garden Fences	5	
H6009951	Unit 207	Construct Alpine and Water Features	5	

K6009952	Unit 208	Construct Garden Walls	5
R6009959	Unit 209	Construct Landscape Foundations and Surfaces	10
D6009964	Unit 210	Introduction to the Cultivation of Decorative Plants by Organic Methods	5
K6009966	Unit 211	Contribute to Establishing and Maintaining Amenity Turf	10
A6009969	Unit 212	Contribute to Establishing and Maintaining Specialist Horticultural Features	10
Y6009364	Unit 213	Participate in Providing Estate Maintenance	10
F6009357	Unit 214	Environmental and Land-based Business	10
K6009983	Unit 215	Contribute to Fruit and Vegetable Cultivation	10
M6009984	Unit 216	Contribute to Fruit Production by Organic Methods	5
H6009979	Unit 217	Participate in Horticultural Crop Production Outdoors	10
Y6009977	Unit 218	Participate in Protected Horticultural Plant Production	10
D6009978	Unit 219	Identification and Control of Plant Problems in the Land-based Sector	10
T6009596	Unit 220	Introduction to Land-based Machinery Operations	10

K6009594	Unit 221	Introduction to the Principles of Land-based Machinery	5
L6009913	Unit 222	Undertake Nursery Stock Production	10
A6009924	Unit 223	Introduction to Plant Nomenclature, Terminology and Identification	5
A6010023	Unit 224	Introduction to Plant Selection	5
A6009356	Unit 225	Presentation and Service for Retailing in the Land-based Sector	10
L6009930	Unit 226	Understand the Principles of Garden History	10
Y6009851	Unit 227	Understand the Principles of Organic Horticulture	5
T6009856	Unit 228	Understand the Principles of Sustainability in Horticulture	5
Y6009865	Unit 229	Participate in Propagation Techniques	10
H6009884	Unit 230	Undertake Soil Management in Organic Horticulture	10
H6009903	Unit 231	Undertake Surveying and Site Appraisal	5
F6010024	Unit 232	Undertake Techniques in Organic Horticulture	10
D6009835	Unit 233	Tractor Driving	5
T6010022	Unit 234	Maintain Sports Turf Surfaces - Cricket	10

J6009957	Unit 235	Maintain Sports Turf Surfaces - Association Football	10
F6009956	Unit 236	Maintain Sports Turf Surfaces - Golf	10
L6009961	Unit 237	Maintain Sports Turf Surfaces - Horseracing	10
L6009958	Unit 238	Maintain Sports Turf Surfaces - Bowling Greens	10
Y6009963	Unit 239	Maintain Sports Turf Surfaces- Rugby Pitches	10
H6009965	Unit 240	Maintain Sports Turf Surfaces - Tennis	10
M6009967	Unit 241	Maintain Turf in Amenity Horticulture	10
A6009972	Unit 242	Maintain Winter and Summer Sports Turf Surfaces	10
K6009854	Unit 243	Understand the Principles of Sports and Amenity Turf Maintenance	10
M6009953	Unit 244	Maintain and Renovate Artificial Sports Surfaces	10
Y6009915	Unit 245	Contribute to Vegetable Production by Organic Methods	5

Total Qualification Time

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a Learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and assessment.

Title and level	GLH	TQT
Level 2 Certificate in Horticulture	90	150
Level 2 Extended Certificate in Horticulture	180	300
Level 2 Diploma in Horticulture	360	600

1.2 Opportunities for progression

On completion of these qualifications learners may progress into employment or to the following City & Guilds qualifications:

- Level 3 Certificate, Subsidiary Diploma, Diploma and Extended Diploma in Horticulture

1.3 Qualification support materials

City & Guilds also provides the following publications and resources specifically for these qualifications:

Description	How to access
Assignment guide	www.cityandguilds.com
Marking guide	information@cityandguilds.com
Information Sheets	www.cityandguilds.com
Fast track approval forms/generic fast track approval form	www.cityandguilds.com

2 Centre requirements

This section outlines the approval processes for Centres to offer these qualifications and any resources that Centres will need in place to offer the qualifications including qualification-specific requirements for Centre staff.

Centres already offering the Level 2 National Certificate in Horticulture (0345)

Centres approved to offer the Level 2 National Certificate in Horticulture (0345-21-24 & 42) may apply for approval for the new Level 2 Certificate, Extended Certificate and Diploma in Horticulture (0078-02)] using the **fast track approval form**, available from the City & Guilds website.

Centres may apply to offer the new qualifications using the fast track form

- providing there have been no changes to the way the qualifications are delivered, and
- if they meet all of the approval criteria specified in the fast track form guidance notes.

Fast track approval is available for 12 months from the launch of the qualification. After this time, the qualification is subject to the **standard** Qualification Approval Process. It is the centre's responsibility to check that fast track approval is still current at the time of application.

New centres must apply for centre and qualification approval. Further information on this process is available on the City & guilds website.

Existing City & Guilds centres that do not offer Level 2 National Certificate in Horticulture (0345-21-24 & 42) will need to get specific qualification approval to run these qualifications (contact your City & Guilds Local Office).

2.1 Resource requirements

Human resources

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be technically competent in the area(s) for which they are delivering training and/or have experience of providing training. This knowledge must be at least to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- be occupationally knowledgeable in the area(s) of horticulture for which they are delivering training. This knowledge must be at least to the same level as the training being delivered
- have credible experience of providing training.

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but must never internally verify their own assessments.

Assessors and internal verifiers

The centre must provide Assessor personnel who must be occupationally competent in the industry either qualified to at least level 2 and/or have current experience of working in the industry at this level.

The centre must provide Internal Quality Assurance personnel who must be occupationally competent in the land-based sector either qualified to at least level 2 and/or have current experience of working in the industry at this level.

Assessors/Internal Quality Assurance personnel may hold relevant qualifications such as D32/33/34 or A1/V1 or TAQA however they are not a mandatory requirement for this qualification. They should have had formal training in assessment/IQA, which may be the qualifications above, or other training that allows the assessor to demonstrate competence in the practice of assessment/IQA. This training may be carried out in-house or with an external agency.

TAQA qualifications are considered very appropriate as Continuing Professional Development (CPD) or as best practice standards for new centre staff to work towards.

Continuing professional development (CPD)

Centres are expected to support their staff in ensuring that their knowledge remains current of the occupational area and of best practice in delivery, mentoring, training, assessment and verification, and that it takes account of any national or legislative developments.

2.2 Learner entry requirements

There are no formal entry requirements for learners undertaking these qualifications. However, centres must ensure that learners have the potential and opportunity to gain the qualifications successfully.

As part of the assessment for the Level 2 Diploma qualification, learners must have access to a work setting/placement.

2.3 Age restrictions

These qualifications have been approved and accredited for pre-16, 16 – 18, 18 + and 19 + learners. However, there are no age limits attached to learners undertaking the qualification unless this is a legal requirement of the process or the environment.

3 Course design and delivery

3.1 Initial assessment and induction

Centres will need to make an initial assessment of each learner prior to the start of their programme to ensure they are entered for an appropriate type and level of qualification.

The initial assessment should identify:

- any specific training needs the learner has, and the support and guidance they may require when working towards their qualifications. This is sometimes referred to as diagnostic testing.
- any units the learner has already completed, or credit they have accumulated which is relevant to the qualifications they are about to begin.

City & Guilds recommends that centres provide an induction programme to ensure the learner fully understands the requirements of the qualifications they will work towards, their responsibilities as a learner, and the responsibilities of the centre. It may be helpful to record the information on a learning contract.

3.2 Recommended delivery strategies

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Centres may design course programmes of study in any way which:

- best meets the needs and capabilities of their learners
- satisfies the requirements of the qualifications.

When designing and delivering the course programme, centres might wish to incorporate other teaching and learning that is not assessed as part of the qualifications. This might include the following:

- Functional Skills
- Personal learning and thinking (PLTS)

Where applicable, this could involve enabling the learner to access relevant qualifications covering these skills.

4 Assessment

4.1 Summary of assessment methods

For these qualifications, learners will be required to complete the following assessments:

- **one** assignment for **each** unit

City & Guilds provides the following assessments:

- Assignment guide containing assignments for each unit

Time constraints

The following time constraints must be applied to the assessment of these qualifications:

- All assignments must be completed and assessed within the learner's period of registration. Centres should advise learners of any internal timescales for the completion and marking of individual assignments.

4.2 Assignments

The assignment guide for these qualifications is available to download from www.cityandguilds.com.

4.3 Recognition of prior learning (RPL)

Recognition of Prior Learning (RPL) recognises the contribution a person's previous experience could contribute to a qualification. RPL is allowed and is also sector specific.

4.4 Resubmission of Assignments

Centres are advised to adopt the following policy on the re-submission of work:

Learners who fail an assignment on the formal (summative) submission, or who would like the opportunity to improve their grade, may re-submit once only and may then achieve either a Pass, Merit or Distinction as appropriate. An appropriate time period between formal submission and re-submission should be set by the centre. Multiple re-submissions are not permitted. Learners who fail to hand in work on the formal submission date, where there is no legitimate reason, should be capped to a maximum of a Pass grade only at the re-submission stage. It is at the discretion of the centre to set informal (formative) submission dates, if appropriate, and a formal submission date.

5 Units

Summary of units

City & Guilds unit number	Title	Unit number	Credits
201	Understand the Basic Principles of Plant Science	T6009808	5
202	Understand the Basic Principles of Soil Science	H6009819	5
203	Setting Out from a Plan	D6009866	5
204	Undertake Work Related Experience in the Land-based Industries	H6009335	10
205	Establish and Maintain Plants Outdoors	T6009968	10
206	Construct and Maintain Garden Fences	Y6009932	5
207	Construct Alpine and Water Features	H6009951	5
208	Construct Garden Walls	K6009952	5
209	Construct Landscape Foundations and Surfaces	R6009959	10
210	Introduction to the Cultivation of Decorative Plants by Organic Methods	D6009964	5
211	Contribute to Establishing and Maintaining Amenity Turf	K6009966	10
212	Contribute to Establishing and Maintaining Specialist Horticultural Features	A6009969	10
213	Participate in Providing Estate Maintenance	Y6009364	10
214	Environmental and Land-based Business	F6009357	10
215	Contribute to Fruit and Vegetable Cultivation	K6009983	10
216	Contribute to Fruit Production by Organic Methods	M6009984	5
217	Participate in Horticultural Crop Production Outdoors	H6009979	10
218	Participate in Protected Horticultural Plant Production	Y6009977	10
219	Identification and Control of Plant Problems in the Land-based Sector	D6009978	10
220	Introduction to Land-based Machinery Operations	T6009596	10
221	Introduction to the Principles of Land-based Machinery	K6009594	5
222	Undertake Nursery Stock Production	L6009913	10
223	Introduction to Plant Nomenclature, Terminology and Identification	A6009924	5
224	Introduction to Plant Selection	A6010023	5
225	Presentation and Service for Retailing in the Land-based Sector	A6009356	10
226	Understand the Principles of Garden History	L6009930	10
227	Understand the Principles of Organic Horticulture	Y6009851	5

228	Understand the Principles of Sustainability in Horticulture	T6009856	5
229	Participate in Propagation Techniques	Y6009865	10
230	Undertake Soil Management in Organic Horticulture	H6009884	10
231	Undertake Surveying and Site Appraisal	H6009903	5
232	Undertake Techniques in Organic Horticulture	F6010024	10
233	Tractor Driving	D6009835	5
234	Maintain Sports Turf Surfaces - Cricket	T6010022	10
235	Maintain Sports Turf Surfaces - Association Football	J6009957	10
236	Maintain Sports Turf Surfaces - Golf	F6009956	10
237	Maintain Sports Turf Surfaces - Horseracing	L6009961	10
238	Maintain Sports Turf Surfaces - Bowling Greens	L6009958	10
239	Maintain Sports Turf Surfaces - Rugby Pitches	Y6009963	10
240	Maintain Sports Turf Surfaces - Tennis	H6009965	10
241	Maintain Turf in Amenity Horticulture	M6009967	10
242	Maintain Winter and Summer Sports Turf Surfaces	A6009972	10
243	Understand the Principles of Sports and Amenity Turf Maintenance	K6009854	10
244	Maintain and Renovate Artificial Sports Surfaces	M6009953	10
245	Contribute to Vegetable Production by Organic Methods	Y6009915	5

Certification/grading modules

City & Guilds unit number	Title
901	Certification module for Level 2 Certificate in Horticulture - pass grade
902	Certification module for Level 2 Certificate in Horticulture - merit grade
903	Certification module for Level 2 Certificate in Horticulture - distinction grade
904	Certification module for Level 2 Extended Certificate in Horticulture - pass grade
905	Certification module for Level 2 Extended Certificate in Horticulture - merit grade
906	Certification module for Level 2 Extended Certificate in Horticulture - distinction grade
907	Certification module for Level 2 Diploma in Horticulture - pass grade
908	Certification module for Level 2 Diploma in Horticulture - merit grade
909	Certification module for Level 2 Diploma in Horticulture - distinction grade
943	Certification module for Level 2 Certificate in Horticulture – distinction* grade
944	Certification module for Level 2 Extended Certificate in Horticulture – distinction* grade
945	Certification module for Level 2 Diploma in Horticulture – distinction* grade

6 Registration and Certification

The Level 2 Certificate, Extended Certificate and Diploma in Horticulture qualifications have been grouped into one programme for registration.

Tutors and Examination Officers should ensure that learners are registered onto 0078-02 and that all 0078-02 documentation for teaching and administration with City & Guilds is used.

When learners' results are submitted to City & Guilds, centres should also submit the relevant Certificate, Extended Certificate and Diploma component, according to which units the learner has achieved, so that the appropriate certificate is generated. The overall grade can be calculated using the formula in the assignment guide.

Please note: There are three certification/grading modules for each of the qualifications which differentiates the three grades – pass, merit and distinction. Once the overall grade for the assignments has been calculated, the correct certification/grading module needs to be indicated on the results entry.

For example, if a learner achieves the Level 2 Certificate in Horticulture at an overall merit grade, then the certification module 902 needs to be submitted. Please see the Rules of Combination below or the City & Guilds catalogue.

Level 2 Certificate in Horticulture QAN 500/8577/3	
Rules for achievement of qualification	5 credits from (201 OR 202 OR 203), plus a minimum of 10 credits from (201 –203), 205, (218 – 220), (223 – 224), 229, 242 Plus 901 for certification at pass grade

Level 2 Certificate in Horticulture QAN 500/8577/3	
Rules for achievement of qualification	5 credits from (201 OR 202 OR 203), plus a minimum of 10 credits from (201 –203), 205, (218 – 220), (223 – 224), 229, 242 Plus 902 for certification at merit grade

Level 2 Certificate in Horticulture QAN 500/8577/3	
Rules for achievement of qualification	5 credits from (201 OR 202 OR 203), plus a minimum of 10 credits from (201 –203), 205, (218 – 220), (223 – 224), 229, 242 Plus 903 for certification at distinction grade

Level 2 Certificate in Horticulture QAN 500/8577/3	
Rules for achievement of qualification	5 credits from (201 OR 202 OR 203), plus a minimum of 10 credits from (201 –203), 205, (218 – 220), (223 – 224), 229, 242 Plus 943 for certification at distinction* grade

Level 2 Extended Certificate in Horticulture QAN 500/8582/7	
Rules for achievement of qualification	10 credits from (201 – 203), plus a minimum of 20 credits from (201 – 203), (205 – 225), (227 – 233), (242 – 243), 245 Plus 904 for certification at pass grade

Level 2 Extended Certificate in Horticulture QAN 500/8582/7	
Rules for achievement of qualification	10 credits from (201 – 203), plus a minimum of 20 credits from (201 – 203), (205 – 225), (227 – 233), (242 – 243), 245 Plus 905 for certification at merit grade

Level 2 Extended Certificate in Horticulture QAN 500/8582/7	
Rules for achievement of qualification	10 credits from (201 – 203), plus a minimum of 20 credits from (201 – 203), (205 – 225), (227 – 233), (242 – 243), 245 Plus 906 for certification at distinction grade

Level 2 Extended Certificate in Horticulture QAN 500/8582/7	
Rules for achievement of qualification	10 credits from (201 – 203), plus a minimum of 20 credits from (201 – 203), (205 – 225), (227 – 233), (242 – 243), 245 Plus 944 for certification at distinction* grade

Level 2 Diploma in Horticulture QAN 500/8576/1	
Rules for achievement of qualification	10 credits from (201 – 203), plus 20 credits from (204 – 205), plus a minimum of 30 credits from (201 – 203), (206 – 245) Plus 907 for certification at pass grade

Level 2 Diploma in Horticulture QAN 500/8576/1	
Rules for achievement of qualification	10 credits from (201 – 203), plus 20 credits from (204 – 205), plus a minimum of 30 credits from (201 – 203), (206 – 245) Plus 908 for certification at merit grade

Level 2 Diploma in Horticulture QAN 500/8576/1	
Rules for achievement of qualification	10 credits from (201 – 203), plus 20 credits from (204 – 205), plus a minimum of 30 credits from (201 – 203), (206 – 245) Plus 909 for certification at distinction grade

Level 2 Diploma in Horticulture QAN 500/8576/1	
Rules for achievement of qualification	10 credits from (201 – 203), plus 20 credits from (204 – 205), plus a minimum of 30 credits from (201 – 203), (206 – 245) Plus 945 for certification at distinction* grade

- Learners must be registered at the beginning of their course. Centres should submit registrations using Walled Garden or Form S (Registration), under scheme/complex 0078-02.
- When assignments have been successfully completed results should be submitted on Walled Garden or Form S (Results submission). One of the certification/grading modules 901 to 909 or 943 to 945 need to be submitted to generate the appropriate certificate and grade. Centres should note that results will not be processed by City & Guilds until verification records are complete
- Learners achieving one or more assessment components will receive a Certificate of Unit Credit listing the assessment components achieved. Learners achieving the number and combination of assessment components required to meet a defined Rule of Combination will, in addition, be issued with a certificate. Centres must submit a certification/grading component to allow this to happen.

Full details on the procedures for all City & Guilds qualifications registered and certificated through City & Guilds can be found on the City & Guilds on-line catalogue.

Unit 201

Understand the Basic Principles of Plant Science

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the basic principles of plant science. It is unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop knowledge relating to the structure of plants by identifying their external features, develop an understanding of how plants function. They will also develop an understanding of the development and physiology of plants, inclusive of growth and development, plant processes, reproduction, life cycles and stages.

Learning outcomes

There are **two** learning outcomes to this unit. The learner will:

1. Know the physical structure of plants
2. Understand the development and physiology of plants

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 201

Understand the Basic Principles of Plant Science

Outcome 1

Know the physical structure of plants

Assessment Criteria

The learner can:

1. Identify the **organs of plants**
2. Describe the main **tissues of plants**
3. Identify the **functions of** leaves, stems, roots and flowers

Unit content

Organs of plants

Roots (fibrous, tap and tuberous), leaves (petiole, lamina, midrib, veins), cotyledons, stems (woody and non-woody), buds, flowers (petals, sepals, anthers, filament, style, stigma, ovary, bract)

Tissues of plants

Main tissues of stems, roots and leaves, inclusive of cell structure, vascular tissues, xylem, phloem and cambium, root hairs: stomata and guard cells, cuticle, epidermis and endodermis

Functions

Leaves: produce food by photosynthesis, carry out transpiration, natural vegetative reproduction i.e. foliar embryos

Stems: provide support for the leaves, flowers and fruit, provide a transport system around the plant for water, nutrients and food, on occasions have a climbing and protective function

Roots: anchor the plant in the soil, absorb water and nutrients from the soil, food storage and reproduction

Flowers: pollination, fertilisation and seed and fruit formation

Unit 201

Outcome 2

Understand the Basic Principles of Plant Science

Understand the development and physiology of plants

Assessment Criteria

The learner can:

1. Summarise the **processes involved in growth and development**
2. Summarise the **processes involved in plant reproduction**
3. Define the terms **ephemeral, annual, biennial, perennial** as they relate to plant life cycles
4. Describe the characteristics of **stages of plant growth**

Unit content

Processes involved in growth and development

Photosynthesis, respiration, osmosis, transpiration and translocation: definitions and descriptions/ use simple formulae, tropisms, environmental factors affecting each process, including light, dark, water, temperature, nutrient, carbon dioxide and oxygen

Processes involved in plant reproduction

Sexual reproduction (pollination, fertilisation) stages of seed germination and types (epigeal and hypogeal), environmental requirements for successful germination (moisture, warmth etc), asexual reproduction by natural vegetative means e.g. corms, bulbs, tubers and stolons

Ephemeral, annual, biennial, perennial

Definition as they relate to plant life cycles

Stages of plant growth

Juvenile, adult, senescent

Unit 201 Understand the Basic Principles of Plant Science

Notes for guidance

The learner will be able to develop the knowledge required to understand how plants function, reproduce, grow and develop. The unit presents an opportunity for learners to consider factors which influence plant production and growth and provides supporting knowledge, understanding and decision making skills necessary for units/subjects associated with propagation, crop production, planting and aftercare.

In Outcome 1, learners develop knowledge of plant structures. They should be able to describe the external structure of plants and the function of tissues within the plant. Though not essential, it would be helpful to introduce them to the internal structure of plants in the laboratory.

In Outcome 2, learners will develop knowledge of the physiological processes that take place in the plant, including photosynthesis, respiration, osmosis, transpiration and translocation. They should appreciate the effects of environmental factors on each of these, both in terms of excesses and deficiencies and then be able to apply this knowledge to horticultural situations, including propagating plants by seed and vegetative means, growing on, planting, weed control and harvesting.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, experimentation, investigations using microscope slides and sections, discussions, video, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible and every opportunity should be taken to show how the knowledge acquired in this unit may be applied to practical horticultural tasks. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

- Adams CR. 2008. *Principles of Horticulture*. Oxford: Butterworth-Heinemann ISBN: 9-780-75068-694-5.
- Brown L. 2002. *Applied Principles of Horticultural Science*. 2nd ed. Oxford: Butterworth-Heinemann. ISBN: 9-780-75068-702-7.
- Dawson P. 2006. *A Handbook for Horticultural Students*. Rushden: Dawson. ISBN: 0-9525911-11.
- Ingram DS, et al. 2008. *Science and the Garden: the scientific basis of horticulture practice*. 2nd ed. Sussex: Wiley Publishing. ISBN-13: 978-1-4051-6063-6
- Roberts M. 1986. *Biology, a functional approach fourth edition*. 4th ed. Cheltenham: Nelson Thornes.
- Salisbury FB and Ross C. 1991. *Plant physiology*. 4th ed. Florence: Brooks Cole.
- Dutta A C. 1997. *Botany for Degree Students*. 6th ed. New Delhi: OUP India

Unit 202

Understand the Basic Principles of Soil Science

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the basic principles of soil science. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the knowledge required to understand the physical and chemical properties of soils and relate this to the growth of plants in the wild and in cultivation. They will also develop the skills to assess soils in order to inform soil management decisions, including the selection of appropriate fertilisers in order to encourage the desired plant growth.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Be able to assess the physical and chemical characteristics of soils
2. Understand the physical properties of soils
3. Understand the chemical properties of soils and fertilisers

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

There are no relevant NOS for this unit

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 202

Outcome 1

Understand the Basic Principles of Soil Science

Be able to assess the physical and chemical characteristics of soils

Assessment Criteria

The learner can:

1. Identify the **horizons in a soil profile**
2. Analyse samples of soil to determine:
 - **textural class**
 - **pH**

Unit content

Horizons in a soil profile

Organic layer, top-soil, sub-soil, parent material

O - organic layer, A - topsoil, B - subsoil, C – (parent material) bedrock, winter water table, drainage characteristics

Soil profile pit, extending to sufficient depth to expose soil profiles O, A, B, and C

Textural class

Components of soils, clay, silt, sand, loam; use of field and laboratory textural analysis methods

pH

Soils: neutral, acid, alkali

Collection and preparation of samples: testing with a colorimetric testing kit to determine relative alkalinity/acidity

Unit 202

Outcome 2

Understand the Basic Principles of Soil Science

Understand the chemical properties of soils and fertilisers

Assessment Criteria

The learner can:

1. Describe the **formation, characteristics, texture and component parts of soils**
2. Explain how soil structure and the balance of soil air and water affect the **growth of plants**
3. Explain **factors relating to soil water**; sources, availability, effects on various soil types and terms associated with the water balance
4. Explain how organic matter and soil organisms contribute to **soil structure and fertility**

Unit content

Formation

Weathering agents, transporting agent, parent material, bedrock

Definition of soil structure and soil texture

Characteristics, texture and component parts of soils

Sandy, loam, clay and organic soils

Components: sand, gravel, loam, clay, organic matter, soil organisms, air and water, importance of air in the soil, contribution of soil organisms to fertility

Growth of plants

Individual components of soils, anchorage, balance and availability of soil air, water and nutrients, drainage, soil temperature, compaction/aeration, workability of soils

Factors relating to soil water

Sources, availability, effects on various soil types and terms associated with the water balance

Definition of: saturation, soil moisture deficit, permanent wilting point, available and unavailable water, field capacity, capillary, gravitational water, water table, drainage and irrigation

Water-holding capacity of sands, silts, clays and organic soil

Soil structure and fertility

Organic matter/humus content, amount of decay, diversity and quantity of soil organisms (invertebrates, vertebrates, fungi, bacteria), contributions made by each

Unit 202

Outcome 3

Understand the Basic Principles of Soil Science

Understand the chemical properties of soils and fertilisers

Assessment Criteria

The learner can:

1. State the **nutrient** requirements of plants and their individual effects on growth:
 - **Micro-nutrients**
 - **Macro-nutrients**
2. State the typical symptoms of nutrient deficiencies in plants:
 - **Micro-nutrients**
 - **Macro-nutrients**
3. Explain **how pH affects plant growth** and methods of adjusting the pH to meet specific requirements
4. Explain the principles of cation and anion **exchange capacity** in the soil and their relationship to texture and organic matter
5. Explain the **categories** and terminology **used to describe fertilisers**
6. **Define the terms** Plant Nutrient Ratio and Nutrient Weight Analysis.

Unit content

Nutrient

Nitrogen, phosphorus and potassium, requirements for growth and photosynthesis, growth stage requirements, availability, uptake and interaction

Micro-nutrients

Functions of : Copper, Sodium, Zinc, Iron, Boron, Manganese, Molybdenum

Main fertilisers and their nutrient content relating to a specific sector of horticulture

Macro-nutrients

Functions of primary (Nitrogen, Phosphorus, Potassium) and secondary (Magnesium, Calcium, Sulphur)

Main fertilisers and their nutrient content relating to a specific sector of horticulture

How pH affects plant growth

Availability of nutrients, specific nutritional disorders related to pH, calcicole and calcifuge, lowering and raising the pH, relationship between plant nutrition and development

Exchange capacity

Cation (positive charged ion), anion (negatively charge ion), nutrient/chemical reactions

Exchange of cations held by soil, effect on nutrient uptake, soils capacity to hold nutrients, Cation Exchange Capacity (CEC) determined by amount of clay/humus a soil contains, a measure of soils fertility, role of soil water, texture, organic matter, content of soils

Categories used to describe fertilisers

Straight, mixture, compound, complete, inorganic, organic, controlled release, granules, liquid, solid, prill, pelleted

Define the terms

Plant Nutrient Ratio and Nutrient Weight Analysis, nutrient content of packaged fertilisers

Nutrient balance, competition between nutrients for uptake, nutrient content/quantities of feeds/fertilisers

Unit 202 Understand the Basic Principles of Soil Science

Notes for guidance

The learner will be able to develop the knowledge required to understand the physical and chemical properties of soils and relate this to the growth of plants in the wild and in cultivation. They will also develop the skills to assess soils in order to inform soil management decisions.

In Outcome 1, learners will develop skills in assessing the physical and chemical properties of soils. They will require access to suitable laboratory facilities for this. Laboratory and field methods should be practised, including collection of soil samples, soil textural analysis in the hand by the 'feel method' (range to include sand, silt, clay and loam) and pH determination using the colorimetric method. Learners will be required to dig a soil profile pit, record and examine the four main horizons and characteristics of the soil.

In Outcome 2, learners will develop an understanding of the physical aspects of soils, including soil formation, soil constituents, texture and structure, pore space, soil water and soil air and factors affecting the health of the plant, including how organic matter and soil organisms contribute to soil structure and fertility. Learners will be required to explain how the structure of a given soil, including its balance of air, water, organic matter, organisms and nutrient availability may affect the growth of plants.

In Outcome 3, learners will further develop their understanding of the chemical aspects of soils, including being able to name the main macronutrients and micronutrients and their individual effects on plant growth. Learners will be able to explain the basic principles of cation and anion exchange, relating that knowledge to the plants potential for growth and development. They will know how the pH of a soil or growing media affects plant growth, including nutritional disorders and the categorisation of plants into the calcifuges and calcicole groups. Knowledge of the categories to describe fertilisers will enhance the learner's ability to select the appropriate feed and method of application. The ability to interpret nutrient content of packaged fertilisers will assist the learner in making informed decisions regarding choice of feeds to encourage desired plant growth.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, experimentation, investigations using microscope slides and sections, discussions, video, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible and every opportunity should be taken to show how the knowledge acquired in this unit may be applied to practical horticultural tasks. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

- Adams CR. 2008. *Principles of Horticulture*. Oxford: Butterworth-Heinemann ISBN: 9-780-75068-694-5.
- Brown L. 2002. *Applied Principles of Horticultural Science*. 2nd ed. Oxford: Butterworth-Heinemann. ISBN: 9-780-75068-702-7.
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- Ellis S and Mellor A. 1995. *Soils and Environment*. Oxon: Routledge. ISBN 0-415-06887-8(hbk) or ISBN 0-415-06888-6 (pbk)
- Ingram DS, et al. 2008. *Science and the Garden: the scientific basis of horticulture practice*. 2nd ed. Sussex: Wiley Publishing. ISBN-13: 978-1-4051-6063-6
- Roberts M. 1986. *Biology, a functional approach fourth edition*. 4th ed. Cheltenham: Nelson Thornes.
- Salisbury FB and Ross C. 1991. *Plant physiology*. 4th ed. Florence: Brooks Cole.

Stamp D. 2008. *Britain's Structure and Scenery*. Hammersmith: Harper Collins.

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of setting out from a plan, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop the skills and knowledge to transfer information from a scale plan onto the ground. They will be able to set out lines, shapes, levels and mark the position for plants and features. They will understand alternative methods for marking out and levelling.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Be able to transfer information from plans to the ground
2. Be able to prepare sites for landscaping
3. Understand the setting out of lines, shapes and levels from scale plans

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

There are no relevant NOS for this unit

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 203

Setting Out from a Plan

Outcome 1

Be able to transfer information from plans to the ground

Assessment Criteria

The learner can:

1. Transfer **dimensions** accurately from scale plans onto the ground, using triangulation, running lines and offsets
2. Set out **geometric shapes** on the ground from scaled plans, to include rectangles, circles, hexagons, and ellipses
3. Set out **irregular shapes** on the ground from plans
4. **Mark out the positions** of plants and features from a plan.

Unit content

Dimensions

Interpret plan(s), accurate boundary dimensions and shapes are to be marked out

Mark out straight lines, curves and irregular shapes, triangulation, running lines and offsets to be used, requires the use of right angles

The plans must be correctly orientated working from an appropriate base line on the plan

Geometric shapes

Interpret plan(s), construct a right angle by intersecting arcs and by Pythagoras' theorem (3, 4, 5 triangle) and mark out rectangles, circles, hexagons, and ellipses on the ground

Irregular shapes

Interpret plan(s), set out irregular shapes working from a plan, ensure correct dimensions and orientation

Mark out the positions

This will include the exact positions of all plants, structures (e.g. sheds, glasshouses), features (e.g. paths, steps, benches, pergolas)

Unit 203

Setting Out from a Plan

Outcome 2

Be able to prepare sites for landscaping

Assessment Criteria

The learner can:

1. Set out and establish **level rectangular areas**
2. Set out **falls** and rises along a line
3. Set out a **rectangular area to a fall**

Unit content

Level rectangular areas

Ensure specified orientation, mark out, set base line, construct a right angle by intersecting arcs and/or by Pythagoras' theorem (3, 4, 5 triangle), set out rectangle accurately to given dimensions identify datum point, establish level

Fall

Ensure specified orientation, set out line to given length, establish level(s) to given parameters

Rectangular area to a fall

Ensure specified orientation, mark out, set base line, construct a right angle by intersecting arcs and/or by Pythagoras' theorem (3, 4, 5 triangle), set out rectangle accurately to given dimensions, identify datum point, establish fall to given parameters

Unit 203

Outcome 3

Setting Out from a Plan

Understand the setting out of lines, shapes and levels from scale plans

Assessment Criteria

The learner can:

1. Describe methods of **marking lines and curves** onto the ground

Unit content

Marking lines and curves

Methods for short-term and longer-term needs

Straight lines can be made by tapes, lines, ranging poles/rods, bamboo canes or marked with sand, spray marker/paint

Curves and irregular shapes can be marked on the ground initially with a spade and V drill or hose pipe/rope but sand will give a longer lasting mark

Pegs can be used for straight lines and curves but must be clearly identifiable and securely fixed.

The position of plants can be marked with canes and labels

Unit 203

Setting Out from a Plan

Notes for guidance

This unit will enable the learner develop the skills and knowledge to prepare a landscape site for planting or landscape construction. Correct measurements and setting out are essential to effective work in the landscape and horticulture industries.

Outcome 1 covers the ability to be able to transfer information from plans to the ground, inclusive of the ability to interpret plans and transfer dimensions accurately from those plans, using various methods i.e. triangulation, running lines and right angled offsets. The learners will also need to set out geometric shapes on the ground from supplied plans, this must include (but does not have to be restricted too); rectangles, circles, hexagons and ellipses. The learner must also demonstrate the ability to set out irregular shapes on the ground and mark the positions of plants and features from a given plan. Resources required may include plan drawing(s), scale rule, garden lines/twine, tape measure(s), chain line, 3' bamboo canes, ranging rods/poles, sand and spray markers.

In Outcome 2 the learners must demonstrate their ability to prepare sites for landscaping, inclusive of being able to set out level rectangular sites, set out falls and rises along a line, together with setting out a rectangular area to a fall.

Level rectangular areas: a minimum area of 9 square metres should be set out in a grid and the level established from a datum. A variety of equipment maybe used, such as a laser level, straight edge and spirit level, boning rods. Learners should be familiar with different methods. For a fall, learners should be able to produce an even gradient over a linear distance of at least 8 metres, working from a datum. They should work from a datum to be able to calculate the overall fall or intermediate fall depending on the method used. For a rectangular area to a fall an accurate rectangle is to be set out from a datum, with an even gradient along one axis and level along the other.

Outcome 3 covers the understanding of the techniques used for setting out of lines, shapes and levels from scale plans. The learner must be able to interpret plans and describe identified conventional methods of marking lines and curves on the ground, together with demonstrating an ability to evaluate the uses, benefits and limitations of different types of levelling equipment for specified situations. This can only be feasibly accomplished if the learner has the opportunity to actually use the equipment, so they may base their evaluations on actual experience of use.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. In particular, this unit links with 'Undertake surveying and site appraisal' and 'Construct landscape foundations and surfaces'. All methods should reinforce the importance of health and safety and environmental issues.

Learners should have access to a range of measuring and levelling equipment. Equipment could include a spirit level, boning rods (possibly a laser level), tape measure(s), chain line, line(s), 3' bamboo canes or ranging rods/poles.

Many of the tasks involved in setting out, levelling and establishing falls are accomplished more efficiently in pairs or small groups, depending on the equipment being used. Safe working practices should be adopted for all activities, with a site specific assessment carried out and environmental damage kept to a minimum. Tutors must ensure that tasks are rotated so that all learners develop the skills and knowledge required.

References

Books

Brickell C. 2002. *The RHS Encyclopaedia of Gardening*. 2nd ed. Surrey: Dorling Kindersley Publishers.

Unit 204

Undertake Work Related Experience in the Land-based Industries

Level: 2

Credit value: 10

Unit aim

The aim of this unit is to give learners the skills needed to identify, participate in and review work experience in a land-based environment. The unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know the range and scope of job roles within an environmental and land-based industry
2. Be able to use relevant documents and skills relating to work experience
3. Be able to plan and review self development during work experience
4. Be able to report on the work experience

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 204

Undertake Work Related Experience in the Land-based Industries

Outcome 1

Know the range and scope of job roles within an environmental and land-based industry

Assessment Criteria

The learner can:

1. Describe different **types of jobs** within an environmental and land-based industry
2. Describe the **skills and qualifications** required for different types of jobs within an environmental and land-based industry

Unit content

Types of jobs

Types of jobs relevant to the industry: managerial, supervisory, team worker, trainee, volunteer, common job titles within the relevant industry, main duties and responsibilities

Skills needed to fulfil duties and responsibilities of appropriate jobs: job specific, vocational and personal

Skills and qualifications

Types of qualifications available to the industry, e.g. GCSE and A level, the Diploma (including Functional Skills), Apprenticeships (including Work-based Learning qualifications), Foundation Learning (Entry Level and Level 1), standalone/industry specific vocational, e.g. Centre-based (City & Guilds, Edexcel and others), practical competence based e.g. Certificates of Competence, other

Progression pathways from trainee or team worker positions to supervisory and management posts. Skills, qualifications and experience required to achieve career progression

Evaluate career and progression opportunities: advantages and disadvantages of identified pathways, suitability to personal interests, skills and qualifications, role of work experience in preparing for a selected career

Skills valued by employers: commitment and reliability, time management, people skills, confidentiality and discretion

Unit 204

Undertake Work Related Experience in the Land-based Industries

Outcome 2

Be able to use relevant documents and skills relating to work experience

Assessment Criteria

The learner can:

1. Locate three advertisements for jobs from **different sources** available within the environmental and land-based industry
2. Produce an **application** for work experience in the environmental and land-based sector
3. **Prepare for an interview** for work experience
4. **Undertake an interview** for work experience

Unit content

Different sources

Locate three advertisements from for example trade magazines, websites, employer approaches to the centre, local paper, Countryside Jobs Service

Application

Suitable work experience position based on existing skills, experience, qualifications, development of skills and experience to achieve future employment goals
Personal details, education and training, professional membership, training, employment history, qualifications held, skills and general information, declarations

Prepare for an interview

Interview preparation: research the business and job role, suitable dress and personal presentation, information to find out and suitable questions to ask

Undertake an interview

Interview performance: attend punctually and dressed appropriately, answering questions, completion of other tests (e.g. practical, aptitude), and reflection on interview performance

Unit 204

Undertake Work Related Experience in the Land-based Industries

Outcome 3

Be able to plan and review self development during work experience

Assessment Criteria

The learner can:

1. **Review own skills and experience** against the requirements for a specific industry
2. Prepare a **self development plan** for work experience
3. **Review** self development plan during and after work experience

Unit content

Review own skills and experience

Current skills and experience compared with those required for the job, identify training and development needs

Self development plan

New skills, knowledge, understanding, experience, development of existing knowledge and skills, training needed

Review

Skills, knowledge, understanding and experience that have been developed during work experience, impact on technical ability to perform the job role, work as a member of a team, future employability, future employment ambitions, further training and development

Unit 204

Undertake Work Related Experience in the Land-based Industries

Outcome 4

Be able to report on the work experience

Assessment Criteria

The learner can:

1. **Gather and prepare evidence** during the work experience
2. **Present information** to others on work experience

Unit content

Gather and prepare evidence

Position within the organisation structure, job description of work role, working practices, health and safety, daily work routine, diary of work activities, report from work experience provider

Present information

Written or oral report on the work experience, name of work experience provider, nature of the organisation (type of business, products or services), job role, health and safety, skills and knowledge developed

Unit 204 Undertake Work Related Experience in the Land-based Industries

Notes for guidance

Learners on centre-based courses should have experience of the type of work that they hope to do and of the expectations of potential future employers. Some level 2 learners are likely to already have experience of working in the land-based and environmental industries, so this unit seeks to provide new experience opportunities for these learners.

This unit should be undertaken in a real business environment relevant to the subject interest of the learner but work experience may be gained by a number of routes, e.g. as part of an industrial placement whilst within the programme, whilst working on a planned daily or weekly basis on the centre's commercial and/or educational facilities, whilst undertaking voluntary work within the industry, or as a member of a group of learners invited to carry out practical work on a suitable business.

Any Act or legislation that is sector specific should be adhered to. This includes duty of care if working with animals.

Learners should complete the equivalent of 4 weeks (or 150 hours) work experience to achieve this unit. Centres should be mindful of their responsibilities for ensuring that work placements have appropriate supervision, insurance and health and safety policies in place and that learners have access to appropriate support whilst on placement.

In Outcome 1, learners will explore the different job roles, responsibilities and job titles commonly associated with them in their specialist sector. This background understanding is likely to require some classroom teaching but learners should be encouraged to explore the range of employment opportunities within their specialist sector. It would be appropriate for employers to be invited to outline to learners their expectations in the workplace. Learners will be required to consider the skills and qualifications that are required for appropriate jobs, and should be encouraged to think about the skills and qualifications that they may need to acquire to achieve their employment ambitions. This should also help them to identify a suitable work experience placement.

Outcome 2 involves learners undertaking the process of applying for work experience. They will need to locate suitable job adverts but can be supported by centres suggesting suitable placements. When applying for work experience learners should produce, as a minimum, a detailed curriculum vitae and letter of application using a computer. Learners may need to be given supported workshop time on computers to develop these documents. Before attending a work experience interview, it would be appropriate for learners to role play an interview and be given feedback on their interview technique. After attending an interview, they should reflect on their performance and how they could improve their effectiveness.

In Outcome 3, learners will review their existing skills, knowledge and experience against those required for a specific job role and how they will seek to develop these during the work experience. This development will be reviewed at a mid-point during the work experience and at the end, when they will reflect on how the work experience has helped to develop their future employability in line with their employment ambitions. Whilst learners are on work experience, and especially if this is an extended placement away from the centre, it is important that they have access to and support available from tutors.

Outcome 4 requires learners to gather basic evidence on their work experience, including the organisation name, main products or services, organisation staffing structure and their role within the organisation. The learner does not need to keep a diary of all duties undertaken each day but should produce a detailed description of the usual work routine and supplement this with a diary of any additional tasks, events, activities or items that represent learning opportunities. They should also note how health and safety of staff

and, if relevant, customers is managed in the workplace. A feedback report from the work experience provider will form part of the evidence for this outcome. The final report on work experience could be presented in written form or as a presentation to tutors and other learners. As a minimum, it should include the range listed. It would be appropriate to include the final review and reflection on work experience from Outcome 3 in this report.

Unit 205

Establish and Maintain Plants Outdoors

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of how to establish and maintain plants outdoors, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to prepare ground and plants and maintain woody and herbaceous plants outdoors, promoting establishment and healthy development.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to prepare ground to receive plants
2. Be able to plant woody and herbaceous plants
3. Be able to maintain the health of plants outdoors
4. Know how to maintain the health of plants outdoors

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L2 Establish plants outdoors

PH3.3 Maintain plant development

CU76.1 Maintain the health of plants outdoors

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 205

Establish and Maintain Plants Outdoors

Outcome 1

Be able to prepare ground to receive plants

Assessment Criteria

The learner can:

1. Assess a site to determine the **preparation** required and **identify hazards**
2. **Prepare land** for planting safely by hand cultivation methods
3. Prepare land for planting **safely using pedestrian operated machines**
4. Explain how **tilth, soil structure, depth of preparation and seasonality and timing of cultivations** affect the establishment of plants

Unit content

Preparation

Basic site analysis carried out to determine the ground preparation required: this should include identifying the need for and requirement of initial site clearance of unwanted plant material and general debris. Determine soil type e.g. clay loam, sandy loam, to ascertain preparation techniques and soil improvement needs. Soil texture, structure, pH and ground conditions of the planting site should be ascertained to influence decision making process

Identify hazards

Permanent hazards such as overhead power lines and underground services, access routes, machine related hazards

Check for temporary/site specific hazards, such as those brought on by inclement weather and possible site contamination. Site hazards to be identified for the avoidance of planting and establishment problems and to ensure safe working

Prepare land

Primary and secondary hand cultivation, weed control and removal, single and double digging as appropriate raking, treading, levelling and tilth production, soil amelioration, incorporation of organic matter and application of appropriate fertilisers

Safely using pedestrian operated machines

The learner is required to demonstrate the use of pedestrian operated machines (rotary cultivator) for secondary cultivation, in a safe and appropriate manner, adhering to manufacturer's instructions

Tilth, soil structure, depth of preparation and seasonality and timing of cultivations

Explanation of the effect of these on the establishment of plants

Methods of tilth production and consolidation

Effects of soil type, structure, drainage and condition on site preparation methods

Potential health and safety concerns inherent in site preparation and planting on outdoor sites

Unit 205

Establish and Maintain Plants Outdoors

Outcome 2

Be able to plant woody and herbaceous plants

Assessment Criteria

The learner can:

1. Select plant material in an **appropriate condition** for planting
2. Plant a range of **woody and herbaceous** plants
3. Provide **immediate aftercare** for new plantings
4. Explain why **planting depth and firming** have a significant affect on establishment

Unit content

Appropriate condition

Moist roots/root-ball, free from pests and diseases, physical damage, containerised and container grown plants, firm in the pot but not root-bound, correct size /even grade/ typical features (reference to British Standards – Nursery Stock categories)

Woody and herbaceous

Trees and shrubs, herbaceous perennials and seasonal bedding, depth of cultivation/planting, correct techniques used (pit planting, supporting/staking) and required firming for different plant types, application of appropriate fertiliser to aid establishment if required

Possible planting through weed suppressant geotextile material

Immediate aftercare

Watering, supporting/staking, mulching, labelling, weed control as appropriate to requirements, soil conditions and time of year

Planting depth and firming

Techniques and benefits to be identified e.g. are tree/shrubs planted at same depth as in nursery, keep top soil separate from sub soil when taking out planting pit, top soil to be returned around the roots first, firm soil around plants to ensure roots are in contact with the surrounding soil, firming also helps to secure plant in the ground, graft union to finish above ground level, planting too shallowly may result in weak and unstable plant, (depends on type) prone to drying out, firm planting also may prevent birds disturbing/loosening small plants

Unit 205

Establish and Maintain Plants Outdoors

Outcome 3

Be able to maintain the health of plants outdoors

Assessment Criteria

The learner can:

1. **Maintain plants** in a way which complies with environmental and health and safety legislation and codes of practice
2. Identify a range of **threats** to plant health:
 - pests
 - diseases
 - disorders
 - unfavourable conditions
 - weeds
3. Promote and maintain **healthy growth** using all of the following methods:
 - feeding
 - watering
 - surface cultivation
 - mulching
4. **Prune plants** using appropriate techniques, according to species, time of year, stage of development.

Unit content

Maintain plants

Ensure maintenance complies with environmental and health and safety legislation and codes of practice: removal and dispose of debris in an environmentally responsible way; avoidance of chemical spray drift; avoidance of damage to site and plant material

Legislation includes Food and Environment Protection Act 1990 (as amended 1995) (FEPA), Control of Substances Hazardous to Health Regulations (2002) (COSHH), Health and Safety at Work etc Act (1974)

Threats

Named pests, diseases, disorders unfavourable weather conditions (drought, wet conditions, frost, high winds) and weeds as relevant to the area of study; relevant legislation

Healthy growth

At least, feeding, watering, surface cultivation and mulching must be covered, but other specific operations should be covered as relevant to the plants being maintained e.g. fertiliser application, pest and disease control and prevention

Prune plants

Shrubs: flowering on current season's growth, flowering on previous season's growth and those grown for winter stems and summer foliage, using clean secateurs and pruning saws as appropriate

Trees: removal of small branches from the ground with non-powered equipment (pruning saws)

Hedges: annual pruning, formal and informal, using secateurs and powered hedge trimmers, correct positioning of pruning cuts should be emphasised, correct time of year for operations, reasons for pruning

Unit 205

Establish and Maintain Plants Outdoors

Outcome 4

Know how to maintain the health of plants outdoors

Assessment Criteria

The learner can:

1. Describe how to recognise **signs of damage or threats** to plant health and the appropriate method of control
2. State how seasonal weather conditions and soil condition affect **plant growth and health**
3. Describe methods used to **maintain/control plant growth**
4. Explain the relationship between **pruning and plant species** to include
 - timing of pruning
 - types of material for removal
 - method of pruning
 - positioning of cuts

Unit content

Signs of damage or threats

Signs of damage to leaves, roots, stems, flowers, yield/vigour, by physical means, pest and disease infestation, identify appropriate prevention and/or control methods.

Environmental threats: frost, drought, water logging, humidity, heat, light/shade, chemical spray drift

Nutritional deficiency/excess

Plant growth and health

Effects of seasonal weather conditions, effects of soil conditions, soil compaction and different soil types (e.g. clay), reasons for feeding, mulching, irrigation and support of established plantings, powered and non-powered maintenance equipment. Increase/decrease of pest and/or disease infestations, inappropriate soil pH levels for plants present

Maintain/control plant growth

To include: pruning, pinching/stopping, irrigation, feeding, pest and disease control, staking, tying, training, grafting, budding, providing frost protection and shade as necessary

Pruning and plant species

Reasons for pruning, timing of pruning, types of material for removal, including suckers, reverted shoots, dead heading, dead, damaged, weak or diseased, method of pruning, positioning of cuts, formative and routine pruning, regenerative pruning

Correct pruning techniques used to ensure required plant growth responses, shrubs- flowering on current season's growth, flowering on previous season's growth and those grown for winter stems and summer foliage

Unit 205 Establish and Maintain Plants Outdoors

Notes for guidance

This unit deals with the principles of planting and maintaining hardy plants, including trees, shrubs, and herbaceous plants in a range of situations. Preparation of the site is covered. The knowledge and understanding within this unit is applicable to plant establishment and maintenance in amenity and commercial situations and is essential to people working as practitioners in most horticultural workplaces.

In Outcome 1, learners are expected to be able to assess the soil texture, structure, pH and soil conditions to determine the preparation required for planting a range of hardy plants. They should be able to identify any specific hazards on site and carry out ground preparation for planting of woody and herbaceous plants and understand how the various cultivation operations affect the establishment of plants.

In Outcome 2, learners are expected to be able to plant bare-root and containerised trees and shrubs and herbaceous plants such as bedding plants or herbaceous perennials. This will include immediate aftercare, such as support, labelling, watering mulching and an understanding of the significance of planting depth and firming.

In Outcome 3, learners will carry out maintenance activities on a shrub or mixed border. They should understand the general needs of plants such as watering feeding, surface cultivation and mulching, but also the additional needs of specific plants, such as support or training. They should be able to identify the border plants and carry out pruning to promote the decorative characteristics of plants.

In Outcome 4, learners are expected to be able to assess a mixed border, identify specific pests, diseases, weeds and other threats to health, to assess the maintenance needs of the plants in the border and specify the different pruning needs of specific plants. They should understand how seasonal weather conditions and soil conditions affect plant growth, health and maintenance activities.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities and learners should not be asked to undertake physical tasks beyond their physical capabilities.

Learners should have access to areas for preparation and planting, and established borders for practical lessons and assessment. Where resources at the centre are limited, visits to demonstration gardens/ historic gardens would be useful to complement lessons at the centre. All tasks should be undertaken at the correct time of the year and in appropriate weather conditions.

References

Books

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Brickell C. 2007. *The RHS Encyclopaedia of Gardening*. 2nd ed. Surrey: Dorling Kindersley Publishers. ISBN: 1405322270

Brickell C and Joyce D. 2006. *RHS Pruning and Training*. Surrey: Dorling Kindersley Publishers. ISBN: 1405315265

Hessayon D G. 1999. *The Tree and Shrub Expert*. London: Transworld Publishers. ISBN: 0903505178

Hillier J and Coombes A J. 2007. *The Hillier Manual of Trees and Shrubs*. 3rd ed. Devon: David and Charles.
ISBN: 07015326640

Websites

www.rhs.org.uk

Royal Horticultural Society

Unit 206

Construct and Maintain Garden Fences

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of how to construct and maintain garden fences and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to construct garden fences safely and to carry out preservation and maintenance activities.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Be able to construct a garden fence
2. Be able to maintain a garden fence
3. Know how to construct and maintain garden fences

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU19.1 Construct and maintain boundaries

Fe 3.3 Place and fix fencing components

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 206

Construct and Maintain Garden Fences

Outcome 1

Be able to construct a garden fence

Assessment Criteria

The learner can:

1. Establish the **line** of a fence
2. Excavate **post holes** safely
3. Construct a **timber fence** safely and accurately
4. Construct a fence incorporating **strained wire** safely and accurately
5. Calculate quantities of all **resources** needed for the construction of garden fences.

Unit content

Line

Identify, set line and levels, removal of vegetation and obstructions, repair of environmental damage

Post holes

Mark out positions with correct centres, excavate, set depth, shape and line

Timber fence

Post and rail, post and panel, close-boarded, larch lap, ensure appropriate levels and line(s) are maintained, removal and correct disposal of debris

Strained wire

Anchor and support straining posts, secure wire, height and tension, removal and correct disposal of debris

Resources

Timber, posts (end, intermediate, straining), post caps, nails, screws, staples and other fixings, concrete, wire, wire strainers, turnbuckles, hand tools and/or equipment

Unit 206

Construct and Maintain Garden Fences

Outcome 2

Be able to maintain a garden fence

Assessment Criteria

The learner can:

1. Carry out **fence repairs** safely
2. Carry out **preventative treatments** safely.

Unit content

Fence repairs

Excavate and replace rotten/broken/damaged post(s) readjust fence line as appropriate, replace broken rail(s), repair of environmental damage and correct disposal of debris

Preventative treatments

Initial use of pressure treated timber, routine use of water-based or solvent-based timber treatments with correct disposal of any excess

Unit 206

Construct and Maintain Garden Fences

Outcome 3

Know how to construct and maintain garden fences

Assessment Criteria

The learner can:

1. State the advantages and disadvantages of a range of **materials and tools** used in fencing
2. Describe the **construction** and **use** of a range of fences
3. Describe **timber treatments** to prevent decay and their relevant hazards and safety requirements
4. Describe **current landscape practices and legislation** associated with the construction of garden fences.

Unit content

Materials and tools

Fence panels (wavy edge, feather edge, interwoven), close-boarded fence, arris rails, straining wire (galvanised, plastic coated), chain-link, posts (wooden, concrete), post fixing (concrete, rammed earth, post sockets - driven, concreted, bolt-down), eye-bolts, turnbuckles, nails, screws, staples
Hand tools: pliers, fence pliers, hammers, saws, screw drivers, mell, drivall, rammer, post hole digger, spade, shovel, barrow, concrete mixer

Construction

Panel fences, strained wire fences, close-boarded and larch and lap fences

Use

Security, decoration, privacy, support for plants, separation, boundary, screening

Timber treatments

Water-based, solvent-based, pressure-treated as applied by timber supplier

Current landscape practices and legislation

Damage to tree roots, plants and wildlife) and all aspects that relate to healthy and safe working practices
British Standards (BS 1722), Local Authority Planning Permissions for fences over 2m height; Health & Safety at Work etc Act 1974

Unit 206 Construct and Maintain Garden Fences

Notes for guidance

The unit concerns the construction principles and practices associated with garden fences and also the commonly used means of repair, treatment and preservation of fences. It should be remembered that this unit is at Level 2 and so aspects such as the design of the fence is not within the scope of the unit. The learner should gain an understanding of fence construction on sloping sites but activities should only take place on level ground.

Outcome 1 requires the learner to undertake construction of both post and timber and post and wire fences, including the positioning and installation of fence posts; the learner should be able to demonstrate the ability to set a straight line and also a 90° return in the fence line. The learner should also be able to measure correctly for the position of each fence post to meet a given specification. All activities can be carried out in small teams, but it is essential that each learner is able to carry out each aspect of the task. There is no requirement to concrete or undertake permanent fixing of posts so as to minimise the resource implications of the outcome.

Outcome 2 involves the routine maintenance and repair of fences. The learner is required to prepare a timber fence for treatment and to apply surface coating to a timber fence. The learner should also be able to remove and replace a broken rail on a post and rail fence and to remove and replace a rotten post on a post and panel fence. These activities may again be carried out in small teams.

Outcome 3 covers the understanding of the principles of fence construction and maintenance and here the learner should be aware of the range of garden uses of fences, the types of fences likely to be suited to garden use, the range of tools and equipment needed for fence construction and maintenance and the advantages and disadvantages of purchase and hire of such equipment. It is essential that the learner is aware of the environmental aspects of fence construction and maintenance (damage to tree roots, plants and wildlife) and all aspects that relate to healthy and safe working practices.

Learners will need to be involved in the practical tasks necessary to safely erect and repair fences, and may need to carry out an environmental impact assessment prior to construction. The unit will enable the learner to transfer the skills gained to varied situations, including both initial construction and subsequent repair in a safe and environmentally responsible manner.

References

Books

Brickell C. 2006. *RHS Essential Garden Planning and Construction*. London: Oxford Publishing Group

Bateman R. 1975. *Garden Constructions*. London: Garden Book Club

Bridgwater A and Bridgwater G. 2008. *Woodwork for the Garden, step-by-step practical guides*. London: New Holland Publishers

Unit 207

Construct Alpine and Water Features

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles required to construct alpine and water features and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to construct rock gardens and other alpine features, and ponds and other water features.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to construct an alpine feature
2. Know the construction of alpine features
3. Be able to construct a garden pond
4. Know how to construct ponds and water features

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L24.5 Construct Rock Gardens

L28.1 Construct water features

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 207

Construct Alpine and Water Features

Outcome 1

Be able to construct an alpine feature

Assessment Criteria

The learner can:

1. Construct **alpine features** safely and securely as appropriate to the situation
2. Handle **materials** safely
3. Avoid **environmental damage** and undue waste during construction
4. **Work effectively** with others.

Unit content

Alpine features

Outcrops, sloping features, sinks/troughs rock garden, rock sculptures, screes, Personal Protective Equipment (PPE)

Materials

Rocks (local to area) with clear strata lines and without clear strata lines, artificial stone: gravels, chippings, growing medium, mulch, plant material, tools and equipment e.g. hand tools, machinery to move and position rocks and materials, appropriate PPE, use of appropriate manual handling techniques

Environmental damage

Practical work activities take place at the correct time of year and in the appropriate weather conditions, undertake environmental impact assessment, correct removal and disposal of debris/waste, ensure efficient use of materials, avoid wastage

Work effectively

Identify task objectives and procedures, communicate clearly and effectively with colleagues, work co-operatively with colleagues, report unexpected findings to person in charge, review progress against objectives, check individual understanding

Unit 207

Outcome 2

Construct Alpine and Water Features

Know the construction of alpine features

Assessment Criteria

The learner can:

1. Describe **rock types** for a range of applications
2. Describe how to **select rock** appropriate to a given situation and purpose
3. Explain how to assess **site conditions and access routes** are appropriate for construction
4. Describe **alpine features** including rock gardens, scree, alpine troughs.

Unit content

Rock types

Sedimentary, metamorphic, igneous, limestone, millstone grit, sandstone, slate, tufa, granite, artificial, hypertufa, gravels, aggregates, concrete, size of rock given the situation to be constructed and to meet given application

Select rock

Rocks (local to area) with clear strata lines and without clear strata lines, compatible with local requirements/planning consent, artificial rock may be appropriate for given project, Shape, size, weight, cost, delivery

Site conditions and access routes

Site conditions: aspect, slope, shade, adjacent vegetation, pH, drainage, soil texture, micro-climate, climate, altitude, temperature range, exposure, viewpoints

Access routes: for construction (access for machinery, imported materials), for routine maintenance after completion, environmental impact assessment

Alpine features

Rock gardens – rock outcrops, pavements, built-up sites, scree, sinks, troughs and raised beds, alpine meadows

Unit 207

Construct Alpine and Water Features

Outcome 3

Be able to construct a garden pond

Assessment Criteria

The learner can:

1. Excavate the **sites** for ponds safely
2. Ensure the perimeter of **excavations** is level
3. Install **small ponds** safely
4. Install pond **edging** safely.

Unit content

Sites

Domestic gardens, areas with public access, sites with good and impeded drainage, level and uneven ground, compliance with health and safety requirements/legislation, wearing of appropriate PPE, hand tools/equipment, machinery

Excavations

Ensure perimeter is level across the site and consistent with construction requirements

Small ponds

Butyl and PVC lined, pre-formed of fibre-glass/plastic shells or similar, clay

Edging

Rock, paving, planted soil, turf

Unit 207

Construct Alpine and Water Features

Outcome 4

Know how to construct ponds and water features

Assessment Criteria

The learner can:

1. State the advantages and disadvantages of a range of **materials** used in construction of ponds and water features
2. Describe the dimensions, shapes and construction of different types of **ponds, cascades and pebble features**
3. Explain how to select **equipment** for fountains and waterfalls and their relevant hazards and safety features
4. Describe current landscape practices and **legislation** associated with the construction of water features.

Unit content

Materials

Liners: puddled clay, concrete, polythene, butyl, bonded clay fabrics, pre-formed fibre-glass and related products

Excavation lining materials, edging materials: rock, paving, soil, turf;

Environmental impact of rock and other materials; plant materials

Ponds, cascades and pebble features

Ponds: depths, surface area, edge accessibility and egress, formal and informal, hidden edges, merged edges, raised edges, siting of ponds and water features

Cascades: pre-formed e.g. polyurethane, constructed on site, lined with butyl, constructed of rock and concrete/mortar

Pebble features: millstones (real, artificial) and other drilled rock features, bubble fountains

Equipment

Pumps (submersible, external, solar), pipe-work, filters, electrical requirements, fittings and connections: water proofing agents, **does not include connection to the electricity supply**

Legislation

Compliance and regard to environmental legislation/guidance, health and safety legislation (e.g. Health and Safety at Work etc Act 1974, PPE at Work Regulations 1992, Manual Handling Operations Regulations 1992), risk assessments, water and electricity regulations, relevant British Standards and Codes of Practice.

Unit 207 Construct Alpine and Water Features

Notes for guidance

Outcome 1 requires that the learner is able to construct simple alpine features safely. This may include sections of whole rock gardens complete alpine features such as sinks/troughs. The activity of constructing a rock garden is by nature one usually done by small teams and this should be borne in mind in the delivery of the outcome. Where the construction is of a sink/trough or other small, contained feature then it is expected that the learner is able to position rocks in an appropriate way to achieve the desired effect; there is no need to construct a trough or disguise a sink.

In all cases the learner should be able to create and position suitable growing media for alpine plants. This may include those for acid and alkaline sites.

Outcome 2 covers the understanding of selection of rock for sites, safe site practices and types of rock / alpine features. The learner should be aware of a range of suitable natural and artificial rock types and their relative advantages and disadvantages, which will include availability, cost and effects on the environment from which they are sourced. An understanding of the positioning and use of rock, including strata lines, sizes of pieces of rock, angles and pockets is essential.

Safe practices should include the safe use of lifting equipment and a clear understanding of the importance of safe access and operating positions for vehicles, machinery and people. The range of features to be covered should include those rock gardens which are artificially mounded on flat sites, outcrop from natural or created slopes, constructed as pavements and scree and a range of self-contained features such as sinks and troughs, both natural and artificial.

Outcome 3 requires the learner to excavate and install a small garden pond. As with outcome 1 above this may be undertaken as a group activity. Excavation may be by hand or machinery. Where machinery is used it is essential that relevant current legislation is complied with. For management of costs, the pond can be lined with heavy-duty polythene if preferred. The learner must demonstrate safe practices through the activity.

Outcome 4 covers the understanding of a range of factors relating to siting and construction of ponds and water features. The learner should be aware of the range of currently available and appropriate lining materials and their advantages and disadvantages, and how they are used in formal and informal situations. Raised ponds and water features, and those solely concerned with the keeping of decorative fish, are not within the scope of the unit. Installed bubble and other small fountains, and pre-formed/ on-site built cascades suitable for domestic gardens, are to be covered.

The learner should be able to calculate the size of pump required to enable fountains and cascades to function effectively, and should also be able to describe the advantages and disadvantages of submersible, external and solar pumps. It is essential that the learner is aware of current legislation and codes of practice that apply to the installation of electricity in domestic garden situations.

References

Books

- Brickell C. 2006. *RHS Essential Garden Planning and Construction*. London: Oxford Publishing Group
- Robinson P. 2008. *The Illustrated Practical Guide to Water and Rock Gardening: everything you need to know*. London: Southwater Publisher
- Hessayon D G. 1993. *The Rock and Water Garden Expert*. London: Transworld Publishers

Quick G. 2000. *A Practical Guide to Creating a Garden Pond, and year-round maintenance*. Pondmasters. Surrey: Interpet Internet Publishing

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Unit 208

Construct Garden Walls

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles to construct garden walls, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to develop the skills and knowledge to construct garden walls safely from bricks and blocks, using a range of brick bonds.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Know how to install foundations for walls
2. Be able to construct garden walls
3. Know how to construct garden walls

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L1 Site preparation

L24.2 Construct free-standing walls

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 208

Construct Garden Walls

Outcome 1

Know how to install foundations for walls

Assessment Criteria

The learner can:

1. Explain how to determine the required **dimensions** of the foundation for a garden wall
2. Describe the **problems** of working on slopes and how to overcome them
3. Describe **methods of locating underground services** prior to excavation.

Unit content

Dimensions

Retaining, non retaining or ornamental wall, materials to be used, height and depth of wall to be constructed, type of soil, level or sloping site

Problems

Unstable ground, retention of soil/subsoil, stepped foundations, drainage and water problems, access and safe working, use of machinery on sloping ground

Methods of locating underground services

From plans, from information supplied by service providers, from on-site above ground observation and inspection, knowledge of site owner, by use of Cable Avoidance Tool (CAT) devices

Unit 208

Construct Garden Walls

Outcome 2

Be able to construct garden walls

Assessment Criteria

The learner can:

1. Construct brick walls safely using stretcher and at least one other **bond**
2. **Construct and render** block walls safely
3. Calculate quantities of all **resources** needed for the construction of walls.

Unit content

Bond

One from: English, Flemish, English Garden Wall

Construct and render

Mix mortar by hand and by machine, cut bricks/blocks by hand, lay bricks/blocks as per bond requirement, strike or point the wall, render wall as appropriate, meet health and safety requirements e.g. adopt appropriate working practices, adhere to Control of Substances Hazardous to Health Regulations (2002) (COSHH), select and wear appropriate Personal Protective Equipment (PPE), adhere to Manual Handling Operations Regulations 1992

Resources

Bricks, blocks, pre-cast, natural stone, walling units, mortar (sand, cement, lime, water), aggregates, brick ties, weep holes, damp-proof membrane

Unit 208

Construct Garden Walls

Outcome 3

Know how to construct garden walls

Assessment Criteria

The learner can:

1. Describe a range of **materials, construction and finishing methods** for free standing and retaining walls
2. Describe **common problems** when constructing walls and how to overcome them
3. Describe a range of **brick bonds** suitable for garden walls
4. Describe **current landscape practices and legislation** associated with the construction of garden walls.

Unit content

Materials, construction and finishing methods

Concrete for foundations, brick types, common, facing (water-struck, wire-cut), engineering, reclaimed, coping bricks, solid and hollow blocks, single brick walls, buttressed walls, retaining walls, wall ties, damp-proof course membranes, weep-holes, striking and pointing methods (flush, recessed, bucket handle, weather struck), mortar types, additives and strengths, cement rendering

Common problems

Weather-related, site-related (slopes, maintaining horizontal and vertical planes, access), environmental impact, disposal of debris

Brick bonds

Stretcher, English, English Garden wall, Flemish, Flemish Garden wall

Current landscape practices and legislation

Building and planning regulations, legislation and Codes of Practice relating to health and safety e.g. COSHH (2002), Health and Safety at Work etc Act 1974, PPE at Work Regulations 1992, Manual Handling Operations Regulations 1992, risk assessments, water and electricity regulations, relevant British Standards and Codes of Practice

Unit 208 Construct Garden Walls

Notes for guidance

The unit requires the learner to be aware of suitable foundations, to construct brick and block walls and understand the principles of garden wall construction.

Outcome 1 concerns the gaining of knowledge of foundations for garden walls. The requirement to install foundations is covered in the unit Construct Landscape Foundations and Surfaces. As such there is no requirement to undertake construction for the achievement of the outcome. However, the foundations that were installed as part of the unit 'Construct landscape foundations and surfaces' can be used for outcome 2 of this unit if convenient.

Outcome 2 requires the learner to construct garden walls in brick using stretcher bond and at least one other appropriate bond. The wall should be constructed to at least 9 courses in height and should include a return or finished end. Stretcher bond should be used to construct a block wall in solid or hollow blocks. The learner should also be able to mix mortar by hand and by machine, cut bricks by hand, strike or point the wall in at least two suitable methods and able to render a block wall.

Given the considerable resource implications of the outcome it is acceptable to use lime mortar throughout. All activities can take place within an appropriate workshop setting. However, the learner must be aware of the constraints of a real working setting as part of the outcome. Calculations for the outcome relate to amounts and volumes of construction materials. It is acceptable to use standard figures for bricks per square metre, etc, in these activities.

Outcome 3 covers the principles of brick and block walls for garden use. The learner should be aware of the range of brick and block types and types of mortar. However it should be noted that this unit is at level 2 and the learner is not required to design walls.

The learner should be aware of how to deal with weather problems by use of temporary protection of the site, as well as dealing with site-related problems and of how to ensure that courses are maintained and vertical and horizontal planes are retained.

At all stages it is essential that the learner is fully aware of current best practice in construction techniques and in particular adopting best practice in regard to health and safety.

The hard landscape sector of the horticultural industry has become a major employer. Employees need to acquire a range of transferable skills, and knowledge of varied construction techniques including garden walls. This unit provides the learner with the opportunity to develop knowledge and the basic wall construction skills often required in the sector, including the resources often required. It also highlights the need for the adoption of safe working practices and an awareness of the potential environmental impact of such construction projects.

References

Books

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Web sites

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Health and Safety Executive

www.ibstcok.com

Ibstock Brick Ltd

www.marshalls.co.uk

Marshalls

Unit 209

Construct Landscape Foundations and Surfaces

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of how to construct landscape foundations and surfaces, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to develop the skills and knowledge to set out sites from a plan, prepare sites for subsequent landscape works and install foundations, concrete and paving.

Learning outcomes

There are **five** learning outcomes to this unit. The learner will:

1. Be able to transfer information from plans to the ground
2. Be able to prepare sites for landscaping
3. Know how drainage and foundations are installed
4. Be able to lay concrete
5. Be able to install paving

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L1 Site preparation

L24.1 Lay hard surfaces

CU19.1 Construct and maintain boundaries

L15.1 Install drainage systems

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 209

Construct Landscape Foundations and Surfaces

Outcome 1

Be able to transfer information from plans to the ground

Assessment Criteria

The learner can:

1. Set out **geometric** and **irregular shapes** on the ground from scaled plans, to include right angles and circles
2. Describe **methods of marking lines and curves** onto the ground.

Unit content

Geometric shapes

Squares, rectangles, circles, triangles, ellipses, formal linear features

Irregular shapes

'Kidney' shaped areas, curvilinear shapes

Methods of marking lines and curves

Use of the 3, 4, 5, triangle technique to construct right angles, use of tape measures, chain lines, ranging poles, pegs /canes and garden line or string, sand lines, chalked string, marking compounds and spray paints

Unit 209

Construct Landscape Foundations and Surfaces

Outcome 2

Be able to prepare sites for landscaping

Assessment Criteria

The learner can:

1. Set out and establish rectangular areas to a **level and a fall**
2. Excavate and install **foundations** for subsequent works
3. Describe **methods of locating underground services** before excavation.

Unit content

Level and fall

Flat/level areas, flat areas on uneven sites, even falls (e.g. 1:50) on rectangular sites, equipment for setting levels and gradients (laser level, spirit level and pegs, Cowley level, boning rods)

Foundations

Strip foundations for walls and edgings, raft foundations for patios and paved areas, use of aggregates and other suitable materials, tools, equipment and machinery

Methods of locating underground services

From plans, from information supplied by service providers, knowledge of site owner, from on-site above ground observation and inspection, by use of Cable Avoidance Tool (CAT) devices

Unit 209

Construct Landscape Foundations and Surfaces

Outcome 3

Know how drainage and foundations are installed

Assessment Criteria

The learner can:

1. Describe the required dimensions and methods of installing foundations for paths, patios and driveways to include **shuttering, formation and sub-grades**
2. Describe **materials** used in foundations to include granular fill, geo-membranes, blinding layers and concretes
3. Describe **drainage methods, tools and materials**

Unit content

Shuttering, formation and sub-grades

Shuttering for: patio edging, paths, sectional buildings, garden walls, driveways

Formation and sub-grades: crushed stone, graded crushed stone, reclaimed materials (e.g. hardcore)

Depths and dimensions of foundations for walls, paths, patios, driveways

Materials

Granular and aggregate fill, geo-textile membranes, blinding layers, concrete

Drainage methods, tools and materials

Drainage methods: porous and permeable surfaces and foundations, pipe drains, prefabricated drainage channels, meeting requirements of Sustainable Urban Drainage Systems (SUDS) regulations

Tools and materials: hand tools, pedestrian-operated machinery, equipment for setting levels and gradients (laser level, spirit level and pegs, Cowley level, boning rods)

Unit 209

Construct Landscape Foundations and Surfaces

Outcome 4

Be able to lay concrete

Assessment Criteria

The learner can:

1. Mix and lay **concrete** safely to include site preparation and formwork
2. Explain the **uses, mixes and finishes** of concrete in a range of **situations**.

Unit content

Concrete

Constituents of concrete (cement, fine and coarse aggregates, water) and proportions;; methods of mixing, general purpose (C20) and high-strength concrete, 'dry-mix' concrete, Control of Substances Hazardous to Health Regulations (2002) (COSHH), Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (as amended 1999), PPE at Work Regulations 1992, Manual Handling Operations Regulations 1992, risk assessments

Uses, mixes and finishes

Uses: foundations, base courses, non-slip surfaces

Finishes: tamped, floated, stippled

Situations

Gardens and other domestic situations (paths, pattern-imprinted concrete for driveways, utility surfaces)

Unit 209

Construct Landscape Foundations and Surfaces

Outcome 5

Be able to install paving

Assessment Criteria

The learner can:

1. Lay **rigid and flexible paving materials** safely
2. Describe the advantages and disadvantages of a range of **paving** materials, bond patterns and **edging materials**

Unit content

Rigid and flexible paving materials

Natural stone, reconstituted stone, concrete, paving blocks and sets, natural stone slabs, pre-cast concrete paving, gravel (bound and unbound), timber decking, paving laid in random, stretcher, herringbone and basket weave patterns, laid on dry sand bed or dry mortar mix or on mortar spots

Paving and edging materials

List of materials as above with advantages and disadvantages identified and described to include prefabricated drainage channels, highway kerbs, path edgings, timber, metal

Methods of jointing and finishing, dry, recessed or raised pointing, compacted with kiln-dried sand, grouted with dry mortar, use of sealants

Unit 209 Construct Landscape Foundations and Surfaces

Notes for guidance

This unit involves the learner in preparing sites for landscaping and using a range of materials to prepare and install foundations and final horizontal surfaces. It does not extend beyond the basic aspects into areas such as steps and tarmacadam.

Outcome 1 requires the learner to set out a range of basic geometric and irregular shapes on the ground working from scaled plans. The learner should be able to set out to appropriate degrees of accuracy for the type of site and prevailing conditions, and should be capable of working with commonly used scales such as 1:20, 1:50 and 1:100. Setting out should include use of tape measures, ranging poles and builders square.

Outcome 2 concerns the setting out of levels and excavation and installation of foundations. Levels should be to examples of those commonly used (e.g. level/ horizontal, with a gradient of 1:80, with a gradient of 1:12). The learner must be aware of the range of methods of ensuring site safety prior to excavation and should be familiar with these methods.

Outcome 3 covers the background knowledge and understanding relating to foundations, concrete and site drainage. It should be remembered that this is a Level 2 unit within a landscape situation and so should not go into excessive depth beyond that required by a learner to install garden features (foundations for walls, patios, paths and domestic driveways) to a satisfactory standard.

Outcome 4 involves the learner in preparing formwork and laying concrete. The learner should be able to work as part of a team in establishing formwork for a path or other simple installed surface and must be able to demonstrate effectively that they can work to required levels and tolerances in the activity. Concrete mixing should be both by hand and by machine and the learner must be aware of the required levels of accuracy in measuring out and mixing materials. Given that there are considerable resource implications in establishing a range of surface finishes for concrete it is acceptable that some of the variations may be demonstrated through visits to construction sites, by observation of finished areas or by viewing demonstrations.

Outcome 5 involves the learner in laying paving and other surfaces suitable for domestic use. The learner should be able to lay both small unit (block) and slab paving, though as noted earlier, given that this has significant resource implications it is acceptable if a group activity is undertaken and paving may be laid, for convenience, on a compacted dry sand bed to enable reuse of pavers. Lime mortars may be used for wet raised/recessed jointing.

The hard landscape sector of the horticultural industry has become a major employer. Employees need to acquire a range of transferable skills, and knowledge of varied construction techniques including foundations and hard surfaces. This unit provides the learner with the opportunity to develop knowledge of landscape foundations/surfaces and the construction skills often required in the sector, including the resources often required. It also highlights the need for the adoption of safe working practices and an awareness of the potential environmental impact of such construction projects.

References

Books

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- Jeswald P. 2004. *How to build Paths, Steps and Footbridges*. North Adams: Storey Books.
- Creative Publishing International. 2006. *The Complete Guide to Landscape Construction*. Minneapolis: Creative Publishing International. ISBN-13: 978-1-58923-245-7.
- Blake J. 1999. *Introduction to Landscape Design and Construction*. Surrey: Gower Publishing. ISBN: 0-566-07775-2.
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Web sites

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| www.hse.gov.uk | Health and Safety Executive |
| www.ibstcok.com | Ibstock Brick Ltd |
| www.marshalls.co.uk | Marshalls |

Unit 210

Introduction to the Cultivation of Decorative Plants by Organic Methods

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the cultivation of decorative plants by organic methods, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop the skills and knowledge to be able to grow ornamental plants and turf by organic growing methods.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to grow ornamental plants organically
2. Understand the growing of ornamental plants by organic methods
3. Be able to care for grassed areas by organic methods
4. Understand the care of grassed areas by organic methods

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L2 Establish plants outdoors

L3 Maintain general amenity turf

L4 Establish and develop decorative amenity turf

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 210

Introduction to the Cultivation of Decorative Plants by Organic Methods

Outcome 1

Be able to grow ornamental plants organically

Assessment Criteria

The learner can:

1. Propagate herbaceous plants by **seed and vegetative** methods
2. **Plant** trees, shrubs and herbaceous plants and bulbs
3. **Maintain woody and herbaceous plants** using approved organic methods
4. Carry out the **pruning** of shrubs.

Unit content

Seed and vegetative methods

Sources of seed, genetically pure seed, seed viability, collection of seed, preparation of seed, appropriate storage of seed, pre-sowing treatments, timing, advantages and disadvantages of seed as a method

Vegetative methods, source of material, timing, division, cuttings (softwood stem, semi-ripe stem, hardwood stem, root), leaf (various), layering, budding, grafting

Provision of aftercare

Learners will be expected to collect and prepare a seed requiring maceration and separation, a nut and one seed that requires cleaning and dry storage

They will be expected to carry out division, propagation by all methods of cutting and simple layering, but are not expected to bud or graft plants

To include natural vegetative means of propagation e.g. stolons, bulbs, rhizomes and the selection and use of suitable growing media for seed and vegetative propagation

Plant

Spacing of plants, preparation of planting pit/hole, depth of planting pit /hole, orientation of plant, soil amelioration, location of plant in relation to finished soil level, firming, removal of waste and ethical disposal

Plant one bare root or container grown tree, a shrub, and a group (3 or 5) herbaceous plant

Maintain plants

Carry out, irrigation, feeding, weed control, mulching, maintenance pruning, pest and disease monitoring as appropriate on FIVE (5) of the following range of plants: deciduous and evergreen trees, shrubs, hedges, climbers, wall shrubs, groundcover, tender and hardy annuals, biennials and perennial, hardy annual displays, spring and summer bedding, container planting, herbaceous perennial plantings and naturalised bulbs

Pruning

Pruning carried out at the optimum time, using appropriate method and tools to create the desired effect

To include pruning for winter twig/stem colour, summer foliage and flower production

Unit 210

Introduction to the Cultivation of Decorative Plants by Organic Methods

Outcome 2

Understand the growing of ornamental plants by organic methods

Assessment Criteria

The learner can:

1. Review the **uses** of annuals, herbaceous perennials, shrubs and trees in gardens
2. Explain the **selection and purchase** of ornamental plants and materials for organic gardens

Unit content

Uses

Enhancement of the environment, creating habitats, supporting biodiversity, functional properties e.g. boundaries, security, aesthetic properties, culinary and medicinal properties

Selection and purchase

Determine needs and requirements, plants and materials originate/obtained from ethical/certified sources
Field (bare root), container grown or containerised plants, correctly named, true to type, true to form, free from pests and diseases and physical damage, materials obtained from ethical/certified sources and are fit for purpose

Unit 210

Introduction to the Cultivation of Decorative Plants by Organic Methods

Outcome 3

Be able to care for grassed areas by organic methods

Assessment Criteria

The learner can:

1. Carry out **mowing** to an appropriate height of cut
2. Carry out **scarification, aeration and top dressing** with bulky materials

Unit content

Mowing

Cylinder and rotary mulch mower (benefits and limitations on returning arisings to sward), settings and adjustment of machines, height of cut at specific times of year, timing of use, the effects on growth, development and ability to withstand environmental stress

Scarification, aeration and top dressing

Manual and machine aeration and scarification, top-dressing with bulky organic material, sand and loam, application of bulky top dressing to adjust levels and remove undulations/depressions in the surface, frequencies, timing, settings and adjustments to machines (as appropriate), the effect on the growth, development and ability to withstand environmental stress

Unit 210

Introduction to the Cultivation of Decorative Plants by Organic Methods

Outcome 4

Understand the care of grassed areas by organic methods

Assessment Criteria

The learner can:

1. Describe appropriate **lawn grasses** and the **establishment** of lawns by turf and seed
2. Describe the **limitations and expectations** of lawn care by organic methods
3. Review nutrient and organic matter **recycling** for grass growth
4. Explain how to avoid **common lawn problems** and the need for chemical inputs.

Unit content

Lawn grasses

Lolium perenne, *Agrostis spp.*, *Festuca rubra rubra*, *Festuca rubra commutata*, *Poa pratensis* and *Phleum pratense* and suitable mixtures for fine turf, high quality coarse turf and turf subjected to hard wear or growing in unfavourable conditions e.g. shade

Establishment

Weed control, levelling, primary cultivation, secondary cultivation, tilth production, soil consolidation, calculation of sowing/fertiliser rate, sowing seed by hand, application of fertiliser if appropriate to site, raking in, setting out for turfing, rolling, irrigation, weed control and first cut

Limitations and expectations

Difficulty of effective control of weeds, pests and diseases without the use of chemicals, role of clover, earthworms, soil bacteria and soil fungi in achieving good growth, mowing height and cutting regime

Recycling

Recycling of organic matter to encourage grass growth, removal or non removal of arisings/clippings, benefits and limitations on returning arisings to sward

Common lawn problems

The use of organic methods to avoid, weeds, pests and diseases

Unit 210 Introduction to the Cultivation of Decorative Plants by Organic Methods

Notes for guidance

The learner will be able to develop the skills and knowledge involved in the cultivation of decorative plants by organic methods. They will be able to grow ornamental plants organically and be able to establish and care for grassed areas by organic methods.

In Outcome 1, learners will be able to propagate plants from seed (sexual propagation) and vegetative means (asexual propagation), plant trees, shrubs and herbaceous plants using organic methods. Learners will develop their practical skills by maintaining a selection plants by carrying out activities such as providing irrigation, feeding, weeding, maintenance pruning as well as pest and disease monitoring. In addition learners will carry out pruning. In order to complete this outcome, learners will require access to propagation facilities, equipment and materials and a selection of ornamental plants growing in situ outdoors.

In Outcome 2, learners will be able to review the uses of a range of annuals, herbaceous perennials, shrubs and trees. Learners will also be able to select and purchase a range of plant material from ethical/certified sources and consider the wider uses of plant material under organic cultivation. Much of this outcome can be assessed during practical activity.

In Outcome 3, learners will demonstrate their practical skills by carrying out mowing, scarification, aeration and top dressing at the correct time using machinery and manual methods. To achieve this outcome, learners will need an area to establish an organic lawn from seed and sufficient machinery, equipment and materials to carry out maintenance operations at the optimum time.

In Outcome 4, learners will develop their knowledge and be able to describe appropriate lawn grasses and how to establish lawns from seed and turf. They will be able to describe the limitations and expectations of a lawn grown by organic culture, in connection with this part of the outcome they are expected to review nutrient and organic matter recycling for grass growth. Learners will explain how it is possible to avoid or reduce the occurrence of a range of turf weeds, common pests and diseases of turf. It would be advantageous for this outcome if learners had access to an area of turf that is currently managed using organic methods.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. Learners will require access to specialised literature and other resources. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

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Books

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www.gardenorganic.org.uk

Garden Organic

www.rhs.org.uk

Royal Horticultural Society

www.bbc.co.uk

BBC

Unit 211

Contribute to Establishing and Maintaining Amenity Turf

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of how to contribute to establishing and maintaining amenity turf, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to develop the skills and knowledge to establish amenity and ornamental turf from seed and turf and to maintain fine and coarse amenity turf to a high quality.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to establish grassed areas from seed and turf
2. Know the establishment of grassed areas from seed and turf
3. Be able to maintain fine and coarse amenity turf
4. Know the maintenance of fine and coarse amenity turf

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L2 Establish plants outdoors

L3 Maintain general amenity turf

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 211

Contribute to Establishing and Maintaining Amenity Turf

Outcome 1

Be able to establish grassed areas from seed and turf

Assessment Criteria

The learner can:

1. **Prepare ground** to receive grass seed or turf
2. **Calculate the required amount of seed** needed for the species mix and the area to be sown
3. Sow grass seed **evenly and at the correct density**
4. Lay **turf** safely.

Unit content

Prepare ground

Clear site of debris and unwanted material including stones prior to commencing ground preparation, which is to include all secondary cultivation, i.e. forking, raking level, stone removal for fine turf, consolidation and development of appropriate tilth. Learners should understand the care required in the preparation of the surface, the accuracy of the level (avoidance of depressions) and sufficiency of consolidation, application of a base fertiliser (if appropriate) to the site at the recommended rate may be required.

The need for a weed and weed-seed free root zone and the use of the stale seedbed technique should be covered. Control techniques should include cultural methods (digging out by hand/mechanical, thermal weeding, and exhaustion); also chemical controls (contact and translocated herbicides).

Calculate the required amount of seed

The application rate will vary with the time of year and the species mix e.g. 30 g per metre squared is a general guide for amenity sowings. Refer to suppliers recommendations for suggested application rates per seed mix. Calculate area of lawn to be created in square meters and multiply by application rate (grams per square meter) to determine quantity.

Evenly and at the correct density

The correct amount of seed is to be weighed/measured out, stirred to mix the species and sown evenly over the area. It is anticipated that the seed will be sown by hand and marking the area into metre squares will be of benefit. The seed should be sown half in one direction and the other half at 90°. Learners will need to practice this technique.

Learners should be able to calculate the required amount of seed for the area to be sown. The application rate will vary with the time of year and the species mix. Some species germinate faster than others and will shade out the slower germinating species if the application rate is too high. A high density of germinating, soft growth will produce more seedling disease and a slower rate to maturity.

Seed should normally be lightly raked into the surface following sowing, avoiding disturbing soil/ground levels already created, the area may require protection from birds.

Turf

Learners should be able to assess that delivered turf is of an appropriate quality (check for presence of pests and diseases weeds and general damage to turfs). Care should be taken with lifting heavy rolls of turf. Smaller sizes may be used if necessary. Laying of turf from boards, using stretcher pattern with no small pieces at the edge. Care must be taken not to stretch the turf during handling and the joints must be as small as possible. The application of a bulky top dressing should be made over the laid turf particularly in the joints and watered in.

Unit 211

Contribute to Establishing and Maintaining Amenity Turf

Outcome 2

Know the establishment of grassed areas from seed and turf

Assessment Criteria

The learner can:

1. Identify **turf grasses** from seed and vegetative characteristics
2. Compare establishment from **seed and** from **turf**
3. State suitable seed mixes for fine and hard-wearing amenity turf
4. Describe the **aftercare** of amenity turf to establishment.

Unit content

Turf grasses

The learner must be able to identify *Lolium perenne*, *Agrostis spp.* and *Festuca rubra* from seeds; and *Lolium perenne*, *Agrostis tenuis*, *Festuca rubra commutata*, *Poa pratensis* and *Phleum pratense* from vegetative characteristics

Seed mixes

Provide suitable examples of seed mixtures for specified fine and hard wearing amenity turf areas

Seed and turf

Seed is cheaper, quicker to apply but takes longer to mature. The species mix can be chosen and seed is usually free of pests, diseases and weeds. It can be stored until needed if weather conditions are unsuitable at the planned time. There is a risk of disturbance to the seed bed by, for example, birds. Seeding requires more attention to ground preparation than turf and requires a longer settlement time. Turf is quicker to maturity with a more immediate visual effect, but is more expensive. Very expensive if a specific species mix is required. Aftercare is easier on turf as long as it is kept watered. Weeds, pests and diseases may be imported with the turf. Turf should be inspected on delivery (cannot not be stored for a long period) to ensure it is relatively free of weeds and free of pests and diseases. It should also be a good colour. Chlorotic turf has probably been rolled for too long and will not establish satisfactorily. Laying turf is heavy and skilled work

Aftercare

Watering in dry weather, keep people off for a suitable period of time to allow for establishment and avoid damage

Seed needs gentle rolling to push any small stones into the surface and encourage tillering when the soil conditions permit (dry enough) Topping off with the mower with sharp blades at about 5 cm, depending on the species sown

The learner should understand the nutritional and pH requirements of new swards

Unit 211

Contribute to Establishing and Maintaining Amenity Turf

Outcome 3

Be able to maintain fine and coarse amenity turf

Assessment Criteria

The learner can:

1. Carry out **maintenance** of fine and coarse turf safely, including cylinder and rotary mowing, scarification, aeration, top-dressing and irrigation
2. Adjust **cylinder and rotary mowers** for use, including adjustment of blades and height of cut.

Unit content

Maintenance

The learner should be able to carry out each operation, understand the effects of each, the frequency and timing of each operation on fine and coarse turf. They should be able to select appropriate machines and equipment for the type of turf and use it safely and efficiently. Maintenance operations must include: mowing (cylinder and rotary), scarifying, aeration, application of bulky top dressing and applying irrigation, (it would be beneficial to include fertiliser application, brushing, pest and disease control). References to the need for autumn or spring renovation should be made.

Cylinder and rotary mowers

Rotary mowers: sharpening, balancing, fitting and setting the height of cut of wheeled and hover types

Cylinder mowers: adjustment of blades and setting of height of cut of pedestrian operated cylinder mowers

Carry out pre-start checks as appropriate to the machine. Refer to manufacturers instructions

Unit 211 **Contribute to Establishing and Maintaining Amenity Turf**

Outcome 4 Know the maintenance of fine and coarse amenity turf

Assessment Criteria

The learner can:

1. Identify common **weeds, pests and diseases** of turf and their relevant control measures
2. Describe the calibration and use of **full width and spinning disc spreaders**
3. Explain the types and uses of **scarifiers and aerators**
4. Describe the advantages and disadvantages of applying **irrigation and fertiliser**

Unit content

Weeds, pests and diseases

A minimum of ten turf weeds (to include grass and broad leaf weeds), 3 pests or signs of pest damage and 3 diseases should be identified. Appropriate and current cultural and/or chemical controls should be stated for each. Cultural controls should include reference to: physical removal and husbandry techniques e.g. mowing, scarification, aeration, pH control. Chemical control should include reference to active ingredients of named appropriate selective herbicides

Full-width and spinning disc spreaders

Calibration and method of working of each type of spreader by reference to make and model (e.g. cyclone – spinning disc) together with reference to manufacturer's instructions; carry out simple calculations, adjust named spreaders in order to accurately calibrate each piece of equipment

Scarifiers and aerators

Identify the types and uses of scarifiers and aerators, both mechanised and pedestrian. Scarifier, uses to include: thatch and debris removal, moss removal, broad leaf weed control and improving surface irrigation. Uses of aerators to include: improvement of sub surface irrigation and aeration of the soil/substrate, together with relieving compaction.

Irrigation and fertiliser

Timing of fertiliser application, the nutrient content required each season, problems of over-feeding and under-feeding, incorrect application rate or application undertaken at the wrong time of year should be covered

Learners will need to appreciate the effects on grass growth and development of the three major nutrients, Nitrogen (N), Phosphorous (P) and Potassium (K) in order to be aware of the advantages and disadvantages of applying differing ratios of each at correct or incorrect points during the year

Effects of drought on the growth and general health of the sward

Frequency and amount of irrigation, applied, matching application to infiltration, timing of application i.e. morning, afternoon, evening or during the night should be covered

Unit 211 Contribute to Establishing and Maintaining Amenity Turf

Notes for guidance

On completion of this unit the learners should have developed skills and knowledge of the establishment and maintenance of amenity turf. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit is designed for those who wish for a career in parks and gardens.

Turf is an important and very visual feature of gardens and the horticulture sector in general, which includes areas for general amenity use and indeed sporting activities. The establishment and maintenance of turf is therefore very important in order to maintain good presentation and for the enhancement of leisure activities.

This is essentially a practical unit, but may be delivered by a wide range of techniques, including lectures, supervised practical work (in a centre or the work-place), discussions, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities and learners should not be asked to undertake tasks beyond their physical capabilities.

Specifically the unit enables the learner to gain an understanding of: the methods of establishing grassed areas from seed and turf, the establishment of grassed areas from seed and turf; the ability to maintain fine and coarse amenity turf and to know the maintenance of fine and coarse amenity turf.

In Outcome 1, learners will be able to safely prepare ground for sowing grass seed and laying turf, appreciating the techniques of primary and secondary cultivation. This will involve the safe use of hand tools, but could also include the use of a rotary cultivator for initial ground preparation, but this is not an essential requirement. Learners will be able to sow grass seed by hand at the appropriate rate for the seed mix and sward being created, together with safely laying turf from boards using stretcher bond pattern, finishing by applying a bulky top dressing. Learners should appreciate the difference between the term “Bulky Top Dressing” and “Top Dressing”, the former generally being a mixture of loam and sand with latter referring to an application of fertiliser.

In Outcome 2, learners must be able give two examples of suitable basic seed mixes for both fine turf (e.g. Bents, Fescues) and hard wearing amenity turf (e.g. Perennial Rye Grass, Timothy) and be able demonstrate that they appreciate the advantages and disadvantages of producing a sward from seed and from laying turf. Together with being able to describe appropriate aftercare techniques, including keeping people off the area, irrigating using suitable application equipment and the first cut.

In Outcome 3, learners should know the benefits of and be able to carry out safely a range of maintenance operations on established turf, including but not restricted to: mowing (cylinder and rotary); scarifying; aeration; application of bulky top dressing and applying irrigation. The learners should also know how to and be able to carry out adjustments to mowers (both cylinder and rotary); with reference to their height of cut which will vary according to the season (spring, summer, autumn, winter). Prestart checks on the mowers' will also have to be undertaken as a routine part of machine utilisation and safe operation.

In Outcome 4, the learner must be able to identify by at least their common names a minimum of 10 turf weeds (to include grass and broad leaf weeds (e.g. *Poa annua*, *Elymus repens*, *Bellis perennis*, *Cerastium fontanum*), 3 pests (e.g. leather jackets, casting worms, cut worms) or signs of pest damage and 3 diseases should be identified. (E.g. Snow Mould, Red Thread, Post Emergence Damping Off). Learners will also need to be able to recognise commonly available seed/fertiliser spreaders i.e. full width and spinning disc and be able to describe their use and how to calibrate them. The outcome must also enable the learner to explain the types and uses of scarifiers and aerators available and be able to identify the advantages and disadvantages

of applying irrigation and fertilisers to the sward. Whilst also recognising that all tasks (including the reasons why) should be undertaken safely, at the correct time of year and in appropriate weather conditions.

Learners should have appropriate access to suitable to uncultivated and fine and coarse amenity turf areas for practical lessons and assessment. Where resources at the centre are limited, visits to parks and gardens would be useful to complement lessons at the centre. However, the learners should have regular access for practical work on amenity surfaces over at least one full season in order to develop their skills to the required level.

All tasks should be done at the correct time of year and in appropriate weather conditions.

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| www.hse.gov.uk | Health and Safety Executive |
| www.the-gtc.co.uk | The Green Keepers Training Committee |
| www.bigga.org.uk | British and International Golf Greenkeepers Association |

Unit 212

Contribute to Establishing and Maintaining Specialist Horticultural Features

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of how to contribute to establishing and maintaining of specialist decorative features, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to develop the skills and knowledge to deal with the specialist decorative areas found within prestige parks and gardens.

Learning outcomes

There are **two** learning outcomes to this unit. The learner will:

1. Be able to establish and maintain specialist plants and horticultural features
2. Know the planting and maintenance requirements of specialist plants and horticultural features

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L4 Establish and develop decorative amenity areas

L8 Establish interior plant displays

L9 Maintain interior plant displays

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 212

Contribute to Establishing and Maintaining Specialist Horticultural Features

Outcome 1

Be able to establish and maintain specialist plants and horticultural features

Assessment Criteria

The learner can:

1. **Plant and maintain alpine plants and features**
2. **Plant and maintain wall shrubs and climbing plants**
3. **Establish and maintain aquatic plants and features**
4. Contribute to the **construction of garden ponds and water features**
5. **Plant and maintain hanging baskets and containers**
6. **Plant and maintain indoor plant displays**

Unit content

Plant and maintain alpine plants and features

Alpines may be planted in a rock garden, scree, alpine trough or other alpine feature.

Planting includes any immediate aftercare required, such as mulching and watering.

Maintenance may include deadheading, cutting back, division, weeding, feeding and watering, and maintenance of gravel mulch, winter protection, autumn leaf clearing, as appropriate

Plant and maintain wall shrubs and climbing plants

Depth of planting and required firming for different species, correct distance for the support/ wall, including providing any necessary support and training the plant to the support and immediate aftercare required
Maintenance includes any necessary pruning and training, in addition to deadheading, weeding, feeding and watering

Establish and maintain aquatic plants and features

Establishing an aquatic plant in a planting basket

Contribute to the maintenance of a water feature, which could be division of pool plants, removal of aquatic weeds and dead leaves

Construction of garden ponds and water features

Fibreglass, butyl liner, UV stabilised plastic, concrete, clay: materials and construction methods, advantages and disadvantages of each type, pond dimensions for balanced ecosystem, equipment and specific plants for aeration

Plant and maintain hanging baskets and containers

Preparation of the basket/container and growing medium, planting of hanging baskets and containers, deadheading, watering and feeding

Plant and maintain indoor plant displays

Prepare plants, containers and growing medium and plant indoor plants, and provide immediate aftercare, to include watering and feeding, cleaning, pest and disease monitoring and specific requirements such as topping up/ re-potting, pruning training, deadheading

Unit 212

Contribute to Establishing and Maintaining Specialist Horticultural Features

Outcome 2

Know the planting and maintenance requirements of specialist plants and horticultural features

Assessment Criteria

The learner can:

1. **Identify** at least 10 of each of the following:
 - Alpine plants
 - Wall shrubs and climbing plants
 - Aquatic plants
 - Plants suitable for hanging baskets and containers
 - Indoor plants
2. Describe the specific **planting requirements** of each of the following:
 - Alpine plants
 - Wall shrubs and climbing plants
 - Aquatic plants
 - Plants suitable for hanging baskets and containers
 - Indoor plants
3. State the specific **maintenance requirements** of each of the following:
 - Alpine plants
 - Wall shrubs and climbing plants
 - Aquatic plants
 - Plants suitable for hanging baskets and containers
 - Indoor plants

Unit content

Identify

At least 10 **alpine plants**, by genus, species and, where appropriate, cultivar or variety. This may be from plants in situ or representative specimens

At least 10 **walls shrubs/climbing plants**, by genus, species and, where appropriate, cultivar or variety

At least 10 **aquatic plants**, by genus, species and, where appropriate, cultivar or variety. These should include deep water plants, oxygenators/marginals/bog garden and may be in situ or from representative specimens

At least 10 plants, by genus, species and, where appropriate, cultivar or variety, that are suitable for use in **hanging baskets and containers**, including trailing, annuals and tender perennials

At least 10 plants for **indoor displays**, by genus, species and, where appropriate, cultivar or variety

Planting and maintenance requirements

Alpine

Soil requirements: preparation required for alpiners, planting season, free draining, pH as appropriate for species, depth of planting, firmness, benefits of gravel mulching

Plants: low and spreading, conifers, bulbs, shrubs

Range of maintenance activities: dead-heading, cutting back, division, weeding, maintenance of gravel mulch as appropriate, pests and diseases of specific plants

Wall shrubs and climbers

Characteristics, advantages and disadvantages of wall shrubs and climbers

Sites suitable for wall shrubs and climbers: fences, walls, trellis, pergolas

Aspect: specific species for north, east, south, west facing and for growing through trees and windy areas

Immediate aftercare: watering, training to support, mulching, labelling as appropriate

Soil requirements: Drainage/water retention, pH as appropriate for species, depth of planting; firmness, support required.

Range of maintenance activities: dead-heading, pruning and training, weeding, feeding and watering, maintenance of mulch as appropriate, pests and diseases of specific plants

Pruning requirement of specific species, including Clematis groups, climbing, rambling and wall-trained roses, Pyracantha, Wisteria

Aquatic plants and features

Planting pond containers, suitable growing medium, planting method and establishment, season for planting

Health and safety requirements when working with pools/water features, including the use of electrically powered equipment

Maintenance includes algae and weed control, division of plants, pest and disease monitoring, prevention/removal of autumn leaf fall, control of icing, emptying and cleaning out

Hanging baskets and containers

Types of container available, suitable plants for winter, summer and long-term displays, benefits of water retaining polymers and controlled release fertiliser, drainage, lining materials

Decorative planting schemes, plant habit, aspect, colour harmony, foliage contrasts, seasonality

Maintenance to include watering/ feeding, pest and disease monitoring, deadheading, re-potting and topping up

Indoor plant displays

Attractive displays, containers, choice of plant material- foliage/flowering/ plant combinations/colour and texture, seasonal interest

Watering and feeding, cleaning, pest and disease monitoring and specific requirements such as topping up/re-potting, pruning training, deadheading

Frequency of maintenance

Unit 212 **Contribute to Establishing and Maintaining Specialist Horticultural Features**

Notes for guidance

This unit deals with the decorative features found in many prestige gardens and parks that require specialist skills and knowledge. The skills and knowledge and understanding within this unit are essential to people working as practitioners in these areas. The two outcomes of the unit cover alpine, wall shrubs and climbers, aquatic plants and features, hanging baskets and containers together with indoor plants, along with the development of plant identification skills. The learner should contribute to establishment of the various features, their installation and aftercare.

In Outcome 1, the learner will be able to plant and maintain a wide range of specialist horticultural features and develop an understanding of their establishment and maintenance requirements. The unit requires learners to carry out relevant tasks thus developing their practical skills. The unit covers the planting and maintenance of alpine plants and features, aquatic plants and features, garden ponds and water features, hanging baskets and containers and indoor plant displays.

The delivery of this outcome should be as practical as possible and learners should be encouraged to develop a wide range of practical skills and techniques. The unit covers preparation of the area, planting and establishment methods, immediate aftercare and maintenance requirements.

Learners must contribute to the preparation of growing medium and individually pot off a minimum of twenty plants, and pot up a minimum of twenty pot plants and be able to provide immediate aftercare which may include staking, tying, stopping, pinching and watering.

In Outcome 2, the learner will be able to identify at least ten plants from within each of the groups specified (alpine, wall shrubs and climbers, aquatic plants and features, hanging baskets and containers together with indoor plants). The enhancement of plant identification skills also has a vital role to play in the learners' development. Learners will develop an understanding of the establishment and maintenance of a wide range of plants.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities and learners should not be asked to undertake physical tasks beyond their physical capabilities.

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Unit 213

Participate in Providing Estate Maintenance

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of estate skills and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The aim of this unit is allow learners from a range of land-based disciplines to develop the skills and knowledge to maintain boundaries, surfaces or habitats.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to select, transport and use a range of hand tools and equipment for estate maintenance
2. Be able to maintain estate boundaries
3. Be able to maintain surfaces or habitats
4. Know how to work safely and minimise environmental damage

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU2.2 Maintain good standards of health and safety for self and others

CU20.1 Maintain structures and surfaces

CU20.2 Repair structures and surfaces

CU22.1 Construct, maintain and repair boundaries

CU23.1 Construct, maintain and repair paths

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SCC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 213

Participate in Providing Estate Maintenance

Outcome 1

Be able to select, transport and use a range of hand tools and equipment for estate maintenance

Assessment Criteria

The learner can:

1. Select appropriate **tools and equipment** for specific **estate maintenance tasks**
2. **Lift tools and equipment safely** using appropriate techniques
3. **Transport and use tools** and equipment **safely**
4. **Maintain and store** tools and equipment according to instructions

Unit content

Tools and equipment

Selection of appropriate tools and equipment (hammer, saw, spade, shovel, pickaxe, post driver, wire strainers, hoe, rake, fork, secateurs, shears, power tools)

Estate maintenance tasks

Constructing, maintaining and mending boundaries, structures and surfaces

Lift tools and equipment safely

Use of appropriate safe lifting techniques, in line with manual handling guidelines and Manual Handling Operations Regulations 1992, straight back, bend knees

Transport and use tools safely

Manual transport, mechanically assisted transport, security of tools

Maintain and store

Routine maintenance, (preparation, checking, adjusting, cleaning), storage, according to instructions

Unit 213

Participate in Providing Estate Maintenance

Outcome 2

Be able to maintain estate boundaries

Assessment Criteria

The learner can:

1. Assess the **condition of boundaries** to determine the maintenance requirement
2. Carry out **routine maintenance** of boundaries safely
3. Carry out **routine repairs** of boundaries safely
4. Dispose of **waste materials** in line with instructions

Range

Boundaries

Living boundaries: hedge, bank, ditch

Constructed boundaries: fence (post and rail, post and wire, electric, netting), wall (stone, brick)

Unit content

Condition of boundaries

Identified purpose, fitness for purpose, visual appearance, state of repair, health and safety implications (for people, livestock or vehicles and access)

Routine maintenance

Appropriate identified maintenance tasks, for example trimming hedges, clearing ditches, restoring banks, checking and adjusting wire tension, improving/maintaining access infrastructure (for example gaps, gates, stiles)

Routine repairs

Appropriate identified repair tasks (wood, brick or stone replacement or treatment)

Waste materials

By-products of repair or maintenance (hedge clippings, debris, litter, rotten wood)

Unit 213

Outcome 3

Participate in Providing Estate Maintenance

Be able to maintain surfaces or habitats

Assessment Criteria

The learner can:

1. Assess the condition of **surfaces** or **habitats** to determine the maintenance requirement
2. Carry out appropriate **maintenance or repairs** of surfaces or habitats

Unit content

Surfaces

Appropriate to the sector: solid (decking, concrete, paving), loose (gravel, wood chippings, sand), horse riding arena surfaces

Habitats

Appropriate to the sector: pond, woodland, heath, field margins, grassland, grazing land

Maintenance or repairs

Identified tasks: adding surface, applying a surface treatment, levelling surface, clearing or restoring a habitat, improving/maintaining access infrastructure (for example boardwalks, stone pitching, grass sward management)

Unit 213

Participate in Providing Estate Maintenance

Outcome 4

Know how to work safely and minimise environmental damage

Assessment Criteria

The learner can:

1. State the current environmental and health and safety **legislation and codes of practice**
2. Describe how to overcome **problems** presented by **services**
3. Describe how **environmental damage** can be minimised
4. Describe how **organic and inorganic waste** may be **disposed** of

Unit content

Legislation and codes of practice

Health and Safety at Work etc Act 1974, Control of Substances Hazardous to Health Regulations (2002) (COSHH), Waste Management (England and Wales) Regulations 2006 (as amended 2008)

Problems

Damage, leakage, disruption to supply, health and safety/emergency procedures, reporting to supervisor

Services

Water, electricity, gas, telephone

Environmental damage

Pollution (water courses, through litter or debris, noise), damage to habitats, wastage of resources

Disposal of organic and inorganic waste: organic waste (recycling, composting, chipping, burning), inorganic waste (recycling, discarding safely, landfill)

Organic and inorganic waste

Organic: wood and plant products, soil, weeds, green waste, animal dung and waste

Inorganic: metal, plastics, concrete, brickwork, oils and lubricants

Disposed

Organic: composting, recycling, chipping, burning, burial

Inorganic: recycling, landfill, approved disposal contractor

Unit 213 Participate in Providing Estate Maintenance

Notes for guidance

This unit has a very practical focus and aims to enable learners to develop estate skills which can be applied to a range of situations and circumstances. The unit has been written such that naturally occurring and locally relevant opportunities can be used in selecting boundaries, structures and surfaces, to repair and maintain.

As learners will be engaged in practical activity there should be an emphasis on safe working practices, including the use of appropriate Personal Protective Equipment (PPE) and appropriate risk assessments should be undertaken. Learners should also be made aware of the impact on the environment, and sustainability concepts should also be demonstrated where possible. Where learners are using tools, they should be supervised and must be made aware of the safety of themselves and others around them.

Learners should have the opportunity to undertake estate skill activity in a setting appropriate to their area of work wherever possible to maximise the vocational relevance. It will be most beneficial if the structures, boundaries, and surface or habitat selected are for a clear purpose.

Outcome 1 is likely to be predominantly practical, as learners are required to select and safely transport and use a range of hand tools. It is not expected that learners demonstrate a practical ability for the full range shown in the unit content, but a minimum of four hand tools should be covered.

Outcomes 2 and 3 require opportunities for supervised practical experience. This may link with an appropriate work placement. It is anticipated that the tutor will guide selection of the repair or maintenance work required. It is particularly important that due regard is given to health and safety, including the use of appropriate PPE.

Outcome 4 will be largely embedded throughout delivery of the practical aspects of this unit. Learners should view working safely, with due regard to the environment as an integral feature of estate skills tasks, rather than as stand alone components.

It is anticipated that most delivery of this unit will take place in a practical setting, with supervised practice of skills. Delivery will also include some classroom based activity in ensuring learners have a good understanding of safe techniques and underpinning knowledge.

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www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of agriculture and Rural Affairs (Northern Ireland)
www.fwag.org.uk	Farm Wildlife and Advisory Group
www.hse.gov.uk	Health and Safety Executive
www.lantra.co.uk	Lantra Sector Skills Council

Unit 214

Environmental and Land-based Business

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of business within the environmental and land-based sector, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will investigate the structure of one industry within the land-based sector and the principal organisations within it. They will explore regulations and legislation relevant to that industry. The learner will develop the knowledge of common business operations and the simple administrative tasks.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know an industry within the environmental and land-based sector
2. Know the relevant legislation and codes of practice within the environmental and land-based sector
3. Know common business operations
4. Know how to carry out simple administrative tasks

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 214

Environmental and Land-based Business

Outcome 1

Know an industry within the environmental and land-based sector

Assessment Criteria

The learner can:

1. Describe the **structure** of one industry within the environmental and land-based sector covering:
 - size
 - employment
 - main activities
 - geographical influence
 - economic contribution
2. Identify the **principal organisations and trade associations** within an industry in the environmental and land-based sector.

Unit content

Structure

Features and characteristics of the industry, different types of businesses and organisations and the type of goods and services they provide, size of these businesses/organisations e.g. numbers employed, regional differences, allied industries (what they are, the goods and services they supply and the role they play), trends and issues currently affecting the industry

Principal organisations and trade associations

Roles and aims of key selected organisations in the industry e.g. statutory, Department for Environment, Food and Rural Affairs ((Defra) England), Welsh Assembly Government (Wales), Scottish Executive Environment and Rural Affairs Department (SEERAD), or Department of Agriculture and Rural Affairs (DARD (Northern Ireland), Health and Safety Executive, Department of Trade and Industry (DTI), Environment Agency, Food Standards Agency, non-governmental, major land-owning or representative e.g. The Royal Society for the Prevention of Cruelty to Animals (RSPCA), British Veterinary Association (BVA), Royal Horticultural Society (RHS), Institute of Groundsmanship (IOG), Lantra Sector Skills Council, British Horse Society (BHS), National Farmers Union (NFU), National Trust, Natural England

Unit 214

Environmental and Land-based Business

Outcome 2

Know the relevant legislation and codes of practice within the environmental and land-based sector

Assessment Criteria

The learner can:

1. Identify the main United Kingdom or European **legislation and codes of practice** relating to one industry within the environmental and land-based sector
2. Identify key requirements of current **employment law** on the environmental and land-based sector

Unit content

Legislation and codes of practice

United Kingdom legislation: consideration of the main relevant current legislation relating to an industry in the land and environment sector for example Agriculture Tenancies Act (1995), Animal Health Act (2002), Welfare of Animal (Transport) Order 2006, Animal Welfare Act 2006, Environment Protection Act 1990 (as amended 1995), Control of Pesticides Regulations 1986 (COPR), Riding Establishments Act 1970, Horse Passports (England) Regulations 2004, Control of Dogs Order 1992, Dangerous Dogs Act 1991 (as amended 1997), codes of practice e.g. welfare of farm or companion animals

European legislation: relevant European directives e.g. relating to employment, the environment and the specific industry in the land and environment sector

Employment law

The main relevant current legislation relating to employment e.g. Health and Safety at Work etc Act 1974, Control of Substances Hazardous to Health Regulations (2002) (COSHH), Working Time Regulations 1998 (as amended 2002), Disability Discrimination Acts 1995 (as amended 2005), Employment Act 2002, National Minimum Wage Act 1998, Race Relations Act 1976 (as amended 2003), Sex Discrimination Act 1975

Unit 214

Environmental and Land-based Business

Outcome 3

Know common business operations

Assessment Criteria

The learner can:

1. Describe how **common IT software** can be used in everyday business operations
2. State the purpose and operation of **common business tasks**
 - financial and banking
 - marketing
 - administrative tasks

Unit content

Common IT software

Examples of business uses of: word processor (e.g. letters, notices), spreadsheets (e.g. records, timesheets), database (e.g. records), graphics (e.g. advertisements, posters), e-mails

Common business tasks

Financial and banking: taking payments by cash, cheque, debit card and credit card, ordering procedure for supplies, invoices, types of bank account (current, savings), loans, overdraft, methods of payment (debit card, cheques, bank giro credit, standing order, direct debit)

Marketing: ways to promote a business (advertisements, promotional events, referral / word of mouth, importance of customer care), preparation of promotional materials

Administrative tasks: file documents, complete simple records (e.g. production, customers), check stock levels and complete stock control records, communicate using written and electronic media, importance of security and confidentiality of business records

Unit 214

Environmental and Land-based Business

Outcome 4

Know how to carry out simple administrative tasks

Assessment Criteria

The learner can:

1. Use appropriate methods to **prepare, present, sort and retrieve information**
2. Carry out simple **accounting and administrative tasks** appropriate to the business

Unit content

Prepare, present, sort and retrieve information

Use of IT and paper filing systems, completion of simple business records, preparation of business documents (e.g. letters, advertisements)

Accounting and administrative tasks

Completion of orders, invoices, cheques, conduct stock check and complete stock records

Unit 214 Environmental and Land-based Business

Notes for guidance

This unit can be applied to any of the industries in the environmental and land-based sector, and delivery should be specifically tailored to the vocational interests of learners and the qualification being studied. They will learn about the industry and legal context in which businesses in the chosen sector takes place, and important operations necessary to manage a business.

In Outcome 1, learners will study the structure of their industry. They may be encouraged to represent graphically the range of businesses and their products/services, and also the ancillary businesses on which the primary businesses depend. They could relate these ideas to a specific business, whilst also investigating the range of businesses found locally and nationally. Learners will also find out about the principal organisations and trade associations concerned with their industry, and will investigate the roles and impact of selected organisations. They will investigate some of the key trends and issues facing their industry and how it is responding. Delivery of this outcome would be enriched by speakers from selected organisations.

Outcome 2 examines the UK and European legal framework affecting businesses in the particular land-based industry. Learners are not expected to become legal experts, but to develop an awareness of the main pieces of legislation and how they impact on business in their industry. Delivery of this outcome could be enhanced by guest speakers with experience of running a business or becoming self employed for the first time.

In Outcome 3, learners will identify how common IT software can be used to perform a range of everyday business operations. Some of these are common to all businesses (e.g. writing letters), but tutors should ensure that examples are vocationally relevant to the subject area of the learners. It would be helpful for learners to have the opportunity to practice some of the IT skills to carry out simulated business tasks. Learners should find out about day-to-day business activities involving finance and banking, but will not be expected to learn about accounts. It would help learners to have the opportunity to study a range of records (financial and non-financial) that are kept in a specific business, and how these are maintained and used.

Outcome 4 links closely with Outcome 3 and gives learners the opportunity to understand and engage in operations and tasks identified previously. This should include preparing a range of business outputs using the IT applications listed. These could relate to other items in the content, e.g. advertisements, posters, specific records appropriate to businesses in their industry. They will also complete examples of paper based records and ensure that both IT and paper records are filed appropriately.

References

Books

Carysforth, C. Neild, M. 2006. *BTEC First Business*. 2nd ed. Oxford: Butterworth Heinemann.
Canwell, D., Sutherland, J. 2006. *BTEC First Business*. Cheltenham: Nelson Thornes.

Websites

www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.wales.gov.uk	Welsh Assembly Government
www.scotland.gov.uk	Scottish Executive Environment and Rural Affairs Department
www.dardni.gov.uk	Department of Agriculture and Rural Affairs (Northern Ireland)
www.bized.ac.uk	Business Education Websites
www.hse.gov.uk	Health and Safety Executive
www.dti.gov.uk	Department for Trade and Industry

www.environment-agency.gov.uk	Environment Agency
www.food.gov.uk	Food Standards Agency
www.rspca.org.uk	Royal Society for the Prevention of Cruelty to Animals
www.bva.co.uk	British Veterinary Association
www.rhs.org.uk	Royal Horticultural Society
www.iog.org.uk	Institute of Groundsmanship
www.lantra.co.uk	Lantra Sector Skills Council
www.bhs.org.uk	British Horse Society
www.nfuonline.com	National Farmers Union
www.nationaltrust.org.uk	The National Trust
www.naturalengland.org.uk	Natural England

Unit 215

Contribute to Fruit and Vegetable Cultivation

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of how to contribute to fruit and vegetable cultivation, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to develop the skills and knowledge to cultivate fruit and vegetables on a non-commercial situation, for example within prestige parks and gardens. The unit focuses on small-scale production of a wide range of crops. Learners will deal with root, leafy, leguminous and salad vegetables, cane and bush fruit and strawberries and apples, pear, plums and cherries.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Be able to establish and maintain vegetable and salad crops
2. Be able to establish and maintain soft fruit crops
3. Be able to establish and maintain top fruit

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L2 Establish plants outdoors

CU76 Maintain plants outdoors

PH3.3 Remove unwanted plant growth to maintain development

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 215

Contribute to Fruit and Vegetable Cultivation

Outcome 1

Be able to establish and maintain vegetable and salad crops

Assessment Criteria

The learner can:

1. Prepare ground by **hand methods** to receive vegetable crops
2. Establish vegetables by **sowing and planting young plants**
3. **Maintain** established crops outdoors and under cloches to harvest or maturity
4. Describe the **planting, maintenance, harvesting and storage** requirements of a range of vegetables and salad crops.

Unit content

Hand methods

Control/remove weeds and general debris, digging (single/double), (use of a rotary cultivator may be beneficial but it is not essential) forking, treading, raking and levelling; production of required tilth, addition of organic matter, application of fertiliser as required, lime as required by specific crops

Sowing and planting young plants

Sowing in flat bottomed, deep and shallow drills

Planting young plants/transplants to a line

To include row and plant spacing, depth of sowing and planting, immediate aftercare- watering, labelling

Maintain

Crops outdoors and under cloches

To include watering, thinning out, gapping up, feeding, support (e.g. use of bamboo canes, pea sticks), weed control, use of cultural pest and disease control and awareness of biological pest control methods, harvesting and cleaning operations specific to the crop

Planting, maintenance, harvesting and storage

Specific sowing, plant raising, planting, harvesting and storage requirements of a range of root crops, leafy crops, legumes, bulbs and salad crops, including row and plant spacing, depth of sowing and planting and their affect on yield, size and success rate.

Crop rotation, seasonality, timing of sowing and planting, successional sowing, station sowing, intercropping
Thinning, watering, weed control, pest and disease monitoring, harvesting and storage requirements of different crops

Health and safety and environmental issues; tools required for hand cultivation; cultivation methods appropriate to different soil types

Unit 215

Outcome 2

Contribute to Fruit and Vegetable Cultivation

Be able to establish and maintain soft fruit crops

Assessment Criteria

The learner can:

1. **Plant** soft fruit plants
2. Carry out **maintenance** cane fruit, bush fruit and strawberries
3. **Prune and train** soft fruit
4. Describe the **planting, maintenance, harvesting and storage** requirements of a range of soft fruit, including the use of certified stocks.

Unit content

Plant

Cane fruits, bush fruits and strawberries, plant spacings and depth of planting

Maintenance

Weed control, mulching, watering, pest and disease monitoring, use of cultural control methods (e.g. bird netting, slug traps) other crop specific activities e.g. training

Prune and train

This should include pruning of a bush fruit and pruning and training of a cane fruit

Planting, maintenance, harvesting and storage

Main types of bush fruit: blackcurrants, red/white currants, gooseberries and cultivars suitable for the locality.

Main types of cane fruits: raspberries, blackberries, hybrid berries and suitable cultivars

Soil preparation required for soft fruit planting

Immediate aftercare and pruning, planting depths and spacing's

Certified fruit stocks

Routine maintenance of bush and cane fruits; feeding, watering, mulching, weed control, pest and disease monitoring, pruning and training methods

Cultivars of strawberries for succession of harvesting; early, main and perpetual

Rotation of strawberry crops, maintenance of strawberry crops including weeding, watering and feeding, pest and disease monitoring, plus mulching/strawing down, runner control and de-leafing, de-blossoming, frost protection timing and handling during harvest and storage

Unit 215

Outcome 3

Contribute to Fruit and Vegetable Cultivation

Be able to establish and maintain top fruit

Assessment Criteria

The learner can:

1. Carry out **maintenance and pruning** of top fruit, including restricted and unrestricted forms
2. Explain the use of **rootstocks** for apples, pears, plums and cherries
3. Describe the requirements for **successful pollination** of top fruit
4. Describe a range of methods of **training top fruit** to meet specific purposes
5. Describe the **planting, maintenance, harvesting and storage** requirements of top fruit.

Unit content

Maintenance and pruning

Learners should carry out pruning of bush apple trees and cordon or espalier apples or pears at the appropriate times of year and be aware of the potential consequences of inappropriate pruning and timing of operations.

Rootstocks

Rootstocks covered should include the reasons for use and benefits of at least M9, M26, MM106, Quince A/C, Pixy, and Colt

Successful pollination

Pollination groups, cultivars flowering at the same time, compatible cultivars, self-fertile cultivars and cross pollination, use of crab cultivars and bee hives for pollination

Training top fruit

Dwarf pyramid and spindle bush to increase yield- affects of tying down branches.
Cordons, espaliers, fans; methods, timing of operations, pruning techniques

Planting, maintenance, harvesting and storage

Apples, pear, plums and cherries and suitable cultivars of each
Soil preparation/improvement and depth required for planting.
Planting distances for bush and intensively trained trees
Site requirements: aspect, soil, drainage, fertility, pH, shelter, frost
Weed control, mulching, feeding and watering, pest and disease monitoring, pruning and training. Timing and handling during harvest. Storage conditions for apples and pears

Unit 215 Contribute to Fruit and Vegetable Cultivation

Notes for guidance

This unit deals with the cultivation of fruit and vegetables in non-commercial situations, for example, where required for demonstration gardens or for use in large households and specialist restaurants. These are typical of many historic houses open to the public, as well as private residences.

The cultivation and management of vegetables and salads, soft and top fruit are dealt with within this unit. Learners should be familiar with a wide range of fruit and vegetable crops, with all the main groups covered. Learners should have access to areas for the production of vegetable crops and strawberries and a variety of established soft and top fruit, including restricted forms for practical lessons and assessment. Visits to demonstration gardens/historic gardens would be useful to complement lessons and activities at the centre.

In Outcome 1, the learner must carry out hand ground preparation techniques, prior to undertaking sowing and planting of a range of vegetables. This must cover single and double digging and the reasons and benefits of such techniques. Learners should also be made aware of the “no dig” technique. Learners must carry out and be able to describe the planting, maintenance, harvesting and storage of a range of vegetables and salads. To include at least one root crop, one leafy crop, one legume and one salad crop

In Outcome 2, the learner must carry out hand ground preparation techniques, prior to undertaking the planting of at least one type of fruit. Learners must carry out and be able to describe the planting, maintenance (including training), harvesting and storage of a range of soft fruit, including the use of certified stock. Learners must demonstrate that they know the difference between cane fruit and bush fruit, (and top fruit) and the meaning of certified stock.

In Outcome 3, learners should carry out relevant maintenance, training and pruning techniques on at least one type of top fruit (apple, pear, plum, cherry) and understand the reasoning behind the tasks, together with the timing of operations. Learners must be able to define the term ‘rootstock’, giving examples and benefits, (M9, M26, MM106, Quince A/C, Pixy, Colt) as well as demonstrating knowledge of the pollination requirements, explaining the terms ‘compatible cultivars’, ‘self-fertile cultivars’ and ‘cross pollination’. Learners must be able to describe methods of planting, maintenance (including training), harvesting and storage of a named top fruit. The ability to undertake associated practical activities would enhance the learning experience.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities and learners should not be asked to undertake physical tasks beyond their physical capabilities. All tasks should be undertaken at the correct time of year and in appropriate weather conditions.

References

Books

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- Brickell C. 2003. *RHS Pruning and Training*. 2nd ed. Essex: Dorling Kindersley Publishers.
- Baker. H. 1998. *RHS The Fruit Garden Displayed*. 9th ed. London: Cassell Illustrated.
- Larkcom. J. 1994. *The Vegetable Garden Displayed*. London: Batsford Ltd.

Websites

www.rhs.org.uk Royal Horticultural Society

Unit 216

Contribute to Fruit Production by Organic Methods

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of fruit production by organic methods, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop the skills and knowledge to be able to grow fruit crops by organic growing methods.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to grow soft fruit crops organically
2. Understand the requirements of soft fruit crops
3. Be able to grow top fruit crops
4. Understand the selection and production of top fruit crops

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

No direct link with NOS.

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 216

Contribute to Fruit Production by Organic Methods

Outcome 1

Be able to grow soft fruit crops organically

Assessment Criteria

The learner can:

1. **Prepare ground** by organic methods
2. **Plant** cane fruit and strawberry runners
3. **Prune** cane and bush fruits
4. Provide support for and **train** soft fruit crops

Unit content

Prepare ground

Remove weeds by hand and general debris, digging (single/double), (use of a rotary cultivator may be beneficial but it is not essential) forking, treading, raking and levelling; production of required tilth; addition of organic matter (primary and secondary cultivations). This must cover single and double digging and the reasons and benefits of such techniques including the 'no dig' technique of production

Plant

Trench plant raspberry plants; pit plant bush and trowel plant strawberry runners. Pre-soak in preparation for planting (as required), inspect plants prior planting, take out trench/pit/hole of adequate dimensions, cultivate base and side (if appropriate), add organic material (if appropriate), position plants at correct depth and spacing, return soil and firm, prune back to required height (if appropriate), label and mulch

Prune and train

Select suitable hand tools and equipment, assess pruning requirements for bush and cane fruit (summer and autumn fruiting) prune appropriately, train and secure as necessary, tidy up site and remove arisings and dispose of in accordance with accepted practice

Unit 216

Contribute to Fruit Production by Organic Methods

Outcome 2

Understand the requirements of soft fruit crops

Assessment Criteria

The learner can:

1. Review the **soft fruit** crops grown in the UK
 - cane fruit, bush fruit and strawberries
 - methods of plant raising
 - maintenance and pruning
 - support and training
 - pests and diseases of specific crops
2. Explain the **purpose** of certified fruit stocks
3. Describe the **harvesting and storage requirements** of soft fruit crops

Unit content

Soft fruit

Raspberries, blackberries, gooseberries, red/white or black currants, blueberries and strawberries

Define terms cane fruit and bush fruit. Plant raising including vegetative propagation by hardwood cuttings and for strawberries use of plantlets from runners, maintenance to include; weed control, mulching, irrigation, feeding, training and tying in as appropriate. Pruning of cane and bush fruit including first year and annual routine pruning, techniques, framework to be encouraged and timing, with common pest and disease (minimum of 3 of each) identified and control methods highlighted

Purpose

Certified stock; to include an explanation of the term, higher re-sale value than non certificated stock, virus free, more vigorous, less prone to diseases and disorders, likely to produce a heavier yield

Harvesting and storage requirements

Picking, timing, methods used for dessert fruit, processing, manual, mechanical, bulk handling, pre cooling, refrigeration, sorting/grading, weighing, packaging, packed in the field, labelling (related to end market), need for careful handling to avoid bruising and damage at all stages

Unit 216

Contribute to Fruit Production by Organic Methods

Outcome 3

Be able to grow top fruit crops

Assessment Criteria

The learner can:

1. **Plant** a light standard tree
2. Winter **prune** an apple tree
3. **Thin out fruitlets**

Unit content

Plant

Container grown/containerised and bare root. Check plant material prior to planting; health and condition, carry out pre-planting pruning as necessary. Preparation of planting pit/hole, depth of planting pit/hole, soil amelioration, location of plant in relation to finished soil level, firming, mulch, provide support; appropriate for type planted e.g. tree stake (short/long) and tie(s), removal of waste and ethical disposal, time of year. Learners should be able to plant and stake one bare root fruit tree

Prune

Prune an unrestricted form of apple in winter, summer prune a restricted form in summer e.g. Cordon, espalier, fan trained or step over

Reasons for pruning, timings and techniques to encourage/discourage vegetative growth and to encourage fruit bud formation

Thin out fruitlets

Thin out fruitlets by hand on one apple, pear or plum at the appropriate time, reduce to appropriate number of fruitlets to obtain required end size and quality of fruit

Unit 216

Outcome 4

Contribute to Fruit Production by Organic Methods

Understand the selection and production of top fruit crops

Assessment Criteria

The learner can:

1. **Review the top fruit** crops grown in the UK
 - apples, pears, plums and cherries
 - purchase and site preparation
 - suitable site and climate
 - maintenance and pruning
 - harvesting and storage
 - pests and diseases of specific crops
2. Describe the **formative and routine pruning and training** of restricted and unrestricted top fruit growth forms
3. Review the **rootstocks** available for apples, pears, plums and cherries and the affects of the rootstock on the subsequent plant
4. Explain the **selection** of top fruit cultivars to ensure pollination compatibility, effective fertilisation and succession of harvest.

Unit content

Review the top fruit

Apples, pears, plums and cherries

Forms, cordons, espaliers, fan, step over, standard, spindle bush. Purchase and site preparation, suitable site and climate, maintenance pruning and timing, harvesting and storage, pest diseases of specific crops

Define term 'top fruit' with examples, maintenance to include checking tree supports and ties, weed control, mulching, irrigation, feeding, pruning/training and tying in as appropriate, shape and framework to be encouraged, with common pest and disease (minimum of 3 of each) identified and control methods highlighted.

Formative and routine pruning and training

Formative pruning; to create vigour and build framework, routine pruning; to enhance yield of the forms; cordons, espaliers, fan, step over, standard, spindle

Rootstocks: selection

Rootstocks for apples, pear, plums and cherries, e.g. Apples, M27 very dwarfing, M9 dwarfing M26 semi-dwarfing, M06 semi - vigorous, M11 semi –vigorous.

Effect of; soil type on vigour, disease resistance, rootstock scion compatibility

Cultivars: availability, consumer preference, disease resistance, time of flowering, ability to fertilise other cultivars

Unit 216 Contribute to Fruit Production by Organic Methods

Notes for guidance

The learner will be able to develop the skills and knowledge involved in the cultivation of fruit by organic methods.

In Outcome 1, the learner must carry out by hand and be able to describe organic ground preparation techniques, prior to planting (trench/pit) cane, bush fruit and strawberries including bare root and container grown. Learners must carry out and be able to describe the planting, maintenance, pruning, training and support techniques, including assessing pruning requirements for bush and cane fruit (summer and autumn fruiting). Learners must demonstrate their awareness of the correct time of year and the appropriate weather conditions in which to carry out the tasks and the importance of removing and disposing appropriately all debris/arising.

In Outcome 2, learners will be able to review the soft fruit crops grown within the UK and be able to grow a range of soft fruit by organic methods. They will be able to prepare the ground to plant cane, bush and strawberry runners, provide the required support and subsequently prune and train as appropriate. Learners must demonstrate their ability to identify raspberries, blackberries, gooseberries, red/white or black currants, blueberries and strawberries and be able to define the terms cane fruit and bush fruit. They will need to know the purpose and benefits of certified fruit stocks. Knowledge of how the plants may be raised, including vegetative propagation by hardwood cuttings and for strawberries use of plantlets from runners will be covered. The learner will also know about weed control, mulching, irrigation, feeding, training and tying in as appropriate, including harvesting and storage requirements. Learners must identify common pests and diseases (minimum of 3 of each) together with control methods.

In Outcome 3, learners need to satisfactory demonstrate that they can plant a light standard tree either container grown or bare root. Learners must prune an unrestricted form of Apple in winter, summer prune a restricted form in summer e.g. Cordon, espalier, fan trained or step over and demonstrate their knowledge of the reasons for pruning, timings and techniques to encourage/discourage vegetative growth and to encourage fruit bud formation. They will also need to thin out fruitlets by hand. Learners will be able to describe formative and routine pruning of unrestricted and restricted forms such as; standard, spindle bush, cordons, espaliers, fan trained and step over. They will be able to review the range of rootstocks available and explain the selection of top fruit cultivars to ensure pollination, compatibility, fertilisation and succession of harvest.

In Outcome 4, learners will be able to review a range of top fruit grown in the UK (apples, pears, plums and cherries and the various forms cordons, espaliers, fan, step over, standard, spindle bush) and be able to explain the purchasing of plant material and site preparation. They must be able to define term 'top fruit' providing examples and describe maintenance techniques to include checking tree supports and ties, weed control, mulching, irrigation, feeding, pruning/training (formative and routine) as appropriate, including shape and framework to be encouraged. Learners must identify 3 common pests and diseases (minimum of 3 of each) and give organic control methods. Learners should be able to define the term rootstock, explain their use and selection of top fruit cultivars to ensure pollination compatibility, effective fertilisation and succession of harvest.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. Learners will require access to specialised literature and other resources. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

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- Brickell C. 2003. *RHS Pruning and Training*. 2nd ed. Essex: Dorling Kindersley Publishers.
- Halstead A and Greenwood P. 2003. *RHS Pest & Diseases*. 2nd ed. Essex: Dorling Kindersley Publishers.
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| www.soilassociation.org.uk | Soil Association |
| www.gardenorganic.org.uk | Garden Organic |
| www.bbc.co.uk | Royal Horticultural Society BBC |
| www.rhs.org.uk | Royal Horticultural Society |

Unit 217

Participate in Horticultural Crop Production Outdoors

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of how to participate in horticulture crop production outdoors, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop the skills and knowledge to be able to plant, maintain and harvest outdoor horticultural crops. Hardy ornamental nursery stock is not covered in this unit.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know how to produce crops outdoors
2. Be able to prepare sites and plant crops outdoors
3. Be able to maintain and harvest outdoor crops
4. Be able to prepare cropping schedules for outdoor crops

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

PH1 Clear and prepare sites for planting crops

PH2 Set out and establish crops

PH3 Monitor and maintain the growth and development of crops

PH4 Harvest and prepare intensive crops

CU79 Identify, collect and prepare plants for dispatch

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 217 Participate in Horticultural Crop Production Outdoors

Outcome 1 Know how to produce crops outdoors

Assessment Criteria

The learner can:

1. Describe the **soil and cultivation requirements** of outdoor crops
2. Describe the **maintenance requirements** of outdoor crops

Unit content

Soil and cultivation requirements

Soil: type, structure, texture, drainage, moisture holding capacity, depth, consolidation, tilth, nutritional status, pH, organic matter levels, stability, freedom from pets and diseases

Cultivation requirements: reasons and benefits, primary and secondary cultivations including single and double digging, weed control (reasons and methods), level seedbed and/or planting bed preparation, post-harvest cultivation and clearance.

Maintenance requirements

Weed control, pest and disease monitoring and control (chemical, cultural and biological), irrigation, feeding, protection from adverse weather conditions, growth stage monitoring, thinning of seedlings, pruning/training, utilisation of plant support mechanisms e.g. bamboo canes, pea sticks

Unit 217

Participate in Horticultural Crop Production Outdoors

Outcome 2

Be able to prepare sites and plant crops outdoors

Assessment Criteria

The learner can:

1. **Prepare sites** to receive outdoor crops
2. **Sow and plant** crops outdoors
3. Maintain **healthy and safe working practices**.

Unit content

Prepare sites

Prepare seed or planting beds; level site, apply appropriate fertiliser if necessary, make ready materials, organise resources in a safe and efficient manner, plants/seeds for planting.

Sow and plant crops

This should relate to the particular crop(s) being produced and thus may be mechanised or by hand

Sow seeds using each of the following techniques; flat bottomed, deep and shallow drills

Plant young plants/transplants to a line (a minimum of 20 plants at appropriate spacing's), dispose of any plant containers in appropriate and safe manner.

To include row and plant spacing, depth of sowing and planting, immediate aftercare- watering, provision of plant support and protection, labelling

Healthy and Safe working practices

Identify likely hazards and risks to control and maintain healthy and safe working practices to include soil, hand tools and mechanised equipment, bamboo/split canes/pea sticks, fertiliser application.

Wear appropriate Personal Protective Equipment (PPE)

Unit 217

Participate in Horticultural Crop Production Outdoors

Outcome 3

Be able to maintain and harvest outdoor crops

Assessment Criteria

The learner can:

1. Maintain the **growth and development** of plants outdoors
2. **Harvest outdoor crops**
3. **Prepare and grade for sale** outdoor crops.

Unit content

Growth and development

Weed control, pest and disease monitoring and control (cultural, chemical, biological as appropriate), irrigation, feeding, protection from adverse weather conditions, growth stage monitoring, pruning/training/supporting, maintain correct plant spacing's for crop

Harvest outdoor crops

This will relate to the crop plants being produced and may include hand or mechanised activities. Picking/cutting/lifting, timing, methods used to ensure freshness, processing, manual, mechanical, bulk handling, sorting/grading, weighing, packaging, packed in the field, labelling. Need for careful handling to avoid bruising and damage at all stages

Prepare and grade for sale

This will relate to the particular crop(s) being produced and is likely to include cleaning, washing, weighing, grading for size and quality, rejection of severely damaged produce, preparation may be for immediate sale or temporary/long-term storage, packaging and labelling to be included in the process

Unit 217 Participate in Horticultural Crop Production Outdoors

Outcome 4 Be able to prepare cropping schedules for outdoor crops

Assessment Criteria

The learner can:

1. Prepare **cropping schedules** for outdoor crops, including plant raising for specific crops
2. Prepare **contingency plans** for outdoor crops

Unit content

Cropping schedules

This should be related to specific crops e.g. salads, cut flowers, and should include clear links to seasonal factors, climate, soil and market/customer requirements

Schedules should include time line details of plant raising e.g. seed sowing (in containers or in situ), pricking out/thinning out of seedlings, delivery of young plants, planting, plant spacing's, provision of plant support, pest and disease identification and control, harvesting

Resources required should be listed for example if initially raised under cover, type of compost, containers, temperature

Contingency plans

These should take into account weather conditions, potential losses and changes to customer demand and timing of harvest, availability of labour, dealing with outbreaks of pests and diseases or other problems

Utilisation of successional sowing and planting to maintain availability and the provision of protection from adverse weather conditions

Unit 217 Participate in Horticultural Crop Production Outdoors

Notes for guidance

This unit can be undertaken in a range of possible cropping contexts, for example cut flower production, salad crops, market gardening, soft or top fruit growing. The content of the unit is written in a generic style to allow for it to be interpreted to the particular local cropping requirements of the centre and learner.

As a consequence, all aspects within the unit are to be clearly defined in terms related to a particular crop or cropping group, but should include the full range of activity and knowledge required.

In Outcome 1 learners must describe for one named edible crop and one ornamental crop the soil and cultivation requirements to include soil: type, structure, texture, drainage, depth consolidation, formation of tilth, nutritional status, pH, organic matter levels. The learner must also demonstrate their knowledge of ground cultivation requirements for the named crops to include reasons and benefits; primary and secondary cultivations including single and double digging, weed control (reasons and methods) seedbed and/or planting bed preparation. The learner must also be able to describe the maintenance requirements for one named edible crop and one ornamental to include weed control, pest and disease monitoring and control (chemical, cultural and biological), irrigation, feeding, protection from adverse weather conditions, growth stage monitoring, thinning of seedlings, pruning/training and the utilisation of plant support mechanisms e.g. bamboo canes, pea sticks.

In Outcome 2, the learner must prepare seed or planting beds to a suitable standard inclusive of levelling site, applying appropriate fertiliser as necessary, together with making ready materials and organising resources in a safe and efficient manner. Learners must sow appropriate seeds using each of the following techniques: flat bottomed, deep and shallow drills and plant young plants/transplants to a line (a minimum of 20 plants) at appropriate spacing's. Learners must also demonstrate that they can identify likely hazards and risks in order to control and maintain healthy and safe working practices to include soil, hand tools and mechanised equipment bamboo/split canes/pea sticks, fertiliser application.

In Outcome 3 learners must demonstrate that they are able to successfully cultivate crops including maintaining their growth and development. This must include the harvesting by hand of two types of edible crops and one type of ornamental crop (e.g. cut flower crop), taking into account ,as appropriate, picking/cutting/lifting, timing, methods used to ensure freshness, processing, bulk handling, sorting/grading, weighing, packaging, labelling. All produce must be carefully handled to avoid bruising and damage at all stages of the process.

In Outcome 4 the learner must demonstrate that they can prepare a basic cropping schedule for one named crop and should include clear links to seasonal factors e.g. climate, soil and market/customer requirements. Schedules should include time line details of plant raising e.g. seed sowing (in containers or in situ), pricking out/thinning out of seedlings, delivery of young plants, planting, plant spacing's, provision of plant support, pest and disease identification and control, harvesting and any other appropriate maintenance requirements. The ability to make contingency plans to take account of unexpected occurrences must also be demonstrated by the learner and should, for example, take into account weather conditions, potential losses and changes to customer demand and timing of harvest, availability of labour, dealing with outbreaks of pests and diseases.

References

Journals

Horticulture Week incorporating The Grower Magazine

Unit 218

Participate in Protected Horticultural Plant Production

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of horticultural plant production - protected, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to describe the principles of plant maintenance in protected production and carry out a range of activities as required by particular production situations.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know the range of protected growing environments used in horticultural plant production
2. Be able to establish crops in protected plant production situations
3. Know how to maintain plants in protected plant production situations
4. Be able to maintain plants in protection and prepare them for sale or display

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

PH1 Clear and prepare sites for planting crops

PH2 Set out and establish crops

PH3 Monitor and maintain the growth and development of crops

PH4 Harvest and prepare intensive crops

CU79 Identify, collect and prepare plants for dispatch

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 218

Participate in Protected Horticultural Plant Production

Outcome 1

Know the range of protected growing environments used in horticultural plant production

Assessment Criteria

The learner can:

1. List advantages and disadvantages of **glasshouses and polythene tunnels** in which to produce plants
2. Describe **construction and cladding materials** used in protected cropping structures
3. Describe the **factors affecting the growing environment** and how these are monitored

Unit content

Glasshouses and polythene tunnels

Green/glasshouses: advantages – warm, good heat retention, good light transmission, easy to ventilate, good growing environment, strong, low maintenance; disadvantages – expensive to erect, if glass used it is fragile, requires planning permission

Polythene tunnels: advantages – cheap to erect, creates humid growing environment, shelters plants from wind, easy to repair minor damage; disadvantages – more difficult to ventilate effectively, can create temperature extremes, require frequent re-cladding and can create high levels of condensation

Glasshouse types: wide-span; single span, double span, multi-span, Venlo types,

Polythene tunnel types: single bay/span, multi-bay/span, seasonal covers (Spanish tunnels), combined polythene/net tunnels

Construction and cladding materials

Green/glasshouses: concrete, steel, alloys, aluminium, glass, double and triple glazing, wood (e.g. Alpine Houses)

Polythene tunnels: concrete, steel, alloys, wood, polythene (including treated films and plastics), netting

Construction of glasshouses: shapes e.g. hemisphere, dome, mansard, pitched roof glasshouses including clear span, single span, double span, multi-span, advantages and disadvantages of different shapes, including light transmission qualities, size of glass panes

Construction of polythene tunnels: e.g. single span, double span, multi-span; tightness of polythene over frame (should be put on in warm weather), use and depth of ground tubes, construction/installation of doors (sliding or fixed)

Factors affecting the growing environment

Aerial temperature (night and day), root zone warming, light levels, day length, relative humidity, ventilation and air movement, carbon dioxide levels

Monitoring: by observation, use of thermometers, hygrometers, aspirated screens (housing sensitive monitoring equipment), automatic computer monitoring

Unit 218

Participate in Protected Horticultural Plant Production

Outcome 2

Be able to establish crops in protected plant production situations

Assessment Criteria

The learner can:

1. Prepare **sites, containers, growing media and plants** in readiness for planting
2. **Pot young plant material** so as to optimise success and minimise waste
3. **Set out and provide aftercare** to plants following potting

Unit content

Sites, containers, growing media and plants

Sites: potting bench, potting machine, bearing in mind ergonomics.

Containers: pots (plastic/clay, modules, standard trays, half trays)

Growing media: for young plant material, for established plants: loam-less composts, loam-based composts

Plants: seedlings, rooted cuttings, cell/plug plants, established plant material

Pot young plant material

Potting off and potting on/up, appropriate growing media selected (compost) – use of loam-less and/or loam-based potting composts, size and type of container, handle young plants with care to minimise root and top growth damage, pot at correct depth and in centre of container selected, lightly firm in; label; water; stop plants if required at potting stage

Set out and provide aftercare

Take off and stand down/set out plants following potting (space out plants according to size of container/plant)

Aftercare: irrigation, support, protection from and control of pests, disease and weeds, provision of appropriate temperatures (aerial and basal), pinching/stopping, ensure adequate lighting (may need supplementary lighting)

Unit 218 Participate in Protected Horticultural Plant Production

Outcome 3 Know how to maintain plants in protected plant production situations

Assessment Criteria

The learner can:

1. Recognise **problems in plant production** caused by moisture, nutrition, physical damage and excessive or inappropriate growth
2. Describe methods of **irrigation and liquid feeding**
3. Recognise different **types of unwanted growth** and the response that is required
4. Describe how plant maintenance activities relate to the **production schedule**

Unit content

Problems in plant production

Moisture: symptoms of excessive, inadequate or uneven watering; damage caused by force of application of water; droplet size, timing of irrigation during the day, problems of wet foliage and flowers on crops

Nutrition: general symptoms of inadequate or excessive feeding; specific symptoms of deficiency in major nutrients (Nitrogen, Phosphorous, Potassium, Calcium) and minor nutrients (Iron, Magnesium)

Physical damage: scorch, cold water damage, frost, mishandling and bruising

Pest, disease and disorder damage

Excessive growth: growth earlier than required, plants over size for market requirements

Inappropriate growth: weeds, early flowering, lateral or apical growth

Irrigation and liquid feeding

Equipment, application methods, formulations, calculations

Liquid feeding: via liquid feed diluter, automatic via computer-controlled programmes how watering and nutritional requirements are affected by seasonality and stage of growth

Seasonality variations due to time of year; variations due to active period in crop (e.g. winter crops)

Stage of growth: immediately after propagation, immediately after first potting or potting on, established crops, nearing market stage, variation for flowering and foliage production

Types of unwanted growth

Weeds/moss/algae, unwanted flowers/buds, dead flowers, dead/damaged foliage, excessive apical growth, excessive lateral growth, growth excessively affected by pests and diseases

Production schedules

Learners should understand the relevant maintenance activities required by specific plants/crops and how they fit into the production schedule e.g. production time lines, temperature levels, pest and disease control, provision of artificial lighting and carbon dioxide, day length control, irrigation.

Unit 218

Participate in Protected Horticultural Plant Production

Outcome 4

Be able to maintain plants in protection and prepare them for sale or display

Assessment Criteria

The learner can:

1. Water plants by **hand and automatic methods**
2. Maintain plants in production situations by **appropriate methods** so as to optimise success and minimise waste
3. **Harvest or collect and prepare plants for sale or display**

Unit content

Hand and automatic methods

Hose pipe and lance/rose, at least one automatic method of irrigation appropriate to the crop(s) being produced. This may be sub-irrigation and/or over head and depend on type of crop, care should taken over amount delivered, consider temperature of water, time of day application

Appropriate methods

Pruning/trimming/stopping/pinching, training/twisting, weed control, removing dead/ damaged/ unwanted plant growth, dis-budding

Examples according to crop(s) being produced, pruning may include pinching out or side-shooting, training may include tying in shrubs or climbing plants to canes

Maintain appropriate levels of: moisture and humidity, temperatures, light, carbon dioxide, nutritional, undertake pest and disease monitoring and control

Harvest or collect and prepare plants for sale or display

Harvesting may include cutting flowers or salad crops and trimming/grading/packing them, preparing crops for sale may include picking out pot plants from the growing area, grading, cleaning, preparing, labelling, sleeving, packing into bases/boxes as applicable to particular crops/plants

Unit 218 Participate in Protected Horticultural Plant Production

Notes for guidance

The unit covers the production of horticultural crops in protected cropping situations, such as glasshouses and polythene tunnels. The content and delivery of the unit can be in any context applicable to these situations, e.g. bedding plant production in modules, cut flower crops in soil or containers, pot plant production or other appropriate crop examples.

Whilst not required, it is valuable to visit production nurseries which produce other crops than those which are produced at the centre so as to demonstrate to learners the range of environments, crops and activities involved in protected production horticulture.

Outcome 1 is generic to all protected situations and whilst only one crop may be studied in detail the principles which underpin this outcome should be explained by reference to relevant crops e.g. those that require high or low humidity or those that show photoperiodism.

Outcome 2 requires that sufficient potting is undertaken to be sure that the importance of quality of plant handling is maintained at the same time as commercial rates of work are achieved. The activities may be undertaken by hand or machine as applicable to the facilities and crops being produced.

Outcome 3 requires that a basic recognition of nutrient deficiency and excess symptoms is achieved and need not go into the full range of trace element problems on a wide range of crops and plants. Similarly, a basic understanding of the range of possible crop maintenance activities is required, which should be presented in greater detail for the particular crops/plants being produced.

Outcome 4 should include the demonstration of preparation of a stock solution, which may use a proprietary feed or be mixed from separate compounds. Liquid feeding may be done by hand or through automatic systems. The types of plant maintenance required should be as described in Outcome 3 above. A general demonstration can be used for factors not required by the specific crop/plants being produced. Harvesting may include cutting flowers or salad crops and trimming/grading/packing them. Preparing crops for sale may include picking out pot plants from the growing area, grading, cleaning, preparing, labelling, sleeving, packing into bases/boxes as applicable to particular crops/plants.

All practical activities require that work is undertaken safely, with regard to the learners and all others who may be affected. Relevant risk assessments, Codes of Practice and PPE should be in use.

References

Journals

Horticulture Week, incorporating The Grower Magazine
The Commercial Greenhouse Grower Magazine

Unit 219

Identification and Control of Plant Problems in the Land-based Sector

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of identification and control of plant problems in the land-based sector, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be aware of the range of pests, diseases, disorders and weeds in a given land-based situation. They will develop skill in the recognition and diagnosis of plant problems and knowledge of the habit, life cycles of pests and the environmental factors that favour their development. A range of options for the control of plant problems is also covered, along with the legislative and environmental implications relating to control measures.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know common plant pests, diseases and disorders in a land-based situation
2. Understand how to deal with plant pests and diseases
3. Assess the requirement for weed control in a crop, planted area or turf
4. Be able to deal with pests, diseases and disorders

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU78 Identify the presence of pests, diseases and disorders and assist with their control

PH3.3 Maintain plant development

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 219 Identification and Control of Plant Problems in the Land-based Sector

Outcome 1 Know common plant pests, diseases and disorders in a land-based situation

Assessment Criteria

The learner can:

1. Identify the signs of and damage caused by common **plant pests and diseases**
2. Explain the **classification of plant pests and diseases**
3. Describe the **life cycles** of typical groups of plant pests and diseases
4. Recognise **environmental and nutritional disorders in plants** and cultural solutions to the problems.

Unit content

Plant pests and diseases

Differentiate between pests, diseases, disorders

Pests: rodents and other mammals, birds, molluscs, insects which affect aerial plant parts (foliage, stems, flowers as applicable), insects affecting sub-surface tissues (roots, bulbs, tubers), mites, nematodes

Diseases: fungal diseases affecting aerial plant parts, fungal diseases affecting sub-surface tissues, fungal diseases affecting stored plant material, viral diseases, bacterial diseases

Identify six common pests and four common diseases

Classification of plant pests and diseases

Pests: rodents and other mammals, birds, slugs and snails (Mollusca), Arthropods – insects: aphids and relatives (Hemiptera), thrips (Thysanoptera), moths and butterflies (Lepidoptera), flies (Diptera), beetles and weevils (Coleoptera), sawflies, ants (Hymenoptera), mites (Acarina), nematodes (Nematoda)

Diseases: fungal (zygomycetes, ascomycetes, basidiomycetes, deuteromycetes), viral diseases, bacterial diseases

Life cycles

Examples of life cycle for one rodent or other mammal or bird pest; one mollusc; one insect with a complete metamorphosis; one insect with an incomplete metamorphosis; one mite; one nematode; one complex fungal life cycle involving different spore types or alternate hosts (e.g. rust or powdery mildew), one simple fungal life cycle (e.g. *Pythium*, *Botrytis cinerea*); one bacterial disease; a simple explanation of the functioning and spread of plant viruses

Environmental and nutritional disorders in plants

Environmental disorders: extremes of temperature; under and over-watering; hail and snow damage; wind and sun scorch; lack of light

Nutritional disorders: low or high pH problems; nutrient deficiencies (Nitrogen, Phosphorous, Potassium, calcium, Magnesium, Iron) and excess Nitrogen, root scorch

Unit 219

Identification and Control of Plant Problems in the Land-based Sector

Outcome 2

Understand how to deal with plant pests and diseases

Assessment Criteria

The learner can:

1. Select appropriate **cultural, chemical or biological control measures** for named pests and diseases
2. Describe how an **environmental assessment** is carried out
3. Select appropriate **equipment** for the application of chemicals for specific purposes
4. List the main requirements of **COSHH** in relation to chemical use.

Unit content

Cultural, chemical or biological control measures

Cultural: control of alternate hosts, disturbance, habitat destruction, barriers / exclusion, optimal growing regimes, crop rotation, hygiene, resistant varieties, amend temperatures and humidity

Chemical: modes of action (contact and systemic), insecticides, acaricides, molluscicides, fatty acids and related formulations, also fungicides

Biological: natural pest control native and exotic parasites, (e.g. *Encarsia formosa*) predators (eg *Phytoseiulus persimilis*), bacterium (e.g. *Bacillus thuringiensis*) and fungal (*Verticillium lecanii*) agents, surfactants

Integrated Pest Management (principles of), utilisation of two or more control methods

Awareness of the requirements of the Food and Environmental Protection Act 1985 (FEPA)

Environmental assessment

Carry out an environmental assessment of a given site to include: species present, pH, soil type, drainage, damage present, potential for environmental damage during works, rainfall, site access, sunlight, site orientation

Equipment

For spray, drench, controlled droplet, fumigation, dust, granule and fog application

Relevant Personal Protective Equipment (PPE)

Biological: natural pest control, cards, packets, bottles, vials

Control of Substances Hazardous to Health 2002 (COSHH) assessment

Identify hazardous substances that may be present or produced, identify if there is potential for exposure, obtain relevant data, identify tasks which may lead to exposure, assess risk, record findings, identify and apply control measures, review and update as necessary

Unit 219

Identification and Control of Plant Problems in the Land-based Sector

Outcome 3

Assess the requirement for weed control in a crop, planted area or turf

Assessment Criteria

The learner can:

1. Identify the type and species of **weeds** in a given area and select appropriate control measures
2. Carry out **cultural control** of weeds
3. Describe damage caused by **ephemeral, annual, perennial weeds** and their means of spread
4. Describe **environmental requirements** for weed emergence and growth.

Unit content

Weeds

Examples of ephemeral, annual and perennial weeds, examples of weeds that spread by seed, fragmentation, stolons, rhizomes, root sections

Examples of weeds that indicate particular soil or other conditions

Control measures: cultural/mechanical, herbicides (total, contact, translocated, residual), flame weeding, mulching, use of weed suppressant geotextiles, stale seed beds

Identify ten weeds by their common names (botanical names would be beneficial), to include examples of ephemeral, annual and perennial weeds

Cultural controls

Hoeing, hand weeding, digging out (trowel, spade/fork), use of 3 pronged cultivator, shallow mechanical cultivation, mulching, scarifying

Ephemeral, annual, perennial weeds

Weeds provide competition for; light, moisture, nutrients, space

Weeds may be unsightly

Weeds can act as hosts for pests and diseases e.g. aphid and rust

Means of spread include; seed, stolons, rhizomes, bulbs, fragmentation

Environmental requirements

Temperature, dormancy to be broken allowing germination, light, moisture, suitable growing medium/surface

Unit 219 Identification and Control of Plant Problems in the Land-based Sector

Outcome 4 Be able to deal with pests, diseases and disorders

Assessment Criteria

The learner can:

1. Carry out **cultural or physical control** of pests and diseases
2. Demonstrate the **calibration and use of a knapsack sprayer**
3. Carry out **cultural operations to deal with disorders**
4. Carry out a simple **environmental assessment**.

Unit content

Cultural or physical control

Pruning, stopping/pinching out soft tops, spacing, mulching, hand removal, humidity and temperature control, general hygiene

Calibration and use of a knapsack sprayer

Calibrate a knapsack sprayer using a simulated chemical, calculate chemical and carrier (water) quantity, mix and avoid 'simulated chemical' spillage and wastage after usage, selection and attachment of correct spray nozzle, rinse out sprayer and dispose of residue in a safe and appropriate manner

Cultural operations to deal with disorders

For example avoid: incorrect pH level in soil/growing media, frost damage, drought, scorch, moisture/humidity and temperature fluctuations, nutritional deficiency and excess, ensure appropriate application of water e.g. overhead application could result in cold water damage on foliage

Environmental assessment

Environmental assessment of a selected site to include: light, moisture/humidity, temperature, presence of weeds and weed seeds, plant species, size and number. Undertake soil textural analysis and pH determination of the soil, determine presence of pests, diseases inclusive of symptoms and damage (and disorders)

Unit 219 Identification and Control of Plant Problems in the Land-based Sector

Notes for guidance

This unit is applicable to learners working in production and amenity horticulture and the turf sectors of the industry and as such should be delivered in both general principles and as applicable to the specific context.

In Outcome 1 this should be interpreted as a clear understanding of a range of general signs and symptoms of pests, diseases and disorders, together with a more detailed identification of specific problems. So, for example, all learners should be familiar with the general symptoms of damage caused by sap-sucking insects. Those following production horticulture may study the damage caused by glasshouse whitefly in greater detail.

Similarly, the general details of an incomplete metamorphosis should be covered in all cases. Production horticulture learners may study in more detail glasshouse whitefly, where the number of instar stages would be covered.

It should be noted that the classification of pests and diseases should be dealt with in outline only as this is a level 2 qualification. Correct biological names of the classes of e.g. insects have been entered in the outcome as a means of clarification for tutors and do not need to be covered as part of formal study.

Outcome 2 should be approached in a similar way. Learners studying turf should be aware of the wide range of control measures available within horticulture, but make more detailed study of cultural and chemical controls for turf pests and diseases. Learners should carry out an environmental assessment of a given site to incorporate potential for damage to occur during works.

This approach also applies to Outcome 3. All learners should be aware of the range of weeds and their control. Those following an amenity horticulture pathway should focus upon relevant weeds for mixed borders and relevant controls (mulching, hoeing, residual herbicides etc) for that context. Learners must identify ten weeds by their common names (botanical names would be beneficial), to include examples of ephemeral, annual and perennial weeds.

Outcome 4 gives the learner the opportunity to use cultural/ physical methods of control and to practise techniques for the application of chemicals with simulated chemical and clean equipment. They should not use real chemicals for this outcome. Learners should be taught and follow the procedures that they would for real pesticides. Learners who hold relevant qualifications recognised under legislation for applying pesticides (Certificates of Competent) may use these against the relevant parts of this outcome.

Within this unit the learner will need to demonstrate their knowledge of a range of pests, diseases, disorders and weeds in a given land-based situation. As part of this developmental process learners must be formally required to identify six common pests and four common diseases and ten weeds by their common names. The unit content could be covered by learners as group 'adopting' a given site(s) and to be actively engaged its maintenance and development, thus providing a feeling of ownership. Where this is not feasible off site visits to local gardens, arboreta, estates, glasshouse units and enterprises may be an option to bring the unit alive and to provide learner focus to the topic being covered.

Learners to be aware that all tasks should be undertaken at the correct time of year and in appropriate weather conditions. It must also be emphasised to learners that all tasks must be undertaken in a safe manner with all appropriate PPE being worn. Learners must demonstrate knowledge of the requirements of COSHH and FEPA.

References

Books

Each particular context may have specific texts and good use should be made of current product lists and guidance for chemical and biological control.

For general background to the unit:

Adams CR. 2008. *Principles of Horticulture*. 5th ed. Oxford: Butterworth Heinemann. ISBN: 978-0-7506-8694-5.

Unit 220

Introduction to Land-Based Machinery Operations

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of land-based machinery operations and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to select, prepare, operate, and maintain a range of land-based equipment and machines appropriate to their area of study. The learner will also cover the health and safety requirements associated with the use and maintenance of machines.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand safe working principles when using equipment and machinery
2. Be able to prepare land-based equipment and machinery for use
3. Be able to operate land-based equipment and machinery
4. Be able to maintain land-based equipment and machinery

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU27 Maintain equipment and machines

L27 Use and maintain non-powered and hand held powered tools and equipment.

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 220

Introduction to Land-based Machinery Operations

Outcome 1

Understand safe working principles when using equipment and machinery

Assessment Criteria

The learner can:

1. Select **appropriate equipment** for land-based tasks
2. Explain why **manufacturers' instructions** should be followed when working with land-based equipment and machines
3. Explain the **legal and environmental requirements** associated with specific machines
4. Identify the **controls/devices/instruments** and other health and safety requirements for machinery and equipment

Range

Agriculture

As appropriate from:

Types: powered and powered machines, tractor mounted, trailed or self propelled, seeding/ planting equipment

Purposes: seedbed preparation, crop harvesting, materials application, liquids, solids, granules, powders

Horticulture/Landscape

As appropriate from:

Types: non powered tools and equipment, hand held power tools, pedestrian controlled machines, ride on machines

Purposes: ground preparation, grass cutting and collection, materials application, liquids, granules, powders, pelleting, chipping, shredding

Unit content

Appropriate equipment

As outlined above, selection, fit for purpose, ground conditions, suitability for scale of work, training/certification requirements

Manufacturers' instruction

Dealer installation process, operator instruction manuals, manufacturer web sites

Legal and environmental requirements

Health and Safety at Work etc Act 1974 (HASWA), Provision and Use of Work Equipment Regulations 1998 (PUWER), Lifting Operations and Lifting Equipment Regulations 1998 (LOLER Control of Substances Hazardous to Health Regulations (2002) (COSHH),

Control of Pesticides Regulations 1986 (COPR), Environmental contamination, Personal Protective equipment (PPE)

Controls/devices/instruments

Operator controls, power unit controls, manual, hydraulic, electronic, machine adjustment/performance settings - safe start devices, clutches, performance/load limiters, seat occupation switches, guards – warning lights, analogue/digital information

Unit 220

Introduction to Land-Based Machinery Operations

Outcome 2

Be able to prepare land-based equipment and machinery for use

Assessment Criteria

The learner can:

1. Carry out **adjustments** on land-based equipment and machines to meet specific requirements prior to use
2. Explain the **benefits** of correct adjustment of equipment and machines
3. Carry out **pre-start checks**, including **fuelling**

Range

Agriculture

As appropriate from:

Types: powered and powered machines, tractor mounted, trailed or self propelled, seeding/ planting equipment

Purposes: seedbed preparation, crop harvesting, materials application, liquids, solids, granules, powders

Horticulture/Landscape

As appropriate from:

Types: non powered tools and equipment, hand held power tools, pedestrian controlled machines, ride on machines

Purposes: ground preparation, grass cutting and collection, materials application, liquids, granules, powders, pelleting, chipping, shredding

Unit content

Adjustments

Operator fit, working height/depth/speed/calibration/tilth/work rate

Benefits

Specific work rates/outputs achieved, power/fuel consumption, risk of premature wear/damage to equipment, operator fatigue

Pre-start checks

Lubricants, cooling, fuel level, wheel equipment, safety guards, road legal, machine/vehicle security, PPE

Fuelling

Fuel types, fuel contamination checks, correct storage, machine power isolation, ventilation, spillage, safe areas, fire hazards, PPE

Unit 220

Outcome 3

Introduction to Land-Based Machinery Operations

Be able to operate land-based equipment and machinery

Assessment Criteria

The learner can:

1. **Operate** equipment and machines safely and **efficiently** for different land-based activities
2. Carry out activities to achieve the **desired results** when operating land-based equipment and machines

Range

Agriculture

As appropriate from:

Types: powered and powered machines, tractor mounted, trailed or self propelled, seeding/ planting equipment

Purposes: seedbed preparation, crop harvesting, materials application, liquids, solids, granules, powders

Horticulture/Landscape

As appropriate from:

Types: non powered tools and equipment, hand held power tools, pedestrian controlled machines, ride on machines

Purposes: ground preparation, grass cutting and collection, materials application, liquids, granules, powders, pelleting, chipping, shredding

Unit content

Operate

Attachment to power unit, engagement of power, assess test runs and re-adjust, site assessment for hazards/risks, continuous monitoring of performance, over/under lapping

Efficiency

Acceptable work rates, back up power availability, economy of fuel, wearing component lifespan

Desired results

All area covered, correct application rates/tilth of seedbed, quality of cut, avoid undesirable results (compaction of soil, wheel marks in seedbed)

Unit 220

Introduction to Land-Based Machinery Operations

Outcome 4

Be able to maintain land-based equipment and machinery

Assessment Criteria

The learner can:

1. Identify **routine maintenance** for land-based equipment and machines using manufacturers' instructions
2. Identify **hazards** and comply with risk assessments **during maintenance activities**
3. Carry out different **routine maintenance activities** safely on a range of equipment and machines
4. **Record maintenance activities** in an **appropriate format**

Range

Agriculture

As appropriate from:

Types: powered and powered machines, tractor mounted, trailed or self propelled, seeding/ planting equipment

Purposes: seedbed preparation, crop harvesting, materials application, liquids, solids, granules, powders

Horticulture/Landscape

As appropriate from:

Types: non powered tools and equipment, hand held power tools, pedestrian controlled machines, ride on machines

Purposes: ground preparation, grass cutting and collection, materials application, liquids, granules, powders, pelleting, chipping, shredding

Unit content

Routine maintenance

Pre-work assessment of machine condition, routine/periodic maintenance, adjustments for wear, lubrication, replacement components, preparation for storage, cleaning, lubrication and protection

Hazards during maintenance activities

Identify hazards according to operations

Record maintenance activities

Complete maintenance record sheet/job cards, record service/maintenance interval/date/work done, record replacement of wearing components, working life

Appropriate format

Manufacturers documentation, service record book, service record charts, company procedures, electronic record storage, service interval label on machine

Unit 220 Introduction to Land-based Machinery Operations

Notes for guidance

This unit is designed for learners who will be given responsibility for field/groundwork using machines typical to their area of study. The unit will provide learners with knowledge and understanding, operational skills and service procedures to prepare, use, maintain and store machines and equipment. Throughout the unit the emphasis will be on acceptable health and safety procedures and safe working practices. It is expected that where tractor mounted machines are to be utilised, prior learning on tractor operations will have been assessed to ensure the learner has reached an acceptable level of skills and knowledge.

The range covered during delivery should include electric vehicles and machinery.

Health and safety - Centres and tutors aware of the need to safeguard learners, particularly in relation to pre-16 learners, when delivering and assessing units where the operation of machinery is involved. This unit requires the learner to undertake machinery operations under close supervision, and this is the same for any unit within the qualification that requires the learner to operate or use machinery. This is a largely practical-based unit which looks at the basic preparation, operation and maintenance of equipment and machinery. There is significant emphasis on safe practices throughout the unit and reference to risk assessment in learning outcome 4. Throughout the unit the emphasis is on acceptable health and safety procedures and safe working practices. The guidance in this unit requires that Health and Safety must be strictly enforced and repeated throughout. The HSE guidance AS10 'Preventing Accidents to Children on Farms' provides practical guidance on how to reduce the risk of injury to children under 13 and older children below the minimum school leaving age (usually 16).

In Outcome 1 the learner will be able to select a suitable item of equipment to perform a range of land-based tasks to achieve given outcomes. The learner will be able to understand basic working principles of the equipment and any environmental and legal issues relating to the machines' use.

Manufacturers' instructions are to be followed at all times to interpret operator controls and instrumentation information.

In Outcome 2 the learner is expected to demonstrate skills in the use of machines and equipment used in the area of their study. This may entail operator set up, connection to power source and initial setting prior to moving on site. Where tractor trailed, mounted or self propelled equipment is to be used an understanding of safe fuelling and transportation must be demonstrated. With ever-increasing costs on fuel, wearing components and operator time, an understanding of the benefits of correct operating procedures, setting linked to work rate targets must be understood.

In Outcome 3 the learner needs to be aware of a range of machine capabilities to achieve specified performance criteria. These may be work rate targets, quality of work, height/depth of work or delivery rates. Field/site procedures need to be correctly chosen where subsequent operations are to follow. Seeding requires a specific depth of seedbed, a fineness of tilth to suit seed type, minimum seedbed compaction with no wheel marks evident.

In Outcome 4 the learner must be able to identify from the manufacturers' instructions, and demonstrate maintenance requirements and procedures. Where power sources are used, maintenance of those sources will need to be identified. Risks of injury/damage to self, others, the environment or equipment need to be identified by the learner and control measures put in place prior to commencement of any maintenance tasks. To enable evaluations and costings to be done an accurate record of work, maintenance and replacement parts must be recorded. This may also be of benefit where warranty procedures are to be implemented to recoup costs of breakdowns.

References

Books

Bell B. 2005. *Farm Machinery*. Old Pond Publishing. ISBN: 1-903-36668-2.

Culpin C. 1992. *Farm Machinery, 12th edition*. Blackwell Scientific. ISBN: 0-632-03159-X.

Journals

Horticultural Weekly

Profi International

Manufacturers publications and manuals

Lubrication charts and data sheets

Websites

www.bagma.com British Agricultural and Garden Machinery Association

www.defra.gov.uk Dept for Environment, Food and Rural Affairs

www.wales.gov.uk Welsh Assembly Government

www.scotland.gov.uk Scottish Executive Environment and Rural Affairs
Department

www.dardni.gov.uk Department of Agriculture and Rural Affairs
(Northern Ireland)

www.hse.gov.uk Health and Safety Executive

Unit 221

Introduction to the Principles of Land-based Machinery

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of land-based machinery and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to recognise the basic roles and functions of engines as the major power source for Land-based machines. It covers knowledge and skills including the working principles of engines and typical engine maintenance activities that may be carried out by the operator.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Know the working principles of combustion engines
2. Know the maintenance requirements of machines
3. Be able to maintain engines on land-based machines

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU27 Maintain equipment and machines

L27.1 Use and maintenance of non-powered and hand held power tools and equipment

L27.2 Carry out routine maintenance to equipment and machinery

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SCC.

Assessment and grading

This unit will be assessed by:

- An assignment covering assessed practical competencies and underpinning knowledge

Unit 221 Introduction to the Principles of Land-based Machinery

Outcome 1 Know the working principles of combustion engines

Assessment Criteria

The learner can:

1. Describe the uses of **combustion engines** on a range of machines within a land-based industry
2. Describe the **working cycles of 2 stroke and 4 stroke engines**
3. State the **functions of component parts** of a combustion engine
4. Describe methods of **transmitting drive** from engines to the working parts of machines

Unit content

Combustion engines

Compression Ignition (CI), Spark Ignition (SI)

Working cycles of 2 stroke and 4 stroke engines

Otto cycle, 2 stroke cycle, air induction, exhaust emissions

Function of component parts

Crankshaft, pistons, connecting rods and bearings, piston rings, bore types, camshaft, valves and springs, oil pump, flywheel

Transmitting drive

Friction plate clutches centrifugal clutches, hydraulic clutches, belt and pulleys, chain and sprocket, gears, electrical generator, compressed air, hydraulics

Unit 221

Introduction to the Principles of Land-based Machinery

Outcome 2

Know the maintenance requirements of machines

Assessment Criteria

The learner can:

1. Describe **common hazards** associated with machine use and maintenance
2. State the purpose of common **workshop tools**

Range

All Learners: activities in maintenance workshop and on site, periodic maintenance, preventative maintenance, unscheduled maintenance

Unit content

Common hazards

Machine power isolation, machine stability and contamination from fuels/lubricants/chemicals/sharps/heat/pressure/fumes

Workshop tools

Spanners/sockets and wrenches, torque wrenches and multipliers, screwdrivers, hammers, punches, service gauges and measuring equipment, tool kit and on site tool kit

Unit 221

Introduction to the Principles of Land-based Machinery

Outcome 3

Be able to maintain engines on land-based machines

Assessment Criteria

The learner can:

1. Carry out a **risk assessment** for machine **maintenance activities**
2. Carry out **pre-start checks and starting procedures** on machines

Unit content

Risk assessment

Risks to self, risks to others, risk to environment, risk to machines and equipment

Pre-start checks and starting procedures

Fuel level, oil levels, coolant and cooling, safety guards and panels, fume extraction within buildings, safe operation distances, safety start devices, engine/turbocharger oil pressure

Maintenance activities

Machine preparation prior to routine/scheduled maintenance, unscheduled maintenance on site, safe use of tools, selection of correct replacement service components, preparation of service area, re-instatement of service area, post service inspection of machine

Also, need to cover:

Current Legislation

Health and Safety at Work etc Act 1974 (HASWA), Provision and Use of Work Equipment Regulations 1998 (PUWER), Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)

Maintenance records

Maintenance check lists, job cards, inspection reports, recording machine details and work hours, records of repairs/replacement parts

Unit 221 Introduction to the Principles of Land-based Machinery

Notes for guidance

This unit is designed to provide learners with knowledge and understanding of basic working principles of Land-based powered equipment, requirements for regular service, maintenance and repair and safe practical experiences while undertaking maintenance tasks.

The range covered during delivery should include electric vehicles and machinery.

Health and safety - Centres and tutors need to be aware of the need to safeguard learners, particularly in relation to pre-16 learners, when delivering and assessing units where the operation of machinery is involved. This unit requires the learner to undertake machinery operations under close supervision, and this is the same for any unit within the qualification that requires the learner to operate or use machinery. This is a largely theory based unit, but Outcome 3 requires learners to be able to maintain engines on land-based machines. Throughout the unit the emphasis is on acceptable health and safety procedures and safe working practices. The guidance in this unit requires that Health and Safety must be strictly enforced and repeated throughout. The HSE guidance AS10 'Preventing Accidents to Children on Farms' provides practical guidance on how to reduce the risk of injury to children under 13 and older children below the minimum school leaving age (usually 16).

In Outcome 1 the learner will be required to investigate working principles of the range of engine types that power land-based vehicles and machines. It is essential that the learner understands the limitations of engine types and why manufacturers designate their use to different purpose. The learners should be encouraged to develop understanding of topical issues regarding available fuel types, environmental pollution and running costs.

Outcome 2 prepares the learner for the knowledge and understanding required prior to undertaking practical maintenance work on engines and powered machines. Emphasis should be directed to safe working practices, care of machines, tools and work areas. The learner should also be encouraged to plan for unscheduled maintenance tasks. Due to the complexity of land-based vehicles and machines it is essential that learners understand that maintenance of machines and vehicles must be carried out to manufacturers recommendations and that service documentation should be available and accurately followed when performing tasks.

In Outcome 3 the learner will be required to carry out risk assessments and put appropriate control measures in place before completing the practical activities. It is anticipated that delivery of this outcome will be predominantly practical, with learners gaining experience of carrying out pre-start checks. The learner must be aware of current legislation and safe working practices and be encouraged to adopt a clean, tidy and methodical approach to work ethic. The importance of accurate completion of maintenance and work records must be highlighted.

Throughout the unit the emphasis will be on safe, legal practices, working to manufacturers' recommended procedures and attention to detail when recording information.

References

Books

Bell B. 2005. *Farm Machinery*. 5th e. Old Bond Publishing. ISBN: 1-903-36668-2.

Hillier V and Coombes P. 2004. *Hillier's Fundamentals of Motor Vehicle Technology*. 5th ed. Nelson Thornes. ISBN: 0-748-78082-3.

Manufacturer's service charts, operator manuals

Websites

www.howstuffworks.com Discovery Communications

www.hse.gov.uk Health and Safety Executive

Unit 222

Undertake Nursery Stock Production

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of how to undertake nursery stock production, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop the skills and knowledge to be able to recognise, establish and maintain nursery stock and to prepare nursery stock material for sale.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know nursery stock plants and their use
2. Be able to prepare for and carry out planting
3. Be able to maintain the growth and development of nursery stock plants
4. Be able to collect and prepare plants for dispatch

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

PH1 Clear and prepare sites for planting crops

PH2 Set out and establish crops

PH3 Monitor and maintain the growth and development of crops

PH4 Harvest and prepare intensive crops

CU79 Identify, collect and prepare plants for dispatch

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 222

Undertake Nursery Stock Production

Outcome 1

Know nursery stock plants and their use

Assessment Criteria

The learner can:

1. Identify **nursery stock plant types** by common and botanical names
2. Describe the **sizes and specifications** of nursery stock plants
3. Describe how **customer requirements** may vary with locality and plant uses

Unit content

Nursery stock plant types

For nursery stock categories refer to British Standards (BS) 3936.

Identify forty nursery stock plants selected from across the following types: trees, shrubs, roses, conifers, climbers, fruit trees and bushes, grasses and bamboos, herbaceous perennials, ferns, aquatic plant

Sizes and specifications

Trees: seedling, cuttings, transplants, undercut, whips, feathered, maiden, standards – half standard, light standard, standard, selected standard, heavy standard, extra heavy standard, semi-mature, multi-stemmed

Fruit trees: rootstocks, maidens, part-trained cordon, step over, fan and espalier

Shrubs: container size, open-ground, height, number of breaks

Roses: budded, cuttings-raised, bush, standard, shrub, climber, rambler

All: open-ground/field grown, containerised, container grown, bare-root, root-wrapped/root-balled, propagated by seed, cuttings, budding, grafting, division

For nursery stock categories refer to British Standards (BS) 3936.

Customer requirements

Location: exposed, sheltered, coastal, soil type, pH, aspect, altitude, latitude, microclimate, size, retail and landscape quality

Unit 222

Undertake Nursery Stock Production

Outcome 2

Be able to prepare for and carry out planting

Assessment Criteria

The learner can:

1. Prepare **sites and plants** for potting and planting into open-ground
2. **Pot on and plant out** nursery stock plants
3. Provide **immediate aftercare and suitable environmental conditions**
4. **Use tools and equipment safely**

Unit content

Sites and plants

Sites: field conditions – final site cultivation and levelling, tilth production, marking out, potting – make ready potting bench or potting machine, supply of containers, growing medium, labels, canes as applicable, risk assessment

Plants: condition, moisture status, removal of weeds, dead and damaged tissues, removal of container/separation of roots/root trimming, grading

Pot on and plant out

Pot on: by hand and/or machine, selection of growing media – loam-less or loam less compost, nutritional status, pH, selection of container – type and size, pot in to centre of container, at appropriate depth and firmness, trim plant if necessary, removal of weeds if present prior to potting, water, label

Plant out: by hand and/or with aid of machinery, plant to a line, grade plants for size and vigour, correct depth and firmness, trim plant if necessary, stake/tie/secure if necessary, water, label

Immediate aftercare and suitable environmental conditions

Aftercare: standing down, watering, support, tying in, trimming, mulching, protection from pests, protection from drying out inclusive of growing media and top growth

Environmental conditions: shelter, shade

Use tools and equipment safely

Select appropriate tools and equipment, inspect tools and equipment for damage, select and wear appropriate Personal Protective Equipment (PPE), use tools and equipment safely with due regard to self and others.

Unit 222

Outcome 3

Undertake Nursery Stock Production

Be able to maintain the growth and development of nursery stock plants

Assessment Criteria

The learner can:

1. **Maintain** the growth and development of plants in open ground and containers
2. Control **unwanted plant growth**
3. **Dispose of waste** in an environmentally appropriate manner

Unit content

Maintain

Caning, tying, training, trimming, pruning, pinching/pinching, manage habit and shape, irrigation, feeding (all as applicable to the stock being grown), planting distance in the open ground and spacing out distance for container grown stock, pest, disease and disorder monitoring and control, provision of shelter

Unwanted plant growth

Weeds, excessive growth, dead, damaged and diseased growth, suckers, leaders / twin leaders/laterals/feathers (all as applicable to the stock being grown)

Dispose of waste

Collection and disposal of waste in an environmentally sound and safe manner, separation of different waste material for disposal purposes, adherence to legislation and guidance

Unit 222

Outcome 4

Undertake Nursery Stock Production

Be able to collect and prepare plants for dispatch

Assessment Criteria

The learner can:

1. **Collect plants for sale or display** as required in line with instruction
2. **Lift and prepare** open-ground material for sale
3. Complete **records** related to orders
4. Work according to best health and safety practice

Unit content

Collect plants for sale and display

Identification and selection of appropriate stock from 'picking list', type, number, grade as per customer requirements, stock handled safely and to avoid damage and maintain quality

Lift and prepare

Hand or mechanised lifting, preparation by removal of weeds, damaged growth, trimming to shape, root-wrapping or protection, tying in of top growth, labelling, placing into temporary storage (all as applicable to the stock being grown)

Records

Updating stock list, updating picking list, labelling trolleys (all as applicable to stock being prepared for sale)

Unit 222 Introduction to Nursery Stock Production

Notes for guidance

The unit is applicable to all forms of nursery stock production and may be applied, for detailed activity, to any aspect of production e.g. trees, shrubs, herbaceous plants etc.

Outcome 1 requires that the learner is able to identify plants by both common and botanical names, including cultivar and variety, as applicable to the plants being studied/ grown. From the range of nursery stock plant types given, examples of at least four should be identified correctly by full names (a minimum a 40 plants) and examples of all the types should be recognised clearly.

Sizes and specifications of plants are focused upon the method of propagation, means of production, size (including height, calliper, bushiness), number of breaks, and container size as applicable to the stock being grown. All learners should be fully aware of the principles of tree specifications in particular, as these are the most precise and exacting. Whilst this is the case there is no requirement for learners to undertake calliper measurement, height measurement etc as part of the unit. Customer requirements should take into account the intended use for the plants, the type of customer (e.g. landscape contractor, retail customer) and the method by which the plant has been produced (e.g. growing medium used, plant grown in the open or under protection).

Outcome 2 involves both field and container planting. Site preparation for field planting can be by hand, pedestrian-operated or tractor-operated equipment. Planting can be mechanised or by hand. Learners must also demonstrate knowledge of the immediate aftercare and the suitable environmental conditions required for successful establishment. They must also appropriately pot nursery stock plants (a minimum of 20) and plant correctly to a line in the 'field' (a minimum of 10). Learners must also demonstrate their ability to select appropriate PPE and use tools and equipment safely with due regard to self and others.

Outcome 3 is determined by the stock being produced. All learners should be able to undertake relevant irrigation and feeding activities, by hand or automatic means. Feeding may be via liquid feed, foliar feed or top dressing. The applicability of all means of feeding should be considered. Other aspects of the maintenance of growth and development should include monitoring growth rate, managing shape and habit, removing weak, badly placed and non-typical growth, all as applicable to the stock being produced. Examples of all of these aspects should be demonstrated clearly to all learners.

Learners must also demonstrate a knowledge of the appropriate collection and disposal of waste in an environmentally friendly manner and with adherence to current legislation and guidance.

Outcome 4 also requires that learners are able to safely and carefully collect plants for sale or display from a stock bed, selecting plants that meet customer requirements from a standard picking list and grading according to customer requirements.

All work throughout the unit should be with due regard to current health and safety best practice for the site and situation concerned. Learners could be given the task as part of the practical element of the learning process of growing a specified nursery stock crop either container or field grown, thus formally linking together the four outcomes in this unit and providing the learner with a degree of ownership of the process. The unit also enables the learner to develop a range of practical skills including potting, planting, care and selection of plants together with the ability to identify and know the eight categories of nursery stock as specified by the British Standards and enhance their plant identification skills by identifying a minimum of forty nursery stock plants.

Learning could be further enhanced by undertaking visits to nurseries involved in containers and/or file production.

References

Books

Lamb K, Kelly J and Bowbrick P. 1995. *Nursery Stock Manual: Grower Manual*. London: Grower Books.

Journals

British Standards Institute.
For nursery stock categories refer to British Standards (BS) 3936

Website

www.gohelios.co.uk National Plant Specification.

Unit 223

Introduction to Plant Nomenclature, Terminology and Identification

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of introduction to plant nomenclature, terminology and identification and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

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

There are **four** learning outcomes to this unit. The learner will:

1. Understand the terminology used in naming plants
2. Understand how the parts of plants can aid identification
3. Identify and name plants using botanical names
4. Be able to work safely and minimise environmental damage

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

PH14 Identify and classify plants accurately using their botanical names

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 223

Introduction to Plant Nomenclature, Terminology and Identification

Outcome 1

Understand the terminology used in naming plants

Assessment Criteria

The learner can:

1. **Define the terms** family, genus, species cultivar, variety and hybrid, using the bi-nomial system
2. Explain the **purpose and importance of botanical names** and discuss why botanical names are **reclassified**
3. Explain how **descriptive botanical names** can aid identification, e.g. nana and pendula
4. Define the terms relating to plants **characteristics**
5. Define terms **relating to plant life-cycles** relating to this area.

Unit content

Define the terms

Terms: family, genus, species (specific epithet) cultivar, hybrid (bi-specific, bi-generic), binomial system

Purpose and importance of botanical names

Common names vary with location; one common name may be used for several plants, one plant may have several common names. There is a need for one standard name that positively identifies the plant world-wide to avoid confusion, accidental poisoning and to be scientifically accurate. A plant needs a scientific (Botanical name) name before it can be protected in law.

Reclassified

By convention earliest published name is used, sometimes find another name published earlier: to be botanically correct as scientific knowledge increases.

Characteristics

Monocotyledons/dicotyledons, woody evergreen/deciduous plants, hardy/half hardy/tender

Relating to plant life-cycles

Annuals, ephemeral, biennials, herbaceous perennials, woody perennials

Unit 223

Introduction to Plant Nomenclature, Terminology and Identification

Outcome 2

Understand how the parts of plants can aid identification

Assessment Criteria

The learner can:

1. Explain how **a plant's characteristics aid identification**
2. Explain how **plant anatomy and plant morphology aid identification.**

Unit content

A plant's characteristics aid identification

Habit (e.g. prostrate, horizontal, fastigiated, columnar, weeping, round, irregular), size, shape, preferred habitat

Plant anatomy and plant morphology aid identification

Leaf shape, apex, margins, colour and arrangement, bud shape, size and arrangement (opposite or alternate), stem colour and texture, stem and leaf modifications, flowers and fruit, colour shape, size, flower morphology, type of inflorescence, scent and fruit

Unit 223

Introduction to Plant Nomenclature, Terminology and Identification

Outcome 3

Identify and name plants using botanical names

Assessment Criteria

The learner can:

1. Identify and botanically name a **range of plants** appropriate to their industry sector
2. Use the **correct format** when writing botanical names
3. Use the **plant's characteristics** to aid identification
4. Use a range of **reference material** to aid identification of plants.

Unit content

Range of plants

A minimum of thirty from each category using their full scientific name, for at least 3 of the following: annuals and short-lived perennials, houseplants, herbaceous perennials, trees and shrubs, grasses, food crops, weeds

Correct format

Learners should use the correct format: Capital letter for Genus, lower case letter for species and variety, Single speech marks and capital letter throughout cultivar names e.g. *Berberis thunbergii* 'Rose Glow'. If in doubt tutors should follow RHS guidelines. Learners should also use correct symbols as necessary e.g. *Primula* x *kewensis*, x *Cuprocyparis leylandii* and + *Laburnocytisus adamii*

Plant's characteristic

Habit (e.g. prostrate, horizontal, fastigiated, columnar, weeping, round, irregular), size, shape, preferred habitat

Leaf shape, apex, margins, colour and arrangement, bud shape, size and arrangement (opposite or alternate), stem colour and texture, stem and leaf modifications, flowers and fruit, colour shape, size, flower morphology, type of inflorescence, scent and fruit, should also include hardiness

Reference material

Utilise reference material to aid plant identification: text books, identification keys

Unit 223

Introduction to Plant Nomenclature, Terminology and Identification

Outcome 4

Be able to work safely and minimise environmental damage

Assessment Criteria

The learner can:

1. Work in a way which maintains health and safety and is consistent with current legislation, codes of practice and **any other requirements**

Unit content

Any other requirements

Care should be taken when handling/pruning/trimming plants, poisonous, irritant, thorny plants and those with sharp, pointed and rigid foliage. All current legislation must be complied with. Safe handling of compost and soils also included which may require wearing of Personal Protective Equipment (PPE)

To minimise environmental damage, consider for e.g. planting, lifting, pruning, removal of material, irrigation, transport, application of fertilisers and insecticides/herbicides

Unit 223 Introduction to Plant Nomenclature, Terminology and Identification

Notes for guidance

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.

Outcome 1 requires the learner to explain/define a range of terms associated with plant naming and identification. This includes family, genus, species (specific epithet) cultivar, hybrid (bi-specific, bi-generic), binomial system in order to assist with the identification of plants. They will also need to demonstrate that they understand why scientific/botanical names are used as an international language rather than adopting colloquial common names which vary from locality to locality and country to country. The learner will also need to be aware of the fact that plants are sometimes reclassified and give the reasons why this may occur. The learner will need to identify and demonstrate knowledge of the varied plant characteristics (including plant life cycles) to aid plant identification. Terms to be covered include monocotyledons/dicotyledons, woody evergreen/deciduous plants; hardy/half hardy/tender, annuals, ephemeral, biennials, herbaceous perennials, woody perennials.

Outcome 2 investigates the plant's characteristics to aid their identification inclusive of habit together with plant anatomy and plant morphology. Learners must be able to explain how a plants characteristics, plant anatomy and morphology aid identification this will be partially demonstrated by the learners undertaking plant identification tests. See requirements of Outcome 3.

In Outcome 3, the learner will practise learning plant names (Botanical/Scientific) and using reference material. Time must be allocated to allow learners to become familiar with the names and learners will require access to suitable reference material, facilities and plants. Visits to suitable gardens would also be helpful, as it is essential that learners see plants growing and not only specimens. Where plant specimens are used in the classroom, they should be exhibiting typical characteristics of the plant. A minimum of thirty from each category using their full scientific name, for at least 3 of the following: annuals and short-lived perennials, houseplants, herbaceous perennials, trees and shrubs, grasses, food crops and weeds. This will need to be accomplished over a period of time.

Outcome 4 ensures the learner works in a way which maintains their health and safety when working with plant material and that of others and this must be consistent with current legislation and codes of practice. Consideration must be given to plant handling/pruning/trimming/planting bearing in mind other such factors as thorns, poisonous and irritant plant material. The unit also addresses the need to minimise environmental damage when planting, lifting, pruning, removing material, irrigating, transporting and applying fertilisers and insecticides/herbicides

This unit enables the learner to develop an understanding of how and why plants are botanically (scientifically) named using the binomial system and to appreciate the diversity of plants through the industry recognised BS categories. It also provides the learner with the opportunity to further develop their plant knowledge by being involved in hands-on activities including undertaking plant identification tests in order to provide focus for that element of the unit. The unit also links with several others where plant handling, plant production and science etc combine to aid the development of identification skills.

References

Books

- Brickell C. 2002. *The RHS Encyclopaedia of Gardening*. 2nd ed. Surrey: Dorling Kindersley Publishers.
- Clapham AR, Tutin TG and Warburg EF. 1962. *Flora of the British Isles*. 2nd ed. Cambridge: Press Syndicate University of Cambridge.
- Hillier J and Coombes A J. 2007. *The Hillier Manual of Trees and Shrubs*. 3rd ed. Devon: David and Charles.
- Hubbard CE. 1992. *Grasses: v. 1: A Guide to Their Structure, Identification, Uses and Distribution*. 3rd ed. London: Penguin Books.
- Phillips R. and Grant, S. 1978. *Trees in Britain, Europe and North America*. London: Pan Books.
- Phillips R and Rix M. 1993. *Perennials: Early Perennials v.1: Early Perennials Vol 1*. London: Pan Books.
- Thomas G. S. 2004. *Perennial garden plants or the Modern Florilegium*. London: Frances Lincoln Limited. ISBN: 0-71122-403-X .

Journals

Brochures from hardy plant nurseries in UK and Europe are also useful.

Websites

www.rhs.org.uk Royal Horticultural Society

Unit 224 Introduction to Plant Selection

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of plant selection, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to develop skills and knowledge in the appropriate selection and use of plants to meet specific purposes and the requirements of the site, location and maintenance of specific plants and plant groups. The learner may know the plant by genera and species, in situations where many species are used, or may know cultivars/varieties of a smaller number of species in restricted situations. This unit may be used in the context of horticulture, turf or trees.

Learning outcomes

There are **three** learning outcomes to this unit. The learner will:

1. Know the characteristics and uses of plants
2. Be able to select plants for specific uses and locations
3. Understand the establishment and maintenance needs of plants

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

PH14 Identify and classify plants accurately using their botanical names

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 224

Introduction to Plant Selection

Outcome 1

Know the characteristics and uses of plants

Assessment Criteria

The learner can:

1. Describe the **aesthetic characteristics** of plants
2. Describe the **functional characteristics** of plants
3. State the **requirements** of specific plants in order for them to thrive
4. State **categories of plants** and their appropriateness for specific purposes

Unit content

Aesthetic characteristics

Aesthetic characteristics of plants: evergreen, deciduous, foliage, flowers, berries/ fruits/ seeds, seasonal variation, stature, habit/form, architectural character, stem/ twig/ bark, branch tracery, fragrance, general appearance

Functional characteristics

Functional characteristics of plants: shelter, shade, screening, privacy, structure, soil/bank stabilisation, absorption of atmospheric pollution, noise abatement, provision of specific surfaces (amenity, sport), habitat, food for wildlife, security, creation/prevention of access and desire lines, tolerance to specific pollution and climate factors (coastal), tolerance to specific soil factors (pH, drainage, arid, wet, bog, depth)

Requirements

Specific requirements: soil factors (moisture, drainage, dry, wet, bog, nutrition, pH), site factors (exposure, shelter, pollution, salt, frost, light/sun, shade, growing season, temperature extremes)

Categories of plants

Categories: trees (broad-leaved, coniferous, forestry, amenity, domestic garden, parkland), native, introduced, open-ground and container-grown/containerised, transplants, whips light standards, standards and semi-mature, shrubs – deciduous, evergreen, native, introduced, open-ground and container-grown, herbaceous perennials – bulbs, corms, rhizomes, stem tubers, hardy, tender, open-ground and container-grown/containerised, annuals and biennials – hardy and half-hardy, wildflower mixtures, grasses – from seed or turf, amenity, sports turf, ornamental, container-grown,

For nursery stock categories refer to British Standards (BS) 3936

Unit 224

Introduction to Plant Selection

Outcome 2

Be able to select plants for specific uses and locations

Assessment Criteria

The learner can:

1. Specify plants appropriately to meet **site characteristics**
2. Specify plants appropriately to meet the required **function or aesthetic purpose**
3. Specify the **establishment needs** of selected plants
4. Produce **simple plans** for specific groups of plants

Unit content

Site characteristics

Site characteristics: exposed, sheltered, sunny, shaded, coastal, low pH, high pH, arid, badly drained, frost pockets, susceptible to temperature extremes

Function or aesthetic purpose

Aesthetic purposes of plants: evergreen, deciduous, foliage, flowers, berries/fruits/seeds, seasonal variation, stature, habit/form, architectural character, stem/twig, branch tracery, fragrance, general appearance
Functional purposes of plants: shelter, sun, shade, screening, privacy, structure, soil/bank stabilisation, absorption of atmospheric pollution, noise abatement, provision of specific surfaces – amenity, sport, habitat, food for wildlife, security, creation/prevention of access and desire lines, tolerance to specific pollution and climate factors (coastal), tolerance to specific soil factors – pH, drainage (arid, wet, bog), depth

Establishment needs

Establishment needs: soil improvement if applicable, shelter, support, protection from pests, diseases, disorders, weeds, provision of water, provision of nutrients, initial pruning and cutting

Simple plans

Plans: initial sketch, scale drawing (with scale stated), make plant selection, production of simple planting plans for beds/borders, landscape site, copse or similar, calculation of plant numbers, justification of plant selection and plan design.

Unit 224

Introduction to Plant Selection

Outcome 3

Understand the establishment and maintenance needs of plants

Assessment Criteria

The learner can:

1. Describe the **establishment needs** of specific plants
2. Describe the **routine maintenance needs** of specific plants
3. State the **legislative and environmental issues** relating to the use of specific plants or plant groups
4. Describe the **problems** associated with the use of specific plant groups and how these can be minimised

Unit content

Establishment needs

Establishment needs: soil improvement if applicable and including for enhanced moisture retention, shelter, support, protection from pests, diseases, disorders, weeds, provision of water, provision of nutrients, initial pruning and cutting, light, space for growth, planting depth and firming in, These criteria should be applied as applicable to all aspects horticulture, trees or turf

Routine maintenance needs

Routine maintenance needs: provision of water, provision of nutrients, protection from pests, diseases, disorders and weeds, pruning/cutting, support/removal/replacement of support, removal of suckers and reverted shoots, replacement of losses, provision of shelter. These criteria should be applied as applicable to horticulture, trees or turf

Legislative and environmental issues

Legislative and environmental issues may include: use of native/non-native species, invasive plants, poisonous or otherwise harmful plants, local planning constraints (e.g. Tree Protection Order (TPO), import licences/plant passports

Problems

Problems: invasive and very vigorous species, species which hybridise with native species, single species planting e.g. sports turf, forestry, and the potential for pest and disease outbreaks, plants with potentially encroaching and damaging roots.

Unit 224 Introduction to Plant Selection

Notes for guidance

This unit covers the principles of plant selection as determined by site and soil characteristics. It can be applied to any area of horticulture, turf and trees and as such should be considered in that context. For example, selection of plants for a mixed border in a garden, seasonal bedding, selection of seed or turf for a sports or amenity area or selection of native species for an area of woodland.

It is anticipated that some formal learning will be required in developing the learners understanding of the principles behind plant selection and suitability. This may be enhanced by site visits to relevant locations and plant suppliers.

In Outcome 1, learners must demonstrate their knowledge of the aesthetic features of plants and their functional characteristics. They are also required to provide evidence that they appreciate the requirements of specific plants in order for them to thrive in specific situations and that they recognise the differing categories of plants and their appropriateness for use in specific areas/purposes. For the eight officially recognised nurseries stock categories reference must be made to British Standards (BS) 3936.

Outcome 2 includes the requirement for learners to produce simple planting plans drawn to scale. These could be for a mixed border in a garden, a seasonal bedding scheme, a shelterbelt or an area of native woodland for example. Where the context of assessment is turf, the learner should produce a range of specific seeds mixes/turf mixtures for a variety of situations typically encountered (close-mown sports turf, amenity grassland, shade tolerant) and give a clear indication that the amounts of seed or turf required for each purpose is understood. Learners must be given the opportunity to select/specify plants to meet given site characteristics and purpose(s), together with outlining the establishment needs of those plants. This could be based on a specified site or border.

In Outcome 3 learners must demonstrate their understanding of the establishment and maintenance needs of plants, together with showing an awareness of the relevant legislative and environmental issues which could be encountered. This includes identifying and describing the likely problems to be faced when establishing and maintaining varied types of plantings. This requirement could be based on a specified site or border.

The unit may be delivered through a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. Much of this unit and aspects of others could be accomplished (if resources/facilities allow) by wrapping the content around a mainly practical hands on project. All activities should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

Agate, E. 2002. *Woodlands: A practical handbook*. London: British Trust for Conservation Volunteers. ISBN: 0-94675-233-8.

Hillier J and Coombes A J. 2007. *The Hillier Manual of Trees and Shrubs*. 3rd ed. Devon: David and Charles.

McIndoe A and Hobbs K. 2005. *Herbaceous perennials*. Devon: David and Charles. ISBN: 0-71532-024-6.

Journals

STRI pamphlet, Turfgrass Seed 2009.

Unit 225

Presentation and Service for Retailing in the Land-based Sector

Level: 2

Credit value: 10

Unit aim

This unit has been specifically developed for 14-19 year old learners in full-time education acquiring additional knowledge of retailing.

The learner will be able to plan the layout of a land-based retail outlet. They will know the products and services offered by a given land-based retail outlet, along with how they are stocked. Practical skills of how to display the products will also be demonstrated. Health and safety considerations of the store will be discussed. The learner will also demonstrate appropriate customer care skills.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to design a suitable layout for a land-based retail outlet
2. Understand the products and services provided by a land-based retail outlet
3. Be able to prepare and display products for sale
4. Be able to demonstrate appropriate customer care skills.

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

n/a

Endorsement of the unit by a sector or other appropriate body

Skillsmart Retail has approved this unit to be used within Edexcel BTEC and City & Guilds qualifications only

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge

Unit 225

Presentation and Service for Retailing in the Land-based Sector

Outcome 1

Be able to design a suitable layout for a land-based retail outlet

Assessment Criteria

The learner can:

1. Plan the **layout** for a land-based retail outlet
2. Report on the **health and safety** and **legislative** requirements of a retail outlet
3. Justify the design and layout of a land-based retail outlet

Range

The retail outlets which can be used for this unit need to be appropriate to the context in which the learner is studying.

Unit content

Layout

Purpose of retail outlet, location of exit and entrance, storage areas/shelving, sectioned areas for grouped items, customer service area, customer facilities, tills, collection points and disabled access

Health and safety

Risk assessments, risks to staff and customers, hazards which could affect staff and customers, storage of chemicals and carry out practical risk assessment

Legislation

Health and Safety at Work etc Act 1974, Control of Substances Hazardous to Health (2002) (COSHH), Reporting of Injures Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR), Disabilities Discrimination Act 1995 (DDA)

Unit 225

Presentation and Service for Retailing in the Land-Based Sector

Outcome 2

Understand the products and services provided by a land-based retail outlet

Assessment Criteria

The learner can:

1. Review **products** and/or **services** in a given land-based outlet
2. Evaluate **factors influencing choice** of products and services for a given land-based retail outlet
3. Describe the **stocking** requirements of products being sold in a given land-based retail outlet

Range

The retail outlets which can be used for this unit need to be appropriate to the context in which the learner is studying

Unit content

Products

Range of products, list/group those available and ensure relevance

Services

Make relevant to the business, list those that link directly to the business for example; delivery service, personal shopper service

Factors influencing choice

Cost, price, quality, prominence/location of product in the outlet, proximity to other products, offers, discounts

Stocking

Space available, position of stock areas, amounts of stock required, who is in charge of ordering stock, health and safety considerations for example; location of stock and lifting stock

Unit 225

Presentation and Service for Retailing in the Land-Based Sector

Outcome 3

Be able to prepare and display products for sale

Assessment Criteria

The learner can:

1. **Prepare** products for sale
2. **Display** products for sale
3. **Maintain** displays within a given land-based retail outlet

Range

The retail outlets which can be used for this unit need to be appropriate to the context in which the learner is studying.

Unit content

Prepare

Checking stock for sell by date, checking for damage, ensure stock is required

Display

Suitability of location of display, prepare display to receive goods, product placement for example; in order of size and grouped accordingly

Maintain

Checking stock for damage, checking sell by dates, product placement, stock rotation, regular cleaning of shelves and display units

Unit 225

Presentation and Service for Retailing in the Land-Based Sector

Outcome 4

Be able to demonstrate appropriate customer care skills

Assessment Criteria

The learner can:

1. Perform **customer care** related activities
 - **processing payments**
 - dealing with customers
 - **customer satisfaction**
2. Describe the importance of customer care in land-based retail outlets

Range

The retail outlets which can be used for this unit need to be appropriate to the context in which the learner is studying

Unit content

Customer care

Open and closed body language, speaking clearly, language, staff presentation, dealing with complaints and difficult customers

Processing payments

Using electronic tills, manual working out of items, using card machines, receiving cash payments and processing cheques

Customer satisfaction

Quality of service provided, quality of goods supplied, dealing with customer enquiries in store and over the telephone and replacing damaged stock

Unit 225 Presentation and Service for Retailing in the Land-Based Sector

Notes for guidance

This unit is designed to provide the learner with an introduction to the knowledge and skills required to work in land-based retail.

Throughout the unit, the emphasis should be on safe working. It is expected that the learners will be aware of safe working practices and behaviours within the context in which they are working.

In Outcome 1, the learners are required to plan the layout of a land-based retail outlet of their choice. To accompany this full justification for the design needs to be given. The relevant health and safety legislative regulations also need to be identified and discussed. This could be investigated by the tutor taking the learners to land-based retail outlets, with prior arrangement and devising a blank plan that the learners could fill out when they go there to note the layout. Several different organisations could be visited, such as small, family run retail outlet or farm shop and a large chain store. This would give learners a good range of outlets to look at and base their ideas and justifications on.

Outcome 2 requires the learner to review the products and services which are offered by a chosen land-based outlet. An evaluation should be carried out relating to both the products and services provided to customers. Learners should also be encouraged to think innovatively when it comes to making suggestions and stocking decisions for products or services that are not currently provided by the outlets.

In Outcome 3, the learner is required to practically prepare and display the products sold within a land-based outlet. Some theory sessions may be required to accompany the practical aspects. Learners can complete this outcome on work placement or in a simulated assessment set up by the tutor. The learners should be able to give a full account of why they have chosen the particular preparation and displays, and could use their experience of visits to outlets to justify their decisions.

Outcome 4 focuses on customer care and the learners are required to demonstrate customer care practices. This task can be completed on work placement, or in a simulated assessment. Customer care is of importance when working in retail, and learners should be encouraged to understand the implications of not providing good customer care and service. This could be done by discussing bad experiences the learners have had in a retail environment or through role play with the rest of the group. This can be delivered interactively, and there are some excellent online materials that can be used to assist with delivery of this unit.

Centres are encouraged to introduce employees and professionals from industry to provide interesting and relevant information to the learner. Teaching would also benefit from visits to a variety of establishments to add depth to the learner experience.

It is expected that the learners will be aware of safe working practices and behaviours within the context in which they are working.

References

Books

Pfahl, PB., Behe B.K.1994. *The Retail Florist Business (5TH Ed)*. Illinois: Interstate Printers and Publishers. ISBN: 0813429670

Business Strategies Limited. 1999. *Skills in the Land-based sector*.

Warwickshire Careers Service.1996. *Careers in the Land-based sector*.

Websites

www.hse.gov.uk Health and Safety Executive

DVD's

Signposts for Health and Safety (2008) HSE

Unit 226

Understand the Principles of Garden History

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of garden history, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to develop knowledge of the changes in styles and fashion of gardens through history and the social, political and artistic factors that have influenced them. Also explored is the work of the plant hunters in making plants available to gardeners and designers and the environmental role of present day plant hunters.

Learning outcomes

There are **five** learning outcomes to this unit. The learner will:

1. Know the characteristics and influences of gardens from ancient civilisations to early European gardens
2. Know the characteristics and influences of 18th century gardens
3. Know the characteristics and influences of 19th century gardens
4. Understand 20th century design styles
5. Understand garden history in the present day context

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

There are no relevant NOS for this unit.

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering underpinning knowledge.

Unit 226

Understand the Principles of Garden History

Outcome 1

Know the characteristics and influences of gardens from ancient civilisations to early European gardens

Assessment Criteria

The learner can:

1. Describe the characteristics of the gardens of **ancient civilisations**
2. State the **characteristics and uses of medieval** and **early formal gardens** through to late 17th early 18th Centuries

Unit content

Ancient civilisations

Ancient civilisations: mostly hot, arid conditions

Pattern of irrigation channels lead to formal layout, e.g. paradise gardens of Middle East, Greek gardens had sacred groves and temples. Romans cultivated many vegetables and fruit, learned how to improve the soil

Characteristics and uses of medieval

At first culinary, medicinal and perfumed plants in monastery gardens, but later also ornamental (decorative) plants in castles and manor houses

Plant types grown, styles/features defensive walls, arbours and shady walks, flowery meads, clipped and trained fruit trees, gravel paths, raised beds and covered walkways, evidence of pleasure gardens being laid out

Early formal gardens

English: 16th & 17th century garden: avenues and allees, knot gardens, parterres, wilderness, canals, fountains and cascades, covered walks, mounts, clairvoyees, topiary, terrace walks, statuary (wooden and stone)

Examples of English early formal gardens

Late 17th century formal garden style of London and Wise, e.g. Blenheim

French: large scale forest gardens, intersecting avenues, hedged enclosures, water features, architectural features

Examples of French early formal gardens

Dutch: rectangular layouts, reduced scale compared to the French, parterres and knot gardens, bowling greens, elaborate water features and canals

Examples of Dutch formal gardens

Unit 226

Outcome 2

Understand the Principles of Garden History

Know the characteristics and influences of 18th century gardens

Assessment Criteria

The learner can:

1. Describe the development of the **early English landscape style**
2. Compare the **design styles** of Charles Bridgeman, William Kent, Lancelot Brown and Humphry Repton

Unit content

Early English landscape style

Gradual reaction to formality and a developing taste for natural scenery over several decades. Many gardens exhibited both styles and characteristics, removal and destruction of formal structured gardens (use of straight lines and geometric shapes), replacing with less structured style, informality (meadows, serpentine lakes, clumps of trees, creation of designed park land)

Stephen Switzer developed the 'Ferme ornee' style which included livestock

Design styles

Charles Bridgeman 1690 – 1738, Royal Gardener 1728 – 1738, transitional role in garden design, moved from formal geometric style to less structured style – use of winding paths and ha-ha's, less formality in designs, early naturalistic landscape style

William Kent 1685 – 1748, artist and designer, introduction of naturalistic landscapes super imposed on geometric designs, one of originators of English Landscape Garden Style, envisioned landscape as a classical painting, use of light, shape, colour, use of classical temples with philosophical associations

Lancelot Brown 1716 – 1783, nicknamed Capability Brown, developed the landscape ideas of Kent and Bridgeman, created huge landscaped parks, credited with the developing the Natural English or Serpentine style, swept away formality of design and many existing formal gardens, grass meadows, serpentine lakes, follies, ha-ha ditches, belts and circular clumps of trees within park land, bridges or cascades connected water features.

Humphry Repton 1752 – 1818, regarded as successor to Brown, softened Browns style, fine tuned earlier gardens/landscapes, retained formal features, avenues, straight lines, terraces and formal gardens near to house, developed 'red book' as a marketing tool, borrowed features e.g. church towers making them part of garden/park landscape vistas/views.

Use named examples of the work of each designer

Unit 226

Outcome 3

Understand the Principles of Garden History

Know the characteristics and influences of 19th century gardens

Assessment Criteria

The learner can:

1. Describe the development of the **Gardenesque** movement and the work of John Loudon
2. Describe the **political and social climate** that fostered the introduction of public parks and arboreta
3. Describe the styles of the **Victorian period design**

Unit content

Gardenesque

John Claudius Loudon (1783 – 1843) introduced term 'gardenesque', planting design recognised as a work of art not a work of nature, use of abstract shapes, use of exotic plants (non native to area), use of specimen trees and shrubs so form of individual plant recognizable (Principle of Recognition), artistic plant groupings, features, geometrical beds, intensive maintenance often required, development of urban gardens and parks. Define also 'picturesque' style to differentiate, Reverend William Gilpin (1724 – 1804)

Political and social climate

Public parks movement was linked to social reform and improvement of the urban working class
Gardenesque style was well suited to public recreation and municipal areas, public parks, arboreta, cemeteries

Public parks included promenades, lakes, ornamental buildings, vast successional bedding schemes and recreational facilities

Victorian Period design

Joseph Paxton (1803 – 1865) – pioneer of public parks, engineer and gardener, designer of conservatories and glasshouses, water features, Head Gardener at Chatsworth

Formality, order and neatness, colourful planting and successional bedding schemes, mixed flower beds set in turf, high maintenance,

Mixed design style

Style used by William Nesfield, formal gardens near the house and informal areas further away included parterres, terraces, fountains and statuary

Provide examples of his work

Unit 226

Understand the Principles of Garden History

Outcome 4

Understand 20th century design styles

Assessment Criteria

The learner can:

1. Review the work of significant designers and styles of the **early 20th century** including Gertrude Jekyll and Edwin Lutyens
2. Describe the **introduction of** rock gardens, woodland gardens, Japanese gardens and the concept of the garden of rooms

Unit content

Early 20th century

Move from elaborate formality to more naturalistic plantings, strong architectural style, formal water features, pergolas, carefully chosen plantings, appreciation of hardy plants, use of herbaceous plants, hardy flower borders

Gertrude Jekyll (1843 – 1932) and Sir Edwin Lutyens (1869 -1944) close working relationship developed, Lutyens created ground plans, Jekyll produced planting plans, characteristics included single colour and mixed borders, use of colour and texture, use of grey leaved plants, planting for year round effect, vibrant colours, harmonious shapes, tier planting, cottage garden.

Introduction of

Arts and crafts, garden of rooms, rock gardens, woodland gardens, Japanese gardens, the work of Thomas Mawson, Vita Sackville-West and Harold Nicholson, Lawrence Johnston, Nora Lindsay, Harold Peto

Unit 226

Outcome 5

Understand the Principles of Garden History

Understand garden history in the present day context

Assessment Criteria

The learner can:

1. Explain how **garden styles** have developed in tandem with plant introductions from other countries
 - **major plant hunters**
 - **areas of exploration**
 - **significant plants** introduced
2. Review the **systems and organisations** concerned with the conservation of historic parks and gardens

Unit content

Garden styles

Rate of introductions gradually increased through the 17th and 18th centuries.

Rapidly increased during the 19th and 20th centuries, leading to the Gardenesque styles and the flamboyant displays in 19th century public parks

Areas of exploration of the major plant hunters

Areas of exploration and significant plant introductions of The Tradescants (Snr and Jnr), David Douglas, William Lobb, Robert Fortune and the Wardian case, Reginald Farrer, Earnest Wilson, George Forrest

Modern day plant hunting

The work of Kew and the Millennium seed-bank at Wakehurst Place, Convention on the International Trade in Endangered Species (CITES) and endangered species, plant re-introductions to the wild, Forestry Commission (Westonbirt Arboretum), various Botanic Gardens

Significant plants

Examples could include, *Pseudotsuga menziesii* (Douglas Fir), *Davidia involucrata* (Dove or Handkerchief Tree), *Liriodendron tulipifera* (Tulip Tree)

Systems and organisations

The National Trust, English Heritage, the Garden History Society, County Gardens Trusts, National Council for the Preservation of plants and Gardens, protective designations

Unit 226 Understand the Principles of Garden History

Notes for guidance

This unit enables learners to develop knowledge of garden history from early eastern influences, through medieval, early formal, landscape, Victorian to 20th and 21st century gardens. It also includes the plant hunters who brought exotic plant introductions from outside the UK. It is anticipated that some formal learning will be required in developing the learners' understanding of the principles of garden history. This will be considerably enhanced by the use of site visits to relevant locations.

There is the opportunity for learners to research aspects of the units and discuss their findings.

Outcome 1 will enable the learner to know and describe in simple terms the characteristics and influences of gardens from ancient civilisations to early European gardens and styles, inclusive of those influences from the ancient world, Japanese, Islamic and European Renaissance.

Outcome 2 introduces the learners to some of the influential people credited with the development of major design styles from the very formal and intricate to the more naturalistic approach leading to the Early English Landscape style, with its taste for natural scenery, charting the development through the 18th century. The tutor should name examples of the work of each designer, thus forming an integral part of the delivery process and aiding learner appreciation of the developmental process and the incorporated design characteristics.

In Outcome 3 the learner will be able to describe the development of the Gardenesque design style or movement and be aware of the contribution of John Loudon who is credited with its introduction. The learner must be able to differentiate between the Gardenesque style and the Picturesque style.

Outcome 4 requires the learner to develop an understanding of recent garden history (late 19th and early 20th century) within the present day context, reviewing the work of significant garden designers in particular Gertrude Jekyll and Sir Edwin Lutyens who developed an influential partnership, This understanding and appreciation enabling learners to put into context current design ideas and styles.

Outcome 5 requires the learner to demonstrate an understanding of garden history within the present day context. They will need to explain how the garden styles have developed in tandem with plant introductions from other countries, enabled by named major plant hunters and their areas of exploration, together with being able to provide examples of named significant plant introductions. Modern day plant hunting will also be covered e.g. the work of Kew and the Millennium seed-bank at Wakehurst Place.

Learners will also be able to review the systems and organisations concerned with the conservation of historic parks and gardens, providing named examples of organisations and their aims and objectives.

The content of the unit lends itself to undertaking off site visits to gardens and parks of note within the local area, thus enabling the learner to better appreciate and visualise design styles, features, plants and plantings covered during the formal lessons. It is important that those seeking employment in this sector should have an appreciation of historic garden styles and their influence on the British garden landscapes, in order to be better placed to select the appropriate maintenance and management strategies required. Lessons at the centre should utilise a pictorial delivery style to create and maintain interest in a very visual topic.

References

Books

- Bisgrove R. 1990. *The National Trust Book of the English Garden*. New York: Viking Adult.
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- Hessayon D G. 1986. *The Armchair book of the Garden*. Andover: Expert Publishing.
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- Landsberg S. 1998. *The Medieval Garden*. Oxford: British Museum Press.

Unit 227

Understand the Principles of Organic Horticulture

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of organic horticulture, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to describe the requirements, standards, principles and philosophy relating to organic growing methods in the UK.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know the organisations and standards relating to organic growing
2. Know the principles of organic growing
3. Know the selection and use of resources in organic growing
4. Know the systems related to organic growing

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

There are no relevant NOS for this unit

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 227

Outcome 1

Understand the Principles of Organic Horticulture

Know the organisations and standards relating to organic growing

Assessment Criteria

The learner can:

1. List the **organisations** that define standards of organic production nationally and internationally
2. List the **certification bodies** that ensure organic standards are met
3. State the **roles of Garden Organic** (formerly HDRA) within the organic movement

Unit content

Organisations

Organisations that define the standards: International Federation of Organic Movements (IFOAM), Advisory Committee on Organic Standards (ACOS), The Soil Association, European Union (EU) regulations/standards

Certification bodies

Soil Association, Organic Farmers and Growers

Roles of Garden Organic

The UK's leading Organic Charity which promotes organic production methods to amateur and commercial growers and farmers: partnership working with other organisations e.g. schools inclusive of International Development information awareness (e.g. growing methods, home composting), trials, research, heritage seed library

Organisation is dedicated to researching and promoting organic gardening, farming and food.

Unit 227

Understand the Principles of Organic Horticulture

Outcome 2

Know the principles of organic growing

Assessment Criteria

The learner can:

1. State the underlying **principles of organic growing**
2. Describe the **conversion of a site** to organic growing
3. Describe the **principles of pest, disease and weed management**
4. State how to comply with the **legislation and codes of practice** relevant to organic horticulture.

Unit content

Principles of organic growing

Underlying principles, creating a diverse ecology, mixed plantings rather than monocultures, working with natural systems to build a well balanced fertile soil from which healthy food of a high nutritional status can be produced, use of bulky organic materials and some organic fertilisers to improve soil structure and nutrient recycling by micro-organisms and to achieve balanced nutrition, sustainable use of natural resources with minimum reliance on outside inputs, avoidance of chemically produced and environmentally harmful fertilisers and pesticides, maintenance of bio-diversity, encouraging natural balance of predators, such as ladybirds, lacewings, blue tits and hedgehogs, avoidance of genetically modified material, waste management – reduce, re-use, recycle

Related systems are: biodynamics, agroforestry and permaculture

Conversion of a site

Registration procedures, conversion periods, timing, the inspection process, derogation of legislation, record keeping requirements, labelling regulations, organic inputs

Principles of pest disease and weed management

Organically grown plants may be better adapted to the local growing environment and therefore may be more likely to survive competition from weeds and attack from pests and diseases.

Pest management: disease management: balance of damage caused against the impact of control measures.

The importance of biodiversity, preferred habitats of beneficial, predators, parasites, bacterium and fungal agents, insects, crop rotation, use of green manures, variety selection

Control measures, cultural, biological (natural), permissible biocides, companion planting, the use of indicators and distracters, weed control, methods of control, crop rotation, tillage, direct control, mulching, cultural, exhaustion, thermal, mechanical and manual

Legislation and codes of practice

Standards of organic production are defined by, IFOAM, (ACOS), Soil Association, European Union (EU) regulations

Unit 227

Outcome 3

Understand the Principles of Organic Horticulture

Know the selection and use of resources in organic growing

Assessment Criteria

The learner can:

1. Describe the selection of **resources**, including
 - renewable and non-renewable
 - ethical sources
 - efficient and sustainable use of water and energy
 - reduction, re-use and recycling
 - ethical disposal
2. Describe the acceptable and non acceptable **use of fertilisers and pesticides** in organic growing
3. Describe the negative effects of **inappropriate use of fertilisers and pesticides**
4. Describe the sourcing of acceptable types of **bulky organic materials**

Unit content

Resources

Renewable and non renewable, ethical and approved for use, efficient and sustainable use of water and energy, reduction, reuse and recycling and ethical disposal.

Use of fertilisers and pesticides

Acceptable and unacceptable fertilisers and pesticides

Identify current approved types and provide reasons, uses, benefits and disadvantages

Inappropriate use of fertilisers and pesticides

Negative effects of inappropriate use, environmental considerations including: soil, water and food contamination, soil residual effects, spray drift, reduction in soil diversity/fauna, monetary costs, operator safeguarding, customer relations and expectations, negative publicity.

Bulky organic material

Used as: soil conditioner, increase soil moisture content, mulch, and growing media. Range of materials, source of supply, (animal inputs) traceability, ethical and environmental considerations, acceptable in organic horticulture, their use or application

Identify types and provide examples: green manures, types, uses and advantages, farm yard manures, types, uses, advantages, composted materials: types, uses, advantages

Note: vegan organic system = growing without any animal input.

Unit 227

Outcome 4

Understand the Principles of Organic Horticulture

Know the systems related to organic growing

Assessment Criteria

The learner can:

1. State the main characteristics of **related systems**, including bio-dynamics and permaculture

Unit content

Related systems

Three main movements/philosophies: permaculture movement, bio-dynamic movement, Agro-forestry movement

Also the 'no dig' growing technique

Cover main aspects: benefits, uses and advantages, techniques

Unit 227 Understand the Principles of Organic Horticulture

Notes for guidance

The learner will be able to understand the underlying principles of organic horticulture. They will develop knowledge regarding the organisations and the standards relating to organic growing, and the principles of organic growing. Learners will be able to correctly select the resources used in organic growing ensuring that organic standards are not compromised. Learners will also know and understand systems that are related to organic growing such as permaculture, bio-dynamics and the forest garden.

In Outcome 1, learners will gain knowledge the role of International and National organisations that define the standards of organic production and the certification bodies that ensure organic standards are met. They will also learn about the importance of Garden Organic and its role and activities within the organic movement.

In Outcome 2, learners will develop their understanding of the principles of organic growing. They will be able to describe how to comply with legislation and codes of practice and the process of conversion of a site to organic growing. In the final part of this outcome learners will develop their knowledge and be able to describe the organic principles of pest, disease and weed control and management.

In Outcome 3, learners will describe the selection of resources (acceptable inputs) into an organic system. They will consider the use of fertilisers and pesticides and describe the effects of inappropriate use on the environment. Finally learners will describe the sourcing and use of bulky organic materials and learn to recognise them and their benefits. It should be noted that the vegan organic system revolves around growing without any animal input.

In Outcome 4, learners will develop their knowledge of related systems and be able to describe the main characteristics of the permaculture movement, the bio-dynamic movement and Agroforestry It would be beneficial to cover the benefits, uses and advantages of the systems in order to assist the learners in relating to the characteristics.

Permaculture characteristics include three main elements: ethical, an understanding of how nature works and a design approach to growing/production. It emphasises an inclusive and holistic approach, caring for the earth, people and setting limits to populations and therefore consumption, recognising that earth's resources are limited and need to be shared amongst many beings.

Bio-dynamic characteristics include a philosophy which covers both farming and gardening, attempting to combine a common sense approach to production, an understanding and appreciation of ecology, together with the environment of a given place with a spiritual approach to the concepts of growing, which also covers the principles and practices of cultivation.

Agroforestry characteristics include the growing of both trees and agricultural/horticulture crops/produce on the same piece of land or site at the same time, focusing on the interactions of the combined plant components, not purely on the individual plant groups themselves; the aim being to protect, conserve, diversify and sustain resources.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. Learners will require access to specialised literature and other resources. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

- Blake F. 1994. *Organic Farming and Growing: A Guide to Management*. Surrey: The Crowood Press.
- Davies G and Lennartsson M. 2006. *Organic Vegetable Production: A complete Guide*. Surrey: The Crowood Press.
- Greenwood P and Halstead A. 2003. *RHS Pest & Diseases*. 2nd ed. Surrey: Dorling Kindersley Publishers.
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Journals

Organic Farming
The Organic Way
Permaculture Magazine
Garden Organic fact sheets – Disease Control, Pest Control, Weed Control

Websites

www.soilassociation.org	Soil Association
www.gardenorganic.org.uk	Garden Organic
www.rhs.org.uk	Royal Horticultural Society
www.biodynamics.or.uk	Biodynamic Agricultural association

Unit 228

Understand the Principles of Sustainability in Horticulture

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of sustainability in horticulture, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to describe the principles of sustainability and ecology and relate them to growing in horticultural systems.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the principles of sustainability in horticulture
2. Know the opportunities for habitat creation
3. Understand ecological principles within horticulture
4. Know systems related to organic growing

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

There are no relevant NOS for this unit

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 228

Understand the Principles of Sustainability in Horticulture

Outcome 1

Understand the principles of sustainability in horticulture

Assessment Criteria

The learner can:

1. Discuss the **impacts of horticulture** on the environment
2. Discuss the **impacts on society** of horticulture and modern marketing practices
3. Review **alternative sources of energy and water**
4. Describe the outlets for **organic produce** and their benefits to the environment and society

Unit content

Impacts of horticulture

Introduction of alien species (flora, pest and diseases), inappropriate use of pesticides and fertilisers, water extraction, storage and usage, direct and indirect destruction of habitats, collection of plants from the wild, energy use and the 'Greenhouse Effect', use of non-renewable resources, inappropriate waste management, food processing and marketing, air miles and packaging, creation of new habitats

Impacts on society

Seasonal and non-seasonal produce, outdoor and protected cropping, increase in food choice, regional specialties, nutritional value, chemical and fertiliser residues, employment opportunities (production and retail), fair trade, leisure and sporting opportunities, transportation of goods, packaging, waste management/disposal, sell by date

Alternative sources of energy and water

Renewable energy sources (e.g. wind turbines), water sources and quality, collection and use of grey water, stored water (nursery reservoirs), recycling, reduction and efficiency of use

Organic produce

Outlets: farm shops, farmers markets, supermarkets, box schemes, green grocers, co-operatives, wholesalers, speciality stores

Benefits: non-consumption and use of synthetic chemicals, maintenance of diverse ecosystems, less energy used in production compared to conventional growing, less waste than conventional production methods, taste and health benefits, freshness, seasonality of produce

Unit 228

Understand the Principles of Sustainability in Horticulture

Outcome 2

Know the opportunities for habitat creation

Assessment Criteria

The learner can:

1. Describe **habitats that exist** and can be managed within the landscape
2. Describe opportunities to **re-create diverse habitats** within the garden
3. State **ways of attracting** vertebrates and invertebrates into the garden including habitat size and wildlife corridors

Unit content

Habitats that exist

Meadows, arable and livestock fields, deciduous and mixed woodlands, hedgerows, pond and stream habitats, domestic and allotment gardens

Re-create habitats

Use of existing garden features/habitats, soil analysis and improvement, plant selection, planting techniques, installation of water features, resources and materials, create a diverse ecology, mixed plantings rather than monocultures

Ways of attracting

Habitat size and bio-diversity, use of wildlife corridors, plant selection, non use of pesticides, provision of water features, positive and negative effects of climate change

Unit 228

Understand the Principles of Sustainability in Horticulture

Outcome 3

Understand ecological principles within horticulture

Assessment Criteria

The learner can:

1. **Define the terms** 'habitat', 'niche', 'community' and 'bio-diversity'
2. Describe how **local climates and micro-climates** affect plant growth and how plants have adapted to stressful environments
3. Summarise the **process of succession** in plant communities, its relationship to weed invasion and control in horticulture
4. Evaluate the **inter-relationship of species**
 - intra- and inter-specific competition on plant growth
 - predator and prey
 - positive and negative effects of grazing
 - movement of energy through ecosystems

Unit content

Define the terms

Habitat, niche, community, bio-diversity

Local climates and micro-climates

Local climate: predominates the general regional climate

Micro-climate: climate of a small zone differs from surrounding area or local climate

Climate conditions: rainfall, light, shade and temperature levels, coastal areas, exposed site

Adaptations to: reduce water loss, store water and food, provide cooling effect, provide support and protection, reduce physical damage, tolerate pollution, tolerate low nutritional status, tolerate pH extremes, resist pest and disease attack, ensure species survival (seed and natural vegetative re-production)

Process of succession

Process of succession, climax vegetation, weed infestation and control, concept of the 'Forest Garden' (agroforestry)

Inter-relationship of species

Intra- and inter-specific competition on plant growth (space, light, moisture, nutrition), predator and prey interaction, positive and negative effects of grazing, movement of energy through eco-systems

Unit 228

Understand the Principles of Sustainability in Horticulture

Outcome 4

Know systems related to organic growing

Assessment Criteria

The learner can:

1. State the main **characteristics of related systems**, including bio-dynamics and permaculture

Unit content

Characteristics of related systems

Three main movements/philosophies: Permaculture movement, Bio-dynamic movement, Agro-forestry movement

Also the 'no dig', growing technique

Cover main aspects; benefits, uses and advantages, techniques

Unit 228 Understand the Principles of Sustainability in Horticulture

Notes for guidance

The learner will be able to describe the principles of sustainability and ecology and relate them to growing in horticultural systems, developing an awareness and knowledge of how they may be applied in practice.

Outcome 1 covers the principles of sustainability in horticulture enabling the learner to identify and discuss the adverse and advantageous impacts of horticulture on the environment and on modern society. This must include reference to the increase in food choice for customers, the locality and/or country of origin and the concept of fair trade. The unit includes the use of non-renewable resources, inappropriate waste management, seasonal and non-seasonal produce, food processing, transportation of goods, air miles and packaging, employment opportunities (production and retail) and the role of sell by dates.

In Outcome 2 learners must be able to identify and describe the habitats that exist in the wider landscape and that can be managed. Together with demonstrating their ability to recognise and describe opportunities to re-create appropriate habitats within the garden, in order to cater for a diverse range of flora and fauna, thus encouraging and maintaining a diverse ecology, the learner must also be enabled to state ways of attracting vertebrates and invertebrates into the garden including plant selection, habitat size and the use of wildlife corridors and micro-climate.

Outcome 3 enables the learner to explore the ecological principles and how they relate to the garden. They will need to be able to differentiate between local climates and micro-climates, describing how they may affect plant growth and recognising how the plants have adapted (evolved) to successfully grow in stressful environments. Learners must be able to give actual examples of adaptations to leaves, stems, roots, flowers, fruit and seeds. The process of succession in plant communities needs to be covered together with the inter-relationship of species within horticulture.

In Outcome 4, learners will develop their knowledge of related systems and be able to describe the main characteristics of the permaculture movement, the bio-dynamic movement and Agroforestry. It would be beneficial to cover the benefits, uses and advantages of the systems in order to assist the learners in relating to the characteristics.

Permaculture characteristics include three main elements: ethical, an understanding of how nature works and a design approach to growing/production. It emphasises an inclusive and holistic approach, caring for the earth, people and setting limits to populations and therefore consumption, recognising that earth's resources are limited and need to be shared amongst many beings.

Bio-dynamic characteristics include a philosophy which covers both farming and gardening, attempting to combine a so-called 'common sense' approach to production, an understanding and appreciation of ecology, together with the environment of a given place with a spiritual approach to the concepts of growing, which also covers the principles and practices of cultivation.

Agroforestry characteristics include the growing of both trees and agricultural/horticulture crops/produce on the same piece of land or site at the same time, focusing on the interactions of the combined plant components, not purely on the individual plant groups themselves; the aim being to protect, conserve, diversify and sustain resources.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. Learners will require access to specialised literature and other resources. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All

methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

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www.gardenorganic.org.uk	Garden Organic
www.rhs.org.uk	Royal Horticultural Society
www.biodynamics.or.uk	Biodynamic Agricultural Association

Unit 229

Participate in Propagation Techniques

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of propagation techniques, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will be able to describe methods of vegetative and seed propagation and carry out vegetative and seed propagation using a variety of methods.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know how to propagate plants by vegetative means
2. Be able to propagate plants by vegetative methods
3. Know how to propagate plants from seed
4. Be able to propagate plants from seed

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU72 Propagate plants by vegetative methods

CU73 Propagate plants from seed

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 229

Participate in Propagation Techniques

Outcome 1

Know how to propagate plants by vegetative means

Assessment Criteria

The learner can:

1. List **advantages and disadvantages** of vegetative propagation
2. Describe methods for **collecting propagation material**
3. Describe the use of **division, cuttings and grafting** as methods to propagate plants
4. Describe the **conditions required** for effective establishment of propagation material

Unit content

Advantages and disadvantages

Advantages of vegetative propagation: often quick and cost-effective means to achieve mature/saleable plants, able to control size/ shape/habit of plant, only method available for plants that produce little or no seed, only method typically suitable for clones/cultivars that will not come true from seed

Disadvantages of vegetative propagation: may need expensive facilities to be provided, skilled tasks that require trained operatives, can be slow, availability of suitable propagation material, breeders rights and licensing agreements may apply, not suitable for most annual plants, possible transference of fungal and viral diseases

Collecting propagation material

Types: division, cuttings (softwood, semi-ripe, hardwood, root), budding/grafting, natural vegetative means (bulbs, corms, stolons, stem tubers, plantlets, foliar embryos)

Methods: time of year, time of day, removal from stock plant, tools (secateurs, snips, knives, spade, fork, dividing knife), resources (polythene bags, trays/boxes), select material which is true to type, appropriate size, not too vigorous and pest and disease free

Division, cuttings and grafting

Division: separation of plant into complete plantlets, simple division by hand, splitting with forks, cutting with knife or other tools, used for many herbaceous perennials and grasses (may also be appropriate for bulbs, corms, tubers)

Cuttings: removal of one section of the plant, stem cuttings - softwood, semi-ripe, hardwood, leafy and deciduous, nodal and intermodal, used on many tender plants, shrubs, herbaceous perennials, leaf petiole cuttings, leaf cuttings – whole leaf, leaf section, foliar embryos, leaf bud cuttings/single node stem cuttings, root cuttings (thick and thin), method used for some alpiners, herbaceous and climbing plants, trees and shrubs

Grafting: joining of distinct rootstock and scion material, methods include whip and tongue, splice, side veneer, bud grafting (budding), rootstock and scion must be compatible, usually in the same species or same genus, grafting mainly in the dormant season, budding mainly when plants are in active growth

Conditions required

Humidity, moisture, dark, light, temperature (base and aerial), carbon dioxide levels, rooting media, rooting hormones and appropriate aftercare

Aftercare, acclimatisation to growing environment after rooting/establishment (weaning), potting off of rooted cuttings, temperature, humidity, moisture, light levels, carbon dioxide levels, pest and disease monitoring and control

Unit 229

Outcome 2

Participate in Propagation Techniques

Be able to propagate plants by vegetative methods

Assessment Criteria

The learner can:

1. Collect and store **propagation material** safely
2. Propagate plants by **division, cuttings and grafting** safely
3. **Handle propagation material** to optimise success and minimise waste

Unit content

Propagation material

Softwood, semi-ripe and hardwood cuttings, root cuttings, scion material for grafting: collect suitable material from deciduous and evergreen shrubs (semi-ripe and hardwood cuttings as appropriate), perennials, house plants or shrubs etc (softwood cuttings), some alpines, herbaceous and climbing plants, trees and shrubs (root cuttings), ornamental/fruit trees or shrubs (grafting), cuts made appropriately on stock plants, suitable amounts of material collected, collect material which is not too vigorous, material kept in a manner to minimise water loss, select material which is true to type, of appropriate size and pest and disease free, material labelled correctly and effectively

Division, cuttings and grafting

Division: splitting of herbaceous material with fibrous rootstock, by hand or with forks, splitting of herbaceous material with dense crown, with knife/cutting tools

Cuttings: softwood, semi-ripe and hardwood stem cuttings (nodal and intermodal), whole leaf, leaf section and leaf petiole cuttings, foliar embryos, single node stem/leaf bud cuttings.

Grafting: whip and tongue technique

Material collected at the optimum time of year and time of day, tools and equipment used in a safe and appropriate manner, Personal Protective Equipment (PPE)

Handle propagation material

Plant handling to include care to avoid unnecessary damage, correct positioning of all cuts or separations, grafts tied in using suitable method and materials, hygiene maintained throughout, maximising available propagules and minimising wastage of material, propagules inserted correctly in appropriate growing medium where applicable, propagules placed in suitable environment to maximise successful establishment of the propagule

Tools and equipment used in a safe and appropriate manner, PPE, awareness of plant material which may be poisonous or may be an irritant

Unit 229

Participate in Propagation Techniques

Outcome 3

Know how to propagate plants from seed

Assessment Criteria

The learner can:

1. State **advantages and disadvantages** of propagation from seed
2. Describe the **categories and sources of seeds**
3. Describe the **timing and methods** of sowing seed indoors and outdoors
4. Describe the importance of **hygiene** in seed propagation

Unit content

Advantages and disadvantages

Advantages: cheap where seed is easily available e.g. native trees, shrubs, large quantities can be sown in small areas, main method used for annuals and many grasses, often a quick means to achieve new plants in large volumes, guaranteed seed sources are available, provenance can be carefully sourced

Disadvantages: can be high levels of loss from 'field factors' outdoors, viability of seed source should be checked, overcoming dormancy may be problematic, seed may be unavailable/plants may not come true, specialist facilities may be required to provide optimum environment

Categories and sources of seeds

Seed categories and sources: open-pollinated seed, F1 and F2 seeds, native and local genotype sourcing, primed seed, seed storage

Timing and methods

Timing: importance of seasonality, freshness of seed, dormancy and methods of overcoming dormancy (e.g. stratification, soaking, chemical)

Methods: reasons for broadcast and drilled sowing into prepared seedbeds outdoors (V shaped and flat bottomed drills), broadcast and space sown into containers, level and depth, consolidation, seed covering materials (soil, compost, vermiculite) selection and characteristics of suitable growing media, watering (prior to and after sowing, from above or below)

Hygiene

Hygiene in seed propagation, managing weeds, pests and diseases in outdoor beds by bed preparation, sterilisation, use of new/sterilised containers, use of sterile, partially sterilised or other suitable growing media, site preparation to ensure good hygiene during the sowing procedures, avoidance of contamination

Unit 229

Participate in Propagation Techniques

Outcome 4

Be able to propagate plants from seed

Assessment Criteria

The learner can:

1. Prepare **containers and outdoor seed beds** for seed sowing
2. Sow seeds by **broadcasting in containers and in drills outside**
3. Provide relevant **aftercare** following germination of seeds.

Unit content

Containers and outdoor seedbeds

Containers: seed trays, pots, cells or modules (infill's), appropriately filled with suitable growing media, growing media prepared for depth, structure, consolidation, level surface, moisture

Outdoor seed beds: removal of weeds, pests and diseases as applicable, addition of organic matter to improve structure and/or drainage material is required, base fertiliser application as appropriate, depth of preparation, use of hand tools and pedestrian-operated machinery, tilth, consolidation, levelling, moisture content

Broadcasting in containers and in drills outside

Broadcasting into containers: fine seed with added carrier (e.g. fine dry sand), seed that can be broadcast easily by hand without carriers, hygiene and safety maintained throughout, waste minimised.

Drills outside: preparation of V-shaped and flat bottomed drills by hand, depth and moisture content, seed scattered into drills or space-sown along the drill by hand, hygiene and safety maintained throughout, waste minimised, drills watered prior to sowing if conditions dry

Aftercare

Aftercare: indoor sowings covered with growing media (compost or vermiculite) effectively where required or left uncovered for fine seed, light excluded or allowed as required by species, watering, labelling, placement into suitable germination environment, monitoring until germination, acclimatisation to growing conditions (weaning), pricking out or separation

Aftercare: outdoor sowings covered in suitable depth of growing media, watering, labelling, protection from adverse conditions, pests and diseases, weed control, thinning and transplanting

Unit 229 Participate in Propagation Techniques

Notes for guidance

The unit provides the learner with the opportunity to select and describe various methods of vegetative and seed propagation (together with aftercare) and to practically carry out a selection of propagation techniques using a variety of methods. This is a very practical based unit requiring access to a range of materials, resources and equipment.

In Outcome 1, learners will be enabled to list the advantages and disadvantages of vegetative propagation, inclusive of the following: learners will be able to describe the methods used for appropriately and safely collecting material, recognising the needs of each type of plant material being used. They must also be able to identify and describe for named plants the various propagation techniques utilised and the conditions required for establishment. Learners must also be aware of how the correct environmental conditions may be provided.

Outcome 2 requires the learner to carry out varied propagation techniques, including the correct collection and storage of material. Techniques which must be carried out are division, softwood, semi-ripe and hardwood stem cuttings (nodal and internodal), root cuttings, leaf petiole, whole leaf and leaf section, single bud/leaf bud and whip and tongue grafting. Part of this process will include the appropriate handling of material in order to optimise plant establishment and minimise waste. All activities must be carried out at the optimum time of year for the technique(s) concerned and in a safe and efficient manner, inclusive of the wearing PPE as deemed necessary.

In Outcome 3, learners will be enabled to list the advantages and disadvantages of propagation of seed, inclusive of the following: Learners will need to recognise and describe the categories and sources of seeds, together with knowing the timings and methods of sowing seed indoors and outdoors, inclusive of broadcast and space sowing in containers, the taking out of both “V” shaped and flat bottomed drills outdoors. The importance of recognising and being able to describe (and apply) the various techniques for ensuring and maintaining hygiene in the propagation process must play an important underlying role in this outcome.

Outcome 4 will require the learner to carry out propagation from seed. This will include the selection and preparation of containers required for seed sowing under protection (correct growing media will also need to be chosen) and the final cultivations required when preparing seed beds for outdoor seed sowing. Techniques to be carried out include: broadcast and space sowing in containers under protection (fine, medium and large awkward seed – one standard seed tray for each), seed sowing outdoors in both “V” shaped and flat bottomed drills (minimum length of drill should be 3m). Learners must also be allowed to provide the relevant aftercare following germination. This must include the ability to prick out (off) seedlings into suitable containers. As a guide a minimum of two (2) standard seed trays need to be used, 40 seedlings in each (5 x 8). Thinning out and the transplanting of seedlings in the open ground should also be carried out by the learner to the appropriate standard.

The content of the unit should include a range of practical activities as described above and there should be adequate time allocated for the practice and assessment of the full range of activities which are identified. It is suitable to simulate sowing of fine seed by the substitution with silver sand if preferred.

Delivery will also make use of lectures, discussions, off site visits (plant propagation units) and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

Where the Centre does not have current/up-to-date propagation facilities on site to cover all the requirements of the unit, one or more visits to observe such propagation sites could usefully be included within the allocated learning time.

References

Books

Brown, D., *et al.* 2004. *The Complete Book of Plant Propagation*. London: Mitchell Beazley Publishers. ISBN: 1-56158-234-4.

Clarke G and Toogood A. 1992. *The Complete Book of Plant Propagation*. London: Cassell Illustrated. ISBN: 1-84188-144-7.

Toogood A. 2003. *RHS Propagating Plants*. 2nd ed. Surrey: Dorling Kindersley Publishers.

Unit 230

Undertake Soil Management In Organic Horticulture

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of soil management in organic horticulture, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learners will be able to understand the soil management relating to organic growing methods in the UK and to carry out soil management tasks.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to manage the physical properties of the soil
2. Understand the physical properties of soils
3. Be able to manage the chemical properties of the soil
4. Understand the chemical properties of soils

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU74 Prepare growing media

L2 Establish plants outdoors

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 230

Outcome 1

Undertake Soil Management in Organic Horticulture

Be able to manage the physical properties of the soil

Assessment Criteria

The learner can:

1. Carry out primary and secondary **soil cultivations**
2. **Assess the structure** of a soil.

Unit content

Soil cultivations

Carry out primary and secondary cultivations

Primary methods include soil inversion by ploughing, double digging, single digging (including the addition of organic material)

Secondary soil cultivation to include; forking, raking, consolidation, levelling and tilth production

Assess the structure

Terms, structure, the arrangement of the solid parts and the pore spaces between them, platy, prismatic, columnar, blocky, granular, structure-less

Unit 230

Outcome 2

Undertake Soil Management in Organic Horticulture

Understand the physical properties of soils

Assessment Criteria

The learner can:

1. State the **proportions** of mineral matter, organic matter, air and water in a healthy soil
2. Describe the **physical properties** of sandy, silty, clay and organic soils
3. Evaluate **methods** to improve and maintain soil structure, including the use of deep beds and no-dig plots
4. Explain the positive and negative effects of **soil cultivations**

Unit content

Proportions

Mineral matter, organic matter, air, water

Amounts expressed in terms of a percentage (%)

Physical properties

Sandy, silty, clay and organic soils

Sandy: gritty texture, easy to cultivate, warms up edrally/quickly, prone to over draining and summer dehydration, problems in moisture retention, leaching of nutrients

Silty: fertile, often good drainage, moisture retention and easily worked, weak structure

Clay: pliable, high nutrient levels, hard to work, prone to water logging, cold/warms up slowly

Organic: moisture retentive, well drains, easily worked, nutrient rich

Methods

Use of windbreaks, use of deep beds, permaculture and no-dig plots, cultivation at correct time, appropriate cultivations for soil type, planting of cover crops, in situ crop residue, crop rotation, mulching, addition of organic matter, use of animal and green manure's, soil inoculation with mychorriza, encouraging earthworms, centipedes, beetles and other soil organisms e.g. fertility building fungi and bacteria

Soil cultivations

Primary methods include soil inversion by: ploughing, double digging, single digging (including the addition of organic material)

Secondary soil cultivation to include forking, raking, consolidation, levelling and tilth production

Positive: relief of compaction, aeration, allows air to enter the soil, allows carbon dioxide escape, improvement of drainage, burial of annual weeds and weed seeds, removal of perennial weeds, control of pests, increase top soil depth, incorporation of organic matter, increase moisture retention

Negative: destruction of soil structure, compaction, encouragement of soil erosion, displacement of nutrients, detrimental effects on food web with thin soils, unbalance interaction between soil life, depletion of organic matter, encouragement of capping

Unit 230

Outcome 3

Undertake Soil Management in Organic Horticulture

Be able to manage the chemical properties of soil

Assessment Criteria

The learner can:

1. Use a colorimetric method to **determine the pH** of soils
2. Identify signs of **nutrient deficiency or excess** in specific plants
3. Select appropriate **feeding programmes** which meet organic principles

Unit content

Determine the pH

Soils: neutral soil, acid, alkali

Collection and preparation of samples: testing with a colorimetric testing kit to determine relative alkalinity/acidity

Nutrient deficiency or excess

Deficiencies in live specimens or from high quality images from; Calcium, Nitrogen, Magnesium, Phosphorus, Potassium Sulphur, Boron, Copper, Manganese, Molybdenum, Zinc, Iron

Symptoms of excess: chlorosis, necrosis, change of colour (reddening/purpling), lack of growth, stunted growth, wilting, collapse, death

Feeding programmes

To alleviate the problem, must meet with organic principles

Learners should be able to recommend a suitable feeding regime to overcome identified deficiencies, appropriate form, correct time of application, appropriate rate of application, appropriate method of application

Unit 230

Undertake Soil Management in Organic Horticulture

Outcome 4

Understand the chemical properties of soils

Assessment Criteria

The learner can:

1. Review the **nutrients** required for plant growth and the **fertilisers and manures** that are acceptable in organic systems
2. Describe the **nitrogen and carbon cycles**
3. Explain the principles of **cation and anion exchange** capacity in the soil and their relationship to texture and organic matter

Unit content

Nutrients (fertilisers and manures)

Macronutrients: Nitrogen, Phosphorus, Calcium, Magnesium, Sulphur

Micronutrients: Iron, Copper, Manganese, Zinc, Boron, Molybdenum, Chlorine

Others include Sodium, Cobalt, Vanadium, Nickel, Selenium, Aluminium and Silicon

Nitrogen and carbon cycles

Outline with the aid of diagrams, the Nitrogen Cycle and explain when nitrogen in any form becomes available to plants, the Carbon Cycle and explain when and in what form carbon becomes available to plants

Cation and anion exchange

Outline principles of cation and anion exchange, exchange capacity, relationship to soil structure, texture and organic matter content

Unit 230 Undertake Soil Management In Organic Horticulture

Notes for guidance

The learner will be able to develop the skills and knowledge involved in the management of soil in organic horticulture. They will be able to explain the positive and negative effects of soil cultivations, carry out soil cultivations, evaluate and carry out methods for improving and maintaining soil structure and improving fertility.

In Outcome 1, learners will develop their knowledge of the soil. They will dig a soil profile pit, record and examine the horizons and characteristics of the soil, being able to assess soil structure and carry out soil texture analysis tests using at least TWO (2) methods. Learners must have the opportunity to demonstrate their ability to carry out (to an acceptable standard) primary cultivation techniques including soil inversion by double digging and single digging, with the addition of organic material, together with carrying out secondary cultivation methods to include; forking, raking, consolidation, levelling and tilth production.

Learners will need to demonstrate their ability to differentiate between soil texture and soil structure and provide acceptable definitions. In order to complete this outcome, learners will need to have access to a suitable site to dig a soil profile pit and basic soil science laboratory facilities and soil testing equipment.

In Outcome 2 learners will be able to evaluate the methods used to improve the soil structure and know how to select methods to stabilise soils and improve fertility, including the benefits of incorporating organic matter, encouraging earthworm activity and that of other soil organisms, together with the utilisation and benefits of deep beds and the no dig technique. Learners will be able to demonstrate knowledge of the proportions of mineral matter, organic matter, air and water in healthy soils. Learners must also demonstrate the ability to identify and explain the positive and negative effects of various soil cultivation techniques including the primary methods of ploughing, double digging and single digging (including the addition of organic material), secondary soil cultivations including forking over, raking, consolidation, levelling and tilth production.

In Outcome 3, learners will carry out pH testing on a range of soils to identify one acid soil, one neutral soil and one alkaline soil using a suitable colorimetric testing kit. Learners will be able to identify at least six nutrient deficiencies from the specified list. They will be able to state the visual symptoms of nutrient excess. Learners will be able to state how to alleviate the problem in each case and recommend a suitable feeding programme, whilst adhering to organic principles.

In Outcome 4, learners will develop their knowledge of soil science and its impacts on plant growth. They will be able to describe the pH scale and its relevance to plant growth and the availability of nutrients. They should be able to name distinct five plants that thrive on acid soils and five distinct plants that thrive on alkaline soils. Learners should appreciate the meaning of the terms calcifuge and calcicole. Learners will review the thirteen nutrients required for plant growth, be able to name them and state the function of the macronutrients in the plant. Learners will be able to describe the Nitrogen and Carbon cycles and their importance on nutrient availability. Learners will also be able to outline the principles of cation and anion exchange and their relationship with the soil.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. Learners will require access to specialised literature and other resources. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

The following list is designed to be helpful, but not exhaustive.

Brown L. 1996. *Applied Principles of Soil Science*. Oxford: Butterworth- Hienemann.

Gear A and Gear J. 2009. *Organic Gardening: The Whole Story*. London: Watkins Publishing. ISBN: 978-1-906787-24-0.

HDRA . 2005. *Encyclopaedia of Organic Gardening*. Henry Doubleday Research Association. Essex: Dorling Kindersley Publishers.

Readman J. 2004. *Managing Soil Without Using Chemicals*. Essex: Dorling Kindersley.

Pears P and Stickland S. 2007. *The RHS Organic Gardening*. London: Bounty Books.

Journals

Garden Organic fact sheets – Composting and Soils

Websites

www.soilassociation.org

Soil Association

www.gardenorganic.org.uk

Garden Organic

Unit 231

Undertake Surveying and Site Appraisal

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of surveying and site appraisal, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop that skills and knowledge to be able to survey an area and collect other data from the site and outside sources. They will also produce scale plans to record the data collected, in preparation for future work.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to carry out linear surveys
2. Know how to carry out linear surveys
3. Be able to carry out a site appraisal
4. Know how to carry out site appraisal

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU85 Design landscape areas and specify materials and components

CU91 Assess the characteristics of sites

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 231

Undertake Surveying and Site Appraisal

Outcome 1

Be able to carry out linear surveys

Assessment Criteria

The learner can:

1. **Measure and record** site details, using triangulation, running lines and offsets
2. Draw simple, scaled **linear** site surveys
3. Comply with **legislation** during survey work.

Unit content

Measure and record

Undertake site inventory and metric measurements used to carry out simple site surveys using triangulation, running lines and offsets, in order to record site dimensions and shapes and the position of existing trees, plantings, services, access/exit points, features and structures

An appropriate base line should be selected as the starting point

Resources include: tape measures, chain lines, ranging poles/rods, recording materials

Methods to comply with standard industry methods; may record data in a field book, note orientation of site

Linear

Draw up accurate simple linear site surveys to scale inclusive (where relevant) of soft and hard landscape features, services, structures, access and exit points, use standard notation/symbols for features and structures, handwritten or printed text to label the plan

Measurement and illustration of levels is not included in this unit

Legislation

Learners should comply with current legislation and landscape practice during survey work

Health & Safety at Work etc Act 1974, site assessment guidance, planning restrictions e.g. conservation area, tree preservation orders, and local planning laws

Unit 231

Undertake Surveying and Site Appraisal

Outcome 2

Know how to carry out linear surveys

Assessment Criteria

The learner can:

1. State **standard conventions and terms** in surveys, landscape plans and drawings
2. State how to **locate underground services**
3. Describe the **orientation of plans**
4. Explain why **accurate measuring and recording** of data is essential.

Unit content

Standard conventions and terms

The learner should understand the use of: right angles, triangulation, running lines and offsets, standard conventions for the layout of plans including the orientation/indication of north, notations/symbols for site services, soft and hard landscape features, services, access and exit points

Metric measurements to be used

Locate underground services

Use of: visual indicators, existing site plans, local knowledge, cable and pipe avoidance tools/equipment (CAT)

Orientation of plans

Use of: compass and existing site plans to determine site orientation, standard conventions for the layout of plans including the orientation/indication of north symbol

Accurate measuring and recording

The required accuracy of measurement depends on the size of the site and scale of the plan. At a scale of 1:100, 10 cm on the ground equals the thickness of a pencil line, so that to the nearest 5 cm (0.05.) is appropriate

At 1:10 much more accuracy is required, therefore learners should measure as accurately as possible, to facilitate the production of the plan

Inaccurate measuring during triangulation will result in inaccurate recording of the angles of the boundaries, position of trees and soft and hard landscape features and structures. The on-site plan does not have to be to scale, but should be large enough and sufficiently detailed to allow clear, unambiguous recording of measurements

Unit 231

Outcome 3

Undertake Surveying and Site Appraisal

Be able to carry out a site appraisal

Assessment Criteria

The learner can:

1. Collect and record **soil data** from a site, including texture, structure, pH, water table and drainage
2. Collect and record the **physical aspects** of a site, including dimensions, access, aspect and topography
3. **Access data** relating to local climate, planning and legal constraints
4. Record **client information** including budget, time available for maintenance, existing and potential use

Unit content

Soil data

Soil textural analysis, pH determination

Soil structure and ascertain winter water table height and drainage characteristics, take out a soil profile pit

Physical aspects

Undertake site inventory record, access/exit points, areas of light and shade, aspect, changes in level, significant or unsightly view inside or outside the garden/site, ascertain north point, any hazards and where possible any services.

Access data

Data for local climate, planning and legal constraints

The Meteorological Office can provide data of the local climate and 30-year records of local climate data are available.

Planning permission maybe required for some projects, such as driveways and erection of structures, and the Local Authority Planning Department can advise

All current legislation must be complied with

Client information

Ascertain the budget, both capital and for routine maintenance, it may be possible for capital funds to be available over time and the garden/site designed in stages to accommodate this. The time available and inclination of the owners for maintenance, existing and potential uses, aesthetic preferences of the owners, the functional uses of for e.g. the garden/site: play area, relaxation, entertaining, the fitness/ health of the owners

Unit 231

Outcome 4

Undertake Surveying and Site Appraisal

Know how to carry out site appraisal

Assessment Criteria

The learner can:

1. Explain methods of **recording** site dimensions
2. Explain how **photographic records** help the planning stage
3. Explain how to set up **station points** and orientate a survey
4. State how to comply with **legislation** during site appraisal activities

Unit content

Recording

On-site recording needs to be as accurate as possible, especially if repeat access to the site is not possible

Carry out initial rough sketch(s) of site

Standard conventions to be used to record data, use of a field book

Photographic records

Useful to record views and existing soft and hard landscape site features, building and access/exit details

They are essential if repeat access to the site is not possible

Station points

Visually assess site outlay, use of ranging rods/poles, chain lines, tape measures, base lines, triangulation, offsets

Use of: compass and existing site plans to determine site orientation, use of orientation/indication of north symbol

Legislation

Learners should comply with current legislation: Health & Safety at Work etc Act 1974, site assessment guidance, planning restrictions e.g. conservation area, tree preservation orders, and local planning laws

Unit 231 Undertake Surveying and Site Appraisal

Notes for guidance

This unit will enable the learner to carry out a survey and site analysis and to use the data obtained to prepare a site survey plan to scale.

In Outcome 1 the learner is required to demonstrate that they can measure and record site details, using triangulation, running lines and offsets, draw simple, scaled linear site surveys and comply with legislation during the survey work. Learners will need to undertake a site inventory and show the ability to use metric measurements to carry out simple site surveys, recording site dimensions and shapes and the position of existing trees, plantings, services, access/exit points, features and structures. An appropriate base line will need to be selected as the starting point. Learners will draw up an accurate linear site survey to scale inclusive of marking on the plan where relevant, soft and hard landscape features, services, structures, access and exit points and demonstrate the use standard notation/symbols for features and structures

In Outcome 2 learners will be able to understand the use of right angles, triangulation, running lines and offsets, together with using standard conventions for the layout of plans. Learners will demonstrate that they know how to locate underground services by the use of use of visual indicators, existing site plans, local knowledge, CAT equipment (cable and pipe avoidance tools/equipment) and that they know the importance of the correct orientation of plans and accurate measuring and recording. The required accuracy of measurement depends on the size of the site and scale of the plan. At a scale of 1:100, 10 cm on the ground equals the thickness of a pencil line, so that to the nearest 5 cm (0.05.) is appropriate. At 1:10 much more accuracy is required, therefore learners should measure as accurately as possible to facilitate the production of the plan. Inaccurate measuring during triangulation will result in inaccurate recording of the angles of the boundaries, position of trees and soft and hard landscape features and structures. The on-site plan does not have to be to scale, but should be large enough and sufficiently detailed to allow clear, unambiguous recording of measurements.

In Outcome 3 learners will demonstrate they can collect and record soil data from a site, collect and record the physical aspects of a site and record client information. Learners must carry out accurately soil textural analysis and a pH determination test, together with taking out a soil profile pit to determine drainage characteristic and water table heights.

In Outcome 4 learners will be able to explain methods of recording site dimensions and how photographic records may help with the planning stage. They will be able to explain how to visually assess a site and set up station points using ranging poles/rods. Learners will also orientate the survey. This will be inclusive of identifying and stating how to comply with legislation. Learners must record data accurately and carry out initial rough sketch(s) of site, using standard conventions to record data in a field book.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues.

Learners should have individual and sufficient access to measuring and draughting equipment, as the techniques in this unit will require practice. Some of the tasks in this unit are best carried out in pairs, but all learners must be able to carry out the entire requirements of the unit. It may also be helpful if learners check each other's measurements during survey work, which will save valuable time later when drawing plans and ensure that all learners understand the processes involved.

References

Books

The following list is designed to be helpful, but not exhaustive

Brookes J. 2001. *John Brookes Garden Design Book*. 2nd ed. Essex: Dorling Kindersley Publishers. ISBN: 978-0-7513-0981-2.

Midgley K. 1985. *Garden Design*. New York: Michael Joseph Publishers.

Rushforth K, Griffin R and Woodland D. 1988. *The Hillier Book of Garden Planning and Planting*. Devon: David and Charles.

Websites

Planning information is available on www.direct.gov.uk.

Unit 232

Undertake Techniques in Organic Horticulture

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of techniques in organic horticulture, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop the skills and knowledge to be able to carry out tasks within organic growing systems using approved techniques.

Learning outcomes

There are **five** learning outcomes to this unit. The learner will:

1. Be able to plan site layout and cropping
2. Be able to select, produce and use bulky organic materials
3. Be able to carry out cultural operations in organic growing
4. Be able to use organic crop protection and plant health techniques
5. Understand organic crop protection and plant health techniques

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU78 Identify the presence of pests, diseases and disorders and assist with their control

PH1 Clear and prepare sites for planting crops

PH2 Set out and establish crops

PH3 Monitor and maintain the growth and development of crops

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 232

Undertake Techniques in Organic Horticulture

Outcome 1

Be able to plan site layout and cropping

Assessment Criteria

The learner can:

1. **Plan the layout of sites** for organic production
2. Plan the **rotation and cropping** within sites, including permanent and temporary crops, succession of harvest, feeding programme
3. Incorporate **plant associations**, green manures and **companion planting** in crop rotation plans

Unit content

Plan the layout of sites

Suitability: meeting organic guidelines, orientation, aspect, drainage, soil type, soil structure, soil texture, pH, organic matter content, and fertility, freedom from weeds, pests and diseases

Techniques: indicative content, use of deep beds, raised beds, permaculture and no-dig plots, returning crop residue, addition of organic matter, use of animal, use of natural fertilisers, plants for soil improvement, green manures, soil inoculation with mycorrhiza

Rotation and cropping

Bed type and layout, crop rotation (minimum of 4 years), permanent, temporary crops, sowing and planting dates, succession of harvest, use of cover crops and green manures, plan the layout for the rotation and cropping of one site (growing a range of fruit and vegetables) over a four year period

Plant associations: companion planting

Plants for soil improvement, inter cropping, trap-cropping, bio-chemical pest suppression, beneficial habitat

Unit 232

Outcome 2

Undertake Techniques in Organic Horticulture

Be able to select, produce and use bulky organic materials

Assessment Criteria

The learner can:

1. **Set up** approved **composting systems**
2. Identify **green manures** and their uses and limitations
3. Describe **composting systems**
 - compost bins
 - worm bins
 - leaf mould
 - trench compost
 - cold compost
4. Select and use **appropriate organic materials** for soil improvement and mulching for clearance and around existing crops

Unit content

Set up composting systems

Static one/two bin systems, general compost bin, worm bins, leaf mould bin

Tumble or rotation systems

Other types, trench compost, windrow, sheet compost/cold compost

Green manures

Short, medium and long term, leguminous, uses, benefits and limitations

Composting systems

Types: compost bins, worm bins, leaf mould bins/piles, trench compost, cold compost, siting, construction materials

Advantages and disadvantages of each type investigated

Green materials to use: crop waste, annual weeds, animal manures, raw vegetables/fruit wastes

Appropriate organic materials

Suitability, characteristics of organic materials, approved materials for soil improvement, mulching for clearance and around existing crops

Materials (if available): spent hops, farm yard manures, composted green waste, composted wood waste, lawn clippings, leaf mould

Unit 232

Outcome 3

Undertake Techniques in Organic Horticulture

Be able to carry out cultural operations in organic growing

Assessment Criteria

The learner can:

1. Identify **weeds and weed seedlings**
2. Carry out the following using **acceptable techniques**
 - weed control
 - seed sowing outdoors and in containers
 - thinning
 - transplanting
 - support
3. Describe **methods of managing annual and perennial weeds**.

Unit content

Weeds and weed seedlings

Learners are required to identify ten common weeds and ten common weed seedlings by common name and suggest a suitable strategy to deal with each of them. Use of botanical names to be encourage, but not essential

Acceptable techniques

Carry out following techniques in accordance with organic principles: ground preparation, seed sowing outdoors, in drills ("V" shaped and flat bottomed), singly or in groups or broadcast, label, seed sowing in containers (space and broadcast), trays, modules and pots (seed types to include, large, medium and small/fine seed), label

For outdoors: carry out thinning seedlings in rows, transplanting to a line seedlings /young plants to a new site, providing support, irrigation and weed control

For protected cropping: prick off seedlings into trays/modules/single pots, label, water (for additional guidance see below)

Methods of managing annual and perennial weeds

Learners will be expected to carry out weed control using three of the following methods: mechanical, cultural, thermal and manual

Learners will be expected to demonstrate that they have controlled, annual weeds ten weeds completing their life cycle within one year, perennial weeds ten woody or non woody weeds that live for more than two years, using suitable strategies

Unit 232

Outcome 4

Undertake Techniques in Organic Horticulture

Be able to use organic crop protection and plant health techniques

Assessment Criteria

The learner can:

1. Identify **pests and diseases** of specific plants and recommend a suitable strategy to deal with them
 - insects
 - mites
 - molluscs
 - vertebrates
 - pathogens
2. Carry out **cultural methods** to deal with pests, diseases and disorders

Unit content

Pests and diseases

Pests: insects, mites, molluscs, vertebrates, identifying features, signs of presence/damage

Diseases: fungal, viral, bacterial, common diseases of specific plants

Cultural methods

Rotation of crops, timely sowing, use of resistant varieties, cultivation, correct pH, monitoring, optimal water availability, hand picking, mulches, physical barriers

Unit 232

Outcome 5

Undertake Techniques in Organic Horticulture

Understand organic crop protection and plant health techniques

Assessment Criteria

The learner can:

1. Evaluate **cultural, physical, biological** and **chemical** methods of pest and disease management in organic systems
2. Explain the cause of **physiological and nutritional disorders** of specific plants

Unit content

Cultural

Rotation of crops, timely sowing, use of resistant varieties, cultivation, correct pH, monitoring, optimal water availability, hand picking

Physical

Mulches, barriers, traps, pinching stem tips out

Biological

Beneficial vertebrates and invertebrates, predator prey relationships, five biological control organisms (predators, parasites, bacterium and fungal agents), attractant plants and companion planting

Chemical

As a last resort, approved products, compliance with legislative requirements, compliance with organic standards, personal health and safety, environmental impact, integrated pest management systems

Physiological and nutritional disorders

Explain the causes of five physiological disorders and five nutritional disorders using ten different plant examples, causes must also be recognised

Unit 232 Undertake Techniques in Organic Horticulture

Notes for guidance

The learner will be able to develop the skills and knowledge of the techniques used in organic horticulture. They will be able to plan site layout and cropping, select, produce and use bulky organic materials, carry out cultural operations and understand and use organic crop protection and plant health techniques.

In Outcome 1, learners will assess sites for suitability ensuring that they meet organic guidelines and plan the layout and cropping of a site producing a range of fruit and vegetables for a minimum period of four years. They will incorporate a range of accepted techniques that will improve soil fertility and nutrition and consider plant association and companion planting.

In Outcome 2, learners will set up four different approved composting systems. They will be able to describe the systems and develop their understanding of the benefits and limitations of each. They will be able to identify five different types of green manures and state the benefits and limitations of each in respect of organic culture. Learners will be able to select suitable approved organic materials, bearing in mind their characteristics for soil improvement, mulching for ground clearance and around existing crops. It will be acceptable for learners to work in groups for composting activities. Tutors may consider setting up a trial for learners to monitor the performance of a range of green manures.

In Outcome 3, learners will develop their ability to identify a range of common weeds at different stages of growth and be able to describe and carry out methods of managing annual and perennial weeds. Learners will need to formally identify ten mature weeds (mix of annual and perennial), being typical of the species by common name and ten weed seedlings by common name (use of botanical names to be encourage, but not essential). They will carry out a range of acceptable techniques in accordance with organic principles to raise seedlings and provide aftercare.

In Outcome 4, learners will develop their ability to identify pests, diseases and plant disorders and be able to specify how to deal with them. The use of a work-book with high quality images may be helpful in teaching and learning. In the final part of this outcome learners are expected to carry out a variety of cultural methods during practical sessions to effectively deal with pests, diseases and disorders. Ten pests and ten diseases to be identified by common name, together with five nutritional disorders and five physiological disorders (see also Outcome 5)

In Outcome 5, learners are required to explain the causes of a range of physiological and nutritional disorders. Five nutritional disorders and five physiological disorders are to be identified – see Outcome 4). It would be helpful if tutors were to specify the range and provide some underpinning knowledge before learners attempt this task. They are also required to evaluate the effectiveness of cultural, physical, biological and chemical methods of pest control. This part of the outcome could be achieved through observation of crops and the monitoring of various methods of control. Learners are expected to cover at least two examples from cultural, physical, biological and chemical methods of pest control. Learners are also required to identify five biological (natural) pest control agents inclusive of predators, parasites, bacterial and fungal agents.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. Learners will require access to specialised literature and other resources. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities.

References

Books

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- Littlewood M. 2007. *Organic Gardener's handbook*. Wiltshire: The Crowood Press Ltd.
ISBN: 978-1-86126-2.
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- Pears P and Sherman B. 2006. *Pests and How to Control Them on Fruit and Vegetables*. Kent: Search press Ltd. ISBN:1-84448-156-5.
- Readman J. 2004. *Managing Soil Without Using Chemicals*. Essex: Dorling Kindersley.

Garden Organic fact sheets – Disease Control, Pest Control, Weed Control.

Websites

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|--|-----------------------------|
| www.soilassociation.org | Soil Association |
| www.gardenorganic.org.uk | Garden Organic |
| www.rhs.org.uk | Royal Horticultural Society |

Unit 233 Tractor Driving

Level: 2

Credit value: 5

Unit aim

This unit aims to provide learners with an understanding of the principles of tractor driving and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The aim of this unit is to provide learners with skills, knowledge and understanding to enable them to carry out tractor driving operations legally, safely and efficiently with the minimum of supervision.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Know the key components and operator controls on a tractor
2. Know the relevant legislation and codes of practice for tractor driving
3. Be able to carry out simple maintenance tasks and settings to a tractor
4. Be able to operate tractor and attachments

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

CU11 Preparation and operation of a tractor and attachments

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignments covering practical skills and underpinning knowledge.

Unit 233

Tractor Driving

Outcome 1

Know the key components and operator controls on a tractor

Assessment Criteria

The learner can:

1. Name the **key components** that make up the build of a current tractor
2. Identify and explain the purpose of all **controls and instrumentation** of a modern tractor

Range

As appropriate to area of study:

Agriculture - Currently available Tractors over 35Kw

All Terrain vehicles (ATVs)

Unit content

Key components

Power unit: guards and covers, fuel tank and filters, cooling system, radiator / fan, pressure cap, coolant, filter screens, oil level indicators and filter, battery, transmission gearbox, final drive and reductions, four wheel drive axle, wheels, tyres and brakes, hydraulic reservoir and filters, drawbar and hitch(es), external services, power take off

Controls and instrumentation

Controls: Operator ergonomics, safety start device, start/heat start switch, clutch(es), brakes, transmission controls, hydraulic controls, power take off controls, cab heating/conditioning, hazard/indicator switches, lighting switches, four wheel drive, differential lock

Instrumentation: Warning lights, audible warning signals, engine performance gauges, Analogue, digital, LED formats, data/performance storage systems

Unit 233

Tractor Driving

Outcome 2

Know the relevant legislation and codes of practice for tractor driving

Assessment Criteria

The learner can:

1. Outline the **relevant legislation** that apply to tractor driving
2. Outline the relevant **codes of practice** that apply to tractor driving
3. Define the **limitations imposed on young or inexperienced tractor drivers**

Range

As appropriate to area of study:

Agriculture - Currently available Tractors over 35Kw

All Terrain vehicles (ATVs)

Unit content

Relevant legislations

Road Traffic Act 1984 (as amended 1991), Health and Safety at Work etc Act (1974) (HASWA), Provision and Use of Work Equipment Regulations (1998), Control of Noise at Work Regulations (2005), Environment Protection Act 1990 (as amended 1995), Construction and Use Regulations 1986

Codes of practice

Highway code, Manufacturers' recommendations, risk assessments, use of Personal Protective Equipment (PPE)

Limitations imposed on young or inexperienced tractor drivers

Insurance policy compliance, evidence of instruction and training, certification, operating on the land, road restrictions, licensing laws, weight restrictions

Unit 233

Tractor Driving

Outcome 3

Be able to carry out simple maintenance tasks and settings to a tractor

Assessment Criteria

The learner can:

1. Carry out **pre-start checks** on a tractor
2. Perform **pre-operational maintenance** tasks prior to undertaking tractor driving operations
3. Carry out **adjustments to the tractor to match the operator** to the tractor
4. **Prepare** the tractor to accept a range of selected **attachments**

Range

Agriculture - Currently available Tractors over 35Kw-
All Terrain vehicles (ATVs)

Unit content

Pre start checks

Fuel level, oil level, coolant level/air screens clear, tyre condition / inflation pressures, transmission oil level, clean windows and mirrors, loads and attachments secure, brake check, road legal lighting, horn, screen wash/wipe, insurance, taxation, safety guards

Pre-operational maintenance

Replenish engine, transmission and hydraulic oil levels, check air intake screens/pre cleaner condition, drain fuel water trap, replenish radiator coolant levels, and adjust tyre pressures, replenish screen wash, brake/clutch fluids

Adjustments to the tractor to match the operator

Seat fore-aft position, seat height, seat suspension, seat rotation for field work / fixed for road work, control panel/joystick adjustments, rear view mirrors, heat and air conditioning settings

Prepare the tractor to accept attachments

Trailed equipment:

Drawbar: length, height, offset, swing, jaws, suitable hitch pins, safe load limit

Automatic pick up hitch: wear on hitch components, hitch lock adjustment, safe load limit

Linkage mounted equipment: correct category, stabilisers, sway chains, top link position, front linkage, maximum height setting, speed of drop setting

Auxiliary fitment: counterweight, wheel ballast, hydraulic connections, electrical

connections, remote controls, lighting sockets, marker boards, wheel track widths, tyre pressures

Unit 233

Tractor Driving

Outcome 4

Be able to operate tractor and attachments

Assessment Criteria

The learner can:

1. Drive a tractor **safely and efficiently** around to meet given objectives
2. Safely **hitch** selected attachments to a tractor
3. **Operate tractors** and attachments safely to meet given objectives
4. Prepare tractors and attachments for **storage** ensuring they are ready for future use

Range

As appropriate to area of study:

Agriculture - Currently available tractors over 35Kw

- linkage and trailed attachments relating to the agricultural land-based industry

All Terrain vehicles (ATVs)

Unit content

Safely and efficiently

Assess risks, operator/bystander injuries, stock, obstructions, ground conditions, public access, fuel consumption, emissions, tyre wear, damage to equipment

Hitch procedures

Assess risks, power unit isolation, external hydraulic controls, stored energy release, correct use of jacks, parking stands, attachment adjustment, road transport/field work

Operate tractors

Correct starting, use of gears/speeds, power take off engagement, hydraulic control, electrical control, mechanical remote control, wet, dry and icy conditions, slopes, field procedures, tramlining, markers, global positioning system

Storage

Cleaning, decontamination, disconnection of attachments, refuelling, storage of linkage connectors, check on condition, reporting procedures

Unit 233 Tractor Driving

Notes for guidance

This unit is designed to give learners sufficient theoretical and practical instruction to gain the necessary underpinning knowledge and practical skills to operate tractors safely and economically. The tractors and equipment should cover a range that the learner would be expected to encounter in their area of study. Learners will need access to a range of tractors incorporating the level of technology expected of modern day equipment. When undertaking operational tasks it is essential that all activities are closely supervised and learners are able to assess hazards and risk for each task.

Health and safety - centres and tutors need to be aware of the requirement to safeguard learners, particularly in relation to pre-16 learners, when delivering and assessing units where the operation of machinery is involved. Legally, learners can drive a tractor from the age of 13 (around a farm/workplace but not on the public highway) therefore it is essential that they are properly trained in this area. The units in this qualification require the learner to undertake tractor driving under close supervision, and this is the same for any unit within the qualification that requires the learner to operate or use machinery. The HSE guidance INDG185 'Tractor Action – a step by step guide to using tractors safely' is highlighted in the guidance section for this unit and tutors and learners are encouraged to follow these safe guidelines for operation. Additionally The HSE guidance AS10 'Preventing Accidents to Children on Farms' provides practical guidance on how to reduce the risk of injury to children under 13 and older children below the minimum school leaving age (usually 16).

Outcome 1 requires learners to familiarise themselves with a range of tractors typically used in their area of learning. Learners should be able to recognise all components of the tractor which will need the attention of the operator prior to, during and after land based operations. Learners will be able to identify and explain all controls and instruments on a range of modern tractors.

In Outcome 2 the learners must demonstrate awareness of legal aspects of tractor driving, both on the land and on the road. They must also be aware of codes of practice, which, if not followed, could lead to health and safety infringements, injuries, or damage to property and/or equipment.

In Outcome 3 the learners will need to carry out basic service tasks and pre start checks to ensure a tractor is safe, legal and ready carry out land-based operations.

Throughout the unit the emphasis will be on safe, legal practices, working to manufacturers' recommended procedures and attention to detail when recording information. Depending on the land-based area the learner is studying, formal lecture delivery may be generic to all areas but practical experiences and learning should be appropriate to the area of study.

In Outcome 4, learners will be able to demonstrate their ability to safely start and drive a tractor around a set course that will include forward and reverse manoeuvres, transmission ratio selection and correct power unit settings. Following positive outcome in this element the learner will be required to match tractor to identified machines and demonstrate safe hitching and operating techniques. It is expected that learners will then demonstrate knowledge and ability to prepare tractors and attachments for storage. At all stages of practical work, the learner must conform to legislations and safe working practices and beware of hazards and risks which may change during the tasks being carried out.

Learners will need access to a range of modern tractors and machines typically available to their area of study. Due to the complexity of many modern tractors it is essential that operations be closely supervised to ensure safety at all times.

References

Books

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Journals

Farmers Weekly

Profi

Amenity Machinery and Equipment

Websites

www.hse.gov/pubns/indg185.pdf

www.hse.gov.uk

www.roadtransport.com

www.direct.gov.uk/highwaycode

Tractor Action

Health and Safety Executive

Road Transport

Public Services Website

Unit 234

Maintain Sports Turf Surfaces - Cricket

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of sports turf - cricket and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present cricket surfaces and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain cricket surfaces to sustain or improve the level of quality
2. Be able to renovate cricket surfaces to Performance Quality Standards
3. Understand the requirements for cricket surfaces
4. Be able to monitor and assess the level of quality of cricket surfaces

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 234

Maintain Sports Turf Surfaces - Cricket

Outcome 1

Be able to maintain cricket surfaces to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Maintain a **cricket pitch, square and outfield** safely and in a safe condition
2. **Measure and mark out** a cricket square, pitch and outfield
3. Set out **equipment and materials** required for the sport

Unit content

Cricket pitch, square and outfield

Assess the surface and undertake maintenance tasks (mowing, edging (if applicable where non-turf pitch is used), aeration, scarification, top dressing, rolling, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held, non-powered), materials (topdressing, seed, turf) and method of application, health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Measure and mark out

Preparation of surface, machinery and equipment, initial setting of a cricket square and wicket, over-marking techniques, marking lines, marking materials and their storage, maintenance of sports equipment, dimensions, recommended gradients/tolerances

Equipment and materials

Stumps and bales, sightscreens, boundary markers, scoreboards

Unit 234

Maintain Sports Turf Surfaces - Cricket

Outcome 2

Be able to renovate cricket surfaces to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and renovate **worn areas** of each cricket surface during the season
2. Carry out **early season activities** to bring the square into use
3. Carry out the required activities to **bring a pitch into use and renovate it** afterwards
4. Comply with **current legislation** when renovating and maintaining turf surfaces

Unit content

Worn areas

Bowler marks, wicket ends, renovation of pitches for later use during the season, localised areas of pest/disease damage

Preparation of area and renovation activities (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, overseeding, fertilising, irrigation), timing of operations

Early season activities

Mowing, pest, disease and moss control, levelling, re-seeding, rolling and irrigation, as required, gradual increase in the weight of the roller and decrease in the height of cut of the mower/rootzone moisture levels

Bring a pitch into use and renovate it

Mower with comb over whole table area. Close mowing, scarification/raking/brushing, rolling, crease marking, switching and irrigation if required, repair wickets as they come out of play. Level scars, over-seed or re-turf ends. At end of season raise the height of cut of mower, scarify and aerate the table, repair wicket ends and over-seed the whole table. Maintain the level of the pitch and apply overall top-dressing and work in

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002 (COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 234

Outcome 3

Maintain Sports Turf Surfaces - Cricket

Understand the requirements for cricket surfaces

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain a cricket square, pitch and outfield
2. Identify Performance Quality Standards that are **particularly appropriate to cricket surfaces**
3. Explain the **benefits** of monitoring the quality of turf surfaces
4. State the **dimensions** of a cricket square, pitch and outfield

Unit content

Objectives

Improve or sustain presentational quality, structure, stability, carrying capacity, specific playing qualities

Particularly appropriate to cricket surfaces

Levels of Performance Quality Standards (basic, standard and high)

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: appearance, visibility of and width of markings, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, spin, hardness

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Dimensions

Junior, adult

Unit 234

Maintain Sports Turf Surfaces - Cricket

Outcome 4

Be able to monitor and assess the level of quality of cricket surfaces

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of cricket surfaces
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required

Unit content

16 appropriate Performance Quality Standards

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, spin, hardness

Interpret

Interpret results and identify Performance Quality Standards level (basic, standard and high)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, brushing, over-seeding, top dressing, marking, rolling, removal of debris

Unit 234 Maintain Sports Turf Surfaces - Cricket

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain turf surfaces for cricket. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the cricket grounds available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery, therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain cricket surfaces to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 2 the learner will be required to renovate cricket surfaces to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to cricket surfaces.

In Outcome 3 the learner will understand the performance requirements for cricket surfaces. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to cricket surfaces.

In Outcome 4 the learner will be required to monitor and assess the level of quality of cricket surfaces. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to cricket surfaces.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations for cricket.

Learners should have appropriate access to suitable cricket facilities for practical lessons and assessment. Where resources at the centre are limited, visits to cricket grounds would be useful to compliment lessons at the centre. However, learners should have regular access for practical work on cricket grounds over at least one full season in order to develop their skills to the required level.

References

Books

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Turgeon AJ. 2009. *Turfgrass Management*. 8th ed. Harlow: Pearson Education: 0-131-14000-0.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 235

Maintain Sports Turf Surfaces - Association Football

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of sports turf - association football pitches and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present football pitches and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain association football pitches to sustain or improve the level of quality
2. Be able to renovate association football pitches to Performance Quality Standards
3. Understand the requirements for association football pitches
4. Be able to monitor and assess the level of quality of association football pitches

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 235

Maintain Sports Turf Surfaces - Association Football

Outcome 1

Be able to maintain association football pitches to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Maintain an **association football pitch** safely
2. Demonstrate how to **measure and mark out** an association football pitch
3. Set out **equipment and materials** required for the sport.

Unit content

Association football pitch

Assess the surface and undertake maintenance tasks (mowing, aeration, scarification, top dressing, rolling, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held, non-powered), materials (topdressing, seed, turf) and method of application, irrigation, fertilisers, health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Measure and mark out

Preparation of surface, machinery and equipment, initial setting out, over-marking techniques, marking lines, marking materials and their storage, maintenance of sports equipment, dimensions, recommended gradients/tolerances

Equipment and materials

Goals and corner flags

Unit 235

Maintain Sports Turf Surfaces - Association Football

Outcome 2

Be able to renovate association football pitches to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and renovate **worn areas** of the pitch during the season
2. Carry out **off-season activities** to renovate the pitch
3. Comply with **current legislation** when renovating and maintaining turf surfaces

Unit content

Worn areas

Preparation of areas (goal areas, the diamond pattern, linesman's strips) and renovation activities (to include mowing, aeration/scarification, divotting, top-dressing, brushing, feeding, re-turfing, over-seeding, top dressing, overseeding), timing of operations

Off-season activities

Mowing, scarification, aeration, top-dressing, levelling, over-seeding, re-turfing, brushing, fertilising, irrigation

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002(COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 235

Maintain Sports Turf Surfaces - Association Football

Outcome 3

Understand the requirements for association football pitches

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain an association football pitch
2. Identify Performance Quality Standards that are **particularly appropriate to association football pitches**
3. Explain the **benefits** of monitoring the quality of turf surfaces
4. State the **dimensions** of a full-sized association football pitch

Unit content

Objectives

Improve or sustain presentational quality, structure, stability, carrying capacity, specific playing qualities

Particularly appropriate to association football pitches

Levels of Performance Quality Standards (basic, standard and high)

Structural: Determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, goal posts, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, hardness

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Dimensions

Junior, adult

Unit 235

Maintain Sports Turf Surfaces - Association Football

Outcome 4

Be able to monitor and assess the level of quality of association football pitches

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of association football pitches
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required.

Unit content

16 appropriate Performance Quality Standards

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, goal posts, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, hardness

Interpret

Interpret results and identify Performance Quality Standards level (basic, standard and high)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, marking, rolling, removal of debris

Unit 235 Maintain Sports Turf Surfaces - Association Football

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain turf surfaces for association football pitches. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the association football pitches available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain association football pitches to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner must be able to mark out at least $\frac{1}{4}$ of a pitch and over-mark existing lines on a whole pitch. The learner must be able to lead and direct any helpers during marking out.

In Outcome 2 the learner will be required to renovate association football pitches to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to football surfaces.

In Outcome 3 the learner will understand the performance requirements for association football pitches. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to football surfaces.

In Outcome 4 the learner will be required to monitor and assess the level of quality of association football pitches. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should use a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to football surfaces.

A learner working towards level 2 is likely to have experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations for association football.

Learners should have appropriate access to suitable association football facilities for practical lessons and assessment. Where resources at the centre are limited, visits to football grounds would be useful to

complement lessons at the centre. However, the learners should have regular access for practical work on association football grounds over at least one full season in order to develop their skills to the required level.

References

Books

Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. Oxon: CAB International. ISBN: 0-851-98720-6.

Brown S. 2005. *Sports Turf and Amenity Grassland Management*. London: The Crowood Press. ISBN: 1-861-26790-8.

Brown S. 2009. *Sports Ground Management: A Complete Guide*. London: The Crowood Press. ISBN: 1-847-97094-X.

Evans RDC. 1994. *Winter Games Pitches: The Construction and Maintenance of Natural Turf Pitches*. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43103-1.

Sachs P. 2004. *Managing Healthy Sports Fields*. Sussex: Wiley. ISBN: 0-471-47269-7.

Turgeon AJ. 2009. *Turfgrass Management*. 8th ed. Harlow: Pearson Education: 0-131-14000-0.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 236

Maintain Sports Turf Surfaces - Golf

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of sports turf - golf and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present golf surfaces and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain golf surfaces to sustain or improve the level of quality
2. Be able to renovate golf surfaces to Performance Quality Standards
3. Understand the requirements for golf surfaces
4. Be able to monitor and assess the level of quality of golf surfaces

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 236

Maintain Sports Turf Surfaces - Golf

Outcome 1

Be able to maintain golf surfaces to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Select appropriate equipment and maintain **a golf green, tee and fairway** safely and in a safe condition
2. Cut a new hole on a green and repair the previous hole
3. Set out **equipment** required for golf and mark out-of-bounds

Unit content

A golf green, tee and fairway

Assess the surface and undertake maintenance tasks (mowing, edging (if applicable where non-turf surfaces are used), aeration, scarification, top dressing, rolling, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held; non-powered), materials (topdressing, seed, turf) and method of application, irrigation, fertilisers, health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Equipment

Flags, tee markers, mark out-of-bounds, change the hole on a green, divot top-dressing

Unit 236

Maintain Sports Turf Surfaces - Golf

Outcome 2

Be able to renovate golf surfaces to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and **renovate worn areas** of golf surfaces
2. Renovate a **golf bunker**
3. Comply with **current legislation** when renovating and maintaining turf surfaces

Unit content

Renovate worn areas

Localised areas of damage/ heavy wear, pitch marks, divots, damaged edges, localised areas of pest/disease damage, including mammals

Preparation of area and renovation activities (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, fertilising, irrigation, re-turfing, drag matting, verticutting), timing of operations

Golf bunker

Preparation of area and renovation activities (to include raking/topping up sand, edging/repair of turf edges, mowing) steep grass banks

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002(COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 236

Maintain Sports Turf Surfaces - Golf

Outcome 3

Understand the requirements for golf surfaces

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain golf surfaces to meet the needs of the sport and the environment
2. Identify Performance Quality Standards that are **particularly appropriate to golf surfaces**
3. Explain the **benefits** of monitoring the quality of turf surfaces
4. Explain the use of winter tees

Unit content

Objectives

Improve or sustain presentational quality, structure, stability, carrying capacity, specific playing qualities

Particularly appropriate to golf surfaces

Levels of Performance Quality Standards (basic, standard and high)

Structural: Determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, soil pH, infiltration rate

Presentational: e.g. appearance, surface debris, and sward colour

Playing: e.g. ball roll/green speed, traction, hardness

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Unit 236

Maintain Sports Turf Surfaces - Golf

Outcome 4

Be able to monitor and assess the level of quality of golf surfaces

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of golf surfaces
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required.

Unit content

16 appropriate Performance Quality Standards

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, soil pH, infiltration rate

Presentational: e.g. appearance, surface debris, and sward colour

Playing: e.g. ball roll/green speed, traction, hardness

Interpret

Interpret results and identify Performance Quality Standards level (basic, standard and high)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, marking, rolling, removal of debris

Unit 236 Maintain Sports Turf Surfaces - Golf

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain turf surfaces for golf. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the golf courses available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain golf surfaces to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 2 the learner will be required to renovate golf surfaces to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to golf surfaces.

In Outcome 3 the learner will understand the performance requirements for golf surfaces. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to golf surfaces.

In Outcome 4 the learner will be required to monitor and assess the level of quality of golf surfaces. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should use a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to golf surfaces.

Learners should be able to maintain all types of turf on the golf course, but transferable skills, such as PQS assessment do not need to be assessed on each type of turf.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

Learners should have appropriate access to golf facilities for practical lessons and assessment. Where resources at the centre are limited, visits to golf courses would be useful to complement lessons at the Level 2 Certificate, Extended Certificate and Diploma in Horticulture (0078-02)

centre. However, the learners should have regular access for practical work on golf courses over at least one full season in order to develop their skills to the required level.

References

Books

- Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. Oxon: CAB International. ISBN: 0-851-98720-6.
- Arthur J. 2003. *Practical Greenkeeping*. 2nd ed. Scotland: Royal & Ancient Golf Club of St Andrews. ISBN: 0-907-58312-1.
- Baker, S. 2005. *STRI Guidelines to Golf Green Construction in the United Kingdom*. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43159-7.
- Brown S. 2005. *Sports Turf and Amenity Grassland Management*. London: The Crowood Press. ISBN: 1-861-26790-8.
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- Perris J and Evans RDC. 1996. *The Care of the Golf Course*. 2nd ed. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43119-8.
- Sachs P. 2004. *Managing Healthy Sports Fields*. Sussex: Wiley. ISBN: 0-471-47269-7.
- Turgeon AJ. 2009. *Turfgrass Management*. 8th ed. Harlow: Pearson Education: 0-131-14000-0.
- Witteveen G and Bavier M. 2004. *Practical Golf Course Maintenance: The Magic of Greenkeeping*. 2nd ed. Sussex: John Wiley & Sons. ISBN: 0-471-47582-3.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 237

Maintain Sports Turf Surfaces - Horseracing

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of sports turf - horseracing and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present horseracing surfaces and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain horseracing surfaces to sustain or improve the level of quality
2. Be able to renovate horseracing surfaces to Performance Quality Standards
3. Understand the requirements for horseracing surfaces
4. Be able to monitor and assess the level of quality of horseracing surfaces

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 237

Maintain Sports Turf Surfaces - Horseracing

Outcome 1

Be able to maintain horseracing surfaces to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Select appropriate equipment and maintain **horseracing facilities** safely
2. Set out **equipment** required for horseracing, in line with Jockey Club General Instructions, Section 3, The Racecourse.

Unit content

Horseracing facilities

Assess the surface and undertake maintenance tasks (mowing, aeration, scarification, top dressing, rolling, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held, non-powered), materials (topdressing, seed, turf) and method of application, irrigation, fertilisers, re-positioning of running rails, fencing set out and prepared for the start of the event, health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Equipment

Equipment: starting positions, furlong markers, marker poles, white tape, winning post, running rails, padding on running rail uprights, yellow bollards, mobile trestle, black and white hurdles, course direction H & C markers

Unit 237

Maintain Sports Turf Surfaces - Horseracing

Outcome 2

Be able to renovate horseracing surfaces to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and **renovate worn areas** of horseracing surfaces
2. Carry out **off season activities** to renovate horseracing surfaces
3. Comply with **current legislation** when renovating and maintaining turf surfaces

Unit content

Renovate worn areas

Localised areas of damage/ heavy wear, divots, localised areas of pest/disease damage
Preparation of area and renovation activities (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, brushing/drag-matting), fertilising, irrigation, timing of operations

Off season activities

Overseeding, re-turfing, aerating, scarifying, top-dressing, divotting, brushing/drag-matting

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002(COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 237

Outcome 3

Maintain Sports Turf Surfaces - Horseracing

Understand the requirements for horseracing surfaces

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain horseracing surfaces to meet the needs of the sport and the environment
2. Identify Performance Quality Standards that are **particularly appropriate to horseracing surfaces** and the **benefits** of using them
3. State the **dimensions** of selected horseracing tracks.

Unit content

Objectives

Improve presentational quality, improve structure, improve stability, increase carrying capacity, improve specific racing qualities

Particularly appropriate to horseracing surfaces

Levels of Performance Quality Standards (basic, standard and high)

Structural: Determines racing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, surface debris, and sward colour

Racing: e.g. traction, hardness (the 'going')

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Dimensions

Junior, adult

Unit 237

Outcome 4

Maintain Sports Turf Surfaces - Horseracing

Be able to monitor and assess the level of quality of horseracing surfaces

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of horseracing surfaces
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required.

Unit content

16 appropriate Performance Quality Standards

Structural: determines racing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, surface debris, and sward colour

Racing: e.g. traction, hardness ('the going')

Interpret

Interpret results and identify Performance Quality Standards level (basic, standard and high)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, marking, rolling, removal of debris

Unit 237 Maintain Sports Turf Surfaces - Horseracing

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain turf surfaces for horseracing. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the horseracing surfaces available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery, therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain horseracing surfaces to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. Tasks may be carried out for Flat or National Hunt racing as required.

In Outcome 2 the learner will be required to renovate horseracing surfaces to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 racing qualities, out of a total of 16 performance quality standards that are appropriate to horseracing surfaces.

In Outcome 3 the learner will understand the performance requirements for horseracing surfaces. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to horseracing surfaces.

In Outcome 4 the learner will be required to monitor and assess the level of quality of horseracing surfaces. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should use a minimum of 8 appropriate structural, 2 presentational and 2 racing qualities, out of a total of 16 performance quality standards that are appropriate to horseracing surfaces.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

Learners should have appropriate access to horseracing facilities for practical lessons and assessment. Where resources at the centre are limited, off-site visits would be useful to compliment lessons at the centre. However, the learners should have regular access for practical work on horseracing facilities over at least one full season in order to develop their skills to the required level.

References

Books

Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. Oxon: CAB International. ISBN: 0-851-98720-6.

Brown S. 2005. *Sports Turf and Amenity Grassland Management*. London: The Crowood Press. ISBN: 1-861-26790-8.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 238

Maintain Sports Turf Surfaces - Bowling Greens

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of sports turf - bowling greens and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present bowling greens and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain bowling greens to sustain or improve the level of quality
2. Be able to renovate bowling greens to Performance Quality Standards
3. Understand the requirements for bowling green surfaces
4. Be able to monitor and assess the level of quality of bowling greens

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 238

Maintain Sports Turf Surfaces - Bowling Greens

Outcome 1

Be able to maintain bowling greens to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Maintain **bowling greens** safely and in a safe condition
2. Ensure the perimeter ditch is edged and clear of debris
3. Set out **equipment and materials** required for the sport.

Unit content

Bowling greens

Assess the surface and undertake maintenance tasks (mowing, edging (if applicable where non-turf pitch is used), aeration, scarification, top dressing, rolling, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held, non-powered), materials (topdressing, seed, turf) and method of application, irrigation, fertilisers, health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Equipment and materials

Mats, scoreboards, chairs as appropriate

Unit 238

Maintain Sports Turf Surfaces - Bowling Greens

Outcome 2

Be able to renovate bowling greens to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and renovate **worn areas** of the bowling green during the season
2. Carry out **early season activities** to bring the green into use
3. Carry out **late season activities to renovate the green** at the end of the season
4. Comply with **current legislation** when renovating and maintaining turf surfaces

Unit content

Worn areas

Localised areas of damage, damage edges, localised areas of pest/disease damage
Preparation of areas and renovation activities (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, fertilising, irrigation), timing of operations

Early season activities

Mowing, pest, disease and moss control, levelling, re-seeding, top-dressing, fertilising, rolling and irrigation, as required, gradual increase in the weight of the roller and decrease in the height of cut of the mower/rootzone moisture levels

Late season activities to renovate the green

Close mowing, scarification, aeration, top-dressing/brushing/levelling, over-seeding, switching and irrigation if required

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002 (COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 238

Outcome 3

Maintain Sports Turf Surfaces - Bowling Greens

Understand the requirements for bowling green surfaces

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain a bowling green
2. Identify Performance Quality Standards that are **particularly appropriate to bowling greens**
3. Explain the **benefits** of monitoring the quality of turf surfaces
4. State the **dimensions** of full size flat and crown bowling greens.

Unit content

Objectives

Improve presentational quality, improve structure, improve stability, increase carrying capacity, improve specific playing qualities

Particularly appropriate to bowling greens

Levels of Performance Quality Standards (basic, standard and high)

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, surface debris, and sward colour

Playing: e.g. ball roll, hardness, green speed

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Dimensions

Junior, adult

Unit 238

Maintain Sports Turf Surfaces - Bowling Greens

Outcome 4

Be able to monitor and assess the level of quality of bowling greens

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of bowling greens
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required.

Unit content

16 appropriate Performance Quality Standards

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, surface debris, and sward colour

Playing: e.g. ball roll, hardness, green speed

Interpret

Interpret results and identify Performance Quality Standards level (basic, standard and high)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, brushing, over-seeding, top dressing, marking, rolling, removal of debris

Unit 238 Maintain Sports Turf Surfaces - Bowling Greens

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain turf surfaces for bowling. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the bowling greens available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery, therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain bowling greens to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. Tasks maybe carried out on a flat or crown green.

In Outcome 2 the learner will be required to renovate bowling greens to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to bowling greens. Tasks maybe carried out on a flat or crown green.

In Outcome 3 the learner will understand the performance requirements for bowling greens. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to bowling greens.

In Outcome 4 the learner will be required to monitor and assess the level of quality of bowling greens. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should use a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to bowling greens. Tasks maybe carried out on a flat or crown green.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

Learners should have appropriate access to suitable bowling greens/ very fine turf for practical lessons and assessment. Where resources at the centre are limited, visits to bowling greens would be useful to

compliment lessons at the centre. However, the learners should have regular access for practical work on bowling greens over at least one full season in order to develop their skills to the required level.

References

Books

Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. Oxon: CAB International. ISBN: 0-851-98720-6.

Brown S. 2005. *Sports Turf and Amenity Grassland Management*. London: The Crowood Press. ISBN: 1-861-26790-8.

Brown S. 2009. *Sports Ground Management: A Complete Guide*. London: The Crowood Press. ISBN: 1-847-97094-X.

Perris J. 2008. *All About Bowls: The History, Construction and Maintenance of Bowling*. 3rd ed. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43106-6.

Sachs P. 2004. *Managing Healthy Sports Fields*. Sussex: Wiley. ISBN: 0-471-47269-7.

Turgeon AJ. 2009. *Turfgrass Management*. 8th ed. Harlow: Pearson Education: 0-131-14000-0.

Websites

www.iog.org

The Institute of Groundsmanship

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of sports turf - rugby pitches and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present rugby pitches and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain rugby pitches to sustain or improve the level of quality
2. Be able to renovate rugby pitches to Performance Quality Standards
3. Understand the requirements for rugby pitches
4. Be able to monitor and assess the level of quality of rugby pitches

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 239

Maintain Sports Turf Surfaces - Rugby Pitches

Outcome 1

Be able to maintain rugby pitches to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Maintain a **rugby pitch** safely and in a safe condition
2. Demonstrate how to **measure and mark out** a rugby pitch
3. Set out **equipment and materials** required for the sport.

Unit content

Rugby pitch

Assess the surface and undertake maintenance tasks: mowing, edging (if applicable where non-turf pitch is used), aeration, scarification, top dressing, rolling, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held, non-powered), materials (topdressing, seed, turf) and method of application, irrigation, fertilisers, health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Measure and mark out

Preparation of surface, machinery and equipment, initial setting out of a rugby pitch, over-marking techniques, marking lines, marking materials and their storage, maintenance of sports equipment, dimensions, recommended gradients/tolerances

Equipment and materials

Corner flags

Unit 239

Maintain Sports Turf Surfaces - Rugby Pitches

Outcome 2

Be able to renovate rugby pitches to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and renovate **worn areas** of the pitch during the season
2. Carry out **off-season activities** to renovate the pitch
3. Comply with **current legislation** when renovating and maintaining turf surfaces.

Unit content

Worn areas

Preparation of areas and renovation activities (to include mowing, aeration/scarification, divotting, brushing, over-seeding, top dressing, fertilising, irrigation), timing of operations

Off-season activities

Mowing, scarification, aeration, top-dressing, levelling, over-seeding, re-turfing, brushing

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002 (COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 239

Maintain Sports Turf Surfaces - Rugby Pitches

Outcome 3

Understand the requirements for rugby pitches

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain an rugby pitch
2. Identify Performance Quality Standards that are **particularly appropriate to rugby pitches**
3. Explain the **benefits** of monitoring the quality of turf surfaces
4. State the **dimensions** of a full sized rugby pitch

Unit content

Objectives

Improve or sustain presentational quality, structure, stability, carrying capacity, specific playing qualities

Particularly appropriate to rugby pitches

Levels of Performance Quality Standards (basic, standard and high)

Structural: Determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, hardness

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Dimensions

Junior, adult

Unit 239

Maintain Sports Turf Surfaces - Rugby Pitches

Outcome 4

Be able to monitor and assess the level of quality of rugby pitches

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of rugby pitches
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required

Unit content

16 appropriate Performance Quality Standards

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, hardness

Interpret

Interpret results and identify Performance Quality Standards level (basic, standard and high)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, marking, rolling, removal of debris

Unit 239 Maintain Sports Turf Surfaces - Rugby Pitches

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain turf surfaces for rugby. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the rugby pitches available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery, therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain rugby pitches to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner must mark out at least $\frac{1}{4}$ of a rugby pitch and over-mark existing lines on a whole rugby pitch. The learner must be able to lead and direct any helpers during marking out. Tasks can be carried out for Rugby Union or Rugby League pitches.

In Outcome 2 the learner will be required to renovate rugby pitches to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to rugby pitches.

In ~Outcome 3 the learner will understand the performance requirements for rugby pitches. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to rugby pitches.

In Outcome 4 the learner will be required to monitor and assess the level of quality of rugby pitches. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should use a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, and a total of 16 performance quality standards that are appropriate to rugby pitches.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

Learners should have appropriate access to suitable rugby/winter sports facilities for practical lessons and assessment. Where resources at the centre are limited, visits to rugby grounds would be useful to

compliment lessons at the centre. However, the learners should have regular access for practical work on rugby/winter sports grounds over at least one full season in order to develop their skills to the required level.

References

Books

Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. Oxon: CAB International. ISBN: 0-851-98720-6.

Brown S. 2005. *Sports Turf and Amenity Grassland Management*. London: The Crowood Press. ISBN: 1-861-26790-8.

Brown S. 2009. *Sports Ground Management: A Complete Guide*. London: The Crowood Press. ISBN: 1-847-97094-X.

Evans RDC. 1994. *Winter Games Pitches: The Construction and Maintenance of Natural Turf Pitches*. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43103-1.

Sachs P. 2004. *Managing Healthy Sports Fields*. Sussex: Wiley. ISBN: 0-471-47269-7.

Turgeon AJ. 2009. *Turfgrass Management*. 8th ed. Harlow: Pearson Education: 0-131-14000-0.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 240

Maintain Sports Turf Surfaces - Tennis

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of sports turf - tennis and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present tennis courts and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain tennis courts to sustain or improve the level of quality
2. Be able to renovate tennis courts to Performance Quality Standards
3. Understand the requirements for tennis courts
4. Be able to monitor and assess the level of quality of tennis courts

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 240

Maintain Sports Turf Surfaces - Tennis

Outcome 1

Be able to maintain tennis courts to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Maintain **tennis courts** safely and in a safe condition
2. **Measure and mark out** a tennis court
3. Set out **equipment and materials** required for the sport.

Unit content

Tennis courts

Assess the surface and undertake maintenance tasks (mowing, edging (if applicable where non-turf pitch is used) aeration, scarification, top dressing, rolling, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held, non-powered), materials (topdressing, seed, turf) and method of application, irrigation, fertilisers, health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Measure and mark out

Preparation of surface, machinery and equipment, initial setting out of a tennis court, over-marking techniques, marking lines, marking materials and their storage, maintenance of sports equipment, dimensions, recommended gradients/tolerances

Equipment and materials

Nets, posts, covers, umpire's chair, chairs for players and line judges, as required

Unit 240

Maintain Sports Turf Surfaces - Tennis

Outcome 2

Be able to renovate tennis courts to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and renovate **worn areas** of the tennis court during the season
2. Carry out **early season activities** to bring the court into use
3. Carry out **late season activities to renovate the tennis court** at the end of the season
4. Comply with **current legislation** when renovating and maintaining turf surfaces

Unit content

Worn areas

Preparation of areas (e.g. base lines) and renovation activities (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, fertilising, irrigation), timing of operations

Early season activities

Mowing, pest, disease and moss control, levelling, top-dressing, scarification, rolling and watering, as required, gradual increase in the weight of the roller and decrease the height of cut of the mower

Late season activities to renovate the tennis court

At end of season raise the height of cut of mower, scarify and aerate the court, repair worn areas. Maintain the level and apply overall top-dressing and work in, over-seed the whole court.

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002 (COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 240

Outcome 3

Maintain Sports Turf Surfaces - Tennis

Understand the requirements for tennis courts

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain a tennis court
2. Identify Performance Quality Standards that are **particularly appropriate to tennis courts**
3. Explain the **benefits** of monitoring the quality of turf surfaces
4. State the **dimensions** of singles and doubles tennis courts

Unit content

Objectives

Improve or sustain presentational quality, structure, stability, carrying capacity, specific playing qualities

Particularly appropriate to tennis courts

Levels of Performance Quality Standards (basic, standard and high)

Structural: Determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, spin, hardness

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Dimensions

Junior, adult

Unit 240

Maintain Sports Turf Surfaces - Tennis

Outcome 4

Be able to monitor and assess the level of quality of tennis courts

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of tennis courts
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required.

Unit content

16 appropriate Performance Quality Standards

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, spin, hardness

Interpret

Interpret results and identify Performance Quality Standards level (basic, standard and high)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, marking, rolling, removal of debris

Unit 240 Maintain Sports Turf Surfaces - Tennis

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain turf surfaces for tennis. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the tennis courts available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain tennis courts to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 2 the learner will be required to renovate tennis courts to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to tennis courts.

In Outcome 3 the learner will understand the requirements for tennis courts. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to tennis courts.

In Outcome 4 the learner will be required to monitor and assess the level of quality of tennis courts. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should use a minimum of 8 appropriate structural, 2 presentational and 2 playing qualities, out of a total of 16 performance quality standards that are appropriate to tennis courts.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

Learners should have appropriate access to suitable tennis facilities for practical lessons and assessment. Where resources at the centre are limited, visits to tennis courts would be useful to compliment lessons at the centre. However, the learners should have regular access for practical work on tennis courts over at least one full season in order to develop their skills to the required level.

References

Books

Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. Oxon: CAB International. ISBN: 0-851-98720-6.

Brown S. 2005. *Sports Turf and Amenity Grassland Management*. London: The Crowood Press. ISBN: 1-861-26790-8.

Brown S. 2009. *Sports Ground Management: A Complete Guide*. London: The Crowood Press. ISBN: 1-847-97094-X.

Perris J. 2000. *Grass Tennis Courts: How to Construct and Maintain Them*. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43134-1.

Sachs P. 2004. *Managing Healthy Sports Fields*. Sussex: Wiley. ISBN: 0-471-47269-7.

Turgeon AJ. 2009. *Turfgrass Management*. 8th ed. Harlow: Pearson Education: 0-131-14000-0.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 241

Maintain Turf in Amenity Horticulture

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of turf in amenity horticulture and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present amenity turf and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain fine and coarse amenity turf surfaces to sustain or improve the level of quality
2. Be able renovate amenity turf surfaces to Performance Quality Standards
3. Understand the requirements for amenity turf surfaces
4. Be able to monitor and assess the level of quality of amenity turf surfaces

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L3 Maintain general amenity turf

CU 76 Maintain plants outdoors

Endorsement of the unit by a sector or other appropriate

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 241

Maintain Turf in Amenity Horticulture

Outcome 1

Be able to maintain fine and coarse amenity turf surfaces to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Maintain a range of **fine and coarse** amenity turf surfaces as identified in BS 7370-3

Unit content

Fine and coarse

Assess amenity turf surfaces e.g. measurements of height of vegetation, assessment of evenness, estimating the percentage ground cover of range of components, measurement of root and root zone depth, measurement of infiltration rate

Carry out appropriate maintenance activities (to include at least mowing, aeration and scarification), select appropriate equipment, comply with current legislation, particularly in respect of health and safety and environmental legislation

Unit 241

Maintain Turf in Amenity Horticulture

Outcome 2

Be able renovate amenity turf surfaces to Performance Quality Standards

Assessment Criteria

The learner can:

1. Identify and renovate **worn areas** of amenity turf
2. Comply with **legislation** when renovating and maintaining turf surfaces

Unit content

Worn areas

Identify worn amenity turf resulting from special events, day -to-day traffic across turf areas, bare patches, broken edges, tyre ruts

Preparation of area and renovation (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding,), autumn versus spring renovation

Legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002(COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 241

Outcome 3

Maintain Turf in Amenity Horticulture

Understand the requirements for amenity turf surfaces

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain amenity turf surfaces for specific purposes
2. Identify Performance Quality Standards that are **particularly appropriate to amenity turf surfaces**
3. Explain the **benefits** of monitoring the quality of turf surfaces
4. Explain how to renovate turf areas after their use for **marquees or temporary buildings**

Unit content

Objectives

Improve presentational quality, improve structure, improve stability, increase carrying capacity, improve specific playing qualities

Particularly appropriate to amenity turf surfaces

Levels of Performance Quality Standards (basic, standard and high)

Structural: determines amenity quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, surface debris, and sward colour

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Marquees or temporary buildings

Mowing, watering, possibly with a wetting agent added, scarification to remove dead material, fertilising, seeding, top-dressing, aeration if required to relieve compaction

Unit 241

Maintain Turf in Amenity Horticulture

Outcome 4

Be able to monitor and assess the level of quality of amenity turf surfaces

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of amenity turf surfaces
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required

Unit content

16 appropriate Performance Quality Standards

Structural: e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentation: e.g. appearance, surface debris, and sward colour

Interpret

Interpret results and identify Performance Quality Standards level: basic (recreational use), standard (general club use) and high (professional and international use)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, marking, rolling, removal of debris

Unit 241 Maintain Turf in Amenity Horticulture

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain and renovate amenity turf surfaces. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the sports turf sites available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain fine and coarse amenity turf surfaces to sustain or improve the level of quality with regard to BS 7370-3; 1991. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 2 the learner will be required to renovate amenity turf surfaces to Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 3 the learner will understand requirements for amenity turf surfaces. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards. The learner should identify a total of 16 performance quality standards that are appropriate to 2 specific amenity turf surfaces.

In Outcome 4 the learner will be required to monitor and assess the level of quality of amenity turf surfaces. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should use a total of 16 performance quality standards that are appropriate to TWO specific amenity turf surfaces.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

Learners should have appropriate access to suitable fine and coarse amenity turf areas for practical lessons and assessment. Where resources at the centre are limited, visits to parks and gardens would be useful to complement lessons at the centre. However, the learners should have regular access for practical work on amenity surfaces over at least one full season in order to develop their skills to the required level.

References

Books

Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. CAB International. ISBN: 0-851-98720-6.

Brown S. 2005. *Sports Turf and Amenity Grassland Management*. The Crowood Press. ISBN: 1-861-26790-8.

Turgeon AJ. 2005. *Turfgrass Management*. Prentice Hall. ISBN: 0-131-14000-0.

BS 7370-3:1991 Grounds maintenance – Part 3: Recommendations for maintenance of amenity and functional turf (other than sports turf)

Websites

www.iog.org

The Institute of Groundsmanship

Unit 242

Maintain Winter and Summer Sports Turf Surfaces

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of maintenance of winter and summer sports turf and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop the skills and knowledge to maintain, renovate and present winter and summer sports surfaces and to use Performance Quality Standards to inform maintenance decisions and monitor the level of quality of surfaces.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to maintain and renovate winter sports surfaces to sustain or improve the level of quality
2. Be able to maintain and renovate summer sports surfaces to sustain or improve the level of quality
3. Understand the requirements for specific sports surfaces
4. Be able to monitor and assess the level of quality of sports surfaces

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 242

Maintain Winter and Summer Sports Turf Surfaces

Outcome 1

Be able to maintain and renovate winter sports surfaces to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Maintain **winter pitches** safely using trailed, mounted or ride-on equipment
2. Demonstrate how to **measure and mark out** a winter sports pitch
3. Set out equipment and materials required for the sport
4. Carry out **renovation activities** to winter sports pitches safely.

Unit content

Winter pitches

Assess the surface and undertake maintenance tasks (mowing, edging, aeration, scarification, top dressing, turfing, seeding, irrigation, brushing/switching, fertilising), timing, equipment (pedestrian, ride-on and tractor mounted) mode of action (powered hand held, non-powered), materials (topdressing, seed, turf) and method of application, irrigation, fertilisers), comply with current legislation

Measure and mark out

Preparation of surface, machinery and equipment, over-marking techniques, marking lines, marking materials and their storage, maintenance of sports equipment, pitch dimensions (junior, senior, national, international), recommended gradients/tolerances for pitches and surfaces

Renovation activities

Preparation of area and renovation (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding), autumn versus spring renovation

Unit 242

Maintain Winter and Summer Sports Turf Surfaces

Outcome 2

Be able to maintain and renovate summer sports surfaces to sustain or improve the level of quality

Assessment Criteria

The learner can:

1. Mow summer sports surfaces safely with **pedestrian operated equipment**
2. **Prepare a summer sports surface** ready for play
3. Scarify, aerate and top-dress a **summer sports surface** safely
4. **Repair summer pitches** by over-seeding and patching
5. Comply with **current legislation** when renovating and maintaining turf surfaces.

Unit content

Pedestrian operated equipment

Select appropriate equipment (e.g. cylinder mower), health and safety, risk assessment, Personal Protective Equipment (PPE), environmental good practice (minimisation of impacts)

Prepare a summer sports surface

Select appropriate operations and equipment required to prepare a summer sports surface for play (e.g. setting and marking out, goal posts, flags)

Summer sports surface

Identification of areas to be worked, selection of appropriate technique, timing, health and safety, PPE

Repair summer sports surfaces

Identification of areas to be repaired, selection of appropriate technique, timing, repair (over-seeding and patching), turf levelling

Current legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (HASWA) (as amended 1999), Control of Substances Hazardous to Health Regulations 2002 (COSHH), Food and Environment Protection Act 1985 (FEPA), Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998 (PUWER)

Unit 242

Maintain Winter and Summer Sports Turf Surfaces

Outcome 3

Understand the requirements for specific sports surfaces

Assessment Criteria

The learner can:

1. State the **objectives** of the range of activities used to prepare and maintain winter and summer sports surfaces
2. Explain how the **type of machine** and frequency of use affects the turf surface
3. Identify Performance Quality Standards that are **appropriate to specific surfaces**
4. Explain the **benefits** of monitoring the quality of turf surfaces

Unit content

Objectives

Improve presentational quality, improve structure, improve stability, increase carrying capacity, improve specific playing qualities

Types of machine

Types of machine (pedestrian, ride-on and tractor mounted) and mode of action (powered hand held, non-powered)

Appropriate to specific surfaces

Levels of Performance Quality Standards: basic (recreational use), standard (general club use) and high (professional and international use)

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, posts, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, spin, hardness

Benefits

Inform management decisions, determine maintenance requirement accurately, justify purchase of equipment/resources, effective use of inputs, reduced wastage, determine the carrying capacity of the turf

Unit 242

Maintain Winter and Summer Sports Turf Surfaces

Outcome 4

Be able to monitor and assess the level of quality of sports surfaces

Assessment Criteria

The learner can:

1. Use at least **16 appropriate Performance Quality Standards** to monitor the level of quality of a turf surface
2. **Interpret** the results of monitoring activities
3. Identify any **remedial action** that may be required

Unit content

16 appropriate Performance Quality Standards

Structural: e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, posts, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, spin, hardness

Interpret

Interpret results and identify Performance Quality Standards level: basic (recreational use), standard (general club use) and high (professional and international use)

Remedial action

Identification of remedial action to bring the turf surface to the stated level of quality e.g. mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding, marking, rolling, removal of debris

Unit 242 Maintain Winter and Summer Sports Turf Surfaces

Notes for guidance

This unit is designed to provide the learner with the sound knowledge and the skills required to maintain and renovate winter and summer sports surfaces. They should be able to select and safely use appropriate machines, equipment and materials for these tasks. The unit should cover as wide a range of activities as possible, appropriate to the sports turf sites available to the learner.

Throughout the unit, the emphasis should be on safe working. It is expected that the learner may not be aware of basic safe working practices with turf maintenance machinery but is likely to be familiar with accepted practices and behaviours within the context in which they are working. It is a requirement for the learner to operate machinery therefore health and safety issues relevant to the operation of the machinery used must be stressed and regularly reinforced. The learner should be actively involved in comprehensive risk assessments.

Health and safety - Centres and tutors need to be aware of the need to safeguard learners, particularly in relation to pre-16 learners, when delivering and assessing units where the operation of machinery is involved. The units in this qualification require the learner to undertake machinery operations under close supervision, and this is the same for any unit within the qualification that requires the learner to operate or use machinery. The first two LOs involve practical activities and the basic use of tools/machinery. Throughout the unit, the emphasis should be on safe working. The guidance in this unit requires that Health and Safety must be strictly enforced and repeated throughout. The HSE guidance AS10 'Preventing Accidents to Children on Farms' provides practical guidance on how to reduce the risk of injury to children under 13 and older children below the minimum school leaving age (usually 16).

All equipment/machinery being used must comply with relevant requirements of the Provision and Use of Work Equipment Regulations (PUWER) 1998. Adequate Personal Protective Equipment (PPE) appropriate to the learner, the machinery and the task must be provided and worn in accordance with the associated risk assessment, industry guidance and operator's manual.

In Outcome 1 the learner will be required to maintain and renovate winter sports surfaces to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner must be able to mark out at least $\frac{1}{4}$ of an association football pitch, over-mark existing lines on a whole pitch and set out nets and corner flags. The learner must be able to lead and direct any helpers during marking out.

In Outcome 2 the learner will be required to maintain and renovate summer sports surfaces to sustain or improve the level of quality. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner must be able to prepare a summer sports surface for play e.g. setting and marking out for cricket/tennis or cutting holes on golf greens and setting markers on tees. The learner must be able to lead and direct any helpers during marking out.

In Outcome 3 the learner will understand the requirements for specific sports surfaces. The learner should determine the range of activities commonly carried out, why they are important and how they impact upon the performance quality standards appropriate to 2 different sports surfaces.

In Outcome 4 the learner will be required to monitor and assess the level of quality of sports surfaces. It is anticipated that the delivery of this outcome will be delivered through supervised practical training and the learner able to consolidate operational skills within realistic working environments. The learner should identify

at least eight appropriate structural quality, two presentational quality and two playing quality, and a total of sixteen performance quality standards that are appropriate to two specific sports surfaces.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. This unit aims to develop the learner's knowledge and skills involved with the safe use of sports turf machinery and equipment. Emphasis should be placed upon 'doing' and developing practical experience. The learner should be given appropriate time to develop their skills. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

Learners should have appropriate access to suitable sports facilities for practical lessons and assessment. Where resources at the centre are limited, visits to sports grounds would be useful to complement lessons at the centre. However, the learners should have regular access for practical work on sports grounds over at least one full season in order to develop their skills to the required level.

References

Books

- Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. CAB International. ISBN: 0-851-98720-6.
- Brown S. 2005. *Sports Turf and Amenity Grassland Management*. The Crowood Press. ISBN: 1-861-26790-8.
- Evans RDC. 1991. *Cricket Grounds: The Evolution, Maintenance and Construction of Natural Turf Cricket Tables and Outfields*. The Sports Turf Research Institute. ISBN: 1-873-43100-7.
- Evans RDC. 1994. *Winter Games Pitches: The Construction and Maintenance of Natural Turf Pitches*. The Sports Turf Research Institute. ISBN: 1-873-43103-1.
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- Perris J and Evans RDC. 1996. *The Care of the Golf Course*. The Sports Turf Research Institute. ISBN: 1-873-43119-8.
- Sachs P. 2004. *Managing Healthy Sports Fields*. Wiley. ISBN: 0-471-47269-7.
- Sports Turf Research Institute. 2005. *STRI Guidelines to Golf Green Construction in the United Kingdom*. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43159-7.
- Turgeon AJ. 2005. *Turfgrass Management*. Prentice Hall. ISBN: 0-131-14000-0.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 243

Understand the Principles of Sports and Amenity Turf Maintenance

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of sports and amenity maintenance. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learner will be able to develop knowledge of sports and amenity turf maintenance and renovation activities and the use of Performance Quality Standards in the development of surfaces for specific purposes.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Understand the effects of sports and amenity turf maintenance activities
2. Understand the irrigation and nutrition of sports and amenity turf
3. Understand sports and amenity turf renovation activities
4. Understand the use of Performance Quality Standards

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L5 Maintain the health of sports turf

L6 Present, maintain and repair sports turf surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC and the Institute of Groundsmanship.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 243

Understand the Principles of Sports and Amenity Turf Maintenance

Outcome 1

Understand the effects of sports and amenity turf maintenance activities

Assessment Criteria

The learner can:

1. Explain the effects of the range of **turf maintenance activities** on the development of the sward
 - seasonal factors
 - weather
 - soil conditions
2. Explain how different **settings and frequencies** of use affect the growth and density of the sward
3. Describe the use of specific equipment in the **preparation of turf surfaces**

Unit content

Turf maintenance activities

Objectives, the effects of seasonal factors, the uses of different attachments and settings must be covered for the following activities: mowing, scarification, aeration/verti-draining, verti-cutting, top-dressing, rolling, overseeding, brushing/drag matting, switching

Settings and frequencies

Types of mowers for specific surfaces, frequency of use and heights of cut, mowing stress, 'never mow off more than 1/3 of the blade' rule

Compare mowing settings and frequencies for golf/bowling green with a rugby pitch, benefits and limitations of removal of grass clippings, turf groomer

Preparation of turf surfaces

When preparing sports turf it is the quality of the playing surface that is of primary concern. This varies with the need of the sport. For example, in cricket and tennis a hard surface is needed so that the ball bounces. For safety the surface needs to be even too. These surfaces are top-dressed with a high clay top-soil, so that they can be rolled in spring to form a hard surface. The blades of the grass are mown off on a cricket pitch and it is the roots that hold the pitch together during play. During the season different pitches are brought in and out of play. For golf greens and bowling greens ball roll/green speed are important factors. Very fine grasses are used which thrive on an acid soil, so the rootzone and top-dressing have a high sand content. A very even surface and a low height of cut are needed. To offset the stress this causes, frequent mowing, grooming, feeding and irrigation are required when the grass is growing. In football ball bounce, ball traction and ball roll are important.

Unit 243

Understand the Principles of Sports and Amenity Turf Maintenance

Outcome 2

Understand the irrigation and nutrition of sports and amenity turf

Assessment Criteria

The learner can:

1. Describe portable and permanent **irrigation systems** for turf and the reasons for their use
2. Describe why **fertilisers** are applied to different turf surfaces:
 - a. benefits
 - b. limitations
3. Compare irrigation and fertiliser use with **natural and artificial rootzones**.

Unit content

Irrigation systems

Pop-up sprinklers, impact sprinklers, sub-irrigation systems, portable systems, benefits and limitations of each, frequency and timing of application, application rate, methods of calculation of water requirement, sources of water

Fertilisers

Benefits/limitations of organic/inorganic fertilisers, formulations of fertilisers, e.g. straight, mixture and compound, solid and liquid, controlled release, mini-granules/prills, nutrient requirement of turf surfaces, fertilisers of different nutrient values and their times of use

Natural and artificial rootzones

Fertiliser and irrigation need is linked to the mineral particles in the rootzone. Clay holds onto water and nutrients so water and fertiliser can be applied in larger doses, but less frequently. Sand drains rapidly and nutrients leach out, so fertiliser and water need to be given little and often. High sand content (70-90%), artificial rootzones need the little and often approach to keep the grass growing at a consistent rate

Unit 243

Understand the Principles of Sports and Amenity Turf Maintenance

Outcome 3

Understand sports and amenity turf renovation activities

Assessment Criteria

The learner can:

1. Describe a range of **renovation activities** to meet the needs of specific sports and amenity turf uses
2. Identify turf and weed **grasses** by vegetative characteristics as appropriate to species

Unit content

Renovation activities

Renovation of the following should be covered cricket grounds, tennis courts, association football pitches, rugby pitches, bowling greens, golf courses

Preparation of area and renovation activities (to include mowing, aeration/scarification, divotting, top-dressing, brushing, over-seeding), timing of operations

The timing of renovation usually matches the off-season for the sport, i.e. association football pitches/rugby union are renovated during the summer months May-August rugby league and bowls, tennis and cricket are renovated in the autumn so that the grass recovers straight after the season. Early spring activities are carried out to bring these surfaces to the playing quality required. Golf is unique in that it is played on all year, strategies to deal with this should be covered.

Grasses

Identify the following from seeds: Perennial ryegrass (*Lolium perenne*), Smooth-stalked meadow grass (*Poa pratensis*), Chewings, Slender or Strong Red Fescue (*Festuca rubra*), Browntop bent (*Agrostis spp*)

Identify the following from vegetative characteristics: Perennial ryegrass (*Lolium perenne*), Smooth-stalked meadow grass (*Poa pratensis*), Chewings Fescue *Festuca rubra commutata*, Slender or Strong Red Fescue (*Festuca rubra spp*), Browntop bent, *Agrostis tenuis*, Creeping bent (*Agrostis stolonifera*), Annual meadow grass (*Poa annua*), Yorkshire fog *Holcus lanata*)

Appropriate growing conditions, mowing height of cut and use of each of the grasses above, how weed grasses may be controlled

Unit 243

Understand the Principles of Sports and Amenity Turf Maintenance

Outcome 4

Understand the use of Performance Quality Standards

Assessment Criteria

The learner can:

1. Explain the benefits and limitations of **Performance Quality Standards**
2. Select appropriate standards for specific turf uses
3. Describe the relevance of **sustainability** for a natural turf surface

Unit content

Performance Quality Standard

This is a series of objective measurements that can be used to determine the level of quality of a sports surface.

Levels of Performance Quality Standards (basic, standard and high)

Structural: determines playing quality and impacts on presentational quality e.g. total ground cover, bare areas, desirable grass species, length of herbage, weeds, moss, algae and lichen, root depth, thatch, rootzone medium, evenness, gradient, pests, diseases, infiltration rate

Presentational: e.g. appearance, visibility of and width of markings, surface debris, and sward colour

Playing: e.g. vertical ball bounce, traction, ball roll, spin, hardness

Sustainability

Sports surfaces are subject to wear. The more games are played on the surface the more wear takes place until a point is reached at which the surface has deteriorated to an unacceptable level. The job of the groundsman/person or greenkeeper is to help the grass to recover and re-grow as quickly and sturdily as possible. The carrying capacity is the number of games that can take place on a surface without undue deterioration. This will depend on the type of surface, the rootzone, the weather and the intensity of maintenance activities and inputs in terms of fertiliser, water, top-dressing, over-seeding. The principle of sustainability is to balance inputs, resource consumption and carrying capacity with surface quality and user satisfaction. All activities should be undertaken to achieve effective and efficient outcomes, emphasising the conservation of resources and waste minimisation

Unit 243 Understand the Principles of Sports and Amenity Turf Maintenance

Notes for guidance

This unit is designed to provide the learner with the sound knowledge of sports and amenity turf maintenance. The learner is not required to use machinery whilst undertaking this unit.

In Outcome 1 the learner will understand the effects of sports and amenity turf maintenance activities. It is anticipated that the delivery of this outcome will be delivered in association with supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 2 the learner will be required to understand the irrigation and nutrition of sports and amenity turf. It is anticipated that the delivery of this outcome will be delivered in association with supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 3 the learner will understand sports and amenity turf renovation activities. It is anticipated that the delivery of this outcome will be delivered in association with supervised practical training and the learner able to consolidate operational skills within realistic working environments.

In Outcome 4 the learner will understand the use of Performance Quality Standards. It is anticipated that the delivery of this outcome will be delivered in association with supervised practical training and the learner able to consolidate operational skills within realistic working environments.

A learner working towards level 2 is likely to have some experience of practical sports turf activities. Although this is a theory unit, there should, if possible, be some aspects of 'doing' and developing practical experience. The learner should be given appropriate time to develop their knowledge. It is important that the learner understands the importance of maintaining an awareness of current legislation and Codes of Practice in relation to turf maintenance and renovation operations.

References

Books

- Adams WA and Gibbs RJ. 1994. *Natural Turf for Sport and Amenity: Science and Practice*. CAB International. ISBN: 0-851-98720-6.
- Brown S. 2005. *Sports Turf and Amenity Grassland Management*. The Crowood Press. ISBN: 1-861-26790-8.
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- BSI. 1991. BS 7370 – 3: 1991 Grounds maintenance — Part 3: Recommendations for maintenance of amenity and functional turf (other than sports turf)
- Evans RDC. 1991. *Cricket Grounds: The Evolution, Maintenance and Construction of Natural Turf Cricket Tables and Outfields*. The Sports Turf Research Institute. ISBN: 1-873-43100-7.
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Websites

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The Institute of Groundsmanship

Unit 244

Maintain and Renovate Artificial Sports Surfaces

Level: 2

Credit value: 10

Unit aim

This unit aims to provide learners with an understanding of the principles of the maintenance and renovation of artificial sports surfaces and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

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

There are **six** learning outcomes to this unit. The learner will:

1. Be able to select, use and maintain equipment
2. Be able to maintain and renovate the condition of artificial sports surfaces
3. Be able to work safely and minimise environmental damage
4. Know the maintenance and renovation requirements of artificial sports surfaces
5. Know the types of equipment required and how to maintain them
6. Know the current health and safety legislation and environmental good practice

Guided learning hours

It is recommended that **60** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

L7 Present, maintain and repair artificial playing surfaces for play

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 244

Maintain and Renovate Artificial Sports Surfaces

Outcome 1

Be able to select, use and maintain equipment

Assessment Criteria

The learner can:

1. Select **appropriate equipment** for this area of work
2. **Use equipment** according to manufacturer's instructions and legal requirements
3. **Prepare, maintain and store equipment** in a safe and effective working condition

Unit content

Appropriate equipment

In line with manufacturer's instructions for the specific surface, where available

Use equipment

The learner must use the equipment safely and efficiently, in line with manufacturer's instructions for the equipment/surface, and in line with legal requirements

Prepare, maintain and store equipment

According to manufacturers' instructions and organisational policy

Unit 244

Maintain and Renovate Artificial Sports Surfaces

Outcome 2

Be able to maintain and renovate the condition of artificial sports surfaces

Assessment Criteria

The learner can:

1. **Clear and prepare** the surface for maintenance
2. Carry out **operations** to maintain the quality and appearance of the surface suitable for the sport
3. Identify and report any conditions that affect the playing quality of one type of surface

Unit content

Clear and prepare

In line with manufacturers' instructions, where this is available

Four operations

Brushing, luting, top-dressing, weed control, moss/algae control, frost protection, marking out, irrigation, renovation (damage repair), contamination removal

Unit 244

Maintain and Renovate Artificial Sports Surfaces

Outcome 3

Be able to work safely and minimise environmental damage

Assessment Criteria

The learner can:

1. Work in a way which **maintains health and safety** and is consistent with current legislation, codes of practice and any additional requirements
2. Carry out work in a manner which minimises **environmental damage**
3. Dispose of **waste** safely and correctly.

Unit content

Maintains health and safety

The learner must comply with all health and safety legislation during activities

Environmental damage

Within the sports area and the wider environment

Waste

Hazardous and non-hazardous: waste to be disposed of appropriately

Unit 244

Maintain and Renovate Artificial Sports Surfaces

Outcome 4

Know the maintenance and renovation requirements of artificial sports surfaces

Assessment Criteria

The learner can:

1. Describe different methods of maintenance for **surfaces**
2. Describe how **surface and weather conditions** affect maintenance and renovation operations
3. Describe how to prepare **the surface** before carrying out maintenance and renovation operations
4. Describe **methods and techniques** used to maintain and renovate surfaces and perimeters
5. State **the standard of playing quality and appearance** that has to be achieved for the sport

Unit content

Surfaces

Hard porous water bound, filled synthetic, non-filled synthetic

Surface and weather conditions

Effects on each surface listed above

The surface

Each surface listed above

Methods and techniques

Brushing, luting, top-dressing, weed control, moss/algae control, frost protection, marking out, irrigation, renovation (damage repair), contamination removal

The standard of playing quality and appearance

Three sports: one sport for each of the types of surface above

Unit 244

Maintain and Renovate Artificial Sports Surfaces

Outcome 5

Know the types of equipment required and how to maintain them

Assessment Criteria

The learner can:

1. Describe the **equipment** which will be necessary for maintaining and renovating artificial sports surfaces
2. Describe methods of **maintaining the equipment** ready for use.

Unit content

Equipment and maintaining the equipment

The equipment required for each surface listed in outcome 4

Unit 244

Maintain and Renovate Artificial Sports Surfaces

Outcome 6

Know the current health and safety legislation and environmental good practice

Assessment Criteria

The learner can:

1. Outline the current health and safety **legislation, codes of practice** and any additional requirements which apply to this area of work
2. Describe how environmental damage can be minimised
3. Describe the correct methods for disposing of **organic and inorganic waste**.

Unit content

Legislation

Health and Safety at Work etc Act 1974, Management of Health and Safety at Work Regulations 1992 (as amended 1999), Control of Substances Hazardous to Health Regulations 2002, Food and Environment Protection Act 1985, Control of Pesticides Regulations 1986, Provision and Use of Work Equipment Regulations 1998

Codes of practice

Risk assessment, Reporting of Injuries, Diseases and Dangerous Occurrences (RIDDOR) 1995, Green Code: Code of Practice for the Safe Use of Pesticides on Farms and Holdings

Organic and inorganic waste

May include weeds, faeces, glass, plastic, metal cans, paper, chewing gum

Unit 244 Maintain and Renovate Artificial Sports Surfaces

Notes for guidance

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.

Outcomes 1, 2 and 3 set out the practical skills that must be acquired by the learner. They should be assessed in the context of one type of artificial surface, which the learner needs frequent access to, in order to develop the required level of skill. To pass the assessment, the learner must carry out a minimum of four of the operations listed in outcome 2, but a higher grade is possible if more operations are carried out. More than one type of turf may be included if this will allow the learner to achieve a higher grade.

Outcomes 4, 5 and 6 set out the knowledge required by the learner and cover 3 different types of artificial surface and all types of maintenance carried out on artificial surfaces. Where centres have limited direct access to artificial surfaces, visits to other sports centres offering a variety of surface will be beneficial. Learners will also need access to the Internet, manufacturers' literature and other sources of information in order to carry out the research required.

References

Books

Brown S. 2005. *Sports Turf and Amenity Grassland Management*. The Crowood Press. ISBN: 1-861-26790-8.

Brown S. 2009. *Sports Ground Management: A Complete Guide*. The Crowood Press. ISBN: 1-847-97094-X.

Perris J. 2000. *Grass Tennis Courts: How to Construct and Maintain Them*. The Sports Turf Research Institute. ISBN: 1-873-43134-1.

Perris J. 2008. *All About Bowls: The History, Construction and Maintenance of Bowling*. The Sports Turf Research Institute. ISBN: 1-873-43106-6.

Perris J and Evans RDC. 1996. *The Care of the Golf Course*. The Sports Turf Research Institute. ISBN: 1-873-43119-8.

Sachs P. 2004. *Managing Healthy Sports Fields*. Wiley. ISBN: 0-471-47269-7.

Sports Turf Research Institute. 2005. *STRI Guidelines to Golf Green Construction in the United Kingdom*. Yorkshire: The Sports Turf Research Institute. ISBN: 1-873-43159-7.

Websites

www.iog.org

The Institute of Groundsmanship

Unit 245

Contribute to Vegetable Production by Organic Methods

Level: 2

Credit value 5

Unit aim

This unit aims to provide learners with an understanding of the principles of vegetable production by organic methods, and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or to further education and training.

The learner will develop the skills and knowledge to be able to grow vegetable crops by organic growing methods.

Learning outcomes

There are **four** learning outcomes to this unit. The learner will:

1. Be able to grow annual vegetable crops organically
2. Understand the requirements of annual vegetable crops
3. Be able to grow perennial vegetable crops
4. Understand the storage of produce and seeds

Guided learning hours

It is recommended that **30** hours should be allocated for this unit. This may be on a full-time or part-time basis.

Details of the relationship between the unit and relevant national occupational standards

PH2 Establishing plants and crops in growing medium

PH3 Monitor and maintain the growth and development of crops

Endorsement of the unit by a sector or other appropriate body

This unit is endorsed by Lantra SSC.

Assessment and grading

This unit will be assessed by:

- An assignment covering practical skills and underpinning knowledge.

Unit 245

Contribute to Vegetable Production by Organic Methods

Outcome 1

Be able to grow annual vegetable crops organically

Assessment Criteria

The learner can:

1. **Prepare ground** by organic methods
2. **Raise plants** from seed sown in situ and in containers
3. **Thin out** and transplants seedlings
4. Provide **aftercare and support** to annual vegetables

Unit content

Prepare ground

Control of weeds, clearance of weed and debris, provision of organic matter, carry out primary cultivation, secondary cultivation and final cultivation/seed bed preparation

Primary cultivations as required (single or double digging or use of rotary cultivator), secondary cultivations as required (ensure appropriate ground levels and firming of soil), final cultivations (rake to produce fine tilth, removal of large stones/debris)

Raise plants

Sow vegetable plants out doors using “V “ shaped and flat bottomed drills set a taught line, take out an appropriate drill (if required), sow coarse, medium and fine seed, cover to correct depth, and row spacing, water open drill if appropriate, label

Sow vegetable seeds in modules and containers, select and prepare suitable growing media, sow coarse, medium and fine seed by broadcast and space sowing, maintain hygienic conditions, label, water and place in a suitable germination environment

Thin out

Outdoors: select suitable equipment for thinning out, thin out seedlings to specified spacing's, ensuring that remaining seedlings are undamaged, water after completion to re-settle

Under protection (indoors): select appropriate containers and equipment (trays, modules or single pots) and compost, prick out/off seedlings to correct depth, spacing's and quantities, accurately label and water (sub irrigation/over head)

Seedlings handled to avoid damage and ensure quick establishment

Aftercare and support

Select appropriate support system, erect support system, train/tie in vegetable plants to support system, irrigate, feed, provision of frost and pest protection as necessary, clean up site and remove all debris, revisit at appropriate time intervals to continue and maintain aftercare

All tasks undertaken at correct time of year and in appropriate weather conditions, inclusive of maintaining safe working practices and wearing of Personal Protective Equipment (PPE)

Unit 245

Contribute to Vegetable Production by Organic Methods

Outcome 2

Understand the requirements of annual vegetable crops

Assessment Criteria

The learner can:

1. Review the **tender and hardy annual vegetables** grown in the UK
 - Roots, leafy crops, bulbs, seeds, legumes and salads
 - tender or frost hardy
 - methods of plant raising
2. Explain the **nutrient, maintenance, harvesting and storage** requirements of the main groups of annual vegetables
3. Explain how catch cropping, intercropping, under planting and successional sowing **maximise the productivity** of an area
4. Describe **methods** that are used to advance or extend the productive season of specific crops

Unit content

Tender and hardy annual vegetables

Crops include runner beans, peas, broad beans, purple sprouting broccoli, oriental cabbage, carrots, celariac, salad potatoes, pumpkins, sweetcorn, beetroot, turnip, swedes, leeks, bulb onions, spring onions, lettuce, endive, tomatoes and leaf beet

Methods of plant raising include outdoors: sowing in situ, transplants, plugs, under protection (glasshouses, polythene tunnels, frames, cloches), sowing in containers: picking out/off, potting, hardening off, planting out
Identification of main vegetable producing/growing areas with the UK

Nutrition, maintenance, harvesting and storage

Nutrition, prior to sowing or planting, during growing period, maintenance, irrigation, shelter, frost protection, nutritional requirements, cultural requirements

Harvesting, methods used for, processing, manual, mechanical, bulk handling, pre cooling, refrigeration, sorting/grading, weighing, packaging, packed in the field, labelling (related to end market)

Storage, temperature, light levels, moisture, dehydrated, frozen

Maximise the productivity

To include use of:

Catch cropping: more efficient use of growing space, fast growing crop grown simultaneously with or between succession plantings/sowings of main crop

Intercropping: growing two more crops in the same area/space at the same time, greater use of available space

Under planting: low growing crop under a taller crop, efficient use of available space

Succession sowing: sowings made to maintain availability of supply and avoid a glut

Methods

Pre-germination, use of fleece outdoors, growing under protection in glasshouses, polythene tunnels, cloches, cold and heated frames

Protected cropping equipment may include supplementary lighting, carbon dioxide enrichment, temperature and humidity controls

Unit 245

Contribute to Vegetable Production by Organic Methods

Outcome 3

Be able to grow perennial vegetable crops

Assessment Criteria

The learner can:

1. **Propagate perennial crops** by division
2. **Plant** bare-rooted vegetable plants
3. Describe the **production** of Globe artichoke, asparagus and rhubarb
 - **propagation techniques**
 - establishment and maintenance
 - harvesting

Unit content

Propagate perennial crops

Select suitable equipment, lift the plants indicated without damage, carry out division efficiently, select suitable propagules for planting, maintain hygiene throughout, carry out final soil preparations prior to planting, plant at correct depth and spacing, firm appropriately, water as required, label and dispose of waste correctly

Plant

Water bare root plants before transplantation, lift plants with minimal damage, handle seedlings/plants carefully (by cotyledon leaves for seedlings), store appropriately, prevent roots drying out, transplant to prepared ground, transplant to a line at correct depth and spacing, firm adequately, water planting whole or afterwards and label

Production

Control of weeds, clearance of weed and debris, provision of organic matter, carry out primary cultivation, secondary cultivation and final cultivation/seed bed preparation Primary cultivations as required (single or double digging or use of rotary cultivator), secondary cultivations as required (ensure appropriate ground levels and firming of soil), final cultivations (rake to produce planting tilth, removal of large stones/debris).

Propagation techniques

Globe artichoke: select and plant offsets/suckers, correct time, depth, spacing (seed not advisable), irrigate, feed, weed, mulch, cut down stems in autumn, protect crowns from frost, cut off first year heads, cropping in second year, productive life 4 to 5 years, harvest heads mid-ate summer

Asparagus: sow seed or plant crowns, keep roots moist, correct time, depth, spacing, irrigate, feed, weed, mulch, cut 2 to 3 years after planting, productive life 8 to 20 years, spears cut 7.5cm below ground at 10 – 13cm tall, cease cutting mid-June.

Rhubarb: plant mature roots/crowns (could sow seed), keep roots moist, correct time, depth, spacing, irrigate, feed, weed, flowering shoots removed, cropping 12 -18 months following planting, productive life 5 to 10 years, sticks pulled in April/May, twist and pull

Unit 245

Contribute to Vegetable Production by Organic Methods

Outcome 4

Understand the storage of produce and seeds

Assessment Criteria

The learner can:

1. Describe the **storage requirements** of the main groups of vegetable produce
 - temperature
 - light levels
 - moisture
 - fresh, dehydrated, frozen
2. Evaluate the **collection and storage** of own seed, where appropriate
 - in-breeders and out-breeders
 - isolation methods
 - grading and cleaning
 - storage requirements

Unit content

Storage requirements

Facilities (indoors/outdoors), equipment and materials, temperature, cold/cool rooms, light levels, air quality, moisture, humidity levels, fresh, dehydrated, frozen

Above to be covered for each of the main groups of vegetables

Collection and storage

Centre for Organic Seed Information (COSI), Heritage seed scheme for vegetables In-breeders and out-breeders, isolation methods, grading and cleaning, storage requirements and resources required, advantages, disadvantages

Seed collection e.g. peas, broad beans, runner beans, French beans, lettuce and tomatoes, from self fertile types, at ripe stage, before dispersal, pick off/remove from plants, dry and remove from pod or extract by fermenting fruit, (e.g. tomatoes) remove seed, clean, store in dry paper bags or packets, keep in cool dry frost free place, advantages and disadvantages of collecting open pollinated, F1 and F2 seed

Unit 245 **Contribute to Vegetable Production by Organic Methods**

Notes for guidance

The learner will be able to develop the skills and knowledge involved in the cultivation of vegetables by organic methods. They will be able to establish crop by a range of methods and care for them by organic methods in preparation for harvest and storage.

In Outcome 1, learners will be able to demonstrate their ability to grow annual vegetable crops, by accepted organic methods. This will include the selection and preparation of the containers required for seed sowing under protection (correct growing media will also need to be chosen) and the final cultivations required when preparing seed beds for outdoor seed sowing. Techniques to be carried out include broadcast and space sowing in containers under protection (fine, medium and large awkward seed – one standard seed tray for each), seed sowing outdoors in both “V” shaped and flat bottomed drills (minimum length of drill should be 3m). The learners must also be able to provide the relevant aftercare following germination. This must include the ability to prick out (off) seedlings into suitable containers by holding cotyledon leaves only, as a guide a minimum of two (2) standard seed trays need to be used, 40 seedlings in each (5 x 8). Thinning out and the transplanting of seedlings (at specified spacing’s) in the open ground and the provision of support should also be carried out by the learner to the appropriate standard.

In Outcome 2, the learner must demonstrate their ability to identify and review the range of vegetables crops grown in the UK. Investigating the methods of plant rising, both under protection and outdoors and know the main production areas of specific crops across the UK. Learners must also be able to differentiate between roots, leafy crops, bulbs and salads giving a minimum of three named examples of each crop type. Learners must also know the nutrient (Nitrogen, Phosphorous, and Potassium), maintenance, harvesting and storage requirements of the main groups of vegetables. The outcome also covers the methods which are commonly used to produce crops out of season. Learners need to appreciate outdoor and indoor production methods, including the provision of the optimum growing environment, pre-germination, use of fleece outdoors and the benefits of growing under protection. It would be beneficial if learners knew the role of N, P K in plant development and how this knowledge may be used to manipulate plant growth.

In Outcome 3, learners will develop the knowledge and skills required to grow perennial vegetable crops by organic methods. They will need to prepare ground using primary and secondary techniques, prepare and lift bare rooted vegetable plants for transplanting, plant them to a taught line in their new positions and at specified spacing’s and provide the necessary aftercare, inclusive of monitoring and controlling pest and disease infestations organically. Learners must have the opportunity to plant up a minimum of two 3m rows (approximately ten bare root plants in each row). They will be able to recognise and describe the different production methods of globe artichoke, asparagus and rhubarb, inclusive of optimum propagation, establishment, maintenance, harvesting and storage methods.

Learners will recognise that globe artichokes are often propagated from offsets/suckers since seed is not advisable/reliable. Asparagus can be grown from seed or 2 – 3 year old crowns, while Rhubarb is usually from mature roots/crowns though seed could also be used. Learners will need to appreciate the benefits and disadvantages of each possible propagation/growing technique and the approximate productive life.

Outcome 4 will require the learner to identify and describe the storage requirements of the main groups of vegetable crops covering produce which is fresh, dehydrated and frozen. Together with demonstrating the ability to evaluate collection, extraction, cleaning and storage methods of own seed learners must show that they recognise the benefits of collecting and sowing own seed as well as the potential disadvantages, particularly when collecting from F1 and/or F2 seed. They will need to appreciate the differing seed extraction methods including for ‘dry’ seed and ‘green seed which requires fermentation to aid extraction. Ideally

learners should be provided with the opportunity to collect, extract and store seed to aid their understanding of the issues involved.

All tasks to be undertaken at correct time of year and in appropriate weather conditions, inclusive of maintaining safe working practices and wearing of PPE.

The unit may be delivered by a wide range of techniques, including lectures, supervised practical work, discussions, site visits and research. Learners will require access to specialised literature and other resources. The delivery of this unit may be integrated with the delivery of other units where this is feasible. All methods should reinforce the importance of health and safety and environmental issues. Risk assessments must be undertaken prior to practical activities. In order to successfully achieve this unit, it would be beneficial if the learners were allocated individual plots (perhaps 3m x 6m) in which to practice the organic methods of vegetable production covered in this unit. Off site visits to organic producers and demonstration gardens will greatly enhance the learner experience.

Reference

Books

- Halstead A and Greenwood P. 2003. *RHS Pest & Diseases*. 2nd ed. Essex: Dorling Kindersley Publishers.
- HDRA. 2005. *Encyclopaedia of Organic Gardening*. (Henry Doubleday Research Association). Essex: Dorling Kindersley Publishers.
- Littlewood M. 2007. *Organic Gardener's handbook*. Wiltshire: The Crowood Press Ltd. ISBN: 978-1-86126-936-2.
- Pears P. 1999. *RHS Organic Gardening*. 2nd ed. London: Mitchell Beazley Publishers.
- Pears P and Sherman B. 2006. *Pests: How to control them on fruit and vegetables*. Kent: Search Press Ltd. ISBN: 1-84448-156-5.

Websites

- | | |
|--|-----------------------------|
| www.soilassociation.org | Soil Association |
| www.gardenorganic.org.uk | Garden Organic |
| www.rhs.org.uk | Royal Horticultural Society |
| www.bbc.co.uk | BBC |

Appendix 1 Relationships to other qualifications

Literacy, language, numeracy and ICT skills development

These qualifications include opportunities to develop and practise many of the skills and techniques required for success in the following qualifications:

- Functional Skills (England) – see www.cityandguilds.com/functionalskills
- Essential Skills (Northern Ireland) – see www.cityandguilds.com/essentialskillsni
- Essential Skills Wales – see www.cityandguilds.com/esw

There might also be opportunities to develop skills and/or portfolio evidence if learners are completing any Key Skills alongside these qualifications.

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on www.cityandguilds.com.

Providing City & Guilds qualifications – a guide to centre and qualification approval contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of learners
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

Ensuring quality contains updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document contains information on:

- Management systems
- Maintaining records
- Assessment
- Internal verification and quality assurance
- External verification.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for learners who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- ***Walled Garden***
Find out how to register and certificate learners on line
- ***Events***
Contains dates and information on the latest Centre events

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Useful contacts

Type	Contact	Query
UK learners	T: +44 (0)84 4543 0033 E: learnersupport@cityandguilds.com	<ul style="list-style-type: none">• General qualification information
Centres	T: +44 (0)84 4543 0000 F: +44 (0)20 7294 2413 E: centresupport@cityandguilds.com	<ul style="list-style-type: none">• Exam entries• Registrations/enrolment• Certificates• Invoices• Missing or late exam materials• Nominal roll reports• Results
Walled Garden	T: +44 (0)84 4543 0000 F: +44 (0)20 7294 2405 E: walledgarden@cityandguilds.com	<ul style="list-style-type: none">• Re-issue of password or username• Technical problems• Entries• Results• GOLLA• Navigation• User/menu option problems
Employer	T: +44 (0)121 503 8993 E: business_unit@cityandguilds.com	<ul style="list-style-type: none">• Employer solutions• Mapping• Accreditation• Development Skills• Consultancy

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