



# Specification

**BTEC Firsts**

**Pearson BTEC Level 2 Certificate, BTEC Level 2  
Extended Certificate and BTEC Level 2 Diploma  
in Countryside and Environment**

**For first teaching September 2010**

**July 2016**

**Issue 4**

## Edexcel, BTEC and LCCI qualifications

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This specification is Issue 4. Key changes are sidelined. We will inform centres of any changes to this issue. The latest issue can be found on our website at [qualifications.pearson.com](http://qualifications.pearson.com)

These qualifications were previously entitled:

Edexcel BTEC Level 2 Certificate in Countryside and Environment (QCF)

Edexcel BTEC Level 2 Extended Certificate in Countryside and Environment (QCF)

Edexcel BTEC Level 2 Diploma in Countryside and Environment (QCF)

The QNs remain the same.

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# BTEC First qualification titles covered by this specification

Pearson BTEC Level 2 Certificate in Countryside and Environment

Pearson BTEC Level 2 Extended Certificate in Countryside and Environment

Pearson BTEC Level 2 Diploma in Countryside and Environment

These qualifications have been accredited to the National Framework and are eligible for public funding as determined by the Department for Education (DfE) under Sections 96 and 97 of the Learning and Skills Act 2000.

The qualification titles listed above feature in the funding lists published annually by the DfE and the regularly updated website [www.education.gov.uk/](http://www.education.gov.uk/). The Qualifications Number (QN) should be used by centres when they wish to seek public funding for their learners. Each unit within a qualification will also have a unit code.

The qualification and unit codes will appear on the learners' final certification documentation.

The QNs for the qualifications in this publication are:

Pearson BTEC Level 2 Certificate in Countryside and Environment	500/9928/0
Pearson BTEC Level 2 Extended Certificate in Countryside and Environment	500/9931/0
Pearson BTEC Level 2 Diploma in Countryside and Environment	500/9930/9

These qualification titles will appear on learners' certificates. Learners need to be made aware of this when they are recruited by the centre and registered with Pearson.

# What are BTEC Firsts?

BTEC First qualifications are undertaken in further education and sixth-form colleges, schools and other training providers, and have been since they were introduced in 1983. Their purpose, approaches to teaching, learning and assessment are established and understood by teaching professionals, employers and learners alike.

The BTEC First qualifications within this specification:

Pearson BTEC Level 2 Certificate in Countryside and Environment

Pearson BTEC Level 2 Extended Certificate in Countryside and Environment

Pearson BTEC Level 2 Diploma in Countryside and Environment.

But for clarity and continuity they are referred to generically as BTEC First qualifications, where appropriate, and maintain the same equivalences, benchmarks and other articulations (for example SCAAT points) as their predecessor qualifications. The following identifies the titling conventions and variations between the predecessor and new specifications.

<b>Predecessor BTEC Firsts (accredited 2006)</b>	<b>BTEC Firsts (for delivery from September 2010)</b>
Edexcel Level 2 BTEC First Diploma	Pearson BTEC Level 2 Diploma
Edexcel Level 2 BTEC First Certificate	Pearson BTEC Level 2 Extended Certificate
Not applicable	Pearson BTEC Level 2 Certificate

BTEC Firsts are Level 2 qualifications designed to provide specialist work-related qualifications in a range of sectors. They give learners the knowledge, understanding and skills that they need to prepare for employment. The qualifications also provide career development opportunities for those already in work. Consequently they provide a course of study for full-time or part-time learners in schools, colleges and training centres.

BTEC Firsts provide much of the underpinning knowledge and understanding for the National Occupational Standards for the sector, where these are appropriate. They are supported by the relevant Standards Setting Body (SSB) or Sector Skills Council (SSC). A number of BTEC Firsts are recognised as Technical Certificates and form part of the Apprenticeship Framework. They attract achievement and attainment points that equate to similar-sized general qualifications.

On successful completion of a BTEC First qualification, learners can progress to or within employment and/or continue their study in the same or related vocational area.



## **Total Qualification Time**

For all regulated qualifications, Pearson specifies a total number of hours that it is expected the average learner will be required to undertake in order to complete and show achievement for the qualification: this is the Total Qualification Time (TQT).

Within this, Pearson will also identify the number of Guided Learning Hours (GLH) that we expect a centre delivering the qualification will need to provide. Guided learning means activities that directly or immediately involve tutors and assessors in teaching, supervising, and invigilating learners, such as lessons, tutorials, online instruction, supervised study giving feedback on performance.

In addition to guided learning, other required learning directed by tutors or assessors will include private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.

These qualifications also have a credit value, which is equal to one tenth of TQT. Pearson consults with users of these qualifications in assigning TQT and credit values.

This suite of BTEC Level 2 qualifications is available in the following sizes:

- Certificate – 150 TQT (15 credits, 90 GLH)
- Extended Certificate – 300 TQT (30 credits, 180 GLH)
- Diploma – 600 TQT (60 credits, 360 GLH)

## **Pearson BTEC Level 2 Certificate – 15 credits**

The 15-credit BTEC Level 2 Certificate offers a specialist qualification that focuses on particular aspects of employment within the appropriate vocational sector. The BTEC Level 2 Certificate is a qualification which can extend a learner's programme of study and provide a vocational emphasis. The BTEC Level 2 Certificate is broadly equivalent to one GCSE.

The BTEC Level 2 Certificate is also suitable for more mature learners, who wish to follow a vocational programme of study as part of their continued professional development or who want to move to a different area of employment.

## **Pearson BTEC Level 2 Extended Certificate – 30 credits**

The 30-credit BTEC Level 2 Extended Certificate extends the specialist work-related focus from the BTEC Certificate and covers the key knowledge and practical skills required in the appropriate vocational sector. The BTEC Level 2 Extended Certificate offers flexibility and a choice of emphasis through the optional units. It is broadly equivalent to two GCSEs.

The BTEC Level 2 Extended Certificate offers an engaging programme for those who are clear about the area of employment that they wish to enter. These learners may wish to extend their programme through the study of a related GCSE, a complementary NVQ or another qualification. These learning programmes can be developed to allow learners to study complementary qualifications without duplication of content.

For adult learners the BTEC Level 2 Extended Certificate can extend their experience of work in a particular sector. It is a suitable qualification for those wishing to change career or move into a particular area of employment following a career break.

## **Pearson BTEC Level 2 Diploma – 60 credits**

The 60-credit BTEC Level 2 Diploma extends the specialist work-related focus from the BTEC Level 2 Extended Certificate. There is potential for the qualification to prepare learners for employment in the appropriate vocational sector and it is suitable for those who have decided that they wish to enter a particular area of work. It is broadly equivalent to four GCSEs.

Some learners may wish to gain the qualification in order to enter a specialist area of employment or to progress to a Level 3 programme. Other learners may want to extend the specialism they studied on the BTEC Level 2 Certificate or the BTEC Level 2 Extended Certificate programme.

## **Key features of the BTEC Firsts in Countryside and Environment**

The BTEC Firsts in Countryside and Environment have been developed in the environmental and land-based sector to:

- provide education and training for learners interested in employment and/or further education in the environmental and land-based and/or associated sectors
- give opportunities for employees who currently work in countryside and/or environmental industries to achieve a nationally recognised Level 2 vocationally specific qualification
- give full-time learners the opportunity to enter employment in the environmental and land-based sector or to progress to vocational qualifications such as the Pearson BTEC Level 3 Nationals in Countryside Management
- give learners the opportunity to develop a range of skills and techniques, personal skills and attributes essential for successful performance in working life.

## **Rationale for the BTEC Firsts in Countryside and Environment**

These BTEC Firsts in Countryside and Environment have been developed to provide entry and progression into and within countryside and/or environmental industries that fall within the environmental and land-based sector. Lantra, the Sector Skills Council for the environmental and land-based industries, has identified knowledge, understanding and technical skills that employers need from learners entering the sector in the coming years. Pearson has included these in the development of units that make up these qualifications.

These qualifications are part of a wide suite of environmental and land-based qualifications offered by Pearson and are designed primarily for 14 to 19 learners who seek employment and/or further learning in the sector. They are also available to other learners who may already have experience within the sector but seek a nationally recognised qualification as part of their career. The qualifications are aimed at those interested in the management of the countryside and investigation of natural and managed environments. The qualifications are made up from discrete 5 and 10 credit units of learning that give learners explicit recognition of their learning in education and work. BTEC First qualifications are free to be delivered and assessed in a range of traditional and contemporary models such as full-time, part-time and e-learning. Tutors are free to create innovative and creative assessments that fit local requirements whilst maintaining a national standard.

## **National Occupational Standards**

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BTEC Firsts are designed to provide much of the underpinning knowledge and understanding for the National Occupational Standards (NOS), as well as developing practical skills in preparation for work and possible achievement of NVQs in due course. NOS form the basis of National Vocational Qualifications (NVQs). BTEC Firsts do not purport to deliver occupational competence in the sector, which should be demonstrated in a work context.

Each unit in the specification identifies links to elements of the NOS.

The Pearson BTEC Level 2 Firsts in Countryside and Environment relate to the following NOS:

- Level 2 Environmental Conservation
- Level 2 Game and Wildlife
- Level 2 Amenity Horticulture
- Level 2 Treework.

# Rules of combination for Pearson BTEC Level 2 First qualifications

The rules of combination specify the:

- total credit value of the qualification
- minimum credit to be achieved at the level or above the level of the qualification
- mandatory unit credit
- optional unit credit
- maximum credit that can come from other BTEC units in the qualification suite.

When combining units for a BTEC First qualification, it is the centre's responsibility to ensure that the following rules of combination are adhered to.

## Pearson BTEC Level 2 Certificate

- 1 Qualification credit value: a minimum of 15 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 8 credits.

## Pearson BTEC Level 2 Extended Certificate

- 1 Qualification credit value: a minimum of 30 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 16 credits.

## Pearson BTEC Level 2 Diploma

- 1 Qualification credit value: a minimum of 60 credits.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 31 credits.
- 3 Mandatory unit credit: 20 credits.
- 4 Optional unit credit: 40 credits.
- 5 A maximum of 10 optional credits can come from other BTEC units to meet local needs.

## **Pearson BTEC Level 2 Certificate in Countryside and Environment**

The Pearson BTEC Level 2 Certificate in Countryside and Environment is 15 credits and has 90 guided learning hours (GLH). It consists of optional units that provide for a combined total of 15 credits (where at least 8 credits must be at Level 2 or above).

<b>Pearson BTEC Level 2 Certificate in Countryside and Environment</b>			
<b>Unit</b>	<b>Optional units</b>	<b>Credit</b>	<b>Level</b>
3	Introduction to Animal and Plant Husbandry	10	2
4	Introduction to Environmental Studies	10	2
5	Participate in Providing Estate Maintenance	10	2
6	Conservation and Improvement of British Habitats	10	2
10	Undertaking Ecological Surveys and Techniques	10	2
11	Introduction to Countryside Access and Recreation	10	2
15	Introduction to Game Management	10	2
18	Introduction to Coastal Zone Management	10	2
19	Tractor Driving	5	2
20	Understand the Basic Principles of Plant Science	5	2

## Pearson BTEC Level 2 Extended Certificate in Countryside and Environment

The Pearson BTEC Level 2 Extended Certificate in Countryside and Environment is 30 credits and has 180 guided learning hours (GLH). It consists of optional units that provide for a combined total of 30 credits (where at least 16 credits must be at Level 2 or above).

Pearson BTEC Level 2 Extended Certificate in Countryside and Environment			
Unit	Optional units	Credit	Level
3	Introduction to Animal and Plant Husbandry	10	2
4	Introduction to Environmental Studies	10	2
5	Participate in Providing Estate Maintenance	10	2
6	Conservation and Improvement of British Habitats	10	2
7	Introduction to Agriculture and Conservation	10	2
8	Introduction to Land-based Workshop Practice	10	2
10	Undertaking Ecological Surveys and Techniques	10	2
11	Introduction to Countryside Access and Recreation	10	2
12	Introduction to Urban Habitat Ecology	10	2
13	Understanding Ecology of Trees, Woods and Forests	10	2
14	Introduction to Practical Forestry Skills	10	2
15	Introduction to Game Management	10	2
16	Introductory Deer Management	5	2
18	Introduction to Coastal Zone Management	10	2
19	Tractor Driving	5	2
20	Understand the Basic Principles of Plant Science	5	2
23	Undertake Tree Felling Operations	10	2
24	Undertake Tree Climbing and Pruning Operations	10	2
25	Carry Out Ground-based Arboricultural Operations	10	2

## Pearson BTEC Level 2 Diploma in Countryside and Environment

The Pearson BTEC Level 2 Diploma in Countryside and Environment is 60-credits and has 360-guided-learning-hours (GLH) that consists of two mandatory units **plus** optional units that provide for a combined total of 60 credits (where at least 31 credits must be at Level 2 or above).

Pearson BTEC Level 2 Diploma in Countryside and Environment			
Unit	Mandatory units	Credit	Level
1	Undertake Work Related Experience in the Land-based Industries	10	2
2	Environmental and Land-based Business	10	2
Unit	Optional units		
3	Introduction to Animal and Plant Husbandry	10	2
4	Introduction to Environmental Studies	10	2
5	Participate in Providing Estate Maintenance	10	2
6	Conservation and Improvement of British Habitats	10	2
7	Introduction to Agriculture and Conservation	10	2
8	Introduction to Land-based Workshop Practice	10	2
9	Introduction to the Principles of Land-based Machinery	5	2
10	Undertaking Ecological Surveys and Techniques	10	2
11	Introduction to Countryside Access and Recreation	10	2
12	Introduction to Urban Habitat Ecology	10	2
13	Understanding Ecology of Trees, Woods and Forests	10	2
14	Introduction to Practical Forestry Skills	10	2
15	Introduction to Game Management	10	2
16	Introductory Deer Management	5	2
17	Introduction to Land-based Machinery Operations	10	2
18	Introduction to Coastal Zone Management	10	2
19	Tractor Driving	5	2
20	Understand the Basic Principles of Plant Science	5	2
21	Establish and Maintain Plants Outdoors	10	2
22	Presentation and Service for Retailing in the Land-based Sector	10	2
23	Undertake Tree Felling Operations	10	2
24	Undertake Tree Climbing and Pruning Operations	10	2
25	Carry Out Ground-based Arboricultural Operations	10	2

# Assessment and grading

In BTEC Firsts all units are internally assessed.

All assessment for BTEC First qualifications is criterion referenced, based on the achievement of all the specified learning outcomes.

Each unit within the qualification has specified assessment and grading criteria which are to be used for grading purposes. A summative unit grade can be awarded at pass, merit or distinction:

- to achieve a 'pass' a learner must have satisfied all the pass assessment criteria
- to achieve a 'merit' a learner must additionally have satisfied all the merit grading criteria
- to achieve a 'distinction' a learner must additionally have satisfied all the grading distinction criteria.

## Grading domains

The assessment and grading criteria are developed in relation to grading domains which are exemplified by a number of indicative characteristics at the level of the qualification.

There are four BTEC First grading domains:

- application of knowledge and understanding
- development of practical and technical skills
- personal development for occupational roles
- application of generic skills.

Please refer to *Annexe B*, which shows the merit and distinction indicative characteristics.

## Guidance

The purpose of assessment is to ensure that effective learning has taken place to give learners the opportunity to:

- meet the assessment and grading criteria and
- achieve the learning outcomes within the units.

All the assignments created by centres should be reliable and fit for purpose, and should be built on the unit assessment and grading criteria. Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the specified criteria. Centres should enable learners to produce evidence in a variety of forms including written reports, graphs, posters, along with projects, performance observation and time-constrained assessments.

Centres are encouraged to emphasise the practical application of the assessment and grading criteria, providing a realistic scenario for learners to adopt, and making maximum use of practical activities and work experience. The creation of assignments that are fit for purpose is vital to achievement and their importance cannot be over-emphasised.

The assessment and grading criteria must be clearly indicated on the fit-for-purpose assignments. This gives learners focus and helps with internal verification and standardisation processes. It will also help to ensure that learner feedback is specific to the assessment and grading criteria.

When looking at the unit assessment and grading criteria grids and designing assignments, centres are encouraged to identify common topics and themes.



The units include guidance on appropriate assessment methodology. A central feature of vocational assessment is that it allows for assessment to be:

- current, ie to reflect the most recent developments and issues
- local, ie to reflect the employment context of the delivering centre
- flexible to reflect learner needs, ie at a time and in a way that matches the learner's requirements so that they can demonstrate achievement.

## Calculation of the qualification grade

### Pass qualification grade

Learners who achieve the minimum eligible credit value specified by the rule of combination will achieve the qualification at pass grade (see *Rules of combination for Pearson BTEC Level 2 First qualifications*).

### Qualification grades above pass grade

Learners will be awarded a merit or distinction or distinction\* qualification grade by the aggregation of points gained through the successful achievement of individual units. The number of points available is dependent on the unit level and grade achieved, and the credit size of the unit (as shown in the 'points available for credits achieved at different Levels and unit grades' below).

### Points available for credits achieved at different Levels and unit grades

The table below shows the **number of points scored per credit** at the unit level and grade.

Unit level	Points per credit		
	Pass	Merit	Distinction
Level 1	3	4	5
<b>Level 2</b>	<b>5</b>	<b>6</b>	<b>7</b>
Level 3	7	8	9

Learners who achieve the correct number of points within the ranges shown in the 'qualification grade' table will achieve the qualification merit or distinction or distinction\* grade.

### Qualification grade

Qualification	Points range above pass grade		
	Merit	Distinction	Distinction*
BTEC Level 2 Certificate	85 – 94	95 – 99	100 and above
BTEC Level 2 Extended Certificate	170 – 189	190 – 199	200 and above
BTEC Level 2 Diploma	340 – 379	380 – 399	400 and above

Please refer to *Annexe G* for examples of calculation of qualification grade above pass grade.

# Quality assurance of centres

Pearson's qualification specifications set out the standard to be achieved by each learner in order to be awarded the qualification. This is covered in the statement of learning outcomes, and assessment and grading criteria in each unit. Further guidance on delivery and assessment is given in the *Essential guidance for tutors* section in each unit. This section is designed to provide additional guidance and amplification related to the unit to support tutors, deliverers and assessors and to provide for a coherence of understanding and a consistency of delivery and assessment.

## Approval

Centres that have not previously offered BTEC qualifications will first need to apply for, and be granted, centre approval before they can apply for approval to offer the programme.

When a centre applies for approval to offer a BTEC qualification it is required to enter into an approvals agreement.

The approvals agreement is a formal commitment by the head or principal of a centre to meet all the requirements of the specification and any linked codes or regulations. Sanctions and tariffs may be applied if centres do not comply with the agreement. Ultimately, this could result in the suspension of certification or withdrawal of approval.

Centres will be allowed 'accelerated approval' for a new programme where the centre already has approval for a programme that is being replaced by the new programme.

The key principles of quality assurance are that:

- a centre delivering BTEC programmes must be an approved centre and must have approval for programmes or groups of programmes that it is operating
- the centre agrees as part of gaining approval to abide by specific terms and conditions around the effective delivery and quality assurance of assessment; it must abide by these conditions throughout the period of delivery
- Pearson makes available to approved centres a range of materials and opportunities intended to exemplify the processes required for effective assessment and examples of effective standards. Approved centres must use the materials and services to ensure that all staff delivering BTEC qualifications keep up to date with the guidance on assessment
- an approved centre must follow agreed protocols for standardisation of assessors and verifiers; planning, monitoring and recording of assessment processes; and for dealing with special circumstances, appeals and malpractice.

The approach of quality assured assessment is made through a partnership between an approved centre and Pearson. Pearson is committed to ensuring that it follows best practice and employs appropriate technology to support quality assurance processes where practicable. Therefore, the specific arrangements for working with centres will vary. Pearson seeks to ensure that the quality assurance processes that it uses do not place undue bureaucratic processes on centres and works to support centres in providing robust quality assurance processes.

Pearson monitors and supports centres in the effective operation of assessment and quality assurance. The methods which it uses to do this for these BTEC First and National programmes:

- ensuring that all centres have completed appropriate declarations at the time of approval, undertaking approval visits to centres where necessary

- requiring all centres to appoint a Lead Internal Verifier for designated groups of programmes and to ensure that this person is trained and supported in carrying out that role
- requiring that the Lead Internal Verifier completes compulsory online standardisation related to assessment and verification decisions for the designated programme
- assessment sampling and verification, through requested samples of assessments, completed assessed learner work and associated documentation
- overarching review and assessment of a centre's strategy for assessing and quality assuring its BTEC programmes.

### **Edexcel Quality Assurance Handbook**

Centres should refer to the *Handbook for Quality Assurance for BTEC Qualifications*, issued annually, for detailed guidance.

An approved centre must make certification claims only when authorised by Pearson and strictly in accordance with requirements for reporting.

Centres that do not fully address and maintain rigorous approaches to quality assurance will be prevented from seeking certification for individual programmes or for all BTEC First and National programmes. Centres that do not comply with remedial action plans may have their approval to deliver qualifications removed.

## **Programme design and delivery**

BTEC First qualifications consist of mandatory units and optional units. Optional units are designed to provide a focus to the qualification and give more specialist opportunities in the sector.

In BTEC Firsts each unit has a number of *guided learning hours* and centres are advised to take this into account when planning the programme of study associated with this specification.

### **Mode of delivery**

Pearson does not define the mode of study for BTEC Firsts. Centres are free to offer the qualifications using any mode of delivery (such as full time, part time, evening only, distance learning) that meets their learners' needs. Whichever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified in the specification and to the subject specialists delivering the units. This is particularly important for learners studying for the qualification through open or distance learning.

Learners studying for the qualification on a part-time basis bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors. The use of assessment evidence drawn from learners' work environments should be encouraged. Those planning the programme should aim to enhance the vocational nature of the qualification by:

- liaising with employers to ensure a course relevant to learners' specific needs
- accessing and using non-confidential data and documents from learners' workplaces
- including sponsoring employers in the delivery of the programme and, where appropriate, in the assessment
- linking with company-based/workplace training programmes
- making full use of the variety of experience of work and life that learners bring to the programme.

## Resources

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BTEC Firsts are designed to prepare learners for employment in specific occupational sectors. Physical resources need to support the delivery of the programme and the proper assessment of the learning outcomes and should, therefore, normally be of industry standard. Staff delivering programmes and conducting the assessments should be familiar with current practice and standards in the sector concerned. Centres will need to meet any specific resource requirements to gain approval from Pearson.

Where specific resources are required these have been indicated in individual units in the *Essential resources* sections.

## Delivery approach

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It is important that centres develop an approach to teaching and learning that supports the specialist vocational nature of BTEC First qualifications and the mode of delivery. Specifications give a balance of practical skill development and knowledge requirements, some of which can be theoretical in nature. Tutors and assessors need to ensure that appropriate links are made between theory and practical application and that the knowledge base is applied to the sector. This requires the development of relevant and up-to-date teaching materials that allow learners to apply their learning to actual events and activity within the sector. Maximum use should be made of the learner's experience.

An outline learning plan is included in every unit as guidance which demonstrates one way in planning the delivery and assessment of the unit. The outline learning plan can be used in conjunction with the programme of suggested assignments.

Where the qualification has been designated and approved as a Technical Certificate and forms part of an Apprenticeship scheme, particular care needs to be taken to build strong links between the learning and assessment for the BTEC First qualification and the related NVQs and Functional Skills that also contribute to the scheme.

## Meeting local needs

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Centres should note that the qualifications set out in this specification have been developed in consultation with centres and employers and the Sector Skills Councils or the Standards Setting Bodies for the relevant sector. Centres should make maximum use of the choice available to them within the optional units to meet the needs of their learners, and local skills and training needs.

In certain circumstances, units in this specification might not allow centres to meet a local need. In this situation, Edexcel will ensure that the rule of combination allows centres to make use of units from other BTEC specifications in this suite. Centres are required to ensure that the coherence and purpose of the qualification are retained and that the vocational focus is not diluted.

## ● **Limitations on variations from standard specifications**

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The flexibility to import standard units from other BTEC Firsts is limited to a total of 25 per cent of the qualification credit value (see *Rules of combination for Pearson BTEC Level 2 First qualifications*).

These units cannot be used at the expense of the mandatory units in any qualification.

## ● **Additional and specialist learning**

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Additional and specialist learning (ASL) consists of accredited qualifications at the same level as, or one level above, the Diploma course of study. The ASL may include BTEC qualifications which are also available to learners not following a Diploma course of study.

Qualifications for ASL must be selected from the ASL catalogue through the National Database of Accredited Qualifications (NDAQ). The catalogue includes qualifications which have the approval of the Diploma Development Partnership (DDP) and will expand over time as more qualifications are approved. To access the catalogue go to [www.ndaq.org.uk](http://www.ndaq.org.uk) and select 'Browse Diploma Qualifications'.

Further units may be added to qualifications within the catalogue and centres undertaking, or preparing to undertake, ASL should refer regularly to the Edexcel website for information regarding additions.

## ● **Functional Skills**

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BTEC Firsts give learners opportunities to develop and apply Functional Skills.

Functional Skills are offered as stand-alone qualifications at Level 2. See individual units for opportunities to cover ICT, Mathematics and English Functional Skills.

## ● **Personal, learning and thinking skills**

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Opportunities are available to develop personal, learning and thinking skills (PLTS) within a sector-related context. PLTS are identified in brackets after the unit pass criteria to which they are associated and they are also mapped in *Annexe C*. Further opportunities for learners to demonstrate these skills may also be apparent as learners progress throughout their learning.

# Access and recruitment

Edexcel's policy regarding access to its qualifications is that:

- they should be available to everyone who is capable of reaching the required standards
- they should be free from any barriers that restrict access and progression
- there should be equal opportunities for all wishing to access the qualifications.

Centres are required to recruit learners to BTEC qualifications with integrity. This will include ensuring that applicants have appropriate information and advice about the qualifications and that the qualification will meet their needs. Centres should take appropriate steps to assess each applicant's potential and make a professional judgement about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Pearson's policy on learners with particular requirements.

Centres will need to review the entry profile of qualifications and/or experience held by applicants, considering whether this profile shows an ability to progress to a Level 2 qualification. For learners who have recently been in education, the profile is likely to include one of the following:

- a BTEC Level 1 qualification in an environmental and land-based subject or a related vocational area
- a standard of literacy and numeracy supported by a general education equivalent to four GCSEs at grades D-G
- other related Level 1 qualifications
- related work experience.

More mature learners may present a more varied profile of achievement that is likely to include experience of paid and/or unpaid employment.

## Restrictions on learner entry

Most BTEC First qualifications are for learners aged 14 years and over.

In particular sectors the restrictions on learner entry might also relate to any physical or legal barriers, for example people working in health, care or education are likely to be subject to police checks.

Pearson BTEC Level 2 Firsts are listed on the DCSF funding lists Section 96 and Section 97.

## Access arrangements and special considerations

Pearson's policy on access arrangements and special considerations for BTEC and Edexcel NVQ qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the 1995 Disability Discrimination Act and the amendments to the Act) without compromising the assessment of skills, knowledge, understanding or competence.

Further details are given in the policy document *Access Arrangements and Special Considerations for BTEC and Edexcel NVQ Qualifications*, which can be found on the website ([qualifications.pearson.com](http://qualifications.pearson.com)). This policy replaces the previous policy (Assessment of Vocationally Related Qualification: Regulations and Guidance Relating to Learners with Special Requirements, 2002) concerning learners with particular requirements.

## ● Recognition of Prior Learning

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Recognition of Prior Learning (RPL) is a method of assessment (leading to the award of credit) that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and so do not need to develop through a course of learning.

Pearson encourages centres to recognise learners' previous achievements and experiences, whether at work, home or at leisure, as well as in the classroom. RPL provides a route for the recognition of the achievements resulting from continuous learning.

RPL enables recognition of achievement from a range of activities using any valid assessment methodology. Provided that the assessment requirements of a given unit or qualification have been met, the use of RPL is acceptable for accrediting a unit, units or a whole qualification. Evidence of learning must be sufficient, reliable and valid.

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## Unit format

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All units in Pearson BTEC Level 2 First qualifications have a standard format. The unit format is designed to give guidance on the requirements of the qualification for learners, tutors, assessors and those responsible for monitoring national standards.

Each unit has the following sections.

### ● Unit title

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The unit title will appear on the learner's Notification of Performance (NOP).

### ● Level

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All units and qualifications will have a level assigned to them, which represents the level of achievement. There are nine levels of achievement, from Entry Level to Level 8. The level of the unit has been informed by the level descriptors and, where appropriate, the National Occupational Standards (NOS) and/or other sector/professional benchmarks.

### ● Credit value

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In BTEC First qualifications each unit consists of a credit value; learners will be awarded credits for the successful completion of whole units.

A credit value specifies the number of credits that will be awarded to a learner who has achieved all the learning outcomes of the unit.

### ● Guided learning hours

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Guided learning hours for the unit are defined on page 3

## **Aim and purpose**

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The aim provides a clear summary of the purpose of the unit and is a succinct statement that summarises the learning outcomes of the unit.

## **Unit introduction**

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The unit introduction gives the reader an appreciation of the unit in the vocational setting of the qualification, as well as highlighting the focus of the unit. It gives the reader a snapshot of the unit and the key knowledge, skills and understanding gained while studying the unit. The unit introduction also highlights any links to the appropriate vocational sector by describing how the unit relates to that sector.

## **Learning outcomes**

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Learning outcomes state exactly what a learner should 'know, understand or be able to do' as a result of completing the unit.

## **Unit content**

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The unit content identifies the breadth of knowledge, skills and understanding needed to design and deliver a programme of learning to achieve each of the learning outcomes. This is informed by the underpinning knowledge and understanding requirements of the related NOS. The content provides the range of subject material for the programme of learning and specifies the skills, knowledge and understanding required for achievement of the pass, merit and distinction grading criteria.

Each learning outcome is stated in full and then the key phrases or concepts related to that learning outcome are listed in italics followed by the subsequent range of related topics.

### **Relationship between content and assessment criteria**

The learner must have the opportunity within the delivery of the unit to cover all of the unit content.

It is not a requirement of the unit specification that all of the content is assessed. However, the indicative content will need to be covered in a programme of learning in order for learners to be able to meet the standard determined in the assessment and grading criteria. The merit and distinction grading criteria enable the learner to achieve higher levels of performance in their acquisition of knowledge, understanding and skills.



## Content structure and terminology

The information below shows how the unit content is structured and gives the terminology used to explain the different components within the content.

- Learning outcome: this is shown in bold at the beginning of each section of content.
- Italicised sub-heading: it contains a key phrase or concept. This is content which must be covered in the delivery of the unit. Colons mark the end of an italicised sub-heading.
- Elements of content: the elements are in plain text and amplify the sub-heading. The elements must be covered in the delivery of the unit. Semi-colons mark the end of an element.
- Brackets contain amplification of elements of content which must be covered in the delivery of the unit.
- 'eg' is a list of examples, used for indicative amplification of an element (that is, the content specified in this amplification could be covered or could be replaced by other, similar material).

## Assessment and grading grid

Each grading grid gives the assessment and grading criteria used to determine the evidence that each learner must produce in order to receive a pass, merit or distinction grade. It is important to note that the merit and distinction grading criteria require a qualitative improvement in a learner's evidence and not simply the production of more evidence at the same level.

## Essential guidance for tutors

This section gives tutors additional guidance and amplification to aid understanding and a consistent level of delivery and assessment. It is divided into the following sections.

- *Delivery* – explains the content's relationship with the learning outcomes and offers guidance about possible approaches to delivery. This section is based on the more usual delivery modes but is not intended to rule out alternative approaches.
- *Outline learning plan* – has been included in every unit as guidance and demonstrates one way in planning the delivery and assessment of a unit. The outline learning plan can be used in conjunction with the programme of suggested assignments.
- *Assessment* – gives amplification about the nature and type of evidence that learners need to produce in order to pass the unit or achieve the higher grades. This section should be read in conjunction with the grading criteria.
- *Suggested programme of assignments* – the table shows how the suggested assignments match and cover the assessment grading criteria.
- *Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications* – sets out links with other units within the qualification. These links can be used to ensure that learners make connections between units, resulting in a coherent programme of learning. The links show opportunities for integration of learning, delivery and assessment.
- *Essential resources* – identifies any specialist resources needed to allow learners to generate the evidence required for each unit. The centre will be asked to ensure that any requirements are in place when it seeks approval from Pearson to offer the qualification.
- *Employer engagement and vocational contexts* – gives a short list of agencies, networks and other useful contacts for employer engagement and for sources of vocational contexts.
- *Indicative reading for learners* – gives a list of learner resource material that benchmarks the level of study.



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# Unit 1: Undertake Work Related Experience in the Land-based Industries

**Unit code:** H/600/9335

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to provide learners with an understanding of the principles of work related experience 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.

## ● Unit introduction

Work experience is an important part of any vocational course.

Learners on vocational courses should have experience of the type of work that they hope to do and an idea of the expectations of those who may employ them. Actual work experience may be gained by a number of routes, eg as part of an industrial placement while at college; while working on a planned daily or weekly basis on the college's commercial and/or educational facilities; while undertaking voluntary work within the industry; in the form of previous relevant and current work experience in the industry; or as a member of a group of learners invited to carry out practical work in, for example, a country park, farm or animal care centre. All of the above may be useful in gathering evidence against the grading criteria for this unit.

Work related experience should not just involve actually undertaking activities in a work environment. Talking to, listening to and watching those with experience of particular industries and/or situations is a very valid way of beginning to understand the work involved and what is required of the employee.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 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.

# Unit content

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

*Environmental and land based industry:* range of sectors represented eg production (livestock, crops), leisure/tourism, equestrian, forestry/arboriculture, fishery management, aquaculture, farriery, floristry, fencing, gamekeeping, animal care/welfare, conservation, countryside management, land-based engineering, landscaping and horticulture

Job roles: the range of roles available within the chosen sector

## **2 Be able to use relevant documents and skills relating to work experience**

*Documents:* job advertisement; CV; covering letter; application form; job/role description; essential and desirable personal requirements; using these documents in an appropriate way

*Skills:* identification of skills required to work in the sector eg interpersonal skills, communication, technical knowledge, practical skills; use of skills

## **3 Be able to plan and review self-development during work experience**

*Personal skills:* identify own skills

Planning self development: methods of reviewing own development needs eg skills audit

Self development: methods of reviewing self-development eg meeting/discussion with supervisor, self review

## **4 Be able to report on the work experience**

*Evidence required:* description of employer's business; description of employees' roles; pictorial evidence about the employer/site eg maps, plans, photos, leaflets; description of how the business makes income; your own role within the organisation and tasks you carried out

Methods of presentation: verbal, written, visual

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> describe different types of jobs within an environmental and land-based industry [IE]	<b>M1</b> prepare a person specification for a job in the chosen sector	<b>D1</b> review a job application against a given person specification
<b>P2</b> describe the skills and qualifications required for different types of jobs within an environmental and land-based industry [CT]		
<b>P3</b> locate three advertisements for jobs from different sources available within the environmental and land-based industry [IE]	<b>M2</b> identify common themes from three job advertisements	<b>D2</b> prepare a job advertisement.
<b>P4</b> produce an application for work experience in the environmental and land-based sector [IE, SM]		
<b>P5</b> prepare for an interview for work experience [IE, SM]	<b>M3</b> prepare questions to be used in a job interview.	
<b>P6</b> undertake an interview for work experience [IE, SM]		
<b>P7</b> review own skills and experience against the requirements for a specific industry [RL]		
<b>P8</b> prepare a self- development plan for work experience [RL]		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P9</b> review a self-development plan during and after work experience [RL]		
<b>P10</b> gather and prepare evidence during the work experience [IE]		
<b>P11</b> present information to others on work experience. [RL]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

## Delivery

Delivery of this unit will involve both practical and written assessment, and most importantly will have links to industrial experience placements.

Tutors could use a wide range of techniques including lectures, discussions, seminar presentations, visiting speakers, site visits and practicals, research using the internet and/or library resources and the use of personal and/or industrial experience. Delivery should stimulate, motivate, educate and enthuse the learner.

Work placements should be monitored regularly to ensure the quality of the learning experience. Learners and supervisors should be aware of the requirements of this unit prior to any work related activities, so that naturally occurring evidence might be collected at the time. Learners should be encouraged to ask for observation records and/or witness statements to be provided as evidence. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Learners would benefit from work experience. This could be as part of an industrial placement while at college; daily or weekly work at the college's commercial and/or educational facilities; voluntary work within the sector, eg in an animal care centre, country park, farm, estate, garden centre etc.

Tutors could integrate the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments used in the learner's programme of study. Learners must be given supported time to plan and review their own development. They should do a minimum of 150 hours or related study/work to complete this unit successfully. Learners could keep a diary/log to show that they have achieved the requirement of completing their work experience. Tutors should encourage as wide a range of experience as possible so that learners develop relevant knowledge and skills.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
<b>Introduction and overview of the unit</b>
<b>Assignment 1: Advertising a Job in the Land-based Sector</b> (P1, P2, P3, M1, M2, M3, D1, D2)
Introduction of brief.
Theory session.
Research the industry and roles, research advertisements, write person specification, prepare questions, review job application, prepare job advert.
<b>Assignment 2: Getting a Job in the Land-based Sector</b> (P4, P5, P6)
Introduction of brief.
Theory session.
Complete job application, prepare answers to likely questions, undertake interview.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit
<b>Assignment 3: Workplace Self Development</b> (P7, P8, P9)
Introduction of brief.
Theory session.
Review own skills, prepare self development plan, review self development plan.
<b>Assignment 4: My Work Experience Placement</b> (P10, P11)
Introduction of brief.
Theory session.
Gather information, prepare and present information.
Work experience.
Unit review.

## Assessment

For P1, learners must describe different types of jobs within an environmental and land-based industry. This should be a sector of the industry in which learners have an interest or which relates to their vocational or chosen course of study or intended future career.

P2 requires learners to describe the skills and qualifications required for different types of jobs within an environmental and land-based industry. The evidence could focus on two or three different jobs from within the same sector and describe both the common skills and qualifications as well as the areas where the requirements differ.

For P3, learners must locate three advertisements for jobs from different sources available within the environmental and land-based industry. They must provide evidence that they have looked at three different sources for these advertisements.

P4 must include evidence that the learner can produce an application for work experience in the environmental and land-based sector. This could be done on a pro forma application designed by the learners themselves or one provided by the tutor.

For P5, learners must prepare for an interview for work experience. They will evidence this by providing a list of answers to questions which it is considered are likely to be asked by an interviewer. These questions may be provided/suggested by the tutor or could be drawn up by the learner. The evidence could be presented in the form of an interview (see P6) or could be presented as written answers or an audio recording of them practising the answers.

To meet P6, learners will undertake an interview for work experience, where they will have the opportunity to present their answers to the questions they prepared for P5, and to show other aspects of preparation such as appropriate personal presentation, and asking appropriate questions. This could either be evidenced via mock interviews with other learners acting as the interview panel and using the evidence they have prepared for M1 and M3, or it could be evidenced by a real interview for a work experience placement, supported by a witness statement from the interviewer.

For P7, learners will provide evidence that they can review their own skills and experience against the requirements for a specific industry. This can be linked closely with the evidence presented for P2, with learners identifying their 'skills gap' either through a skills audit or similar.

To evidence P8, learners will need to prepare a self-development plan for their work experience placement. This could be done on a pro forma provided by, or in a format suggested by the tutor. The plan will identify areas of improvement that the learners need to develop during their work experience, and show how the learners are going to do this.

For P9, learners need to review the self-development plan during and after work experience. Evidence could be in the form of witness statements or tutor observations to show that the plan had been discussed and reviewed, that progress to date had been discussed and how future progress may occur.

To meet P10, learners must gather and prepare evidence during the work experience. This evidence will cover the content.

For P11, learners must present information to others on work experience. This can be done in any suitable format – it may be a poster with photos, leaflets and learner-prepared text about the employer; it could be a verbal presentation with accompanying slides/pictorial evidence; or it could be an audio-visual presentation made at the placement.

For M1, learners need to prepare a person specification for a job in the chosen sector. The specification could be based on one of the advertisements researched in P3, and should show the major skills, qualities and qualifications required for that role, and an indication of whether these are essential or desirable.

To evidence M2, learners are required to identify common themes from three job advertisements – what are the main areas of commonality, are there things that all three have? It may also be that learners consider what differences there are between the advertisements. This could be presented in a poster format with annotations to show areas of difference/similarity.

For M3, learners need to prepare questions to be used in a job interview. This can be the same job for which the person specification has been produced. It is expected that a list of at least 10 questions is prepared.

For D1, learners must review a job application against a given person specification. This could be an application which has been produced by other learners for the purpose of meeting criterion P4, or it could be an example application form provided by the tutor.

To meet D2, learners will prepare a job advertisement. This will link in with the evidence required for P3 and M2 and could advertise the role for which the person is being sought in M1.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1, M2, M3, D1, D2	Advertising a Job in the Land-based Sector	You work for an employer in the land-based sector and are in the position of taking on a new staff member. Your manager has asked you to see what other roles exist with other similar employing organisations and what sort of skills and qualifications they are looking for, by sourcing different advertisements and identifying common themes in them. Once you have found that out, it is then your responsibility to write a person specification for the role you will advertise, prepare an advertisement to attract applicants, review an application against your criteria, and plan the questions you would ask in an interview.	Verbal or written report.
P4, P5, P6	Getting a Job in the Land-based Sector	You are looking for your first job in the land-based sector. You need to complete an application form for a job you would like to do, prepare for an interview by coming up with a list of questions you would want answered and having a job interview.	Application form. List of questions. Interview.
P7, P8, P9	Workplace Self-Development	To progress within any employment, self-development is an essential feature. This requires you to have a clear idea about what employers need from their employees and the skills and experience you have already got and those you need to build. You then need to prepare a plan to show how you might build the required skills and experience and to review this plan during and after work experience.	Report on what employers require of employees in the chosen sector. Self-development plan. Evidence of review of the plan during and after work experience.
P10, P11	My Work Experience Placement	In order to inform other learners about your work experience placement, you need to provide them with information about it such as a description of the employer's business, a description of the other employees' roles, pictures of the organisation or site, a description of how the business makes income and a description of what you did while you were there.	Report on work experience placement.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Environmental and Land-based Business	Undertake and Review Work Related Experience in the Land-based Industries

### Essential resources

Learners require supervised access to suitable sites for work experience. Centres may need to provide transport to suitable sites. First aid facilities and appropriately trained staff are essential where practical activities are undertaken. For work placements away from the college, staff time must be made available as per individual college policies relating to work placements.

### Employer engagement and vocational contexts

This unit focuses on skills and experience to be developed through preparing for, and undertaking, work experience. Centres are encouraged to create and develop links with local employers who can provide appropriate work experience.

### Indicative reading for learners

James J – *You're Hired! Interview: Tips and Techniques for a Brilliant Interview* (Trotman, 2009) ISBN 9781844551781

Mills C – *You're Hired! CV: How to write a Brilliant CV* (Trotman, 2009) ISBN 9781844551774

#### Websites

[www.countryside-jobs.com](http://www.countryside-jobs.com)

[www.fwi.com](http://www.fwi.com)

[www.growcareers.info](http://www.growcareers.info)

[www.land-force.org.uk/index.aspx](http://www.land-force.org.uk/index.aspx)

[www.lantra.org.uk](http://www.lantra.org.uk)

[www.naturenet.net](http://www.naturenet.net)

[www.ruralslp.co.uk/index.aspx](http://www.ruralslp.co.uk/index.aspx)

Countryside Jobs Service

Farmers Weekly

Horticultural Careers

Land-based Jobs on-line

Lantra Sector Skills Council

UK Countryside and Nature Conservation

Lantra on-line Competency Framework

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	researching jobs within the sector researching job advertisements and evaluating their relevance completing a job application preparing for, and participating in, a job interview gathering and preparing evidence during work experience
<b>Creative thinkers</b>	describing the skills and qualifications required for a job in the land-based sector
<b>Reflective learners</b>	preparing and reviewing a self-development plan presenting information to others on their work experience reviewing their own skills and experience
<b>Self-managers</b>	carrying out research

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Team workers</b>	working with others to carry out interviews

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching roles within the sector researching job advertisements
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching roles within the sector researching job advertisements
<b>ICT – Develop, present and communicate information</b>	
Bring together information to suit content and purpose	developing a presentation about work experience
Present information in ways that are fit for purpose and audience	making the presentation about work experience
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	taking part in work experience making presentation about work experience
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	writing person specifications for job





# Unit 2: Environmental and Land-based Business

**Unit code:** F/600/9357

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to provide learners with an understanding of the principles of business within the environmental and land-based business, 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.

## ● Unit introduction

Understanding how businesses and organisations fit into the land-based industry provides a foundation of knowledge from which more specialist study can follow. The environmental and land-based industries are wide-ranging, covering employment in many sectors.

Learners will investigate the different types of businesses and organisations in their specialist sector of the environmental and land-based industries, their characteristics and influences. Learners will look at current trends and issues affecting their industry.

All businesses operate within a framework of statutory legislation and other codes of practice. Learners will investigate a range of UK and EU legislation that impacts on their sector and employment within it.

To operate effectively, organisations need to perform a wide range of business and administrative tasks. Learners will develop skills in performing a range of tasks concerned with finance and banking, marketing and general administration. They will also consider how information technology can be used to perform a range of these tasks.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 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.

# Unit content

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## 1 Know an industry within the environmental and land-based sector

*Structure:* features and characteristics of the industry size, employment, main activities, geographical influence, economic contribution; different types of businesses and organisations and the type of goods and services they provide; size of these businesses/organisations eg numbers employed, area of land, size of enterprises; any 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 – statutory eg Department for Environment Food and Rural Affairs (DEFRA), Health and Safety Executive, Department for Business Innovation and Skills, Environment Agency, Food Standards Agency; non-governmental, major land-owning or representative eg The Royal Society for the Prevention of Cruelty to Animals (RSPCA), British Veterinary Association, Royal Horticultural Society, Institute of Groundsmanship, Lantra Sector Skills Council, British Horse Society, National Farmers Union, National Trust

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

*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 eg Agriculture Tenancies Act 1995, Wildlife and Countryside Act 1981, Animal Health Act 2002, The Welfare of Animals (Transport) (Amendment) Order 1999, Environment Protection Act 1990, Environment Act 1995, Control of Pesticides Regulations 1986, Riding Establishments Act 1970, Horse Passports (England) Regulations 2004, Control of Dogs Order 1992, Dangerous Dogs Act 1991; codes of practice eg five freedoms welfare of farm or companion animals, Code of Good Agricultural Practice; European legislation; relevant European directives eg 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 eg Health and Safety at Work Act 1974, Control of Substances Hazardous to Health Regulations 1991, Working Time Regulations 1998, Disability Discrimination Acts 1995 and 2005, Employment Act 2002, National Minimum Wage Act 1998, Race Relations (Amendment) Act 2000, Sex Discrimination Act 1975

## 3 Know common business operations

*Common IT software:* examples of business uses of word processor (eg letters, notices), spreadsheets (eg records, timesheets), database (eg records), graphics (eg advertisements, posters), email; advantages and disadvantages of using IT for business tasks

*Common business tasks:* financial and banking – taking payments by cash and cheque, ordering procedures for supplies, invoices, types of bank account (current, savings, business) loans, overdraft, methods of payment (cheques, standing order, direct debit, electronic/internet); 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 (eg production, customers), check stock levels and complete stock control records, complete simple single entry cash analysis book, communicate using written and electronic media; importance of accuracy, confidentiality, security and data back-up of business records

#### **4 Know how to carry out simple administrative tasks**

*Preparation, presentation, sorting and retrieval of information:* use of IT and paper filing systems, completion of simple business records, preparation of business documents (eg letters, advertisements)

*Accounting and administrative tasks:* completion of orders, invoices, cheques, complete stock records, single entry cash analysis book; purpose of accounting and administrative tasks

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<p><b>P1</b> describe the structure of one industry within the environmental and land-based sector covering:</p> <ul style="list-style-type: none"><li>◇ size</li><li>◇ employment</li><li>◇ main activities</li><li>◇ geographical influence</li><li>◇ economic contribution</li></ul> <p>[IE]</p>	<p><b>M1</b> explain the roles of principal organisations within an industry in the environmental and land-based sector</p>	<p><b>D1</b> discuss how legislation and statutory and representative organisations affect a specified business in the environmental and land-based sector</p>
<p><b>P2</b> identify the principal organisations and trade associations within an industry in the environmental and land-based sector</p> <p>[IE]</p>		
<p><b>P3</b> identify the main United Kingdom or European legislation and codes of practice relating to one industry within the environmental and land-based sector</p> <p>[IE]</p>	<p><b>M2</b> explain the objectives and purpose of important current United Kingdom or European legislation for the environmental and land-based industry</p>	
<p><b>P4</b> identify key requirements of current employment law on the environmental and land-based sector</p> <p>[IE]</p>		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P5</b> describe how common IT software can be used in everyday business operations  <b>P6</b> state the purpose and operation of common business tasks: ◇ financial and banking ◇ marketing ◇ administrative tasks	<b>M3</b> explain the advantages and disadvantages of using IT for common business tasks     <b>M4</b> explain the purpose of specified administrative and accounting tasks.	<b>D2</b> discuss the importance of accuracy, security, confidentiality and data back up when completing business tasks.
<b>P7</b> use appropriate methods to prepare, present, sort and retrieve information [CT]  <b>P8</b> carry out simple accounting and administrative tasks appropriate to the business. [SM]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

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## Delivery

Delivery of this unit will involve practical and written assessments, and will have links to industrial experience placements.

In outcome 1 learners will study the structure of their industry. They will require the opportunity to investigate 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, while also investigating the range of businesses found locally and nationally. They will need access to any published data on the size and economic importance of their industry. 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 need support in investigating 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 they need to develop an awareness of the main pieces of legislation and how they impact on business in their industry. They will need to investigate their legal rights and responsibilities as employees within the workplace.

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 (eg sending emails), but tutors should ensure that examples are vocationally relevant to the subject area of the learners. It is anticipated that delivery will include the opportunity for learners to develop their IT skills so that they gain a better understanding of the use of IT software. Learners will benefit from completing tasks using the range of software, and, by careful planning, these tasks could provide evidence for P7 and P8, for example use of word processor and graphics programmes to produce a marketing poster; a spreadsheet for stock inventory and valuation. Learners will need to find out about day-to-day business activities involving finance and banking. 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 opportunity to practically engage in business operations and tasks. This should include preparing a range of business outputs using the IT applications listed, which could relate to other items in the content, eg advertisements, posters, specific records appropriate to businesses in their industry. It will be important for learners to have the opportunity to practise completion of paper-based records and ensure that both IT and paper records are filed appropriately. The importance of accuracy, confidentiality, security and regular back up of data should be stressed.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
<b>Assignment 1: Industry Structure and Organisations</b> (P1, P2, M1)
Tutor introduces the assignment brief.
Classroom theory session and discussion: Structure of an industry in the environmental and land-based sector: activities and types of business, ancillary businesses, regional variations.
Theory session: size of the industry and economic data, development of the industry and current issues.
Classroom activity: use of industry magazines, publications and internet to identify principal organisations and trade associations.
Guest speaker: role of statutory and representative organisations.
Assessment completion and support.
<b>Assignment 2: Legislation</b> (P3, P4, M2, D1)
Tutor introduces the assignment brief.
Theory session: UK and EU legislation and codes of practice relating to an environmental and land-based industry.
Classroom activity: importance of codes of practice.
Theory and supported research: Requirements of employment law.
Visit/guest speaker: how legislation and organisations affect a business in the sector.
Assessment completion and support.
<b>Assignment 3: Business Tasks and Operations</b> (P5, P6, P7, P8, M3, M4, D2)
Tutor introduces the assignment brief.
Use of IT for common business tasks; application of word processor, email, spreadsheets, database and graphics software.
Financial and banking tasks – making and receiving payment, business bank accounts, ordering and invoicing.
Marketing – ways to advertise and promote a business, customer care and referral business.
Administrative – paper and electronic filing systems, stock check, business documents, simple business records, importance of confidentiality and security.
Assessment completion and support.

## Assessment

For P1, learners need to describe the structure of one industry within the environmental and land-based sector. This must include the main activities and types of businesses that are found, including ancillary businesses, and regional variations. They should describe the size of the industry, making reference to any available data on employment and economic output. The evidence could be presented as a report or illustrated poster.

P2 requires learners to identify the principal organisations and trade associations within an industry in the environmental and land-based sector. Evidence should cover at least three different organisations, including one statutory, one non-governmental and one representative organisation. It should detail the name, contact details, aims and objectives of each organisation in relation to the land-based industry sector. Evidence could be a report, annotated poster, or verbal presentation.

For P3, learners need to identify the main United Kingdom or European legislation and codes of practice relating to one industry within the environmental and land-based sector. Evidence should include at least three important and relevant pieces of UK or EU legislation and/or codes of practice. It should provide the full title and date, and briefly summarise the main requirements of the legislation in relation to the industry. Evidence may be a report or guidance booklet.

For P4, learners need to identify key requirements of current employment law on the environmental and land-based sector. Evidence should include at least two important and relevant pieces of UK and/or EU legislation. It should provide the full title and date, and briefly summarise the main requirements of the legislation in relation to the industry. Evidence may be a report or guidance booklet.

P5 requires learners to describe how common IT software can be used in everyday business operations. This must cover word processor, email, spreadsheet, database and graphics software. Evidence may be a verbal or written report, poster or leaflet.

For P6, learners must state the purpose and operation of common business tasks. For financial and banking this will include how businesses make and receive payments, order supplies and raise invoices. Marketing must include suitable ways to advertise and promote a business. Administrative tasks should include paper and electronic filing, simple records relevant to the industry sector, and stock control. Evidence may be in the same format as P5.

For P7 and P8, learners must carry out simple accounting and administrative tasks appropriate to the business and use appropriate methods to prepare, present, sort and retrieve information. Evidence must include all of the content listed; some of this could be IT generated.

For M1, learners need to extend work completed for P1 and P2 to explain the roles of principal organisations within one environmental and land-based industry. Evidence should include an explanation of the roles of at least three organisations (including at least one statutory and one non-governmental) presented in the same format as P1 or P2.

For M2, learners must explain the objectives and purpose of important current United Kingdom or European legislation for the land-based industry. Evidence should cover one piece of employment legislation and one other relevant piece of legislation. These could have been used for evidence towards P3 and P4 and presented in the same format.

For M3, learners are required to explain the advantages and disadvantages of using IT for common business tasks. Evidence could be a verbal or written report, poster or leaflet.

For M4, learners must explain the purpose of four of the tasks completed for P7 and P8. The tasks could be selected by the tutor, or agreed through discussion with the learner. Evidence could be in the same format as M3.

For D1, learners need to discuss the impact of legislation and statutory and representative organisations on the industry. Evidence should consider one piece of legislation and two organisations in detail, including positive or negative impacts and ways that the legislation and organisations affect working practices in the industry.

D2 requires learners to discuss the importance of accuracy, security, confidentiality and data back up when completing business tasks. Evidence should include legal as well as practical reasons, and describe ways in which accuracy can be checked and security and confidentiality ensured. Evidence may be in the same format as M3.



## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1	Industry Structure and Organisations	You are taking part in marketing your industry sector to school leavers. You need to create a poster that gives an overview of your industry and the roles of the principal organisations and trade associations.	Poster.
P3, P4, M2, D1	Legislation	You need to produce a fact sheet for someone starting a business in the industry that informs them of some basic legal requirements. Include the effect of the legislation on the business operations, and the impact of statutory and representative organisations on their working practices.	Fact sheet.
P5, P6, P7, P8, M3, M4, D2	Business Tasks and Operations	You need to assist a business manager in performing a range of tasks, making use of IT. Create a guidance leaflet for the work experience student who is helping you which includes the purpose of the tasks, the advantages and disadvantages of using IT, and the importance of accuracy, security, confidentiality and data back up.	Portfolio of practical tasks and under-pinning knowledge, guidance leaflet.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Undertake Work Related Experience in the land-based Industries	Business Management in the Land-based Sector

## Essential resources

Learners need to be able to access relevant information about their industry, through personal contacts, work experience or case study visits. They will also need access to IT, administrative and accounting records for completion.

## Employer engagement and vocational contexts

This unit provides opportunity for learners to gain an overview of one industry within the environment and land-based sector. They will also gain valuable experience in completing administrative and accounting tasks, including using IT. Learners would benefit from a range of guest speakers and industry visits.

## Indicative reading for learners

### Textbooks

Canwell D and Sutherland J – *BTEC First Business 2nd edition* (Nelson Thornes, 2006) ISBN 9780748783946

Carysforth C – *NVQ Level 2 Business and Administration* (Heinemann, 2006) ISBN 9780435463335

Carysforth C and Neild M – *BTEC First Business 2nd edition* (Heinemann, 2006) ISBN 9780435499075

Fardon, Nuttall and Prokopiw – *GCSE Applied Business* (Osborne Books, 2002) ISBN 9781872962320

Gookin D – *Word 2007 for Dummies* (John Wiley & Sons, 2006) ISBN 9780470036587

Seliet H – *BTEC Introduction to Business* (Heinemann, 2005) ISBN 9780435401214

Wang W – *Office 2007 for Dummies* (John Wiley & Sons, 2006) ISBN 9780470009239

### Websites

[www.bized.co.uk](http://www.bized.co.uk)

Business Studies Teaching Resources

[www.businesslink.gov.uk](http://www.businesslink.gov.uk)

Business Link

[www.cla.org.uk](http://www.cla.org.uk)

Country Land and Business Association

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment, Food and Rural Affairs

[www.netregs.gov.uk](http://www.netregs.gov.uk)

Environmental regulations

[www.nfuonline.com](http://www.nfuonline.com)

National Farmers Union

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	investigating the structure of an industry in the land-based sector researching organisations researching legislation affecting the sector investigating business bank accounts
<b>Creative thinkers</b>	presenting information about an industry using IT software to perform business operations preparing and presenting information
<b>Reflective learners</b>	discussing the importance of customer care discussing the importance of customer care
<b>Self-managers</b>	carrying out accounting and administrative tasks.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Team workers</b>	working with others to complete a stock check
<b>Self-managers</b>	completing assignment work to deadlines.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using software to perform business operations
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	filing electronic information
Follow and understand the need for safety and security practices	maintaining security and back-up copies of information
Troubleshoot	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	preparing promotional material compiling a stock valuation preparing a database of business information
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	writing a business letter
Evaluate the selection and use of ICT tools and facilities used to present information	
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	preparing invoices
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	preparing business records
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	

Skill	When learners are ...
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching legislation affecting the industry
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	completing assignments on the industry, trends and issues affecting it.



# Unit 3: Introduction to Animal and Plant Husbandry

**Unit code:** K/600/9403

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to skills and knowledge of animal and plant husbandry and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education. The learner will understand the husbandry requirements of plants and animals used in land-based production. They will learn about the welfare of farm livestock and monitoring of livestock food, water and general health. Learners will develop their ability to work to the strict pre-planned deadlines required by all sectors of the industry.

## ● Unit introduction

An understanding of the husbandry requirements of plant and animals is central to all land-based production. This unit introduces the key aspects of husbandry, and will enable learners to develop their practical skills.

Learners will investigate how good husbandry affects the health and welfare of farm animals. They will also learn how to assess animal health, and identify the factors that contribute to it. They will develop the practical skills needed to provide food and water to farm animals, as well as an understanding of the importance of feed plans and the factors affecting them.

Learners will explore crop husbandry. They will cover the annual crop production cycle and the factors affecting growth and yield and look at crop health, including the need for nutrients, and the impact of weeds, pests and disease.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Understand the requirements needed to maintain the health and welfare of farm animals
- 2 Be able to provide food and water to production farm animals
- 3 Understand the annual production cycles of locally important crops
- 4 Know the requirements for maintaining the healthy growth of locally important crops.

# Unit content

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## **1 Understand the requirements needed to maintain the health and welfare of farm animals**

*Requirements of farm animals:* food; water; housing; bedding; ventilation; space/stocking ratios; preventative health treatments (eg worming, vaccination)

Health and welfare: signs of health and ill health (eg appearance, temperature, respiration); animal behaviour; welfare in relation to the 'five needs', duty of care

## **2 Be able to provide food and water to production farm animals**

*Feeding plan:* purpose of a feeding plan (eg growth, maintenance, milk production, breeding); record keeping requirements

*Feeding and watering tasks:* methods of feeding and providing water (eg automatic, hand feeding, use of equipment and machinery); feed types (eg concentrates, grass, hay, silage, legumes); grazing management; seasonal factors (eg feed availability, effects of ice and frost, changes to animal requirements); safety (use of PPE, completing risk assessment, observing hygiene after handling feed and livestock)

## **3 Understand the annual production cycles of locally important crops**

*Annual production cycles:* soil preparation and seed bed requirements; methods and timing of planting; growth patterns; harvest timing and methods; storage of crops

Factors: weather; soil type, structure and drainage; use and timing of fertilisers; weeds, pest and diseases; crop protection methods; previous cropping

## **4 Know the requirements for maintaining the healthy growth of locally important crops**

*Nutritional requirements:* major and minor nutritional requirements eg nitrogen, phosphorous, potassium, trace elements; signs of nutrient deficiency; importance of water; sources of plant nutrients eg organic and inorganic fertilisers, nitrogen fixing legumes

Pests, weeds and diseases: common pests affecting crop growth eg aphids, birds, rabbits; weeds; diseases; methods of pest, weed and disease reduction eg chemical, cropping plan, physical intervention



## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> explain requirements needed to maintain the health and welfare of a specified farmed mammal and a specified farmed bird [IE]	<b>M1</b> explain how health and welfare are assessed using the 'five needs'	<b>D1</b> explain how good animal husbandry affects the performance of a given species of farmed animal
<b>P2</b> assess the health and welfare of a specified farmed mammal or a specified farmed bird		
<b>P3</b> follow a plan for providing food and water to a given species of farmed animal [SM]		
<b>P4</b> safely carry out routine feeding and watering tasks for a given species of farmed animal [SM]	<b>M2</b> explain the importance of following a feeding plan for a given species of farmed animal	
<b>P5</b> explain the annual production cycles of specified crops [RL]	<b>M3</b> explain how factors affect growth and yield of a specified crop	<b>D2</b> discuss the importance of good crop husbandry in maximising yield for a specified crop.
<b>P6</b> state factors that may change the growth and yield of a specified crop [IE]		
<b>P7</b> identify the nutrient requirements of a crop species at a give site	<b>M4</b> monitor the health of a crop species over a given timescale at a given site.	
<b>P8</b> describe the common pests, weeds and diseases of a crop species at a given site. [IE]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

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## Delivery

Tutors delivering this unit have opportunities to use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised farm practicals, research using the internet and library resources and the use of personal and industry experience would all be suitable. This unit enables learners to study production animals and crops that are of particular relevance to their local area, which maximises the opportunity for learning through visits, practical activity and work experience.

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 carried out.

Learning outcome 1 covers the health and welfare of selected farmed animals and birds. Learners need to develop their practical skills in assessing the health and welfare of animals and birds, and in observing animal and bird requirements, particularly the 'five needs'. Learners should also have the opportunity to witness and take part in the implementation of preventative health measures, such as vaccination, worming and grassland management. In understanding the importance of health and welfare, it is helpful to explore the consequences of poor health and welfare. Any visits or placements should be to establishments showing due regard to animal health and welfare, consequences of poor health and welfare would be best covered through classroom-based activities using library pictures and guest speakers.

It is anticipated that delivery of learning outcome 2 will include considering the feeding and watering requirements for animals kept for different purposes and at different life and production stages. The unit has a practical focus, and learners need to carry out routine feeding and watering tasks in a working environment. It is important that tutors stress the requirements for health and safety, animal welfare, and the importance of timeliness and hygiene.

In learning outcome 3 learners need to gain an overview of crop production from pre-planting activity to post-harvest storage considerations. Delivery should include consideration of the time of year for different activities, for both spring and winter sown crops. It is possible that learners will not be able to observe the full production cycle due to the timing of their centre terms, and so visits will need to be supplemented with classroom based activity. This learning outcome also includes an understanding of the different factors which affect crop growth and yield, and classroom delivery would be usefully supplemented by practical activity such as site visits and crop walking.

For learning outcome 4 learners will need access to a site where production crops are grown, as well as some formal input on the nature of nutrient requirements, pests, weeds and diseases. It will be helpful if, where possible, learners can see examples of common pests and weeds at first hand.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

## Topic and suggested assignments/activities and/assessment

Introduction to unit.

**Assignment 1: Animal Health and Welfare** (P1, P2, M1) – introduction to topic and assessment.

Classroom activity: what is good welfare? Introduction and consideration of the five needs.

Theory: farm animal requirements.

Theory: signs of good and ill health, importance of good health.

Visit(s) to farm – what do 'five needs' mean in practice, plus assessing health of animals.

Practical – routine health activities.

Practical assessment of animal health.

Personal study time/support/assessment completion.

**Assignment 2: Animal Feeding and Husbandry** (P3, P4, M2, D1) – introduction to topic and assessment.

Theory: reasons for feeding plans, different animal requirements.

Practical – feeding and watering tasks.

Practical assessment.

Personal study time/support/assessment completion.

**Assignment 3: Crop Growth** (P5, P6, M3) and Crop Husbandry (P7, P8, M4, D2) – introduction to topic and assessment

Visit to farm for crop walk to see current stage of growth and health.

Theory – annual production cycle stages.

Theory – factors which affect crop growth.

Guest speaker – arable farmer to discuss husbandry activities at different stages of the crop cycle.

Practical – identifying common weeds.

Classroom activity – recognition of evidence of pests and diseases using actual/pictorial evidence.

Visit to farm for crop walk to see different stage of growth and assess crop health.

Theory – nutritional requirements of crops and supplying them.

Lab practical – assessing soil sample.

Personal study time/support/assessment completion.

Unit review.

## Assessment

For P1, learners must explain the requirements for maintaining health and welfare for one specified farmed mammal and one specified farmed bird. Tutors could identify the specified mammal or bird, or agree them in discussion with learners. Learners need to cover the range of requirements shown in the *Unit content*. Evidence could take the form of a report, information leaflet, case study or annotated poster.

For P2, learners need to assess the health of a specified farmed mammal **or** a farmed bird. It is expected that this will be a practical assessment, and may be through use of a pro forma or observation checklist.

P3 and P4 are linked. Learners are required to follow a feeding plan to carry out routine feeding and watering tasks for a given species of farmed animal safely. Tutors could identify the animal group or agree them through discussion with learners. Learners will need to demonstrate a basic understanding of the purpose of the feeding plan as well as carry out the tasks safely. These criteria could be assessed directly by the tutor during practical activities using appropriate observation records. Alternatively, they could be assessed during work placement, through the use of witness statements which have been verified by the tutor.

For P5, learners must describe the annual production cycle of a specified crop. Tutors could identify the crop or agree it in discussion with learners. Evidence could be presented pictorially, for example an annotated poster or leaflet, or illustrated written report.

For P6, learners need to state the factors which may affect crop growth and yield, and they must cover the range of factors shown in the *Unit content*. Evidence could be presented alongside the evidence for P5, for example through adding the factors to the poster or leaflet, or could be through a written assignment or verbal presentation.

For P7, learners need to identify the nutrients required by a selected crop at a given site. The crop and site could be identified by the tutor, or could be agreed through discussion with learners. Evidence could be presented as a written report or project.

For P8, learners need to identify the common weeds, pests and diseases for the selected crop at a given site. Learners are not required to identify weeds, pests and diseases that are currently present, but need to identify and describe at least one relevant crop pest and disease and three or four of the most important weeds in the local area. Evidence could take the form of a report, annotated poster, information leaflet or case study.

For M1, learners need to explain how the 'five needs' can be used to assess animal welfare. This could be included in the assessment of P1 and P2, and could use the same types of evidence.

For M2, learners need to explain the importance of following a feeding plan, which should include consideration of the purpose of the feeding plan. This could be assessed through tutor questioning as follow-up to the practical assessment for P3 and P4, or learners could write up the practical activity.

For M3, learners need to explain how factors affect crop yield, which could be assessed through an extension of their description for P5 and P6. Evidence could take the form of annotations to a poster or leaflet, or a written report or verbal presentation.

For M4, learners are required to monitor the health of a crop species over a given timescale at a given site. It is expected that this monitoring should take place on at least two separate occasions to enable changes to be assessed.

For D1, learners need to explain how good husbandry affects the performance of the farmed animal studied, which should be the same one studied for P1, P2, P3, P4, M1 and M2. Evidence could be through an extension of the assessment used for these criteria.

For D2, learners need to evidence their understanding of the link between good husbandry and crop yield. Evidence could be through an extension of the assessment used for P5, P6, P7, P8, M3 and M4.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1	Animal Health and Welfare	For the farmed mammal and bird selected, provide an assessment of their health and welfare. Include how this relates to the five freedoms. Explain what the animal and bird need in order to maintain their health and welfare.	Practical assessment. Short report.
P3, P4, M2, D1	Animal Feeding and Husbandry	For the farmed animals selected, follow a feeding plan to feed and water the animals safely. Explain why it is important to follow the feeding plan. Prepare a presentation which explains why good animal husbandry is important for the performance of your selected animals.	Practical assessment/ observation sheets. Presentation.
P5, P6, M3	Crop Growth	Create a poster showing the annual production cycle for your chosen crop. Your poster should be labelled to show factors which affect the crop growth at different stages, with a brief explanation of how growth is affected.	Annotated poster.
P7, P8, M4, D2	Crop Husbandry	Following two field visits, write a short illustrated report for the farmer. Your report should include a description of the pests, weeds and diseases that might be a problem for the growing crop, and an identification of its nutritional requirements. Include in the report your assessment of any changes in crop health between each visit, and some advice to the farmer about how good husbandry can improve the yield they get from the crop.	Illustrated report.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
CU33 Provide Feed and Water to Animals	Undertake Agricultural Livestock Production
	Undertake Agricultural Crop Production

## Essential resources

It is essential that learners have supervised access to farms producing animals, birds and crops so that they can learn and practise animal and crop husbandry tasks and observe different methods of production. Where it is not possible to visit a range of farm types, high quality audio-visual resources will be essential.

Access to library resources and the internet for research and reference must be available.

## Employer engagement and vocational contexts

This is a practical unit, and it gives opportunities for employer engagement, through work placement, supervised farm visits and invited guest speakers. Centres are encouraged to develop appropriate employer links to enable learners to witness a range of production systems for both crops and animals.

## Indicative reading for learners

### Textbooks

Bateman H, Curtis S and McAdam K – *Dictionary of Agriculture* (A&C Black Publishers Ltd, 2006) ISBN 0713677783

Bazeley K – *Practical Cattle Farming* (The Crowood Press Ltd, 2007) ISBN 1861269757

Bland D – *Practical Poultry Keeping* (The Crowood Press Ltd, 1996) ISBN 1861260105

Brown D and Meadowcroft, S – *The Modern Shepherd* (Farming Press, 2002) ISBN 0852361882

Cardell K – *Practical Sheep Keeping* (The Crowood Press Ltd, 1998) ISBN 1861261632

Lockhart J and Wiseman A – *Lockhart and Wiseman's Crop Husbandry* (Woodhead Publishing Ltd, 2002) ISBN 1855735490

Soffe RJ and McConnell P – *The Agricultural Notebook* (Wiley Blackwell, 2003) ISBN 0632058293

Smith P – *Practical Pig Keeping* (The Crowood Press Ltd, 2001) ISBN 1861263880

### Journals

*Arable Farming*

*Crops*

*Dairy Farmer*

*Farmers Guardian*

*Farmers Weekly*

*Pig Farmer*

*Poultry World*

### Websites

[www.defra.gov.uk](http://www.defra.gov.uk)

[www.fawc.org.uk](http://www.fawc.org.uk)

[www.hse.gov.uk](http://www.hse.gov.uk)

[www.iah.ac.uk](http://www.iah.ac.uk)

[www.nfuonline.com](http://www.nfuonline.com)

Department for Environment, Food and Rural Affairs

Farm Animal Welfare Council

Health and Safety Executive

Institute for Animal Health

National Farmers Union

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	researching what is needed to maintain health and welfare researching factors that affect crop growth and yield researching crop pests, weeds and diseases
<b>Reflective learners</b>	explaining the annual production cycles of specified crops
<b>Self-managers</b>	following a plan to provide food and water to animals Carrying out routine feeding and watering tasks safely.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	researching plant nutrients required by crops
<b>Creative thinkers</b>	discussing the importance of the five freedoms in assessing animal health and welfare
<b>Reflective learners</b>	receiving feedback and developing their practical husbandry skills
<b>Team workers</b>	taking part in practical animal health tasks
<b>Self-managers</b>	taking part in practical animal husbandry tasks.



## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	researching factors which affect crop growth and crop production cycles researching crop pests, weeds and diseases
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	completing and presenting assignments
Bring together information to suit content and purpose	describing common weeds, pests and diseases
Present information in ways that are fit for purpose and audience	explaining requirements to meet health and welfare of farmed animals and birds
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching crop pests, diseases and weeds and animal health and welfare requirements
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	explaining requirements needed to maintain health and welfare.

# Unit 4: Introduction to Environmental Studies

**Unit code:** Y/600/9171

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to environmental study skills and knowledge, and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

Learners will be introduced to a range of scientific investigation skills enabling them to collect, analyse and compare environmental information about different sites. They will investigate the relationships between plants, animals and humans and consider energy and nutrient flows.

## ● Unit introduction

Understanding the natural environment is at the very centre of the land-based industries. It is therefore important for learners to appreciate some of the mechanisms that determine how the natural environment functions. Workers in the land-based industries need to understand the limits various land-use factors place on the land. They will then be able to adapt land management practices in order to get the most from different sites.

Learners will be introduced to a range of scientific investigation methods enabling them to collect, analyse and compare information about local sites. They will consider atmospheric processes by looking at the weather and microclimates. Learners will explore why different sites have different microclimates and suggest ways in which human intervention can change this.

The practical investigation of soils will allow learners to compare a variety of soil characteristics and investigate how some of these characteristics can be changed and improved with good management.

The ecology of sites will be explored through surveys and by investigating the relationships between plants and animals. This will lead to an understanding of the impact that management can have on natural ecosystems. Investigations relating to decay will enable learners to understand how the atmosphere, lithosphere and biosphere interact in relation to nutrient recycling. Learners will also investigate the water cycle to develop an understanding of the impact of land use on water quality.

## ● Learning outcomes

### **On completion of this unit a learner should:**

- 1 Be able to collect data from ecosystem components
- 2 Know factors that affect microclimates
- 3 Understand components of ecosystems
- 4 Understand the relationship between water and the hydrological cycle.

# Unit content

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## 1 Be able to collect data from ecosystem components

*Microclimate data collection:* data collection of specific components which define the characteristics of particular ecosystems eg rainfall, wind speed, relative humidity, soil temperature, air temperature, light levels, hours of sunlight, maximum and minimum temperatures, water flow; equipment requirements; data recording

Species data collection: plant and animal species; basic species identification, use of identification keys; use of quadrats and transects; species presence and distribution

Soil profile diagrams: soil horizons (topsoil, subsoil, parent, bedrock); formation; bedrock characteristics (igneous, sedimentary, metamorphic); chemical weathering, physical weathering

## 2 Know factors that affect microclimates

*Microclimates:* definition; importance of microclimates; variation in microclimates at different sites eg sites with different aspects and/or altitudes, sites on either sides of boundaries

Factors affecting microclimates: location of site; aspect; altitude; proximity to boundaries eg walls, hedges, ditches, fences; proximity to other features eg trees, buildings; methods used to manipulate microclimates using boundaries eg shelterbelts, use of plant thinning and restocking programmes to manipulate microclimates

## 3 Understand components of ecosystems

*Ecosystems definition; comparison of different habitats eg woodland with grass, arable with pasture, crops with field margins, deciduous woodland with conifer woodland, pond with river; mineral and nutrient cycles, carbon cycle and nitrogen cycle; effects of human activity on ecosystems*

*Food chain:* energy flows, transfer of solar energy to chemical energy through photosynthesis; producers, consumers (primary, secondary and tertiary), detritivores and decomposers; definition of population, community and biomass; identification of trophic levels; pyramid of numbers; predator/prey relationships

Soil characteristics: type of soil (clay, sand, loam); texture; pH; organic matter content; colour; water and air content; biological content; stability; structure

## 4 Understand the relationship between water and the hydrological cycle

*Hydrological cycle:* change in the state of water; water transfer (evaporation, transpiration, transport, precipitation, runoff, collection); water storage eg reservoirs and aquifers

Water pollution: potential causes of pollution eg accidental spillages, animals and birds, fertiliser and slurry runoff; use of herbicides; identification of pollution eg through biological survey, chemical testing and physical appearance, use of indicator species; equipment and materials required for monitoring water quality; methods of pollution prevention management and the role of current statutory bodies eg Environment Agency, Scottish Environment Protection Agency, Environment and Heritage Service, Department of the Environment Northern Ireland

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> collect and collate microclimate and species data for different sites	<b>M1</b> suggest reasons for differences between the microclimate, species and soil profiles of the different sites	<b>D1</b> discuss human impacts on the fragile balance of a specified microclimate
<b>P2</b> produce soil profile diagrams for different sites		
<b>P3</b> describe factors that affect the microclimates of given sites		
<b>P4</b> compare microclimate data from different sites		
<b>P5</b> explain a simple food chain from information collected	<b>M2</b> explain the relationships between soil characteristics and species present in the food chain	<b>D2</b> explain the possible effects of human intervention on a specified food chain
<b>P6</b> evaluate soil characteristics from information collected		
<b>P7</b> explain the hydrological cycle based on a selected area	<b>M3</b> explain how pollution of a specified water source could be avoided.	<b>D3</b> explain factors which affect water availability in a specified area.
<b>P8</b> explain how water can become polluted as a result of land use.		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

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## Delivery

This unit can be delivered using a mixture of lectures, discussions and practical sessions, making site visits where possible. Delivery should aim to stimulate, motivate and enthuse learners.

Risk assessments must be undertaken, and the importance of health and safety stressed, before any practical activities. Learners at Level 2 are likely to have varied backgrounds and experience, so differentiation of learners should be key when planning practical sessions.

For learning outcome 1 delivery could include discussions, practical laboratory and field sessions, independent learner research and site visits. Learners will need the opportunity to collect and interpret microclimate data and soil-profile information from at least two different sites. Visiting expert speakers could add to the relevance of the subject. For example, a countryside ranger could talk about their work and the importance of various types of boundary in providing different microclimates.

Delivery of learning outcome 2 should be closely linked to learning outcome 1 and could include lectures, discussions, practical sessions, site visits and independent learner research. Learners will develop knowledge about microclimates within different settings. They should have the opportunity to visit local sites where they can assess information and data relating to different microclimates. They should look at least two sites to allow comparisons to be drawn, but these sites do not have to be large in order to collect valid data. The sites chosen will depend on the programme the learner cohort is following and care should be taken to select appropriate examples that are vocationally relevant. Learners will identify the impacts of climate change on microclimates. Visiting expert speakers could add to the relevance of the subject.

For learning outcome 3 learners will need to gain an understanding of food chains and food webs, and of soil characteristics. Learners will need to understand how to use the information they collect to draw basic conclusions. Delivery may include a range of methods, but it is anticipated that basic soil experiments will be conducted. Learners will develop knowledge about the primary components of ecosystems and should have the opportunity to visit different ecosystems in order to collect data. Work-placement opportunities may also give learners opportunities to develop knowledge and collect data.

For learning outcome 4 it is likely that delivery will include a significant proportion of class-based theory sessions. These could be supplemented by visits to see aspects of the hydrological cycle in practice, for example to a reservoir or river; and to learn more about pollution risks, for example by visiting a farm close to a river. Learners may also be able to develop knowledge and collect data through appropriate work, placement opportunities. Visiting expert speakers such as an Environmental Agency pollution officer, could add to the relevance of the subject.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
<b>Assignment 1: Microclimates</b> (P1, P2, P3, P4, M1, D1)
Tutor introduces the assignment brief.
Introduce microclimates and data collection and presentation techniques.
Carry out data collection.
Carry out collation and presentation of data collected.
Visits to different sites.
Investigation of natural factors affective microclimates.
Investigation of human factors affective microclimates.
<b>Assignment 2: Ecosystem Components</b> (P5, P6, M2, D2)
Tutor introduces the assignment brief.
Investigation of food chains and soil characteristics from data collected and other sources. Includes time for independent research.
Undertake visits to see the human and natural influences on different ecosystems.
Discuss different food chains and ecosystem relationships.
Visits to different sites.
<b>Assignment 3: Hydrological Cycle</b> (P7, P8, M3, D3)
Tutor introduces the assignment brief.
Discussion and investigation of factors that affect water, drawing on topical examples.
Investigation of hydrological cycle.
Visits to different sites.
Unit review.

## Assessment

For P1, learners will collect and present data relating to microclimates and species at two different sites. Tutors should identify the microclimates to be surveyed and the methods to be used, or agree them in discussion with learners. The microclimate sites may be the same as those used to provide evidence for other grading criteria. Learners should provide microclimate data on maximum and minimum temperatures, soil temperature, air temperature, light levels, rainfall, wind speed, relative humidity and hours of sunlight. Species data should include species types (flora and fauna) and distribution at each site. Evidence could take the form of a pictorial presentation with notes, laboratory or field notebooks, an annotated poster or a site diagram.

For P2, learners are required to produce annotated soil-profile diagrams for at least two different sites, which should ideally be the same sites used for P1.

For P3 and P4 learners should identify factors which affect microclimates and compare data from different microclimates. The data could be that collected for P1. Evidence could take the form of a written report, pictorial presentation with notes, or an annotated poster.

For P5 learners will be expected to use data collected in P1 to produce a species list and simple food chain. Evidence could take the form of a pictorial presentation with notes, laboratory or field notebooks, an annotated poster or a diagram.



For P6 learners are required to evaluate the soil characteristics of at least two soil types. The data used could be derived from a series of soil tests carried out in class, but carrying out soil tests is not part of the assessment, which focuses on learners' ability to use data to draw evaluative conclusions about soil characteristics. Evidence could be a report, leaflet or annotated diagrams.

P7 requires learners to explain the hydrological cycle for a specified area. The area used could be provided by the tutor or agreed through discussion with learners. Evidence could be an annotated map or diagram, or an illustrated report.

P8 requires learners to explain how water can become polluted as a result of land use at a specified location. Tutors should identify the location or agree it in discussion with learners. It is expected that learners will produce wide-ranging evidence, taking into account as many causes of pollution as possible for the chosen location. Evidence may be in the form of laboratory or field notebooks, an annotated poster or a project.

For M1 learners need to suggest reasons for the differences found between the microclimates, species data and soil profiles found at the two different sites investigated for P1, P2, P3 and P4. Evidence may be in the form of a verbal presentation, illustrated report or annotated poster.

For M2 learners are required to explain the links between soil characteristics and the food chain, ie how the soil characteristics affect and determine the species present at the two sites, building from evidence generated for P6 and P7. Evidence may take the form of a written or verbal report or an annotated diagram.

For M3, learners are required to explain how pollution of a specific water source could be avoided. Evidence is likely to be an extension of work provided for P7 and P8, where learners apply their knowledge of the hydrological cycle and causes of pollution. The water source could be identified by the tutor or agreed through discussion with learners.

D1 requires learners to describe the human impacts on the fragile balance of a specified microclimate. Tutors should identify the microclimate or agree it in discussion with learners, but it is likely to be one of the sites studied for P1 and P2. Evidence may be in the form of written report, verbal presentation or annotated poster.

For D2, learners need to explain the possible effects of human intervention on a specified food chain. Tutors should identify the food chain or agree it in discussion with learners, but it is likely to be that studied for P5 and M2. Evidence may be in the same format as for D1.

For D3, learners are required to apply their understanding of the hydrological cycle and causes of pollution to a specified area in order to explain the factors affecting water availability. It is anticipated that the area identified will be the same as that used for P7. Evidence may be in the same format as for D1.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, M1, D1	Microclimates	As part of your role as a countryside ranger you have been asked to collect, collate and compare microclimate and species data from two sites. Produce an illustrated report which also includes soil profile diagrams for both sites. Suggest reasons for the differences between the two sites and discuss the human influence on ecosystem balance.	Illustrated report.
P5, P6, M2, D2	Ecosystem Components	Use the information collected on species data and results from soil tests to create an annotated poster showing a food chain and soil characteristics for the ecosystem studied. Label your poster to show the links between soil characteristics and the food chain, and the possible effects of human intervention.	Annotated poster.
P7, P8, M3, D3	Hydrological Cycle	As part of your work for the Environment Agency you have been asked to create a map showing the hydrological cycle for a selected area. Your map should also show possible sources of pollution and how these may be avoided. Include an explanation of factors affecting water availability in the area.	Annotated map.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element EC2.2 Report on the condition of the natural environment	Understanding the Principles of Wildlife Populations, Ecology and Conservation
Conservation and Improvement of British Habitats	Understanding Principles of Physical and Biological Environmental Processes
Introduction to Agriculture and Conservation	Understanding Land Use and Environmental Issues

## Essential resources

Learners must have access to at least two sites to collect microclimate, species and soil profile data. They must also have access to weather data-recording equipment, soil-testing equipment, identification keys and field guides, and survey equipment, for example hand lenses, quadrats.

## Indicative reading for learners

### Textbooks

Allaby M – *A Dictionary of Ecology* (Oxford University Press, 2004) ISBN 0198609442

Brown A (editor) – *The UK Environment* (HMSO, 1993) ISBN 0117524204

Byrne K – *Environmental Science*, Second Edition (Nelson Thornes Ltd, 2001) ISBN 0174483058

Cadogan A and Best G – *Environment and Ecology* (Blackie, 1992) ISBN 0216930308

Cotgreave P and Forseth I – *Introductory Ecology* (Blackwell Science Ltd, 2002) ISBN 0632042273

Holman J – *Organisms and the Environment* (Nelson Thornes Ltd, 1996) ISBN 0174482671

Killham K – *Soil Ecology* (Cambridge University Press, 1994) ISBN 0521435218

Parsons R – *GCSE Geography* (Coordination Group Publishers Ltd, 2004) ISBN 1841463744

### Websites

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment, Food and Rural Affairs

[www.doeni.gov.uk](http://www.doeni.gov.uk)

Department of Environment Northern Ireland

[www.ehsni.gov.uk](http://www.ehsni.gov.uk)

Northern Ireland Environment Agency

[www.english-nature.org.uk](http://www.english-nature.org.uk)

Natural England

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency

[www.forestry.gov](http://www.forestry.gov)

The Forestry Commission

[www.lantra.org.uk](http://www.lantra.org.uk)

Sector Skills Council for the Environment and Land-based Industries

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	collecting data from different ecosystems collecting water samples
<b>Creative thinkers</b>	developing skills in observation and recording when working in a field study situation
<b>Reflective learners</b>	analysing data and performance when surveying habitat damage identifying improvements in practical surveying and recording of results.
<b>Self-managers</b>	

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using the internet to research appropriate data
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	including tables and charts as part of water and habitat surveys and data recording
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	emailing relevant local organisations, to obtain material

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	giving presentations and contributing to discussions
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching microclimates, ecosystems and hydrological cycles.
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	

# Unit 5: Participate in Providing Estate Maintenance

**Unit code:** Y/600/9364

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

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.

## ● Unit introduction

Developing skills in estate maintenance is fundamental for learners studying any land-based qualification. Workers in many different jobs need to be able to carry out construction, maintenance and repair work on a variety of structures and surfaces. This unit develops these practical skills, together with the required underpinning knowledge.

This unit aims to develop practical skills in the use of hand tools and equipment, together with those required to maintain boundaries and surfaces or habitats in the context of the industry sector being studied by the learner. Learners will work both independently and in group situations to refine their individual skills and abilities.

Throughout this unit learners will be made aware of the health and safety implications of the work they are carrying out and its possible impact on the environment. They will learn the importance of risk assessment, keeping themselves and those around them safe and using personal protective equipment. They will also gain an overview of environmental and health and safety legislation and the consequences of not adhering to these.

On the achievement of this unit, learners will be able to complete a variety of basic maintenance and repair tasks, demonstrating awareness of health and safety and working with due regard to the environment around them. This unit will prepare the learner for work in a variety of vocational jobs within the land-based sector and will provide a sound foundation for further study at a higher level.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 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.

# Unit content

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

*Selection of hand tools and equipment:* for maintenance tasks eg hammer, spanner, saw, spade, shovel, yard brush, fork, rake, loppers, secateurs, shears, pickaxe, wire cutters, wire strainers, trowel, mallet, half moon edging iron, bolster chisel, paint brush, wheelbarrow, string line, tape measure, ladder, spirit level, fence post driver

Tool and equipment use: safe methods of use, checks and maintenance, safe manual handling, tool and equipment transportation, safe storage

Safety: current legislation eg Health and Safety at Work Act 1974, safe working practices including manual handling techniques and working distances; personal protective equipment (PPE), risk assessment

## 2 Be able to maintain estate boundaries

*Boundaries:* relevant to the land-based sector being studied eg hedgerows, walls (eg retaining, free standing, dry-stone), ditches, canal/river banks, fencing (eg post and rail, chestnut paling, chain link, post and wire, electric, panel, closeboard, temporary, security, picket, rabbit, deer, hurdle, trellis)

Maintenance and repairs: pre maintenance checks, relevant safe routine maintenance and repair techniques using correct tools and equipment (eg trimming hedges, clearing ditches, restoring banks, repairs to walls and fences), safe working practices, correct disposal of waste, personal protective equipment (PPE), risk assessment

## 3 Be able to maintain surfaces or habitats

*Surfaces:* relevant to the land-based sector being studied eg woodchip, concrete, gravel, soil, stone, grass, paving eg block, slab; sand, rubber, bitumen, decking, resin, temporary

*Habitats:* relevant to the land-based sector being studied eg woodland, scrub, grassland, marsh, salt marsh, sand dune, fen, heathland, mire, bog, flush, swamp, standing water, running water, arable land

Maintenance or repairs: pre maintenance checks, relevant safe maintenance and repair techniques using correct tools and equipment (eg adding surface, applying a surface treatment, clearing or restoring a habitat), safe working practices, correct disposal of waste, personal protective equipment (PPE), risk assessment



## 4 Know how to work safely and minimise environmental damage

*Health and safety legislation:* relevant current legislation eg Health and Safety at Work Act 1974, Reporting of Incidents, Control of Substances Hazardous to Health (COSHH) 2002, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR); reasons for legislation, accident reporting, consequences of accidents at work, personal protective equipment (PPE), risk assessments, safe manual handling techniques

*Environmental legislation and codes of practice:* relevant current legislation and codes of practice eg Environment Act 1995, Environmental Damage and Liability Regulations 2009, Waste Management (England and Wales) Regulations 2006; reasons for legislation and codes of practice; role of relevant authorities eg Environment Agency, local authorities

*Problems presented by services:* risk of damage to pipes (eg water, gas, sewage), cables (eg telephone, electricity); location of pipes and cables; methods to locate pipes and cables; disconnection of services; planning work to avoid pipes and cables; lack of services for work completion (eg water, telephone, electricity)

*Environmental damage:* pollution (to water courses, through litter or debris, noise); damage to habitats; wastage of resources; ways of minimising damage

*Waste disposal:* safe disposal of organic waste, eg recycling, composting, chipping, burning; safe disposal of inorganic waste eg recycling, discarding safely, landfill

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> select appropriate tools and equipment for specific estate maintenance tasks [SM]	<b>M1</b> explain the importance of correct tool selection, transport, usage and maintenance	<b>D1</b> discuss the purpose of practical work completed, suggesting further maintenance work required
<b>P2</b> lift tools and equipment safely using appropriate techniques [TW, SM]		
<b>P3</b> transport and use tools and equipment safely [TW, SM]		
<b>P4</b> maintain and store tools and equipment according to instructions [TW, SM]		
<b>P5</b> assess the condition of boundaries to determine maintenance requirements [CT]	<b>M2</b> plan and carry out the maintenance and repair tasks to agreed timescales and specification	
<b>P6</b> carry out routine maintenance of boundaries safely [TW, SM]		
<b>P7</b> carry out routine repairs of boundaries safely [TW, SM]		
<b>P8</b> dispose of waste materials in line with instructions [TW]		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<p><b>P9</b> assess the condition of surfaces or habitats to determine the maintenance requirement [CT]</p>	<p><b>M3</b> plan and carry out the maintenance or repair tasks to agreed timescales and specification</p>	
<p><b>P10</b> carry out appropriate maintenance or repairs of surfaces or habitats [TW, SM]</p>		
<p><b>P11</b> state the current environmental and health and safety legislation and codes of practice [RL]</p>	<p><b>M4</b> explain the importance of planning estate maintenance work.</p>	<p><b>D2</b> discuss how to plan and carry out specified estate maintenance tasks to overcome problems and demonstrate responsible working practices.</p>
<p><b>P12</b> describe how to overcome problems presented by services [IE, EP]</p>		
<p><b>P13</b> describe how environmental damage can be minimised [IE, TW, EP]</p>		
<p><b>P14</b> describe how organic and inorganic waste may be disposed of. [IE, TW, EP]</p>		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

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## Delivery

The delivery of this unit is likely to have a highly practical content, with learners given sufficient time to develop their practical skills. Delivery of the underpinning knowledge is likely to involve a range of techniques, including classroom based sessions, visits, guest speakers and links to appropriate work experience.

Health and Safety and environmental protection should be covered at the beginning of this unit as this will allow the learner to develop underpinning knowledge of the possible hazards and risks involved in their practical activities. The use of a safety officer or an outside speaker would be able to back up theory with up-to-date legislative requirements and also indicate service providers. A clear link to risk assessments should follow so they can be completed prior to undertaking practical tasks. Tutors should be up to date on the key aspects of legislation and ensure that practical activities are carried out safely and legally. Learners should understand how laws affect them while working practically both in the centre and in the workplace.

When using hand tools the tool should be set in context of the industry being studied. It is expected that tutors will cover all tools listed while working practically. This can be achieved by demonstration, supervised practical activities and observation however, if this is not possible the tool should be identified and examples of use given. Safe use, storage and transportation of tools can be achieved through practical activities and observations within the tool shed/workshop and should be backed up with care and maintenance tasks.

The estate maintenance of boundaries, surfaces and habitats are closely related to their delivery. The techniques of this delivery should be varied, but must be practically based to meet the criteria. Learners should have the opportunity to identify different types of boundaries, surfaces or habitats which are already established in order to link theory and practice. This may have to be achieved on visits to different businesses within their own area of study. Learners will also need access to practical areas where they can put into practice those skills learnt in the classroom. It is essential that learners understand the importance of the environmental issues that surround their practical tasks and deal with waste accordingly throughout their work.

It is expected that learners will investigate the uses of boundaries fully, identifying the purpose of those maintained in earlier tasks. During classroom based lessons, active problem solving tasks can be used to cover all listed problems that may occur during estate maintenance activities in the unit content. Learners should have access to a range of path materials to cover both fluid and hard components. Those that cannot be practically accessed should be identified while on visits or via research.

Learners may have the opportunity to contribute to the maintenance of boundaries, surfaces or habitats while on work placements. They should be encouraged to ask for observation records and/or witness statements to be provided as evidence. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Tutors should not expect learners to do physical tasks that are beyond their physical capabilities.

Tutors could integrate the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments in the learners programme of study.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
<b>Assignment 1: Being Safe and Considering the Environment</b> (P11, P12, P13, P14, M4, D2)
Tutor introduces the assignment.
Theory based sessions: Introduction to health and safety to develop underpinning knowledge of the possible hazards and risks involved in their practical activities. Accident reporting, consequences of accidents at work, personal protective equipment (PPE), risk assessments, safe manual handling techniques.
Practical: carrying out a risk assessment.
Theory based sessions: Theory based sessions current environmental legislation and codes of practice, environmental protection and waste disposal.
Site visit: potential problems presented by services, disposing of waste, environmental good practice.
Personal study, assessment completion and support.
<b>Assignment 2: Tools and Equipment</b> (P1, P2, P3, P4, M1)
Tutor introduces the assignment.
Theory session: introduction to tools, types and purpose.
Practical sessions: selecting tools and equipment for tasks.
Theory session: safe lifting principles, how to apply in practice, how to transport safely.
Practical sessions: safe lifting and transport of tools and equipment.
Theory: Maintenance and storage of tools and equipment, reasons why important, how to carry out checks and maintenance.
Practical sessions: maintenance and storage of tools and equipment.
<b>Assignment 3: Boundary Maintenance</b> (P5, P6, P7, P8, M2)
Tutor introduces the assignment.
Theory session: assessing maintenance needs and purpose of boundaries, types of maintenance and repair for different boundary types.
Visits to see examples of different boundaries and maintenance required.
Practical demonstrations, activities and assessments on boundaries.
<b>Assignment 4: Surface or Habitat Maintenance</b> (P9, P10, M3, D1)
Tutor introduces the assignment.
Classroom session: types of surface and habitat.
Practical session: assessing condition of surfaces/habitats.
Theory session: planning maintenance of surfaces/habitats.
Practical sessions: maintenance and repair of surfaces/habitats.
Unit review.

## Assessment

Assessment of P1, P2, P3, P4 could be linked. Learners are required to demonstrate the selection (P1), safe lifting (P2), transportation and use (P3) and maintenance (P4) of at least four hand tools or pieces of equipment. Evidence for this criterion should be linked to the work being done for P6, P7, P8 and P10. The range of hand tools provided for evidence will therefore vary in relation to the work that is being carried out for these criteria during practical activities. Suitable evidence from guided activities would be observation records completed by the learner and tutor. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

For P5, learners need to assess the condition of boundaries for maintenance requirement; assessment could be in the form of individual oral questioning or maintenance planning sheets. A minimum of two boundaries should be included. These may be selected by the tutor or agreed through discussion with the learner.

Assessment of P6, P7 and P8 could, as indicated above, be linked with P1, P2, P3, P4 with suitable projects and with assessment evidence in the same format. It is expected that learners will work with at least two different boundaries, for assessment purposes, from the unit content list.

For P9 learners are required to assess the condition of surfaces or habitats for maintenance requirement; assessment could be in the form of individual oral questioning or maintenance planning sheets. A minimum of two surfaces or habitats should be included. These may be selected by the tutor or agreed through discussion with the learner.

Assessment of P10, could be linked with P1, P2, P3, P4 with suitable projects. It is expected that learners will work with at least two different surfaces or habitats, for assessment purposes, from the unit content list.

For P11, learners will be expected to state current health and safety and environmental legislation and codes of practice. Learners should investigate various levels of the laws relating to the individual, other employees and the employer. Evidence for this could take the form of a pictorial presentation with notes, using appropriate software, flipcharts or OHPs, an annotated poster or leaflet, or as answers to short answer questions.

For P12, learners will need to know the services they may encounter while carrying out estate maintenance work, describe problems these present and how these could be overcome. Evidence could be a written or verbal report, or annotated plans of an area showing services and how problems may be overcome.

For P13, learners need to describe how environmental damage can be minimised. A leaflet, annotated poster or project can be used, and could be linked to assessment for P4.

For P14, learners need to identify and describe a range of methods for disposing of organic and inorganic waste. Evidence should bear in mind the legislative controls, and the desire to minimise environmental damage. Evidence could be in the same format as for P3.

For M1, learners are required to explain the importance of correct tool selection, transport, usage and maintenance. Evidence may be a verbal or written report, leaflet or presentation.

Assessment of M2 links to work completed for P5, P6, P7 and P8. To achieve M2 learners need to have demonstrated planning of the maintenance and repair tasks, and the work needs to have been completed to a high standard. This is expected to include the learner working independently, having a logical approach to completing the task, showing responsibility for the environment and checking their own work.

Assessment of M3 links to work completed for P9 and P10. To achieve M3 learners need to have demonstrated planning of the maintenance or repair tasks, and the work needs to have been completed to a high standard, as for M2.

Assessment of M4 could be an extension of work completed for P11, P12, P13 and P14. Learners are required to explain the importance of planning estate maintenance work, particularly in overcoming the potential problems identified in the pass criteria. Evidence may be a verbal or written report, leaflet or presentation.

For D1, learners are required to review the work they have completed for the pass and merit criteria, and suggest further maintenance work required. These suggestions should include maintenance of tools and equipment, boundaries and surfaces/habitats. Evidence may be a presentation, report, leaflet or guidance booklet.

For D2, learners are required to discuss how to plan and carry out two estate maintenance tasks to overcome problems and demonstrate responsible practices. The tasks chosen may be selected by the tutor or agreed through discussion with the learner. This assessment links to the pass and merit criteria, and the discussion should include, for example, how to plan to work within the legislation, minimise environmental damage, overcome problems and use appropriate tools safely and effectively. Evidence may be in the same format as D1.

### Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P11, P12, P13, P14, M4, D2	Being Safe and Considering the Environment	You are working for a land based business, and have been told a school pupil is planning to work alongside you for their work experience. Create a guidance leaflet for them which explains why planning estate maintenance work is important. Include the legislation that affects your work, how to overcome problems presented by services, how to dispose of waste and minimise environmental damage. Your leaflet should also show how to plan and carry out two tasks to overcome problems and demonstrate responsible practices.	Leaflet.
P1, P2, P3, P4, M1	Tools and Equipment	You are helping a busy countryside ranger with their work. You will be asked to select appropriate tools and equipment, lift them safely, transport and use them, and then maintain and store them. Create some notes for your work experience pupil explaining the importance of correct tool selection, transport usage and maintenance.	Observation records. Witness statements. Guidance notes.
P5, P6, P7, P8, M2	Boundary Maintenance	In your role you have been asked to plan and carry out routine repairs and maintenance of two boundaries. Before starting, assess the condition of the boundaries to plan the work needed. You will need to dispose of any waste in line with instructions.	Observation records. Photographic evidence.
P9, P10, M3, D1	Surface or Habitat Maintenance	Having completed the boundary tasks to a high standard you have now been asked to maintain or repair two surfaces or habitats. Before starting, assess the condition to determine the work needed. After completing these tasks, discuss the purpose of the work completed and suggest further maintenance required.	Observation records. Photographic evidence. Verbal report.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Environmental and Land-based sector suite. This unit has particular links with the following unit titles in the Environmental and Land-based suite:

Level 2	Level 3
Element CU19.1 Construct and maintain boundaries	Undertake Estate Skills
Element CU19.2 Construct and maintain paths	
Undertake Work Experience in the Land-based Industries	
Maintain Animal Accommodation	
Conservation and Improvement of British Habitats	

### Essential resources

Access to an area of land where practical work can be carried out is essential. Centres may need to provide transport for learners to travel to suitable sites. First aid facilities and appropriately trained staff are essential for such visits. Also required is a sufficient range and quantity of hand tools and materials to allow the tasks to be undertaken safely.

Ideally, tasks should be carried out 'for real' but, where this is not possible, temporary work is permissible. Powered machinery can be used where appropriate.

### Employer engagement and vocational contexts

This unit focuses on the skills of estate maintenance and will provide learners with a basic knowledge of undertaking tasks on boundaries and surfaces or habitats. Learners will be encouraged to develop an understanding of health and safety while working and will consider environmental protection and ways of minimising damage in addition. Centres are encouraged to develop links with local businesses within the sector being studied so learners can experience the day-to-day running of a busy estate via guest speakers and visits.

### Indicative reading for learners

#### Textbooks

Agate E – *Fencing: A Practical Handbook* (BTCV, 2001) ISBN 9780946752294

Agate E – *Footpaths: A Practical Handbook* (BTCV, 2001) ISBN 9780946752317

Agate E – *Toolcare: A Maintenance and Workshop Manual* (BTCV, 2000) ISBN 9780946752249

Agate E – *Tree Planting and Aftercare: A Practical Handbook* (BTCV, 2001) ISBN 9780946752256

Agate E – *Woodlands: A Practical Handbook* (BTCV, 2002) ISBN 9780946752331

Brooks A and Agate E – *Hedging: A Practical Handbook* (BTCV, 1998) ISBN 9780946752171

Brooks A and Agate E – *Waterways and Wetlands: A Practical Handbook* (BTCV, 2001)

Brooks A, Adcock S and Agate E – *Dry Stone Walling: A Practical Handbook* (BTCV, 1999)  
ISBN 9780946752195

Butterfield, W H – *Making Fences Walls and Hedges* (BiblioBazaar, 2009) ISBN 9781110871339



Health and Safety Executive leaflets eg Manual Handling Assessment Charts (HSE, 2003)  
ISBN 9780946752300

Key R – *Garden Surfaces: 20 Projects for Paths, Decks, Steps Patios and Edgings* (Laurel Glen Publishing, Feb 2003) ISBN 9781571458247

Kindersley D – *Walls and Fences* (RHS Practicals) (Dorling Kindersley; 2nd revised edition, 2003)  
ISBN 9780751348620

MacLean M – *New Hedges for the Countryside* (Farming Press Books and Videos, 1992)  
ISBN 9780852362426

Negus J and Bradley V – *Garden Tools: An Illustrated Guide to Choosing, Using and Maintaining* (Carroll & Brown Publishers Limited; illustrated edition, 2001) ISBN 9781903258231

Scottish Executive Rural Affairs Department – *Prevention of Environmental Pollution from Agricultural Activity: Code of Good Practice Dos and Don'ts Guide* (Scottish Executive, 2002) ISBN 9780755905188

Stokes A – *Health and Safety Overview for Practical Conservation Project: A Guide to Good Practice for Conservation Groups and Land Managers* (BTCV, 1999)

Sutherland W J – *Managing Habitats for Conservation* (Cambridge University Press; 1st edition, 1995)  
ISBN 9780521447768

### Websites

[www.btcv.org.uk](http://www.btcv.org.uk)

British Trust for Conservation Volunteers

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment, Food and Rural Affairs

[www.fwag.org.uk](http://www.fwag.org.uk)

Farm Wildlife and Advisory Group

[www.hse.gov.uk](http://www.hse.gov.uk)

Health and Safety Executive

[www.lantra.co.uk](http://www.lantra.co.uk)

Lantra Sector Skills Council

[www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Natural England

[www.rhs.org.uk](http://www.rhs.org.uk)

Royal Horticultural Society

## ● Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
<b>Independent enquirers</b>	reporting how to overcome problems faced while working reporting on how environmental damage can be minimised describing how to overcome typical problems that may occur during estate maintenance activities
<b>Creative thinkers</b>	Assessing the condition of boundaries, surfaces or habitats to determine maintenance requirement
<b>Reflective learners</b>	reviewing the purposes of different types of boundaries presenting current environmental and health and safety legislation and codes of practice
<b>Team workers</b>	taking responsibility for the environment carrying out maintenance tasks safely
<b>Self-managers</b>	selecting appropriate tools/equipment for specific estate maintenance tasks Lifting, transporting, maintaining and storing tools and equipment safely using appropriate techniques
<b>Effective participators</b>	reporting how to overcome problems faced while working reporting on how environmental damage can be minimised describing how to overcome typical problems that may occur during estate maintenance activities.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	investigating key points of the current environmental and health and safety legislation and codes of practice
<b>Creative thinkers</b>	applying techniques to maintenance tasks
<b>Reflective learners</b>	evaluating own performance action planning and target setting for future activities
<b>Team workers</b>	peer help and support during tasks
<b>Self-managers</b>	risk assessment completion
<b>Effective participators</b>	investigating problems that occur when lifting incorrectly.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	presenting information on current environmental and health and safety codes of practice
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching the internet for current environmental and health and safety codes of practice
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	designing maintenance planning sheets presenting leaflets and pamphlets producing risk assessments for practical tasks
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	presenting information on current environmental and health and safety codes of practice.
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	producing risk assessment for practical tasks
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Draw conclusions and provide mathematical justifications	producing risk assessment for practical tasks
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presenting information on current environmental and health and safety codes of practice
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching for current environmental and health and safety codes of practice
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	reporting how to overcome problems faced while working reporting on how environmental damage can be minimised.

# Unit 6: Conservation and Improvement of British Habitats

**Unit code:** R/600/9380

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to the conservation and habitat improvement skills and knowledge and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

## ● Unit introduction

The British countryside contains a wide variety of habitats. For a small island country, the diversity of wildlife is large but the amount of space is limited. To maximise biodiversity, the small amount of natural space needs to be managed correctly. For learners to make a positive contribution to the future of rare and sensitive habitats, they need to develop an appreciation of the many different types of habitat found in the UK.

This unit focuses on the identification and management of different habitats. It provides a forum for a discussion of the threats facing habitats and the management techniques used to address them. It also provides learners the opportunity to actively manage and improve habitats to benefit wildlife. Learners will develop their ability to recognise habitats and gather information, analyse it and draw suitable conclusions.

On completion of this unit, learners will have a good knowledge of different habitats and the techniques available for managing them. Learners will also have developed the skills required to gather and interpret information from different habitats. By participating in this unit, learners will also learn how to identify the tools and equipment used to carry out practical habitat management activities, and develop a working knowledge of their safe uses.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know types of habitat found in the British Isles
- 2 Know factors that affect wildlife in the British Isles
- 3 Be able to collect and present information concerning flora and fauna
- 4 Be able to improve a habitat.

# Unit content

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## 1 Know types of habitat found in the British Isles

*Major habitat types:* upland; lowland (grassland, heathland, wet); freshwater; coastal; woodland

*Local habitat types:* specific habitats eg marsh, ponds, lakes, peatlands, reservoirs, rivers, wetlands, grassland, heathlands, meadow, mountain, woodlands, scrub, field margins, hedgerows, urban, estuarine, mud-flats, sand dunes, maritime cliffs; buffer zones; habitat origins and development; human influence; effects of weather and climate

*Characteristics:* altitude; rainfall; temperature (maximum and minimum); light levels; wind speed and direction; hours of sunlight; soil characteristics (soil type, water holding capacity, aeration, stability, organic matter, pH, soil structure); nutrient status; dominant flora and fauna

*Mapping:* habitat types in a specified area eg Phase 1 Habitat Map

## 2 Know factors that affect wildlife in the British Isles

*Biotic factors:* presence or absence of other plants and animals, competition, food chain

*Abiotic factors:* soil: type, characteristics, pH, nutrients; temperature; rainfall; wind; light; humidity; aspect; shelter; water presence and characteristics eg static, flowing, salt content, clarity, dissolved oxygen, pollutants

*Relationships:* predation; parasitism; symbiosis; competition

*Population:* factors eg food supply, space, birth and death rates, migration, disease

*Human:* influences eg agriculture, forestry, building or road developments, tourism, industrial, shipping, leisure and recreation, conservation and habitat improvement activities

## 3 Be able to collect and present information concerning flora and fauna

*Survey:* quadrats/line transects; species identification (using keys, guides); collation of results; importance of surveys in monitoring eg habitat decline, pollution, species under threat

*Flora:* relevant to site studied eg trees, wildflowers, grasses, planted crops

*Fauna:* relevant to site studied eg mammals, birds, reptiles, amphibians, fish, invertebrates

*Data presentation:* quantitative and qualitative; written; graphical; pictorial; how results may be used; record keeping requirements for habitat conservation schemes

## 4 Be able to improve a habitat

*Need for improvement:* causes eg neglect, overgrown, polluted, updated rationales to management plans; reasons eg benefit to wildlife, benefit to human community, need to have varying habitat types close to one another, site management planning

*Equipment:* as appropriate to task eg spades, forks, shovels, secateurs, handsaws, clippers, hammers, pickaxes, hand fencing equipment; safe and correct use; checks before use; suitable clothing and personal protective equipment (PPE)

*Habitat improvement work:* health and safety; tool selection, use and maintenance; practical jobs relevant to the area of study with the intention of improving habitats eg mowing, renovation, planting and staking as applicable, clearing (path, fence line), coppicing, uprooting, weeding, hedge maintenance, pruning, thinning, cutting or mowing and mulching, pond, stream and ditch clearance

*Minimising environmental damage:* minimising damage during task eg noise, pollution, habitat disturbance, species disturbance; minimising damage after task, waste disposal, use of composting, reuse or recycling of materials

## Assessment and grading criteria

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> identify major British habitat types	<b>M1</b> discuss the origins and development of a given habitat type	<b>D1</b> explain human influences on the wildlife for a given habitat
<b>P2</b> describe major British habitat types		
<b>P3</b> outline characteristics of a given habitat		
<b>P4</b> describe biotic and abiotic factors that affect a given species of wildlife within a specified habitat	<b>M2</b> discuss the population factors that affect a given species of wildlife in a specified habitat	
<b>P5</b> outline relationships between species within a specified habitat		
<b>P6</b> select and use survey techniques in accordance with survey specification	<b>M3</b> interpret and summarise data collected	<b>D2</b> recommend improvements to a specified habitat based on survey information.
<b>P7</b> conduct a survey of a specified local habitat, recording flora and fauna [IE, TW, SM]		
<b>P8</b> present data collected [IE]		
<b>P9</b> select and use appropriate equipment [SM]	<b>M4</b> explain the need to improve wildlife habitats.	
<b>P10</b> carry out habitat improvements safely according to site management plans [TW]		
<b>P11</b> carry out work in a manner which minimises environmental damage. [TW]		



**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

## Essential guidance for tutors

### Delivery

This unit can be delivered through a range of activities. In addition to lectures, seminars and practical sessions, visits to habitats can greatly enhance learners' understanding of a range of habitats, their flora and fauna. Talks from habitat specialists involved in the management of habitats will help learners develop an awareness of current issues.

Field-based activities are an important part of this unit. In particular, some learning outcomes require learners to carry out practical habitat surveys and habitat improvements. Where possible, delivery should reflect learners' interests whilst seeking to broaden their understanding of different habitat types.

Much of the unit content can be delivered at the centre. Even urban-based centres have scope for habitat survey and practical work, although field trips may be required to cover the breadth of the unit content.

Work placements may support delivery of this unit, and should be monitored regularly to ensure the quality of the learning experience. Learners and supervisors should be aware of the requirements of this unit before any work-related activities, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to improve several habitats when they are on their work placement. Learners should be encouraged to ask for observation records and/or witness statements to be provided as evidence.

Tutors could integrate the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments in the learner's programme of study. For example, some of the practical elements of this unit could be closely related to those undertaken in *Unit 8: Participate in Providing Estate Maintenance*. Health and safety issues relating to fieldwork must be stressed and reinforced regularly, with appropriate risk assessments undertaken before any practical activities. Learners will need access to a well-equipped store of tools and personal protective equipment.

### Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
<b>] I: The Large Blue Butterfly</b> (P1, P2, P3, P4, P5, M1, M2, D1)
Tutor introduces the assignment brief.
Classroom activity: description of major habitat types.
Visits to see different habitat types.
Class discussion: features of different British habitats.
Discussion of abiotic features.
Theory session: review of biotic features, including population interactions.

Topic and suggested assignments/activities and/assessment
Learner research and assessment completion.
<b>Assignment 2: Habitat Survey</b> (P6, P7, P8, M3, D2)
Tutor introduces the assignment brief.
Classroom activity: carrying out surveys, survey types and methods, species identification.
Practical activities and assessments: carrying out surveys of local habitats.
Reporting results: calculating and presenting results.
Survey write up and assessment completion.
<b>Assignment 3: Habitat Management</b> (P9, P10, P11, M4)
Tutor introduces the assignment brief.
Completing risk assessments, planning tool use and tasks.
Classroom activity: improving wildlife habitats, reasons and methods.
Practical activities and assessments: carrying out practical habitat management.
Review of work completed and impact on wildlife improvements.
Learner research and assessment completion.
Unit review.

## Assessment

For P1 and P2, learners need to identify and describe major British habitat types. Learners could demonstrate their knowledge through short-answer questions or by producing an annotated map, leaflet or report.

For P3, learners need to outline the characteristics of a given habitat. Characteristics included should be those shown in the unit content. Evidence for this could be in the same form as for P1.

For P4, learners are required to describe biotic and abiotic factors that affect a given wildlife species within a specified habitat. The habitat could be specified by the tutor, or agreed through discussion with learners. Evidence could be a poster, leaflet or report, including examples of how wild animals and plants thrive, or are restricted, in a specified habitat.

P5 requires learners to outline the relationships between species in a specified habitat. This could be based on the same site as for P4. Suitable evidence would be a leaflet or annotated poster.

For P6 and P7, learners are required to select and use a survey method and carry out a survey on a specified habitat. Suitable evidence for this would be an observation record or a witness statement.

P8 requires learners to present the results of their survey. This could be in the form of completed worksheets.

For P9, P10 and P11 learners will be assessed on their practical improvements to a habitat. Learners must select and use appropriate equipment, carry out practical habitat improvements and carry out the work safely in a manner that minimises environmental damage. Learners will need to carry out at least three habitat management tasks. Habitat improvements may be undertaken as group activities, but evidence to meet the criteria must be present for each learner individually. The use of video or photographic evidence of achievement must be authenticated. If practical activities are assessed directly by the tutor, suitable evidence would be observation records completed by the learner and the tutor. If assessed during an industry experience placement, witness statements should be completed by a suitable industry representative and verified by the tutor. Health and safety is paramount, and appropriate risk assessments must be carried out before any practical activities.

For M1, learners are required to discuss the origins and development of a given habitat type. This could be an extension of work completed for P3 and evidence could be in the same format.

For M2, learners must discuss the population factors that affect a given species of wildlife in a specified habitat. This could be assessed through an assignment that links to P4. Suitable evidence includes observation records, witness statements, a pictorial presentation with notes (possibly using appropriate software or OHPs), an annotated poster or leaflet.

For M3, learners must interpret and summarise survey information relating to a specified habitat. Learners could carry out a project based on the results taken from their survey for P7. Alternatively, tutors may provide survey results for another site, which will give learners the opportunity to carry out a detailed interpretation. Suitable evidence would be a written report, an annotated poster or pictorial presentation using appropriate software.

For M4, learners must explain the reasons why habitat improvements are undertaken. This could be the same work carried out for P10 and P11. Evidence for this criterion could be a presentation, an observation record, witness statement, or in any suitable written format.

For D1, learners must explain human influences on wildlife in a specified habitat. Learners could use evidence collected via news items or reports from organisations objecting to or supporting, for example, a proposed building development or proposed environmental scheme. Alternatively, evidence could be produced in a seminar discussion about positive and negative human influences.

D2 requires learners to recommend habitat improvements for a specific site based on survey information. This could be the same site as the one worked on for P7 or P10 or a different site, and may be identified by the tutor or in discussion between the learner and tutor. Evidence may be based on the use of scenario-based materials, which detail a local organisation wanting improvements made to a site. Learners could present their plans as a written or verbal presentation (with appropriate records).

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, P5, M1, M2, D1	The Large Blue Butterfly	You are working for the National Trust and have been asked to create an innovative description on the successful re-introduction of the Large Blue Butterfly ( <i>Maculinea arion</i> ) to the UK. Ensure you include a description of the major UK habitats, as well as the habitat, population and human factors which have contributed to this re-introduction.	Annotated poster. Press release. Written report. Completed worksheets.
P6, P7, P8, M3, D2	Habitat Survey	The local wildlife trust has been donated a piece of land and has asked you to carry out a basic survey of the principal features. They have also asked you to present an interpretation and summary of your results, and to recommend habitat improvements.	Completed worksheets. Annotated poster.
P9, P10, P11, M4	Habitat Management	As a member of the British Trust for Conservation Volunteers, you have been asked to participate in practical habitat improvement tasks. On one of the tasks, a member of the public has walked up to you and asked why you are carrying out the work.	Practical observation records. Witness statements.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element EC2.1 Collect and record data on the natural environment Element EC2.2 Report on the condition of the natural environment Element CU87.1 Maintain suitable site conditions Element CU87.2 Manage vegetation	Undertake Estate Skills
Participate in Providing Estate Maintenance	Understand Grassland Management

### Essential resources

Learners should have access to a wide range of different habitats. If these cannot be provided on the centre's site, then transport should be provided to give learners access to a suitable mix of sites. Ideally, a site manager or countryside warden should provide a guided tour of the site and explain the management work carried out and rationale for the management. Suitable sites will also be required for the learners to carry out practical tasks. In addition, a well-stocked tool store will be required to enable learners to carry out practical habitat management activities. Suitable personal protective equipment and first aid kits will also need to be provided.

### Employer engagement and vocational contexts

For this unit it is desirable that centres make link with local authority countryside services, country estates, the local wildlife trust or Natural England. Some parts of the unit can be delivered within a vocational setting by using learners' work placements.

### Indicative reading for learners

#### Textbooks

Ausden M – *Habitat Management for Conservation – A Handbook of Techniques* (Oxford University Press, 2007) ISBN 9780198568735

Bibby CJ – *The Conservation Project Manual* (BP, 2003) ISBN 1901930394

BTCV – *Health and Safety Overview for Practical Conservation Projects* (British Trust for Conservation Volunteers, 2006) ISBN 0950164380

Jefferies MJ – *Biodiversity and Conservation* (Routledge, 2006) ISBN 0415343003

Lenon B and Cleves P – *Fieldwork Techniques and Projects in Geography* (Collins Educational, 2001) ISBN 0007114427

Nature Conservancy Council – *Handbook for Phase One Habitat Survey: A Technique for Environmental Audit* (Joint Nature Conservation Committee, 1990) ISBN 0861396367

Rose F and O'Reilly C – *The Wild Flower Key (Revised Edition): How to identify wild plants, trees and shrubs in Britain and Ireland* (Frederick Warne, 2006) ISBN 0723251754

Smith RL and Smith TM – Ecology and Field Biology (Benjamin Cummings, 2001) ISBN 0321042905

Townsend CR, Begin M and Harper JL – Essentials of Ecology (Blackwell, 2008) ISBN 9781405156585

Warren A and French JR – Habitat Conservation – Managing the Physical Environment (John Wiley and Sons, 2001) ISBN 041798499X

### **Journal**

*British Wildlife*

### **Websites**

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment, Food and Rural Affairs

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency

[www.forestry.gov.uk](http://www.forestry.gov.uk)

Forestry Commission

[www.fwag.org.uk](http://www.fwag.org.uk)

Farm Wildlife and Advisory Group

[www.jncc.gov.uk](http://www.jncc.gov.uk)

Joint Nature Conservation Committee

[www.lantra.org.uk](http://www.lantra.org.uk)

Lantra

[www.leafuk.com](http://www.leafuk.com)

Linking Environment and Farming

[www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Natural England

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	carrying out a survey of a local habitat
<b>Team workers</b>	working together to carry out a survey reaching a group decision on the best method to choose to conduct a particular survey working together on a practical task
<b>Self-managers</b>	Selecting tools to use for a task and caring for resources.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Creative thinkers</b>	developing solutions to situations encountered during a practical habitat management task
<b>Reflective learners</b>	justifying the benefits of carrying out practical habitat management tasks
<b>Effective participators</b>	carrying out a survey of a local habitat.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using software to analyse and present data
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching information on the successful re-introduction of the Large Blue Butterfly
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	summarising and analysing information obtained during surveys of local habitats
Present information in ways that are fit for purpose and audience	providing an oral presentation or writing a written report on the information obtained from the survey of a specified habitat
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	analysing and interpreting information obtained during the survey of a local habitat
Draw conclusions and provide mathematical justifications	providing conclusions of a habitat based on their survey and numerical analysis
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing methods for carrying out a survey
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching the complex array of sources behind the factors involved with the successful re-introduction of the Large Blue Butterfly
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	providing justification for the need to manage wildlife habitats.



# Unit 7: Introduction to Agriculture and Conservation

**Unit code:** K/600/9160

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to the skills and knowledge needed for understanding how agriculture and conservation interact and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

Learners will study ways in which agricultural practices have changed over time and the effects on habitats and wildlife. They will investigate how landowners can be encouraged to consider agri-conservation and with apply their learning to a given site where they will recommend ways to conserve wildlife.

## ● Unit introduction

Agriculture has, single-handedly, altered the British landscape. As populations have grown, the demand for food has increased dramatically. Many of the intensive farming practices used a decade ago did improve food productivity, but in some instances this was at the expense of native habitats and wildlife.

Farming practice has moved into a new era. The financial emphasis has shifted from production to environment led, with increasing political and public interest in the impact of farming practices.

In completing this unit learners will investigate the changes in agricultural practices and how these changes have impacted on habitats and wildlife. They will explore the funding available to farmers to improve farm habitats and conserve the wildlife on their land, and familiarise themselves with the bodies that can support farmers in doing so.

Learners will be able to identify potential areas for improvement in the farming landscape in terms of conservation and the possible improvements that can be made.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know changes in agricultural practices and the effects on habitat and wildlife
- 2 Know support available to landowners for adopting environmentally friendly practices
- 3 Know wildlife conservation strategies
- 4 Be able to recommend wildlife conservation strategies.

# Unit content

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## 1 Know changes in agricultural practices and the effects on habitat and wildlife

*Changes in agricultural practices:* development of farming since the Second World War: effects of rationing, desire for food security; changes in enterprise size; advances in breeding strategies; advances in agronomic knowledge; diversification; conversion of barns; advances in technology; due to public interest/scrutiny

Intensive farming practices: subsidy-led farming, growing of monocultures, extensive use of fertilisers and pesticides, removal of hedgerows, drainage of marsh, effects of mechanisation; increased stocking rates; use of livestock housing

Effects on habitats and wildlife: decline of species; use of insecticides; chemical spray drift affecting surrounding habitats and non-target species; fertilisers: impacts on water courses, eutrophication; removal of habitats, eg conversion of barns for housing, removal of in-field trees, removal of hedgerows

Current practices: effects of Single Farm Payment Scheme; Good Agricultural and Environmental Conditions environmental stewardship; regulations and codes of practice eg Environmental Protection Act 1990, Hedgerows Regulations 1997, Defra Code of Good Agricultural Practice

## 2 Know support available to landowners for adopting environmentally friendly practices

*Grants and funding:* eg Single Farm Payment Scheme, Woodland Grant Scheme, Rural Development Plan England, Energy Crops Scheme, Catchment Sensitive Farming Delivery Initiative

Sources of advice: statutory bodies eg Defra, FWAG, Natural England, Environment Agency, Forestry Commission; Non-statutory organisations: eg Wildlife Trusts, RSPB, British Trust for Ornithology, British Mammal Society, National Bat Trust

## 3 Know wildlife conservation strategies

*Sites suitable for conservation:* sites where habitat conservation is possible; potential habitats for wildlife species; habitat in need of restoration or creation

Habitat creation/restoration projects: eg establishment of field margins, beetle banks, pond creation or restoration, management of in-field trees, woodland management, nesting boxes, badger gates, water trough floats to prevent barns owl drowning, hedgerow improvement

Habitat creation/restoration options: appropriate to project eg mowing, trimming, weeding, planting, laying, coppicing, clearance, creation of manmade structures

#### 4 Be able to recommend wildlife conservation strategies

*Identify a site for improvement:* site where improvement would benefit wildlife species; site where improvement is feasible; identify possible improvements eg provision of shelter, cover, food, water, reduction in predators or competitors

Survey site: appropriate survey methods to the species or habitat chosen eg quadrat, line transect; species identification (flora and fauna); data collection (quantitative and qualitative); data presentation, eg histogram, scatter graph, annotated map

Wildlife strategy: identify objectives eg species (flora and fauna) protection, increase in species diversity and/or distribution; identify habitat creation/improvement methods; timescales; monitoring impact

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> describe the changes in agricultural practices with the introduction of mechanisation, intensification, use of herbicides, pesticides and fertilisers, production subsidies [EI, TW, EP]	<b>M1</b> describe in detail the effect that intensive farming practices have had on habitats and wildlife	<b>D1</b> discuss how advice and funding available to farmers can change farming practices to benefit wildlife
<b>P2</b> outline the effect on habitat and wildlife of intensive farming practices		
<b>P3</b> outline grants available to land owners adopting environmentally friendly practices [IE]	<b>M2</b> describe in detail how farmers can use grant funding in adopting environmentally friendly practices	
<b>P4</b> describe uses of grant aid for adopting environmentally friendly practices		
<b>P5</b> state sources of advice available to farmers [IE]	<b>M3</b> describe the role of organisations that provide advice to farmers and the types of advice that are available	

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P6</b> identify sites suitable for conservation [CT]	<b>M4</b> explain methods which could be used to improve a site for wildlife conservation.	<b>D2</b> recommend and justify methods to improve a site for wildlife conservation.
<b>P7</b> list the features to look for when surveying a site		
<b>P8</b> describe options for restoring or recreating given habitats [IE]		
<b>P9</b> identify a site which could be improved for wildlife conservation [IE]		
<b>P10</b> survey site for its conservation value		
<b>P11</b> recommend a wildlife strategy		
<b>P12</b> describe a wildlife conservation strategy.		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

## Delivery

Learners will need to understand a variety of farming enterprises, ideally including arable, intensive livestock, conservation grazing, dairy herd management and organic. Local FWAG officers may be able to advise centres as to which farmers would be willing to discuss their management techniques with learners. However, it may be possible to deliver this using case studies and presentations.

Learners should have the opportunity to investigate the impact intensive farming methods of the 1980s, 1990s and early 2000s have had on the habitats and wildlife of UK farms. Much of this is well documented and the RSPB or FWAG can provide detailed information about and statistical evidence of these impacts.

Access to a suitable farm, or range of farms, will be important when showing learners the various practical conservation strategies that can be implemented to improve the conservation value of a farming environment. Since the introduction of the Single Farm Payment Scheme most farms have an area that is environmentally friendly which can be viewed. Tutors will need to identify an area of farmland, with potential for improvement, where learners can demonstrate their understanding of how to identify these areas themselves, and consider all the options they could recommend to improve the conservation value. Although elements of this could be carried out as a case study, some fieldwork will be needed for the surveying aspect of this unit and it would be ideal to find a farm that could facilitate this.

The options for surveying the site will depend entirely on the type of site and range of improvements being discussed. It is expected that learners will be able to undertake a simple survey of flora, fauna or habitat type. They should show an understanding of the importance of carrying out a survey before undertaking any improvements. Some areas will lend themselves to obvious surveys, such as a farmland bird survey on an arable site, an invertebrate survey on a potential beetle bank site or a water quality survey on a potential pond improvement site.

Learners should gain a thorough understanding of how agriculture is changing and how the financial emphasis is no longer on production but on appropriate land management. It may be possible to obtain financial data to show how reduced production has been off set by the Single Farm Payment Scheme subsidies.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

### Topic and suggested assignments/activities and/assessment

Introduction and overview of the unit.

#### **Assignment 1: Changing Farming Practices (P1,P2,M1)**

Tutor introduces assessment and establishes class knowledge of subject area.

Topic and suggested assignments/activities and/assessment
History of farming: investigation and research into changing farming practices, compilation of timeline to show major changes and link to human population growth.
Farming practice: site visits/guest speakers. Learners experience range of farming enterprises considering the impacts of past and present management techniques.
Impact on wildlife and habitats: formal lecture and research. Learners to investigate the decline or destruction of farm species and habitats during the peak period of intensive farming.
<b>Assignment 2: Funding and Organisations</b> (P3, P4, P5, M2, M3, D1).
Tutor introduces assessment.
Funding and organisations: introduce the organisations that can support farmers and the grant funding available to farmers.
<b>Assignment 3: Choosing a Site for Habitat Improvement.</b> (P6, P7, M4)
Tutor introduces assessment.
Farm visits: learners see a variety of conservation strategies in place and understand the benefits and how sites are selected for wildlife conservation work.
Conservation strategies: research into methods and benefits of a variety of conservation strategies.
Farm visit: learners to identify three possible areas for improvement within a farmed environment.
<b>Assignment 4: Wildlife Conservation Strategies</b> (P8, P9, P10, P11, P12, D2). Tutor introduces assessment.
Practical activity: range of habitat methods.
Practical activity: site surveying for wildlife.
Classroom session: wildlife conservation strategies, reasons for strategies, important features, methods to use in different circumstances.
Personal study/supported assessment time.

## Assessment

For P1, learners are expected to investigate the modern history of farming in focusing on how production-linked subsidy resulted in a boom intensive agriculture. Learners should be able to explain the developments that arose in farming during this time with the advent of heavy machinery, and the extensive use of pesticides and fertilisers. To a lesser extent, they should be aware of the significant scientific advances in breeding and growing strategies. Learners could present this as a written report, as a PowerPoint presentation or as a poster.

For P2, learners are required to outline the effect that intensive farming practices have had on habitat and wildlife. Evidence could be linked to that for P1 and presented in the same format.

For P3, learners will be able to identify some of the grant opportunities that are available to farmers in relation to environmental management. Evidence could be produced as an advice leaflet for farmers, or a chart or report. P4 is closely linked, and learners need to describe how the funding outlined in P3 can be used to enable farmers to adopt environmentally friendly practices.

P5 could also be linked to P3 and P4 and learners must be able to state the various sources where farmers could seek advice on adopting environmentally friendly practices, and on the requirements of grant funding. Evidence could take the same forms as for P3.

Assessment for P6 to P10 could be closely linked and the same evidence could be used to meet all the criteria. Learners will need access to a suitable farming site with potential for environmental improvements. For P6 learners need to identify at least three sites which could be suitable for conservation. For P7 they need to list the features to look for when surveying a site including physical, environmental and biological features. Evidence could be an annotated map, or a written or verbal report.

For P8, learners need to describe at least two options for restoring or recreating three given habitats. These could be selected by the tutor or agreed in discussion with learners. It would be preferable if the chosen habitats were the same as those identified in P6, but this is not mandatory. Evidence could be presented in the same form as for P6 and P7.

For P9, learners need to select a site which could be improved in terms of wildlife conservation. Learners are expected to provide a basic rationale for their selection, based on the environmental benefits of the potential improvements. Evidence could be in the same format as for P6.

For P10, learners need to carry out a survey of the site selected in P9 to assess its conservation value. Appropriate survey methods should be selected for the chosen site (an indicative range is shown in the unit content). Evidence may be in the form of a written report, poster or presentation.

Assessment for P11 and P12 is closely linked and relates to a basic wildlife conservation strategy. For P11 learners need to recommend a wildlife strategy for a given site, which could be the site selected in P9. For P12 they need to describe the wildlife strategy, including its objectives, the suggested habitat improvement methods, timescales and how impact will be monitored. Evidence could be presented in a report, a leaflet or a verbal presentation.

Assessment of M1 builds on evidence presented for P1 and P2, and learners need to describe in detail the effect of intensive farming practices on habitats and wildlife. Learners should be able to give examples of specific species that declined significantly during this period. Habitats and species can be selected by the tutor or chosen by learners in agreement with the tutor. It is expected that learners will investigate three habitats and two species of wildlife that have been affected.

For M2, learners must be able to describe in detail how farmers could use grant funding in adopting environmentally friendly practices. This could be an extension of the evidence produced for P3 and P4.

For M3, learners need to demonstrate their understanding of the key organisations that affect farming. Learners should be able to identify both statutory and non-statutory organisations and the type of support that they can offer to farmers. This could be an extension of the evidence produced for P5.

For M4, learners need to describe a range of areas suitable for conservation management in a farming environment. This could build on evidence produced for P6 and P7, and could be presented in the same format.

For D1, learners need to draw together the impact of farming on wildlife and the impact of grant funding on farming practices, and discuss the changes which have occurred as a result of funding and advice. Evidence could be an extension of that produced for M1, M2 and M3 and could be in the same format.

D2 is an extension of M5 and requires learners to recommend and justify particular methods to improve a site in terms of wildlife conservation. The justification should include the effectiveness of the methods in achieving given objectives, the practicalities of using them, the skill level required and any resource and cost implications.



## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1	Changing Farming Practices	You are working as a farming wildlife adviser for FWAG and have been asked to produce information for a visiting school group detailing how farming practices have changed and how this has impacted on the habitats and wildlife on farms.	Written and pictorial evidence – presentation or poster.
P3, P4, P5, M2, M3, D1	Funding and Organisations	In your role as a FWAG Adviser you have been asked to produce an advice leaflet for farmers that explains which organisations offer support and the grant funding available for environmental management of farms. Include a section on how advice and funding change farming practices to benefit wildlife.	Advisory leaflet.
P6, P7, M4	Wildlife Conservation Strategies	You have been asked by a local farmer to assist with his ELS application. Provide a report which lists the features to look for when surveying a site, and describe three sites which could be suitable for wildlife conservation. Recommend and justify one of these sites for conservation management.	Written report including annotated drawings and maps.
P8, P9, P10, P11, P12, D2	Choosing a Site for Habitat Improvement	You have been asked by the farmer to make specific recommendations for a wildlife conservation project that they could carry out to improve the farm. Identify a site which could be improved, survey the site and describe options and methods to restore the habitat on the site. Describe and recommend a wildlife strategy for the site and justify the methods to use in the strategy.	Presentation supported by annotated maps.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Introduction to Environmental Studies	Understanding Land Use and Environmental Issues
Participate in Providing Estate Maintenance	Understanding Principles of Physical and Biological Environmental Processes
Conservation and Improvement of British Habitats	Understanding the Principles of Wildlife Populations, Ecology and Conservation
Undertaking Ecological Surveys and Techniques	

## Essential resources

Learners will need access to a variety of farming enterprises and farm habitats. Simple surveying equipment such as quadrats, hand lenses and sweep nets will also be required.

## Employer engagement and vocational contexts

It will be helpful if centres create and develop good links with a range of local farmers, their local Natural England Officer and local FWAG adviser as this will give learners a much greater insight into farming and the financial implications and rewards associated with good environmental management on farms. Through a series of visits and guest speakers learners can develop their understanding of the ecology of farmland species.

## Indicative reading for learners

### Textbooks

Andrews J and Rebane M – *Farming and Wildlife: A Practical Management Handbook* (A&C Black, 1994)  
ISBN 0903138670

MacLean M – *New Hedges for the Countryside* (Farming Press Books and Videos, 1992)  
ISBN 0852362420

Natural England – *Look After Your Land With Environmental Stewardship* (2009) ISBN 978-1-84754-093-7

Soffe R J – *The Agricultural Notebook* (Wiley Blackwell, 2003) ISBN 978-0632058297

Royal Society for the Protection of Birds – *Ecosystems and Human Activity* (Collins Educational, 1994)  
ISBN 0003266443

Scottish Executive Rural Affairs Department – *Prevention of Environmental Pollution from Agricultural Activity: Code of Good Practice Dos and Don'ts Guide* (Scottish Executive, 2002) ISBN 0755905180

Watt T and Buckley G – *Hedgerow Management and Nature Conservation* (Imperial College Press, 1995)  
ISBN 0862660378

### Journals

*BBC Wildlife*

*Birds* (RSPB quarterly)

*Crops Magazine*

*Farmers Guardian*

*Farmers Weekly*

*The Field*

### Websites

[www.cla.org.uk](http://www.cla.org.uk)

Country Land & Business Association

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment, Food and Rural Affairs

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency

[www.fwag.org.uk](http://www.fwag.org.uk)

The Farming and Wildlife Advisory Group

[www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Natural England

[www.RSPB.org.uk](http://www.RSPB.org.uk)

Royal Society for the Protection of Birds

[www.ukagriculture.com](http://www.ukagriculture.com)

UK Agriculture – agriculture, food and farming resource

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	<p>studying changes in agricultural practices, available funding, roles of organisations, options available for restoration or creation of farming habitats</p> <p>researching the impact that agricultural practices have had on habitats and wildlife, exploring issues, events and problems caused by farming from the perspective of a farmer and a conservationist</p> <p>researching the impacts of agriculture, analysing and evaluating the importance of the information</p> <p>making recommendations for improvements to farm habitats supporting conclusions and making reasoned arguments with evidence</p>
<b>Creative thinkers</b>	<p>considering the possible options for conversation strategies in a given farming environment, generating ideas and exploring possibilities</p> <p>identifying the features to look for when surveying a site, generating ideas</p>
<b>Team workers</b>	<p>researching the changes in agricultural practices in small groups, collaborating with others to work towards common goals</p> <p>carrying out survey work in the field, collaborating with others to work towards common goals</p>
<b>Self-managers</b>	<p>carrying out survey work and working towards goals, showing initiative, commitment and perseverance</p> <p>carrying out survey work, organising time and resources and prioritising actions.</p>
<b>Effective participators</b>	

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	learning about changes in agricultural practices considering the influence of circumstances, beliefs and feelings on decisions and events
<b>Creative thinkers</b>	<p>participating in class discussions throughout this unit, questioning their own and others' ideas and experiences in inventive ways</p> <p>meeting guest speakers or visiting farm locations, asking questions to extend their thinking</p>
<b>Reflective learners</b>	<p>working on assessments and setting goals with success criteria for their development and work</p> <p>discussing their research with classmates and tutors, communicating their learning in relevant ways for different audiences</p>
<b>Team workers</b>	adapting their behaviour to suit different roles and situations on farm visits.
<b>Self-managers</b>	

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching changes in farming practices, organisations and grant funding
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	
Bring together information to suit content and purpose	producing evidence for assessment
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	
<b>Mathematics</b>	

Skill	When learners are ...
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	participating in class discussions.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	



# Unit 8: Introduction to Land-based Workshop Practice

**Unit code:** F/600/9794

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

The learner will cover the basic work requirements within land-based workshops. They will understand the importance of Health and Safety as an integral topic. They will learn how to safely use hand and power tools and basic welding equipment commonly found in a land-based setting. The skills associated with these will be integrated with the development and use of basic maintenance and repair techniques.

## ● Unit introduction

The practical application of workshop skills plays a vital part in land-based business operations. Predominantly concerned with 'things mechanical' these skills, deployed in a safe and efficient manner, contribute greatly to the wellbeing of successful organisations and individuals. Workshop activities not only include both repair and servicing work, but also fabrication and re-fabrication of new and worn out or damaged components. The ability to return a broken machine to optimum working condition and so reduce down time and costs, is a skill much sought after by employers in land-based industries.

The scale and complexity of jobs undertaken in land-based workshops will depend on their size, level of equipment, the employees skills, tools available and the type of work the organisation is involved in. However there are basic principles that underpin any workshop activity. Foremost is the health, safety and wellbeing of employees, employers, visitors and customers of the organisation.

From basic principles the unit aims to develop good working practices in the use of hand and power tools and stresses the need for good maintenance and storage of these expensive assets. The most common forms of welding and cutting will be introduced allowing learners to apply the skills and knowledge gained in maintenance, servicing, repair and fabrication activities on land-based machines and equipment.

Learners will be directed to a range of information sources including operator and workshop manuals, standards organisations, maintenance and adjustment schedules, and will understand the importance of working to specifications where stated. Generally, workshop tidiness and the need to maintain a clean and uncluttered working environment will be embedded as supervised practical work is undertaken in either simulated or commercial workshop conditions.

## ● Learning outcomes

### **On completion of this unit a learner should:**

- 1 Be able to safely use commonly found hand and power tools for the maintenance and repair of land-based machinery and installations
- 2 Be able to safely use basic welding and cutting equipment
- 3 Be able to safely use basic maintenance and/or repair techniques on land-based machinery and installations
- 4 Understand land-based workshop health and safety requirements.



# Unit content

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## **1 Be able to safely use commonly found hand and power tools for the maintenance and repair of land-based machinery and installations**

*Safe use of hand and power tools:* hand tools eg spanners, socket sets, screwdrivers, Allen keys, pliers, hammers; hand tools for measuring, marking out and cutting eg rules, squares, centre punches, hacksaws; power tools for drilling, grinding, cutting and soldering eg 240V, 110V and cordless tools as appropriate; correct uses of each type of tool listed; safe methods of use; tool storage and maintenance; tool transportation; health and safety

## **2 Be able to safely use basic welding and cutting equipment**

*Safe use of basic welding and cutting equipment:* manual metal arc (MMA); metal inert gas (MIG); brazing; oxy-acetylene welding and cutting; advantages and limitations of each system; set up, use and maintenance of equipment and materials; methods used to produce basic fillet and butt joints; use of welding standards; health and safety; risk assessment

## **3 Be able to safely use basic maintenance and/or repair techniques on land-based machinery and installations**

*Techniques:* construction and use of fasteners eg nuts, bolts, rivets, circlips; driveline maintenance eg belts, chains; cutting mechanism maintenance eg sharpening, adjusting; lubrication requirements eg grease, oil, 'anti rust' agents; service and maintenance schedules; manufacturers' handbooks; health and safety

## **4 Understand land-based workshop health and safety requirements**

*Health and safety procedures:* personal protective equipment (PPE); relevant current legislation and codes of practice eg Health and Safety at Work Act 1974; role of welding standards; risk assessment; employee responsibilities; employer responsibilities; personnel cleaning requirements and facilities

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> select and safely use hand and power tools to meet given objectives maintaining or repairing land-based machinery or installations [IE, TW, EP]	<b>M1</b> plan the work processes and tool requirements to carry out routine maintenance tasks on land-based machinery	<b>D1</b> report on the activities undertaken and equipment and materials used to complete workshop maintenance and repair tasks on land-based machinery
<b>P2</b> state reasons for the hand and power tools selected [RL]		
<b>P3</b> safely use basic welding equipment and materials to produce a simple welded joint to meet given objectives [IE, TW]		
<b>P4</b> state reasons for the basic welding equipment and materials selected	<b>M2</b> review a given simple welded fabrication task suggesting improvements	
<b>P5</b> safely use basic techniques to maintain or repair land-based machinery or installations to meet given objectives	<b>M3</b> illustrate safe working procedures for an identified area of work in a land-based workshop environment.	<b>D2</b> explain employee responsibilities under health and safety legislation when operating in a land based workshop environment.
<b>P6</b> state reasons for the basic techniques selected		
<b>P7</b> explain the importance of health and safety in the workshop [RL, CT, SM]		
<b>P8</b> produce a suitable risk assessment for the use of hand and/or power tools to meet given objectives. [RL, CT, SM]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

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## Delivery

Delivery is likely to be a mixture of classroom learning and supervised practical sessions in a workshop. Assessment is likely to be in the form of a portfolio of evidence bringing together recorded and authenticated evidence.

Tutors have the opportunity to use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised land-based workshop practicals, internet and library research and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

Work placements should be monitored regularly before to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to contribute to the maintenance or repair of land-based machinery and installations and they should be encouraged to ask for observation records and/or witness statements to be provided as evidence. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Whichever delivery methods are used, it is essential that tutors stress the importance of the principles and application of health and safety guidance, good workshop practice, environmental issues and the need to manage the resource using legal methods. Although stated in learning outcome 4, these principles should be embedded at all stages of delivery and throughout all learning activities. Tutors must consider the safety of those working or coming into contact with the machinery and equipment to be maintained and/or repaired. Risk assessments must be undertaken before practical activities. Tutors should not ask learners to undertake tasks that are beyond their physical capabilities. As the learners develop their skills, the tutor may encourage them to identify and remedy faults in real situations, to selecting and using necessary tools and equipment under supervision.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments the learner may also be taking as part of their programme of study.

Learning outcome 1 is likely to be delivered using formal lectures, discussions, supervised land-based workshop practicals and independent learner research. Learners will be introduced to the common types of hand and power tools found in most workshop situations. They will look at the safe and correct use of these tools and the maintenance and storage requirements that ensure their continued availability and safe operation. The learning outcome seeks to develop a sense of 'good working practice' wherever tools are used, to control costs and prevent injury to users and damage to machinery. Visiting expert speakers could add to the relevance of the subject for learners. For example, a mechanic working with land-based machinery could talk about their work and the tools they use to maintain and repair appropriate machinery.

Learning outcome 2 is likely to be delivered through a series of formal lectures, demonstrations and supervised land-based workshop practicals. The ability to correctly set up and use basic welding and cutting equipment in a safe manner will be developed further with continued practise, in the fabrication and re-fabrication activities undertaken in many workshop situations. Again good working practices will be stressed as skill development progresses through an understanding of the various techniques, their advantages and limitations to their application in supervised repair and/or fabrication activity.

Tutors are required to cover the four methods listed in the unit content but it is accepted that learners may not become proficient in all of these during the learning time available. Tutors may concentrate practical delivery on one of the systems and, if time and learner development allow, move on to other methods.

Learners must be given the background theory and practical demonstrations for all the systems. Visiting expert speakers could add to the relevance of the subject for the learner. For example, a mechanic working with land-based machinery could talk about their work and the welding systems they use to maintain and repair appropriate machinery and installations.

Learning outcome 3 is likely to be delivered using formal lectures, discussion, supervised land-based workshop sessions and independent learner research. Learners will become aware of the safe use of basic maintenance and/or repair techniques on land-based machinery and equipment. In particular, learners must be made aware of service and maintenance schedules and be able to undertake basic tasks related to these. Learning outcome 3 gives tutors an opportunities to help learners apply and embed the skills and knowledge covered in learning outcomes 1, 2 and 4, in conducting repair and maintenance activities on a range of land-based machinery and equipment. Here the need for the application of good working practices will be reinforced as learners look at typical exercises in machinery maintenance and investigate the various sources of information and standards commonly found in workshop situations. Visiting expert speakers could add to the relevance of the subject for learners as in learning outcomes 1 and 2.

Learning outcome 4 is likely to be delivered using formal lectures, discussion, supervised land-based workshop practicals and independent learner research. Learners will become aware of the health and safety requirements of working in land-based workshops. Learners should be made aware of the difference between 'hazard' and 'risk' and understand the controls or precautions that can be used to limit them. Visiting expert speakers could add to the relevance of the subject for the learners. For example, a safety adviser or environment officer could talk about their work and the implications for the relevant land-based industries. Tutors should maintain current knowledge of legislation and ensure that all practical work is carried out safely and legally. It is not expected that learners will be able to state the exact provisions of various Acts of Parliament. However, they should be able to understand how relevant legislation affects them whilst carrying out practical tasks in the centre and workplace.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduce unit and assessment processes.
<b>Issue Assignment 1: Workshop Skill Development</b> (P1, P2, P5, P6, M1, D1)
and
<b>Assignment 2: Welding Skill Development</b> (P3, P4, M2, D1)
Hazards in the workshop and controlling risk – workshop/work area cleanliness.
Basic hand tool kit contents and uses. Safety, storage and maintenance.
Special tools and applications. Safety, storage and maintenance.
Tools for measuring, marking out and cutting. Safety storage, maintenance and sharpening.
Practical tool use – mark out and cut, drill and grind. Simple component manufacture.
Fusion welding process – safety and PPE.

Topic and suggested assignments/activities and/assessment
Hazards in the welding workshop and controlling risk.
Joint types and terminology.
Welding standards introduction and use.
Materials and suitability for welding.
Oxy-acetylene gas welding (and cutting) introduction and set up.
Manual metal arc welding introduction and set up.
Metal inert gas welding introduction and set up.
Fasteners in common use – form recognition, application and associated tools.
Rivets and riveting – recognition, application and tool requirements.
Circlips – application and use – handling and tool requirements.
Driveline component maintenance – belts.
Driveline component maintenance – chains.
Driveline component maintenance – shafts and bearings.
Driveline component maintenance – gears and couplings.
Service and maintenance operations – tractor units.
Service and maintenance operations – machines.
<b>Assignment 3: Investigate Health and Safety Implications (P7, P8, M3, D2)</b>
Sources of information and relevance.
Legislation and application to the workplace.
Employer responsibilities formalised.
Employee responsibilities.
Unit review.

## Assessment

For P1, they will be expected to select and use hand and power tools safely to meet given objectives, maintaining or repairing land-based machinery or installations. Tutors should identify the given objectives which may depend on the specific requirements of the centre at the time of assessment. Where possible, the size and complexity of these should be the same for each learner to ensure the fairness of assessment. This criterion could be assessed along directly by observation by the tutor during practical activities when learners are undertaking identified tasks and recording their activities. If this format is used suitable evidence from guided activities would be observation records completed by the learner and tutor and accompanied by appropriate work logs or other relevant learner notes. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

P3 requires learners to demonstrate the safe use of basic welding equipment and materials to produce a simple welded joint to meet given objectives. Evidence could be in the form of a test piece. Evidence for P4 could be linked to the work being undertaken for P3 in the form of an oral examination or report. Learners will be expected to use at least one type of welding system to achieve these criteria. Tutors should identify the given objectives which may include basic quality tolerances.

For P5, learners are required to use basic techniques safely to maintain or repair land-based machinery or installations to meet given objectives. Evidence for this may be linked to that being provided for other grading criteria and may be in the form of a portfolio of evidence showing maintenance activities covering the unit content. Where possible, the given objectives for this criterion should be the same for each learner.

However, it is appreciated that this may be difficult to organise for larger learner groups, in which case tutors should try to ensure fairness of assessment for all learners. For P6, learners could include in their portfolio a statement describing the reason for their particular approach to the tasks undertaken

P7 requires learners to explain the importance of health and safety in the workshop. This could take the form of an annotated report, a presentation using suitable software or a poster campaign for a given site.

P8 requires learners to produce a suitable risk assessment for the use of hand and/or power tools to meet given objectives. Evidence for this may be linked directly to tasks being undertaken to provide evidence for P1 to P6 and included in learners' portfolio. Tutors should identify the given objectives and a risk assessment pro forma, which should be in a format that is acceptable in a real-work situation.

For M1, learners are required to plan the work processes and tool requirements to carry out routine maintenance tasks on land-based machinery. Evidence for this may be linked directly to tasks being undertaken for the P1, P2, P5 and/or P6 in this unit and could be in the form of a checklist of tools and equipment, work processes with accompanying notes, extracts from manufacturers' schedules and/or materials and quantities lists, drawn up before executing the task.

For M2, learners are required to review a given simple welded fabrication task to suggest improvements. Evidence for this criterion may be linked directly to tasks being undertaken for P4 and P5 and could be in the form of a checklist of tools and equipment, work processes with accompanying notes, extracts of welding standards and materials and quantities lists, drawn up prior to executing the task.

For M3, learners are required to illustrate safe working procedures for an identified area of work in a land-based workshop environment. Evidence should be linked to the range of activities undertaken for other criteria and could take the form of a poster presentation, illustrated report or a pictorial presentation using suitable software.

For D1, learners are required to report on the activities undertaken and equipment and materials used to complete workshop maintenance and repair tasks on land-based machinery. Evidence may be linked directly to work being undertaken for other criteria or tutors could ask learners to evaluate other work that meets the necessary objectives for this criterion. Evidence could take the form of a reflective log attached to the activities undertaken for P1 to P6, M1 and M2, where learners describe the activities undertaken and evaluate whether the work has met the given objectives and, if not, why this may be.

D2 requires learners to explain the employee responsibilities under health and safety legislation when operating in a land-based workshop environment. Evidence could take the form of a web-based research project with downloads and extracts populating an illustrated report or animated presentation. This lends itself to group working. If this method of assessment is applied tutors should satisfy themselves of each individual's contribution achieve to the distinction grade.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P5, P6, M1, D1	Workshop Skill Development	Learners set up systems to record workshop activities. Basic portfolio requirements to include risk assessments, information on tasks, toolage and material requirements. Work process statements and evaluative elements for each, providing evidence for merit and distinction criteria.	Observation. Course work portfolio. Presentation of work logs. Illustrated reports and/or AV presentations using suitable software.
P3, P4, M2, D1	Welding Skills Development	Learners to produce welded joint test pieces having selected and set up a welding system within the range of the unit content. Recording of risk assessments, work process statements and evaluative elements to provide evidence for merit and distinction criteria.	Observation and test pieces. Illustrated reports. Work logs.
P7, P8, M3, D2	Investigate Health and Safety Implications	Working in small groups, learners to review institutional approaches to health and safety and compare with legislative requirements to explain the importance to both employers and employees. Merit and distinction criteria could be evidenced through analysis.	Group work. AV/illustrated presentation. Poster campaign. Written reports.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Introduction to Land-based Machinery Operations	Undertaking Land-based Workshop Practice
Participate in Providing Estate Maintenance	Undertake Estate Skills

## Essential resources

Facilities required for this unit include regular and routine supervised access to appropriately resourced land-based workshops.

Sufficient equipment and materials should be available to allow learners to gain experience of a range of powered and non-powered tools for example powered drills, grinders, saws, MMA welders, MIG welders, brazing equipment and hand tools.



Access to resources should be sufficient to allow all learners adequate opportunity to develop practical competence and confidence over a period of time.

## Employer engagement and vocational contexts

The unit has a very practical focus and in this respect employer engagement will provide the modern context into which workshop skills and employers and manufacturer requirements for land-based machinery and equipment can be placed.

Good employer links will also help secure a valuable resource which will benefit of learners. Work placement opportunities should be actively sought alongside visits by experienced practitioners to illustrate current equipment, trends and practice in maintenance and repair operations. Learners could be encouraged to develop links with employers and arrange visits and demonstrations.

## Indicative reading for learners

### Textbooks

Agate E – *Tool Care – A Maintenance and Workshop Manual* (British Trust for Conservation Volunteers, 2000) ISBN 0946752249

Bell B – *Farm Machinery* (Old Pond Publishing, 2005) ISBN 1903366682

Gibson S and Smith A – *Basic Welding* (Thomson Learning, 1993) ISBN 0333578538

Shippen J – *Basic Farm Machinery* (Butterworth-Heinemann, 1980) ISBN 0080249116

### Journals

*Farmers Guardian*

*Farmers Weekly*

*Profi International*

### Websites

[www.defra.gov.uk](http://www.defra.gov.uk)

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

[www.hsegov.uk](http://www.hsegov.uk)

[www.lantra.co.uk](http://www.lantra.co.uk)

Department for Environment, Food and Rural Affairs

Environment Agency

Health and Safety Executive

Lantra Sector Skills Council

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	exploring the safe use of power tools
<b>Creative thinkers</b>	connecting with others' experiences of workshop hazards and safety
<b>Reflective learners</b>	considering the hazards and risks associated with workshops
<b>Team workers</b>	working with others to use basic welding equipment
<b>Self-managers</b>	organising safe and hazard free workshop activity.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	investigating tool use and maintenance reviewing specifications for welded joints
<b>Creative thinkers</b>	analysing health and safety poster information creating poster campaigns and risk assessments
<b>Reflective learners</b>	stating reasons for tool and equipment usage stating reasons for choice of techniques
<b>Team workers</b>	working on practical tasks researching health and safety information
<b>Self-managers</b>	stating personal reasons for tool and equipment usage stating personal reasons for choice of techniques
<b>Effective participators</b>	participating in practical activities participating in group-work.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using web based research skills to obtain H&S information and guidance delivering AV presentations for assessment
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	planning work processes for particular tasks preparing and submitting work for assessment
Manage information storage to enable efficient retrieval	using electronic storage mediums for planned and completed tasks recording risk assessments for later adaptation and use
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching tools and techniques for personal use reviewing tool supplier catalogues and price lists
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	accessing and using welding standards information accessing and using health and safety websites and information
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	preparing and delivering AV presentations using suitable software recording set up specifications (gas pressures, nozzle size, voltages, amps etc) measuring and recording compliance with standards compiling risk assessments to a pro forma
Bring together information to suit content and purpose	compiling risk assessments to a pro forma preparing and presenting poster information
Present information in ways that are fit for purpose and audience	compiling risk assessments to a pro forma preparing and presenting poster information
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	measuring, marking out, calculating and cutting to tolerances calculating material requirements calculating material and machine cutting and feed speeds
Identify the situation or problem and the mathematical methods needed to tackle it	measuring and marking out from a datum point using error reduction techniques
Select and apply a range of skills to find solutions	using tables and standards to work effectively
Use appropriate checking procedures and evaluate their effectiveness at each stage	using tables and standards to evaluate practical tasks
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	calculating material requirements calculating cutting and feed speeds interpreting engineering drawings and tolerances
Draw conclusions and provide mathematical justifications	self assessing fabricated components complying with specifications and standards
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presenting assessed work and obtaining feedback working in groups to meet objectives requesting materials and tools for particular tasks
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	reviewing standards to enable compliance comparing workshop information with legislative requirements analysing content for completeness
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	compiling portfolios of evidence preparing risk assessments for practical activities reporting on particular work processes and general workshop activity.

# Unit 9: Introduction to the Principles of Land-based Machinery

Unit code:	K/600/9594
Level 2:	BTEC First
Credit value:	5

## ● Aim and purpose

This unit aims to introduce learners to the skills and knowledge associated with land-based machinery and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

## ● Unit introduction

The majority of land-based businesses have some form of machinery (including vehicles) associated with them for use by their employees. These machines are generally used in the growing and production processes or in the maintenance of the estate and/or facilities. They are important in ensuring a business is efficient in its growing and production processes, keeping costs within acceptable limits.

Employees working within the land-based industries are often required to have a working knowledge of their machines to reduce both costs and down time. Many land-based businesses have limited access to immediate specialist help. Therefore, it is important that employees have a working knowledge of the operating principles of the machines they use.

The size and complexity of the machines depends on the business and its objectives.

This unit has been designed to cover the basic working principles of machines commonly found in land-based businesses, including tractors, rough terrain and utility vehicles. The unit covers the principles of the basic power units, transmission and 12V electrical systems found in common land-based machines, along with the basic maintenance and inspection requirements that operators must fulfil before using these machines.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 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.

# Unit content

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## 1 Know the working principles of combustion engines

*Combustion engines:* compression ignition (CI) and spark ignition (SI) engines, 2 stroke and 4 stroke cycles, naturally aspirated and turbo-charged air intake systems, diesel, petrol, bio-products, lubricants, air and liquid cooling systems, emissions legislation, cold start systems

*Component parts:* cylinder block and head, flywheel, clutch assemblies, crankshaft, pistons and rings, connecting rod and bearings, valves and springs, gaskets and seals, cooling system components, fuel system components, lubrication oil filters, starter motor, generator

*Engine use:* land-based self-propelled units, hand held equipment, static units, drive systems, clutches, shafts, belts and chains, transmission gearbox, compressed air and hydraulics, engine speed, power and torque

## 2 Know the maintenance requirements of machines

*Common hazards:* exhaust fumes, heat, noise, vibrations, stored energy, sparks, and machine stability

*PPE:* footwear, personal clothing protection, barrier cream, gloves, eye protection, ear defenders, chemicals protection (apron)

*Maintenance tools:* selection and safe use of hand tools, measuring equipment, use of manufacturers' service literature, lubrication oils data, daily and periodic checks and maintenance schedules

## 3 Be able to maintain engines on land-based machines

*Maintain engines:* manufacturers' recommended schedules, records, reasons for maintenance, risk assessments for maintenance tasks, starting procedures, pre-start checks and maintenance, fuel, lubrication, cooling and charging system maintenance, waste disposal, regulations and legislation

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> describe the uses of combustion engines on a range of machines within a land-based industry [IE]	<b>M1</b> state the functions of component parts of a combustion engine	<b>D1</b> explain the purpose of land-based machine transmission systems for given situations.
<b>P2</b> describe the working cycles of 2 stroke and 4 stroke engines [IE]	<b>M2</b> describe external differences between 2 stroke and 4 stroke petrol engines	
<b>P3</b> state the functions of component parts of a combustion engine [EP]		
<b>P4</b> describe methods of transmitting drive from engines to the working parts of machines		
<b>P5</b> describe common hazards associated with machine use and maintenance [EP]	<b>M3</b> Describe PPE required for maintenance activities	
<b>P6</b> state the purpose of common workshop tools		
<b>P7</b> carry out risk assessment for machine maintenance activities [SM,TW]	<b>M4</b> carry out maintenance activities safely, effectively and without damage to the environment with the aid of manufacturers' handbooks.	
<b>P8</b> carry out pre-start checks and starting procedures on machines.		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators



# Essential guidance for tutors

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## Delivery

Tutors have the opportunity to use as wide a range of techniques as possible. Lectures, discussions, site visits, supervised land-based workshop practice, internet and library-based research and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities, so that naturally occurring evidence could be collected at the time. For example, learners may have the opportunity to contribute to the maintenance or repair of land-based machinery and they should be encouraged to ask for observation records and/or witness statements to be provided as evidence.

Whichever delivery methods are used, it is essential that tutors stress the importance of health and safety, good workshop practice, environmental issues and the need to manage the resource within the law as an introduction to the unit. Risk assessments must be undertaken before practical activities. As learners develop their skills, the tutor may encourage them to carry out maintenance tasks in real situations, selecting and using necessary tools and equipment under supervision.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments the learner may also be taking as part of their programme of study.

Learning outcome 1 concentrates on the possible applications of engines and power units in the land-based sectors, together with the knowledge required to understand the basic working processes of a range of engines. Learners will study equipment typical to their area of study, for example agriculture, landscape, horticulture and countryside.

Learning outcome 2 deals with the understanding of why engines and power units require regular maintenance and the consequences of not following manufacturers' guidelines when scheduling and carrying out maintenance. This learning outcome also covers the selection and safe use of hand tools required to carry out service tasks, and hazards associated with working in a maintenance workshop environment, in particular the need for the correct selection and use of PPE.

Learning outcome 3 covers the practical maintenance of engines on land-based machines. Emphasis must be on safe systems of work, use of manufacturers' handbooks and maintaining service records. It is inevitable that hazardous and non-hazardous wastes will result from the service procedures. Tutors must ensure that there are no contraventions of safe working practices or environmental pollution issues generated.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

## Topic and suggested assignments/activities and/assessment

Introduction and overview of unit.

**Assignment 1: Working Principles of Land-based Engines and Power Units** (P1, P2, P3, P4, M1, M2, D1) – introduction.

Introduction to engine types, design and cycle of operation.

Investigation of engine components and their purpose.

**Assignment 2: Workshop Maintenance, Safe Procedures** (P5, P6, M3) – introduction.

Workshop investigations, tools, safety issues, PPE and information sources.

**Assignment 3: Engine and Power Unit Maintenance** (P7, P8, M4) – introduction.

Introduce recording systems, job cards, risk assessments, carry out pre-start checks and correct start-up procedures.

Carry out maintenance tasks.

Feed back on Assignments 1 and 2.

Feed back on Assignment 3.

Unit review.

## Assessment

For P1, learners will need to describe where different types of engines and power units are used to provide power for machines and equipment used in their area of land-based study. Assessment could take the form of an oral discussion where the tutor marks off criteria using a pre-prepared evidence sheet.

For P2, learners must describe 2 stroke and 4 stroke cycles of internal combustion engines making references to fuel types and outline advantages and disadvantages of the different units. For P3, learners need to state the functions of combustion engine parts. These criteria could be assessed in the same way as P1 with evidence recorded on an extended or separate evidence sheet. For P4, learners will describe the various methods of transmitting energy from the internal combustion engine to power land-based machines and equipment. Learners could produce written evidence backed up by way of labelled diagrams and highlight advantages and disadvantages of the different drive systems.

For P5, learners need to describe hazards associated with maintenance tasks that need to be carried on land-based power units, equipment and machines. Relevant codes of practice and current regulations should be recorded.

For P6, learners must state the purpose of common workshop tools. For P7 and P8, learners must carry out risk assessment and pre-start checks on equipment safely and demonstrate correct and safe starting procedures. These could be evidenced during practical activities using witness statements or observation records.

For M1, learners need to state the functions of the main internal components of an internal combustion engine. Evidence could be generated by way of a pre-prepared answer sheet where learners will record the names and function of a range of components presented to them. Learners will also locate major serviceable items on a power unit that will feature in service and maintenance tasks, mainly cooling, lubrication and electrical components.

For M2, learners are required to describe the visible external differences between different types of internal combustion engines. This could be evidenced by way of an observation checklist that should highlight design and component information for the different unit types.

For M3, learners are to identify and record PPE requirements against relevant maintenance work activities.

For M4, learners will carry out maintenance activities for a range of land-based equipment and machines covering scheduled and non-scheduled service and minor repairs demonstrating their ability to follow manufacturers' recommendations, safe working practice and compliance with current legislation.

D1 requires learners to explain the purpose of land-based machine transmission systems in the context of a minimum of three different land-based contexts. Evidence could be through an assignment or machinery report linking to merit criteria.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, M1, M2, D1	Working Principles of Land-based Engines and Power Units	You are to give a presentation explaining the difference between a range of engines and power units, highlighting the differences in external appearance, the location of external components and an explanation of a range of available internal engine components.	Oral assessment, identification exercise. Written descriptions accompanied by diagrams. Written description and diagrams.
P5, P6, M3	Workshop maintenance, safe procedures	Before undertaking power unit and machine maintenance tasks you are to carry out hazard-spotting exercises to ensure awareness of health and safety issues. You will assess the PPE requirements for identified service tasks and familiarise yourself with sources of information required to carry out scheduled maintenance to manufacturers' recommendations.	Hazard-spotting exercise, record findings. Oral assessment on use of hand tools.
P7, P8, M4	Engine and Power Unit Maintenance	You are to carry out service procedures in accordance to manufacturers' recommendations on a range of land-based equipment. Service tasks are to include daily checks and maintenance, pre-start checks, scheduled maintenance and non-scheduled maintenance and repairs.  These tasks are carried out in a land-based maintenance workshop environment where other activities will be carried out at the same time. Health and safety issues are to be closely observed and monitored, hence the need for risk assessments to be carried out. On completion of the tasks, the work area is to be restored, waste materials to be correctly disposed of and service records completed.	Completed risk assessments. Observation checklists. Portfolio of evidence of service procedures.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element CU27.1 Prepare equipment and machines for maintenance Element CU27.2 Carry out maintenance procedures	Understanding Principles of Land-based Machinery
Introduction to Land-based Machinery Operations	Manage Agricultural Environments
Tractor Driving	Understand Farm Power Units – machinery and operation

### Essential resources

A range of currently available engines, power units and equipment, typical to the learner's chosen area of study, manufacturers' service schedules and maintenance charts, lubrication and filter data should all be available.

A range of hand tools and measuring equipment required to complete service tasks will also be required.

A suitably equipped service bay within a typical land-based maintenance workshop, which allows tasks to be carried out safely and to current legislative standards.

Suitable waste disposal systems to comply with environmental regulations and company policies.

### Employer engagement and vocational contexts

Centres are encouraged to supply the range of equipment required for this unit, links with local industry, contractors or the centre estates departments may be able to supply up to date equipment requiring maintenance. This will emphasise using 'live' equipment rather than working through simulated scenarios. Visits to commercial workshops may enhance learners' understanding of safe working practices, teamwork and workshop organisation. Work experience opportunities may develop learners' skills before this unit is assessed.

## Indicative reading for learners

### Textbooks

Bell B – *Farm Machinery* (Old Pond Publishing, 2005) ISBN 1 903366682

Brian Cairns – *The Farmers and Groundsmans guide to Planning Vehicle and Machinery Maintenance* (The Crowood Press Ltd, 2009) ISBN 978-1847971104

Culpin C – *Farm Machinery*, 12th edition (Blackwell Scientific, 1992) ISBN 0632031597

Hillier V and Coombes P – *Hillier's Fundamentals of Motor Vehicle Technology*, 5th edition (Nelson Thornes, 2004) ISBN 0748780823

### Journals

*Horticultural Weekly*

*Profi International*

### Other publications

Manufacturers' publications and manuals

Lubrication charts and data sheets

### Websites

[www.bagma.com](http://www.bagma.com)

British Agricultural and Garden Machinery  
Association

[www.hse.gov.uk](http://www.hse.gov.uk)

Health and Safety Executive

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	describing the working applications and principles of engines describing the 2 and 4 stroke engine cycles stating the purpose of workshop tools
<b>Self-managers</b>	producing risk assessments
<b>Effective participators</b>	describing common hazards
<b>Team workers</b>	taking part in discussions with colleagues/tutor when assessing risks.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	producing job cards and service documentation analysing manufacturers' service information planning servicing tasks
<b>Creative thinkers</b>	trying out different approaches to practical tasks
<b>Reflective learners</b>	completing service documentation which needs to be available for future reference
<b>Team workers</b>	taking part in discussions with tutor/service manager when selecting equipment for service
<b>Self-managers</b>	organising time schedules when completing service tasks.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	completing and storing service records
Follow and understand the need for safety and security practices	carrying out workshop-based tasks
Troubleshoot	carrying out pre-start checks
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	selecting and using manufacturers' service data
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	using manufacturers' information to determine service schedules
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	producing service records explaining working principles of engines
Bring together information to suit content and purpose	using service charts and lubrication oils data
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	formulating liquid coolant strengths
Identify the situation or problem and the mathematical methods needed to tackle it	servicing lubrication oil and coolant system
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	explaining working principles and uses of engines
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	interpreting manufacturers' data and instructions
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	producing service records producing risk assessments.



# Unit 10: Undertaking Ecological Surveys and Techniques

**Unit code:** Y/600/9168

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

Learners will investigate the planning, surveying and reporting of terrestrial and aquatic habitats. They will learn about the safe selection and use of different methods and the tools and equipment necessary in the correct and accurate collection and recording of data in the field and laboratory. They will conclude by learning the approach and use of basic statistical analysis.

## ● Unit introduction

The ability to manage natural resources successfully requires access to accurate information, and in countryside management there is a particular requirement to be able to carry out ecological surveys and interpret their results. This unit will give learners an understanding of basic ecological surveying and enable them to study methods that can be used in a wide range of habitats.

Throughout the unit learners will be made aware of safe working practices relating to themselves, their colleagues, equipment, animals, plants and the environment. They will be able to carry out risk assessments before undertaking any practical tasks.

Learners will investigate methods used to plan terrestrial and aquatic animal and plant surveys using appropriate techniques, and learn how to use keys to identify species. They will have the opportunity to carry out surveys in a range of situations, and gain an understanding of the reasons why surveys are carried out.

They will learn the importance of accurate data collection and how to minimise errors, as well as the presentation, reporting and interpretation of survey results, which are all critical skills in the countryside and environment sector.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Be able to plan surveys using safe working methods and appropriate techniques
- 2 Know how to identify terrestrial and aquatic species using identification keys
- 3 Be able to carry out surveys and accurately record data in different situations and habitats
- 4 Understand the use of basic statistical analysis in the production of reports.

## ● Unit content

### 1 Be able to plan surveys using safe working methods and appropriate techniques

*Planning:* aims and objectives of investigation; logical sequence of actions; location; health and safety including personal protective equipment (PPE); risk assessment; preliminary skills and knowledge to include basic knowledge of geology, soils, related land use, climate, map reading skills; use of identification keys; basic assessment of the use of operational methods to minimise damage and disruption to site and wildlife; relevant current legislation eg Wildlife and Countryside Act 1981

Risk assessments: consideration of risks; likelihood of risk; severity of risk; ways to mitigate risks

### 2 Know how to identify terrestrial and aquatic species using identification keys

*Identification:* using identification keys and guide books to identify plants and animals; equipment used to identify plants and animals (hand lenses and microscopes, binoculars and nets); advantages and disadvantages of using dead, preserved and living samples for identification purposes; use of indicator species (in first instance their determination); health and safety

Indicator species: species whose presence or absence gives information about characteristics of the environment, eg air quality, water pollution, soil or rock types, species competition, climate change

### 3 Be able to carry out surveys and accurately record data in different situations and habitats

*Surveys:* abiotic surveys eg soil (horizons, type and pH), climate (light, wind, temperature, humidity), water (dissolved oxygen, temperature, nitrate level, flow, clarity); site assessment eg plans, maps, photographs, sketches and diagrams; plant surveys (basic quantitative studies using simple quadrat and transect methods); animal surveys eg pitfall traps, sweep nets; conducting and recording simple surveys; equipment needed to carry out surveys; use of automatic data recording systems; health and safety (to include PPE, risk assessments); relevant current legislation eg Wildlife and Countryside Act 1981

Present results: quantitative (eg tables, charts, scatter graphs, histograms, pie charts); qualitative (eg annotated map, diagram, written report)

### 4 Understand the use of basic statistical analysis in the production of reports

*Statistical analysis:* basic statistical analysis to include mean, median, mode and range, distribution; conclusion in relation to hypothesis and survey aims

Possible sources of error: collection errors; recording errors; identification errors; sampling errors; calculation errors

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> use terrestrial and aquatic survey planning techniques	<b>M1</b> create a logical plan for carrying out a terrestrial or aquatic survey	<b>D1</b> explain the reasons and methods used for carrying out terrestrial and aquatic surveys
<b>P2</b> carry out risk assessments relevant to surveys planned		
<b>P3</b> identify terrestrial and aquatic animals and plants using appropriate keys		
<b>P4</b> describe the importance of indicator species	<b>M2</b> explain the advantages and disadvantages of using keys to identify species	
<b>P5</b> carry out terrestrial and aquatic surveying [CT,TW, SM, EP]	<b>M3</b> plan and carry out terrestrial and aquatic surveying independently and diligently	<b>D2</b> evaluate and suggest improvements to survey work, analysis and presentation of results.
<b>P6</b> record and collate terrestrial and aquatic data accurately		
<b>P7</b> undertake analysis of survey data		
<b>P8</b> present results in appropriate formats		
<b>P9</b> explain the use of statistical analysis relating to surveys carried out [IE]	<b>M4</b> explain the importance of recording and presenting data accurately.	
<b>P10</b> discuss the possible sources of error and their minimisation/prevention. [RL]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

## Delivery

Tutors delivering this unit can use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised field and laboratory practicals, internet and/or library-based research and the use of personal and/or industrial experience would all be suitable. If delivery is supported by work placements these should be monitored regularly in order to ensure the quality of the learning experience.

Learners and supervisors should be made aware of the requirements of this unit before any work-related activities are undertaken, so that naturally occurring evidence can be collated at the time. For example, learners may have the opportunity to undertake habitat surveys and they should ask for observation records and witness statements to be provided as evidence. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Whichever delivery methods are used, it is essential that tutors stress the importance of health and safety and environmental issues and the need to manage resources using legal methods. Risk assessments must be undertaken before any practical activities. Learners should not be asked to undertake tasks that are beyond their physical capabilities. Adequate PPE must be available and used during practical activities.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments learners may also be taking as part of their programme of study.

Supervised field visits are a vital part of this unit as both terrestrial and aquatic habitats must be surveyed. Tutors could deliver all the learning outcomes whilst working around identified terrestrial and aquatic habitats. The aquatic habitats studied within this unit may be freshwater, brackish or marine. Visiting expert speakers could add to the relevance of the subject. For example, a countryside ranger or Environment Agency biologist could talk about their work and the importance of accurate survey data in making management decisions.

Learners will need to experience all aspects of survey work, from the initial plan and risk assessment through to results analysis and presentation. Delivery will need to encompass a range of methods for carrying out surveys and presenting results, including statistical analyses and formats for presenting results.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

### Topic and suggested assignments/activities and/assessment

#### Assignment 1: Identifying Species (P3, P4, M2)

Tutor introduces the unit and the brief.

Classroom session: theory of identification keys, classification of plants and animals, learner activity to design a key.

Topic and suggested assignments/activities and/assessment
Practical activity: using keys to identify a range of species.
Classroom session: use of indicator species to confirm presence of other species. Practical activity matching species with indicator species.
Personal study and assessment completion.
<b>Assignment 2: Planning Surveys</b> (P1, P2, M1, D1)
Tutor introduces the assignment brief.
Classroom session: survey planning, methods, techniques.
Practical session: risk assessment for surveying. Health and safety to be fully discussed, with examples of all potential hazards.
Visit: identify terrestrial and aquatic habitats to survey and particular features which will impact on planning.
Personal study and assessment completion.
<b>Assignment 3: Practical Surveying</b> (P5, P6, P7, P8, P9, P10, M3, M4, D2)
Tutor introduces brief.
Classroom session: importance of accurate data collection and recording.
Classroom discussion: sources of error and their minimisation and prevention.
Practical surveying: aquatic and terrestrial habitats.
Classroom session: methods of presenting results, use of statistical analysis.
Practice session: using statistics, presenting results.
Classroom-based activity: basic analysis and interpretation of survey data.
Personal study time and results analysis and write-up.

## Assessment

For P1, learners will be expected to plan a terrestrial and an aquatic survey to meet given objectives. Tutors should identify the habitats to be surveyed and the survey objectives, or agree them with learners. It is expected that evidence will include details of preliminary site visits as well as the plan for the survey. Evidence could take the form of a pictorial presentation with notes (possibly using appropriate software or OHPs) or a project.

P2 requires learners to carry out a risk assessment for each of the two surveys planned in P1. Tutors should identify the survey and the agreed format for the risk assessments, which should be in a style that is recognised by the Health and Safety Executive. Evidence could take the form of a completed risk assessment pro forma.

P3 requires learners to identify specified terrestrial and aquatic animals and plants using identification keys. Learners should correctly identify at least five terrestrial plants, five terrestrial animals, five aquatic plants and five aquatic animals. This could be assessed directly by the tutor during practical activities. If this format is used, observation records would be suitable evidence, if completed by the learner and tutor and accompanied by appropriate work logs or other relevant learner notes. If assessed during a placement, witness statements should be provided a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided by the Edexcel website. Alternatively, evidence could take the form of a pictorial presentation with notes (possibly using appropriate software or OHPs), laboratory or field notebooks, an annotated poster or leaflet, or a project.

For P4, learners need to describe the importance of indicator species, and should include examples of indicator species that are commonly used to form a view about at least three environmental conditions. Evidence could be a verbal presentation, report, leaflet or poster.

P5 and P6 are linked. Learners will be expected to carry out a terrestrial and an aquatic survey to meet given objectives and record and collate the data accurately. Tutors should identify the habitats to be surveyed and the survey objectives, or agree them in discussion with learners. Habitats and survey plans may be the same as those used to provide evidence for other grading criteria. This could be assessed directly by the tutor during practical activities. If this format is used, observation records would be suitable evidence if completed by the learner and tutor and accompanied by appropriate work logs or other relevant learner notes. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

P7 and P8 require learners to produce a report of a given survey to meet an agreed format. Tutors should identify the survey, which is likely to be one of those completed for P5 and P6, and the agreed format for the report, or agree them in discussion with learners. Evidence will be a report, with results presented in the most appropriate format(s).

For P9, learners need to explain how statistical analysis is used for the surveys they have undertaken. Evidence could be a verbal report or a section of the report completed for P7 and P8.

P10 requires learners to discuss possible sources of error and how they can be minimised or prevented. Learners should include a range of possible errors as indicated in the unit content. Evidence could be a verbal or written report, which may be included within evidence presented for other criteria.

Assessment of M1 links with evidence for P1 and P2, and requires the plan to be logical, ie capable of being followed sequentially to achieve identified objectives.

For M2, learners are required to explain the advantages and disadvantages of using keys for identification purposes. Learners should provide evidence that is wide ranging, possibly using examples from work they have carried out during the course of this unit. Evidence may be in the same form as for P4.

M3 links with P5, requiring learners to demonstrate independence and diligence in their surveying, showing a level of attention to detail and careful completion.

M4 requires learners to explain the importance of recording survey data accurately. Learners should provide evidence that is wide ranging, possibly using examples from work they have carried out during the course of this unit. Evidence may take the form of a report or annotations to a poster or leaflet.

For D1, learners need to explain the reasons and methods used for carrying out surveys, building on the evidence presented for M1 and M2.

D2 requires learners to review and evaluate their survey and the consequent reporting of results, and suggest improvements. Evaluations could encompass learners' own performance, how well the survey met the given objectives, the accuracy of the work completed and the environmental impact of the survey work. Evidence could be a verbal discussion or presentation, or a written evaluative report, which may be included in the report required for P8.

### **Programme of suggested assignments**

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1, D1	Planning Surveys	<p>You are working with a field biologist to research the biodiversity in an area, including land and water habitats.</p> <p>You have been asked to carry out preliminary visits to the sites to be surveyed. Complete a risk assessment for each site and create a logical survey plan. Include an explanation for the reasons and methods used for carrying out surveys.</p>	Completed risk assessment and survey plans.
P3, P4, M2	Identifying Species	<p>Other volunteers are also working with the field biologist, but have less experience than you. Show them how to identify, using keys, the terrestrial and aquatic species given to you. Produce a short reference leaflet explaining the advantages and disadvantages of using keys and describing indicator species and their importance.</p>	<p>Observation of species identification.</p> <p>Leaflet.</p>
P5, P6, P7, P8, P9, P10, M3, M4, D2	Practical Surveying	<p>The field biologist has asked you to carry out a survey of one terrestrial and one aquatic site. After your survey, analyse and present your findings in a written report. Include an explanation of the statistical analysis used, possible sources of error and the importance of accurate data. Conclude by evaluating your work.</p>	<p>Practical observation, diary/work log, photographic evidence, witness statements.</p> <p>Written report.</p>

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
<p>Element EC2.1 Collect and record data on the natural environment</p> <p>Element EC2.2 Report on the condition of the natural environment</p>	<p>Understanding Principles of Physical and Biological Environmental Processes</p>
<p>Introduction to Environmental Studies</p>	<p>Understanding the Principles of Wildlife Populations, Ecology and Conservation</p>
<p>Conservation and Improvement of British Habitats</p>	

## Essential resources

Learners must have supervised access to a range of terrestrial and aquatic habitats which contain a range of animal and plant species. They must also have access to identification keys and field guides, plus survey equipment, for example hand lenses, quadrats, clipboards, sampling nets, trays, test kits, automatic data-collection equipment and laboratory microscopes.

## Employer engagement and vocational contexts

This unit focuses on giving learners an opportunity to learn how to plan and carry out surveys of terrestrial and aquatic habitats safely and correctly. Centres are encouraged to create and develop links with environmental agencies which may allow learners to get involved with studies taking place that would enable them to use their skills and broaden their interest in the ecological surveys and techniques others use. Visits to areas of moorland and areas of interest outside learners' immediate area would be of great use, as would visits by speakers from diverse areas within this field. Encouraging learners to spend their free time working on ecological survey sites, when available, would enhance their learning and enthusiasm.

## Indicative reading for learners

### Textbooks

Chinery M – *Collins Pocket Guide: Insects of Britain and Western Europe* (Collins, 1993) ISBN 0002191377

Clegg C J and Mackean D G – *Advanced Biology: Study Guide* (Hodder Murray, 1996)  
ISBN 071955358X

Dowdeswell W H – *Ecology: Principles and Practice* (Heinman, 1984) ISBN 0435602268

Furniss P and Lane A – *Practical Conservation Water and Wetlands* (Hodder Arnold, 1992)  
ISBN 0340533684

Holmes D and Warn S – *Fieldwork Investigations – A Self Study Guide* (Hodder & Stoughton, 2003)  
ISBN 0340679697

Manuel R and Fitter R – *Collins Field Guide to Freshwater Life* (Collins, 1986)  
ISBN 0002191431

Phillips R – *Grasses, Ferns, Mosses & Lichens of Great Britain & Ireland* (Macmillan, 1994) ISBN 0330259598

Williams G – *Techniques and Fieldwork in Ecology* (Collins, 1991) ISBN 0003222462

### Websites

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment Food and Rural Affairs

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency

[www.forestry.gov](http://www.forestry.gov)

The Forestry Commission

[www.lantra.org.uk](http://www.lantra.org.uk)

Lantra – Sector Skills Council for Environmental and Land-based Industries

[www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Natural England



## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	carrying out their research using websites or other information
<b>Creative thinkers</b>	taking part in discussions with other learners and involving themselves fully in planning their work and when working as part of a group
<b>Reflective learners</b>	making suggestions to improve performance. after completing tasks
<b>Team workers</b>	working effectively as part of a team and collaboratively in discussions and practical tasks
<b>Self-managers</b>	planning their own work without constant supervision or guidance from others.
<b>Effective participators</b>	

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	planning a terrestrial and an aquatic survey to meet given objectives
<b>Creative thinkers</b>	planning a terrestrial and an aquatic survey to meet given objectives
<b>Reflective learners</b>	producing a report of a given survey to meet an agreed format making suggestions to improve their own performance in the future
<b>Team workers</b>	collaborating with others to carry out risk assessments, surveys and using all equipment as part of a team
<b>Self-managers</b>	taking on responsibility, organising own time and resources and prioritising actions during their survey planning.
<b>Effective participators</b>	

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using OHTs or PowerPoint to present their work using computers to produce their risk assessments and plan of actions
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	researching the internet for the appropriate information regarding the identification of plants and animals collecting data required for their presentations and assignments
Manage information storage to enable efficient retrieval	putting all collated data into files neatly retrieving files to update when required
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching the internet for the appropriate material required for assignments
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	collating survey data on <ul style="list-style-type: none"> <li>• breeds and types of animals and plants</li> <li>• number of species found in surveys</li> <li>• records made when carrying out surveys</li> </ul>
Bring together information to suit content and purpose	collating information producing surveys, graphs PowerPoint presentations
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	guarding their own using discretion when sending messages and information

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	using mathematics as a tool in a wide range of situations to solve problems using number for solution and example
Identify the situation or problem and the mathematical methods needed to tackle it	recognising relevant formulae and expressions where mathematics is used to solve the problem
Select and apply a range of skills to find solutions	laying out formulae and expressions in a logical order, once the problem has been recognised
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	<p>taking part in a variety of discussions with other learners and using a variety of methods to produce their presentations</p> <p>listening to others speaking and presentations from a variety of people</p>
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	interpreting information from a variety of sources to present their work and involving themselves in discussions about information received.
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	



# Unit 11: Introduction to Countryside Access and Recreation

**Unit code:** F/600/9164

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

Learners will develop a knowledge of issues surrounding the management of land for access and recreation. They will develop skills in working with the public and an understanding of legal issues.

## ● Unit introduction

This unit is designed to develop learners' knowledge and understanding of the importance of access and recreation in the countryside. Understanding why access and recreation are important, and the need to balance these with the need for conservation, is crucial to anyone working in countryside management.

The countryside is an extremely popular destination for many people. The number of leisure day trips to the countryside in England and Wales increases every year. These include trips to National Parks, the New Forest and the Norfolk Broads. The RSPB reserves alone receive more than 1 million visits a year. However, this use brings pressures which countryside managers need to understand in order to be able to manage the resource effectively.

The Countryside Management Association says: 'The role of the countryside manager is to balance the potentially conflicting demands of conservation, recreation and the needs of local communities. Our countryside is a major tourist destination and brings much-needed revenue into rural communities. However, it is essential that recreation and tourism are managed in a sustainable way to ensure that the very things people come to enjoy are not destroyed. Balancing these complex relationships is one of the key roles of countryside professionals.'

On completing this unit, learners should have a broad understanding of the conflicting issues that need to be faced when managing land for access and recreation.

The unit will prepare learners for work in a variety of jobs in the countryside management sector and will give them a sound foundation for further study.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know opportunities for countryside recreation
- 2 Know effects of access and recreation
- 3 Understand the importance of countryside access and recreation
- 4 Be able to promote responsible use of the environment.

# Unit content

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## 1 Know opportunities for countryside recreation

*Recreational activities:* sports and fitness eg walking, dog walking, running/jogging, orienteering, hiking, cycling, angling, golf, equine activities, watersports; trips and holidays eg camping, caravanning, barbequing, picnicking; nature based eg wildlife studies, bird watching; adventurous activities eg 'extreme' activities, motor vehicle-based activities, paintballing, other activities eg shooting, kite flying, model flying

Reasons for increase in recreational activities: developments in technology eg invention/increased use of mountain bikes, increased household technology affecting leisure time; increased areas of land available for access; rise in popularity of countryside activities; demographic factors eg early retirement, longer life expectancy, unemployment; larger urban populations; interest in activities closer to home; awareness of importance of health and fitness; improved access routes

## 2 Know effects of access and recreation

*Environmental impacts/threats:* damage or disturbance to wildlife and habitats; disturbance to other users; erosion; visual impact; 'honeypot' sites; congestion; pollution; pressure for development (car parks, shops, tea rooms); antisocial uses eg littering, vandalism, dog fouling; conflict between recreation and other land uses

Benefits: economic benefits to local community/economy eg creation of employment, generation of income, raised standards of living, improvements to infrastructure, increased revenue for local services, transport networks; benefits to visitor services/attractions/facilities eg increased income, increased availability of activities/services; increased access to scenery/countryside; health benefits of recreation; creation and management of habitats

## 3 Understand the importance of countryside access and recreation

*Organisations:* Natural England, The Forestry Commission, Environment Agency, Department for Environment, Food and Rural Affairs (Defra), British Waterways, Sport England, National Trust, Association of National Park Authorities, Countryside Alliance, local councils, wildlife trusts, local charitable organisations and volunteer groups

*Legislation:* laws relating to access and recreation eg National Parks and Access to the Countryside Act 1949, Countryside Act 1968, Countryside and Rights of Way Act 2000, Hunting Act 2005; codes of practice related to access/recreation eg Countryside Code, user group codes of practice designed to limit environmental damage; role of laws in controlling irresponsible use of the environment eg by laws

## 4 Be able to promote responsible use of the environment

*Definitions:* what is 'responsible use', link to concept of sustainability

Maintain safety: complete risk assessment; put in place control measures; control access routes; ensure appropriate information and signage; supervise as required

*Information and advice:* site history and layout; location of facilities; paths and access routes; identification of recreational opportunities; wildlife species and features of interest; rules, restrictions and guidance

Methods of providing information and advice: verbal eg via face-to-face contact, guided walks, presentations, educational visits, events; via multimedia methods eg audio trails, podcasts; via written media eg posters, signs, interpretation boards, leaflets, brochures, flyers; via visitor centres

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> identify recreational opportunities in a specified area [IE, CT]	<b>M1</b> describe recreational activities in a specified countryside area	<b>D1</b> justify a recreational activity suitable for a given countryside area
<b>P2</b> outline reasons for increase in given recreational activities [IE]		
<b>P3</b> outline threats the public might pose to ◇ a given site ◇ flora and fauna ◇ health and safety [IE]		
<b>P4</b> identify benefits of given recreational activities [IE]		
<b>P5</b> explain the impact of organisations involved in countryside recreation [IE]	<b>M3</b> explain in detail the impact of organisations and legislation on a given recreational activity	<b>D2</b> evaluate the impact of information, advice and visit leadership in encouraging members of the public to use a given site safely and responsibly.
<b>P6</b> discuss laws and codes of practice relevant to countryside recreation [IE]		
<b>P7</b> maintain the safety of the public and others during visits to a given site [TW, EP]	<b>M4</b> provide high quality information and advice to encourage members of the public to use a site safely and responsibly.	
<b>P8</b> provide information and advice to encourage members of the public to use a given site responsibly. [TW, EP]		



**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

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## Delivery

The unit will need to be delivered using a range of activities to stimulate and encourage learner interest. In addition to lectures and other classroom-based delivery, site visits will be an important part of developing learners' understanding of the range of available recreational opportunities and facilities. Talks from people involved in the management of sites used for access and recreation will help develop learner awareness of the issues and conflicts involved. Practical activities such as site surveys, questionnaires, habitat surveys, footpath condition audits and mapping work will also engage learners. Where possible, delivery should reflect learners' interests and seek to broaden their understanding. This unit is intended to provide a broad overview of the issues surrounding access and recreation.

Any work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities are undertaken, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to identify recreational opportunities in a specified area and they should ask for observation records and/or witness statements to be provided as evidence. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments learners may also be taking as part of their programme of study.

For learning outcome 1 learners should understand the different types of recreation and how sites and facilities may vary depending on the type of recreation occurring there. Learners need to be aware of the range of recreational opportunities in the countryside, particularly the most popular ones. A selection of activities that occur in the local area could be studied in greater detail. Learners should research an activity of particular interest to them in more depth. If possible, they should have opportunities to participate in one or more recreational activities. Learners also need to understand why the demand for recreation has increased over the past decade.

Learning outcome 2 covers the effects of access and recreation. The number of recreational activities, and the increased demand for them, have both a negative and positive impact on the countryside. Visits to sites showing signs of impact will be a useful way of demonstrating this, with a site survey being a useful delivery method. Talks from site managers about problems they encounter will be a good method of raising learner awareness. Antisocial recreation is a constant issue for many site managers, so an awareness of the problems caused is important. They should also understand how antisocial recreation can be dealt with. Learners need to be aware that even where a site does not show signs of environmental impact or antisocial recreation, there may still be conflicts. These conflicts may be between perfectly legitimate uses but can still create issues for site managers. Examples may be conflicts between walkers, cyclists and horse riders using the same track. A useful discussion tool is Green's compatibility matrix (1985), which learners can use to compare their experiences of different activities. A carefully organised site visit with a talk and/or tour from the site manager would be an ideal way to engage learners.

Learning outcome 3 requires learners to understand the importance of the organisations that influence countryside access and recreation, through lobbying, policy and legislation creation, and active involvement in the countryside. This may include the National Trust, local tourism organisations, county and borough councils which own and manage country parks or influence National Parks, non-governmental organisations such as the Association of National Parks Authorities, and user groups such as the British Mountaineering Council which promote good practice to their members. Learners also need to gain an overview of the

laws and codes of practice which affect both the countryside and recreational activities. Learners are not expected to state the exact provisions of the various acts of Parliament. However, they should be able to understand their general aims and intentions. A guest speaker from a countryside organisation would add interest and relevance for learners.

Learning outcome 4 requires learners to understand how to maintain the safety of the public and others during a site visit and how to promote responsible use of the environment. They will need to understand what 'responsible' use is and how it links with ideas and concepts of sustainability in their widest sense. Learners will need supervised access to a suitable site and members of the public, which could be other learners. Health and safety, including the use of risk assessments and PPE, will be a particularly important aspect of delivery. Learners will also need to be aware of the different methods of promotion most commonly used in the countryside. Examples of some methods would form an important element of delivery, for instance studying promotional leaflets, attending a guided walk or event, going on a visit.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and unit overview.
<b>Assignment 1: Who Controls the Countryside?</b> (P5, P6, M3)
Introduction of brief.
Theory session: laws and codes of practice in the countryside.
Theory session: organisations involved in countryside access and recreation, including guest speaker input.
Presentations on laws/organisations.
<b>Assignment 2: If You Go Down to the Woods Today</b> (P1, P2, P3, P4, M1, M2, D1)
Introduction of brief.
Learner research and theory sessions: different types of recreation.
Theory session: reasons for increased demand for recreation.
Site visits to explore threats and benefits.
Class discussion: threats of recreation – in general and to specific sites.
Theory session: benefits of recreation – in general and to specific sites.
<b>Assignment 3 Safety and Responsible Site Use</b> (P7, P8, M4, D2)
Introduction of brief.
Class discussion: responsible use and sustainability.
Theory session: methods of promotion and how to ensure public safety, factors to consider and ways of encouraging responsible use.
Site visits, including talks by site manager/countryside ranger etc.
Presentations and preparing information.
Practical assessment – maintain safety and provide information.

## Assessment

P1 requires learners to identify recreational opportunities in a specified area. This could be carried out using a survey activity where a particular site is examined for current and potential recreational opportunities. Alternatively, learners could study a location known to them (for example their home town) and identify the recreational opportunities on offer. A simple pro forma, designed by either the tutor or learners, would assist in this activity.

For P2, learners must outline reasons for the increase in given recreational activities. This could be based on a poster which focuses on a particular recreational activity. Learners could give reasons why the activity has increased in popularity over a particular time period. Although there will be reasons that are common across many activities, there may also be reasons particular to the specific activity.

For P3, learners need to outline threats the public might pose to a given site, in relation to the flora and fauna and health and safety. This could link to the survey used for P1 and identify areas of the site which might be affected by public use. This could be combined with a general description of the types of threats the public present across a range of sites.

P4 requires learners to identify benefits of given recreational activities, both to the locality and to the people taking part. Evidence may be in the same format as for P3.

For P5, learners need to explain the impact of organisations involved in countryside recreation. This could include organisations which are trying to prevent the negative impacts of recreation and access in an area, and/or organisations which are trying to encourage more positive benefits. The impact of at least three organisations should be included.

For P6 learners need to discuss laws and codes of practice relevant to countryside recreation. Learners should focus on a minimum of three examples and show either how they were set out to encourage access/recreation, for example, laws leading to the creation of National Parks or Country Parks, or how they were set out to limit the impacts of access or recreation, for example, the Countryside Code, codes of responsible use.

P7 requires learners to maintain the safety of the public and others during visits to a given site. This will need to be assessed on site and learners could lead other groups/individuals around the site and identify hazards.

P8 links closely with P7 and requires learners to provide information and advice to encourage members of the public to use a given site responsibly. This could be via a poster or leaflet, a video or any other suitable means.

M1 is an extension of P1, where learners need to describe at least three countryside recreational activities which take place in a specified area. Evidence could take the form of a poster or a verbal presentation where learners give information about each particular recreational activity. Activities could be ones they are familiar with or ones they wish to learn more about. Learners should demonstrate their knowledge of each activity, which shows evidence of research and application of understanding.

M2 requires learners to contextualise the threats and benefits identified in P3 and P4 for a given site. Learners must show they are aware of the range of benefits and threats that access and recreation bring to the site.

For M3, learners should build on the evidence presented for P5 and P6 to explain in detail the impact on a given recreational activity. The activity could be selected by the tutor or chosen by the learner and agreed with the tutor in advance.

M4 requires learners to provide high quality information and advice to encourage members of the public to use a given site responsibly. This is an extension of the evidence required for P7 and P8.

For DI, learners need to recommend a specified recreational activity in a given area. This could be presented from either the angle of examining an area/site and describing what activity/ies could be developed there

or by choosing an activity and then finding a suitable location/area in which to develop it, based on the requirements of that activity. Recommendations must show how learners would plan to minimise threats and maximise benefits in developing the activity, and how their proposed developments are in line with legislation, codes of practice and guidance from relevant organisations.

D2 requires learners to evaluate the impact of the information, advice and visit leadership provided in encouraging members of the public to use a given site safely and responsibly. This could follow on from the evidence presented for M4, through a verbal or written evaluation. Learners are expected to identify strengths and areas for further improvement within their evaluation. They could seek the views of the public and other learners in completing this activity.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P5, P6, M3	Who controls the countryside?	In your role as a country park ranger, you have been asked to give a talk to a school group about the organisations and laws that are concerned with access and recreation. Include the impact on one recreational activity as an example to illustrate your talk. The group is made up of 13 and 14 year olds, so the information needs to be clearly presented and in an easy-to-understand format.	Verbal presentation with supporting text and images.
P1, P2, P3, P4, M1, M2, D1	If You Go Down to the Woods Today	In your role as recreation and tourism officer for Anyshire County Council, you have been asked to provide advice on the recreational potential for a particular area. First you need to present a case for why recreation is increasing in popularity. Then you should identify the opportunities in a particular area and the threats the public might pose to this area. This needs to be balanced with evidence for the benefits that access and recreation may bring to the area. The advice can then focus on three specific recreational activities, with a description of each and its particular threats and benefits. Conclude by recommending how to develop a specific activity to maximise benefits and minimise threats, taking account of relevant laws, codes of practice and guidance.	Any suitable method, including one or more of the following: written report, poster, photographs, audio-visual presentation either in person or recorded on audio-visual media.
P7, P8, M4, D2	Safety and Responsible Site Use	In your role as a trainee park ranger, you need to manage your site to maintain public safety and to encourage the public to use the site responsibly. Your manager has asked you to lead a group around the site and make sure they are safe and know how not to damage the site. You will provide the group with relevant information, which could be a leaflet you have produced, for example about site hazards, dangers in the countryside and dos and don'ts of using the site. This information will be presented in a talk or presentation to the group. After the event, your manager wants to discuss it with you so you can evaluate the impact of the information you provided.	Practical activity together with written information, eg leaflet/poster with additional discussion/feedback. Presentations could be recorded on suitable media.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Introduction to Environmental Studies	Understanding Countryside Tourism and Recreation
Conservation and Improvement of British Habitats	Undertaking Environmental Interpretation in Land-based
Introduction to Coastal Zone Management	Understanding Land Use and Environmental Issues

### Essential resources

Access and visits to sites and facilities where countryside recreation is undertaken are essential and learners should have opportunities to carry out surveys. Talks by countryside staff would be a useful learning tool. Learners will require access to textbooks, the internet, journals and magazines, educational videos and other multimedia resources to research and gain the required underpinning knowledge and understanding.

### Employer engagement and vocational contexts

This unit focuses on practical and applied aspects of countryside access and recreation. Centres are encouraged to create and develop links with local access and recreational facilities and enterprises. This could be through visiting these sites and facilities or inviting guest speakers to the centre.

## Indicative reading for learners

### Textbooks

Countryside Agency – *Positive Access Management – Practical Ways to Manage Public Access on your Land* (Countryside Agency, 2004)

Countryside Commission – *Countryside Recreation – Enjoying the Living Countryside* (Countryside Commission, 1999) CCP 544 ISBN 0861705068

Forestry Commission – *Forest Recreation Guidelines* (The Stationery Office Books, 1992) ISBN 011710311X

Glyptis, S – *Countryside Recreation* (Longman Group Ltd, 1991) ISBN 0582050359

McCool, S and Moisey, R – *Tourism, Recreation and Sustainability: Linking Culture and the Environment* (CABI Publishing, 2001) ISBN 0851995055

National Trust – *Recreational Activities at National Trust Properties* (National Trust, 2000)

Parkes, C – *Law of the Countryside* (CMA, 1994) ISBN 0950927120

Plummer, R – *Outdoor recreation: an introduction* (Routledge, 2008) ISBN 9780415430418

### Journals

*Countryside Recreation* (published three times a year, Countryside Recreation Network website)

### Websites

[www.countrysideaccess.gov.uk](http://www.countrysideaccess.gov.uk)

Countryside Access

[www.countrysiderecreation.org.uk](http://www.countrysiderecreation.org.uk)

Countryside Recreation Network

[www.defra.gov.uk/rural/countryside/index.htm](http://www.defra.gov.uk/rural/countryside/index.htm)

Department for Environment Food and Rural Affairs

[www.nationaltrust.org.uk/main](http://www.nationaltrust.org.uk/main)

National Trust

[www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Natural England

[www.naturenet.net](http://www.naturenet.net)

Naturenet

Many county councils will also have sections on their websites relating to access and recreation.

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	identifying recreational opportunities in a specified area researching the reasons for the rise in popularity of countryside recreation researching threats to the environment researching laws and organisations involved with countryside access and recreation
<b>Creative thinkers</b>	identifying the range of activities that may occur in an area
<b>Team workers</b>	providing and presenting information about responsible site use.
<b>Effective participators</b>	

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	researching a recreational activity researching the benefits of countryside recreation
<b>Reflective learners</b>	evaluating their presentation and performance and identifying areas for improvement.
<b>Effective participators</b>	



## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	<p>using the internet to research information on recreational activities</p> <p>using the internet to research information on laws and codes of practice</p> <p>using the internet to research information on organisations</p>
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
<p>Enter, develop and format information independently to suit its meaning and purpose including:</p> <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	providing information to encourage safe and responsible site use
Bring together information to suit content and purpose	providing information to encourage safe and responsible site use
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	contributing to discussion and presentation about laws and organisations.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	



# Unit 12: Introduction to Urban Habitat Ecology

**Unit code:** F/600/9407

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to skills and knowledge in urban habitat ecology and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education. It provides learners with an understanding of the formation and characteristics of urban habitats with a view to protecting them.

## ● Unit introduction

Since the industrial revolution the UK's population has become increasingly concentrated in towns and cities. This separation from the natural environment has long been seen as reducing quality of life. Historically, urban parks were established to provide green recreational areas for city dwellers, but their manicured nature had little value for wildlife. More recently there has been a move towards managing parks and gardens to benefit wildlife, which is also seen as providing benefits for urban residents. Other wildlife habitats, such as the elongated green spaces alongside roads and railways and the derelict sites that are left when buildings are removed or disused, have been created unintentionally. All such uniquely urban habitats provide vital corridors between the fragmented and isolated remnants of natural habitats.

This unit introduces learners to the wide range of urban habitats and the fauna and flora which inhabit them. On completion of the unit, learners will be able to recognise the ecological characteristics of urban habitats in terms of their benefit for wildlife, the effects of pollution and the factors that have influenced their development. They will also be able to carry out a basic ecological survey of an urban habitat.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Understand the influences that shape urban habitat formation
- 2 Know the ecological characteristics of urban habitats
- 3 Understand the source and effect of pollution on urban habitats
- 4 Be able to undertake an ecological survey.

# Unit content

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## 1 Understand the influences that shape urban habitat formation

*Species factors:* tolerance and ability to adapt to urban conditions eg mechanisms of dispersal, flexibility of diet, size, resistance to polluting chemicals, ability to survive in soil seed banks, ability to deal with disturbance

*Environmental factors:* soils (characteristics, nutrient supply); water supply; climate

*Human factors:* positive and negative, deliberate and accidental; fragmentation of natural habitats eg edge effects, transition zones; reduction or removal of habitats, eg through house building, removal of habitat features; creation of new habitats eg derelict brownfield sites, linear habitats alongside transport networks, parks and gardens; changes to microclimate conditions eg heat island effects, effects on rainfall and wind; pollution of air, water and soil; management activities eg habitat enhancement, reduction of vandalism and disturbance, mowing, removal of dead or diseased trees, land reclamation

## 2 Know the ecological characteristics of urban habitats

*Urban habitats:* to include both terrestrial and aquatic habitats; habitats specific to urban areas and remnant habitats

*Terrestrial:* eg woodland (for wildlife, recreation, screening, urban forestry), parks, gardens, allotments, playing fields, golf courses, brownfield sites, industrial wasteland, spoil heaps and waste tips, quarries and mines, refuse tips, road verges, railway sidings, walls, buildings, paved areas, churchyards

*Aquatic and coastal:* eg sewage works, sand and gravel pits, reservoirs, canals, streams, rivers, ponds, lakes, docklands, estuaries, salt marshes, mud flats, sand dunes, cliff grasslands, river banks

## 3 Understand the source and effect of pollution on urban habitats

*Types of pollution:* air; noise; water; land contamination; species pollution; toxic; persistent

*Sources:* industry; vehicles; domestic; runoff from impermeable surfaces; individuals eg deliberate vandalism, fire; accidental pollution

*Effects of pollution:* on plants and animals and on species diversity; long- and short-term effects

*Control of pollution:* work of statutory government organisations; relevant current legislation and codes of practice; initiatives to reduce pollution eg lead free petrol, use of bunds

## 4 Be able to undertake an ecological survey

*Planning:* be able to plan an ecological survey eg produce suitable maps, select suitable methods of survey, select suitable equipment, produce risk assessments.

*Carrying out:* be able to identify and record habitats using a suitable method of surveying eg Stage I Habitat survey, lichen survey, aquatic invertebrate survey; health and safety

*Presentation of results:* eg in the form of a plan or map with a key, as tables, as visual presentation

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> explain how urbanisation has been influenced by humans over the last century	<b>M1</b> evaluate the effect of human activity on the ecological characteristics of a given urban area/habitat	<b>D1</b> discuss management practices that would improve the ecological characteristics of a given urban area/habitat
<b>P2</b> assess ecological characteristics of a given urban habitat [IE]		
<b>P3</b> describe the ecological characteristics of a given urban habitat	<b>M2</b> compare the ecological characteristics of an urban habitat with those of a similar natural habitat	
<b>P4</b> identify and explain the sources of pollution in a given urban habitat	<b>M3</b> describe the measures that should be taken at a given workplace/site to prevent pollution of surrounding habitats	
<b>P5</b> identify and explain the effect of pollution on a given urban habitat		
<b>P6</b> plan the survey of a given urban habitat to identify ecological zones [TW, SM, EP]	<b>M4</b> plan, carry out and report on a thorough survey of a given urban area/habitat.	<b>D2</b> interpret the results of a habitat survey suggesting improvements to the method used.
<b>P7</b> carry out the survey of a given urban area/habitat to identify ecological zones		
<b>P8</b> present the results of surveying carried out.		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

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## Delivery

This unit should be delivered in as practical a context as possible. Whilst general concepts, such as the key factors that have influenced urban habitat formation, can be approached on a wider national scale, it is expected that most concepts will be approached from a more local perspective and involve site visits.

Learners need to be introduced to a good range of urban habitats, including both terrestrial and aquatic. They should learn that some urban habitats are remnants of what was previously countryside, whilst others are uniquely urban, having been created intentionally or unintentionally by the process of urban development. For this reason it is important to include a number of contrasting field studies.

Whilst the types, sources and effects of pollution can be introduced in lectures, learners should also be encouraged to look for sources and effects of pollution when on field trips.

Fieldwork activities should involve mapping different habitat types, perhaps in the style of a Phase I survey. They could also involve other ecological survey work, including pollution surveys, such as lichen or aquatic invertebrate surveys, to illustrate the effects of pollution on living organisms. As well as allowing learners to look at the ecological characteristics of these habitats, such studies should involve discussion of the factors that led to the habitats, and of the flora and fauna that are present.

Planning for all fieldwork activities should involve the production of risk assessments and a consideration of the potential damage or disturbance to the habitats. Links with other units that relate to habitat management activities and to biological survey techniques should be pointed out to learners.

The choice of habitats should reflect learners' interests whilst aiming to broaden their experience and understanding of different urban habitats. It is expected that much of the fieldwork will be local to the centre, but fieldwork undertaken further away in contrasting environments may also be useful. For urban environments that are not easily accessible the use of good quality visual/audio-visual materials could be a suitable alternative to widen learners' experience of different habitats.

Talks from habitat specialists involved in the management of urban habitats, such as urban rangers, will help to vary learners' experience of, and give them up-to-date information on, both the positive and negative effects of humans on urban habitats. Talks could involve speakers visiting the centre, but it is often better, for both speakers and learners, for them to occur on site. Talks from officers from water management or pollution monitoring organisations will help learners to develop an awareness of current issues relating to pollution.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Lectures and discussions on urban habitats, their formation, ecological characteristics, survey and management (to include talks from local habitat managers).
<b>Assignment 1: Urban Habitat Survey and Assessment</b> (P1, M1, D1)
Planning and carrying out a practice Phase 1 habitat survey, investigating the formation of the site and producing a report as a class or in groups.
Planning a Phase 1 survey and working individually to carry out the survey, to research factors that lead to the formation of the habitat and to produce a report for assessment of learning outcomes 1 and 4.
<b>Assignment 1: Urban Habitat Information</b> (P2, M2)
Production of a presentation or leaflet for a general public audience to interpret the ecological characteristics of a given habitat and show how its flora/fauna are suited to living there.
Lectures and discussions on the sources and effects of pollution in urban habitats (to include talks from water pollution or monitoring organisations) and on measures that should be taken to prevent pollution incidents.
<b>Assignment 3: Urban Pollution Survey</b> (P4, P5, P6, P7, P8, M3, M4, D2)
Carrying out fieldwork to look at sources of pollution and pollution levels in local habitats.
Production of a pollution report/presentation on a given site to include information on the impact of pollution on the organisms that live there and on measures that should be taken at a given workplace/site to prevent pollution.
Unit review.

## Assessment

Assessment of learning outcomes 1 and 4 is likely to involve learners carrying out, and preparing a report on a survey of a particular urban area. This urban area might consist of a number of different habitats, such as in an urban park, or be a single diverse habitat, such as an area of woodland or heath. Learners should contribute to the planning of a survey to identify the ecological zones of the area/habitat.

To achieve P1 learners need to review the full range of human factors that has influenced the development of urban habitats and then describe which of these factors have been involved in the formation of a particular urban area/habitat (which could be the same area/habitat used to assess learning outcome 4). Use of old maps, records and photographs may help learners in looking at historical influences that may or may not be obvious on site. For M1 learners should move on to evaluate the effects of human activity in terms of which factors have been positive and which have been negative for the wildlife on the site and in what way. Finally for D1 they should discuss possible future management practices and suggest some that would improve the area for wildlife.

For P6, P7 and P8 learners must plan, survey the site and present their results. To achieve M4 the report should be in an appropriate standard style such as that of a Phase 1 Habitat Survey and there should be some analysis of the results. This might, for instance, involve learners listing the habitat types along with the approximate percentage of the area covered by each. For M4 the survey should also have been carried out thoroughly, with no areas being missed out or 'guessed at'. This should be evident in the final report or assessed by the tutor, with evidence in the form of observation records. For D4 learners should interpret the results of a habitat survey in terms of the value of the area for wildlife as well as suggesting suitable improvements or additions to the survey.

Assessment of learning outcome 2 could involve learners looking in more detail at the ecological characteristics of the same urban area/habitat used for learning outcomes 1 and 4 or, where feasible, could involve a separate, perhaps contrasting, area/habitat. For P2 learners should describe the ecological

characteristics of a habitat in terms of its flora, fauna and environmental conditions. To achieve M2 they should then compare these characteristics with those of a similar natural habitat, picking out similarities and differences.

For P4 and P5 learners should carry out a pollution survey of a given site, looking for possible sources of pollution, the type of pollution produced by each source and the effects of the pollution. They may need to carry out some research to find out the type of pollution produced by each source and tutors could facilitate this by providing suitable documentation. The results of the survey could be presented as a table or form part of a visual presentation.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
PI, MI, DI	Urban Habitat Survey and Assessment	Your local park is looking to improve its value for wildlife. You are to carry out a habitat survey and research the development of the park. You should then present this information in a report which describes the current value for wildlife and then gives advice on management activities that would improve the value of the area for wildlife.	Written evidence. Witness testimony.
P2, M2	Urban Habitat Information	Produce a short presentation or a leaflet suitable for visiting members of the public. You should outline the characteristics of the given habitat, show how these compare with a similar natural habitat and explain how the organisms that live there are suited to living in this particular habitat.	Written evidence. Visual presentation and witness testimony.
P4, P5, P6, P7, P8, M3, M4, D2	Urban Pollution Survey	You are to survey a given urban habitat and produce a report or presentation outlining the sources, types and effects of pollution at this site. You should describe the measures that should be taken to prevent pollution of the surrounding habitats. Further information should also be provided on the effect of pollution on the type of organisms living in an urban habitat.	Survey.



## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Introduction to Environmental Studies	Understanding Land Use and Environmental Issues
Introduction to Agriculture and Conservation	Undertaking Urban Habitat Conservation
Element EC2.1 Collect and record data on the natural environment	
Element EC2.2 Report on the condition of the natural environment	

### Essential resources

Learners should have access to suitable urban habitats to meet the needs of the unit and to relevant tools and field equipment, for example hand lenses, survey equipment and identification keys.

### Indicative reading for learners

#### Textbooks

BTCV – *Urban Handbook* (BTCV 2000)

Carr, S and Lane, A – *Practical Conservation: Urban Habitats* (Hodder & Stoughton, 1993)  
ISBN 9780340533697

Gilbert, O L – *The Ecology of Urban Habitats* (Chapman & Hall, 1989) ISBN 9780412282706

Gilbert, O L and Anderson P – *Habitat Creation and Repair* (Open University Press, 1998)  
ISBN 9780198549666

Joint Nature Conservancy Council Handbook for Phase I Habitat Survey – *A Technique for Environmental Audit* (JNCC, 2003)

Wheater, C – *Urban Habitat* (Routledge, 1999) ISBN 9780415162654

Williams, G – *Techniques and Fieldwork in Ecology* (Bell and Hyman Limited, 1987) ISBN 9780713527308

#### Journals

*Urban Wildlife News*

#### Websites

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment Food and Rural Affairs

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency

[www.forestry.gov.uk](http://www.forestry.gov.uk)

Forestry Commission

[www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Natural England

[www.ukbap.org.uk](http://www.ukbap.org.uk)

UK Biodiversity Action Plan

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	producing a plan for a habitat survey with tutor support,.
<b>Team workers</b>	carrying out the habitat and pollution surveys
<b>Self-managers</b>	carrying out the habitat and pollution surveys.
<b>Effective participators</b>	

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	researching the historical influences on urban habitats.
<b>Creative thinkers</b>	

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	producing reports or visual presentations
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	analysing results of habitat surveys
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	

Skill	When learners are ...
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presenting information on habitats
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	completing written reports.

# Unit 13: Understanding Ecology of Trees, Woods and Forests

**Unit code:** D/600/9169

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

Learners will study trees, woods and forests in the UK and how these are integral to our landscape. They will identify important tree and shrub species and investigate how these relate to animals and humans. They will develop their understanding of forest and woodland exploitation and how these can be done in a sustainable way. They will also encourage responsible public use of woodlands or forests.

## ● Unit introduction

Woodlands and forests are important areas for biodiversity. Many species depend on the structure and features of woodlands for food and shelter. Even individual trees, particularly ancient or veteran trees, are recognised as invaluable refuges for wildlife. For example, several species of rare lichens can be found only on the bark of veteran trees. Woods have long been a source of fuel and timber supporting a range of industries, whilst another traditional economic use of woodlands has been for hunting and shooting. Most recently, the role of trees, woods and forests in maintaining a stable global climate has been recognised.

This unit introduces the range of commercially important tree species, and their biology, and will help learners to understand the relationships between trees and other species. Learners will visit woodlands to become familiar with tree and shrub species and to investigate the plants and animals that depend on woodland structure, as well as those that are considered to be pests in relation to tree growth and development.

Trees, woods and forests are an integral part of our landscape and have been influenced by humans for centuries. Learners will discover the different influences which affect the management and composition of woodlands. As the use of forests and woodlands by the general public continues to increase, this unit also explores how to encourage the public to use woodland areas safely and responsibly.

On completion of this unit, learners will be confident in identifying the principal tree and shrub species found in UK forests and woodlands. In addition, they will be able to recognise the damage pest species and physical factors cause to the growth and development of trees. Learners will also become more confident in dealing with the general public and exploring creative ways of interpreting woodland and forest environments.

## Learning outcomes

### On completion of this unit a learner should:

- 1 Know locally important and commercial tree and shrub species
- 2 Know the major parts of trees and shrubs
- 3 Understand the relationships between trees and other plants and animals
- 4 Understand the effects of human influence on the distribution and composition of forests and woodlands
- 5 Be able to promote good public use of forests or woodlands.

# Unit content

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## 1 Know locally important and commercial tree and shrub species

*Commercial and locally important species:* definition of broadleaved, deciduous, hardwood, conifer, softwood and evergreen species; commercially important broadleaved and coniferous species eg oak, spruce

Identify: use of identification keys to identify trees and shrubs in and out of leaf (from samples, in the field, from illustrations, using appropriate features eg bark, twigs, buds, foliage, fruit/cones, shape; life cycles

Life cycle: seed, germination, seedling, sapling, maturation, seed and cone formation, dispersal

## 2 Know the major parts of trees and shrubs

*Major parts of trees and shrubs:* roots; root hairs; bark; cambium; phloem; xylem; trunk; sap wood; heart wood; annual rings; branches; twigs; crown; leaves; buds; foliage; flowers; fruit/seed

Functions of major parts: anchorage; water and nutrient uptake; protection from disease and damage; transport of water, nutrients and products of photosynthesis; reproduction; growth and development

## 3 Understand the relationships between trees and other plants and animals

*Relationships:* identification of plant species that can have a major impact on tree growth and health eg bramble, bracken, honeysuckle, invasive weeds on planting sites; interactions with plant species eg wild daffodil, wood barley, bluebell, oxlip, lichens on veteran trees, bryophyte species, other species of particular conservation importance in the locality; interactions with animal species eg pied flycatcher, pine martin, red squirrel, stag beetle, dormouse, other species of particular conservation importance in the locality

Impact of pest species: common woodland pests eg deer, rabbits, grey squirrel, bark beetle

## 4 Understand the effects of human influence on the distribution and composition of forests and woodlands

*Influences:* industrial; agricultural; urban; historical eg industrial revolution, Royal Forests, the First World War; the creation of the Forestry Commission and its effect on UK public and private forestry, taxation systems; current issues and trends in managing woods and forests eg community forests, recent emphasis on broadleaves, restoration of plantations on action woodland sites; relevant current legislation and codes of practice

*Sustainable exploitation:* sustainable exploitation of forests and woodlands to meet multi-purpose objectives eg timber production, shelter, forest products, recreation, nature conservation/biodiversity, amenity, game and wildlife

## 5 Be able to promote good public use of forests or woodlands

*Types of use:* activities eg walking, cycling, bird watching and observing other wildlife, horse riding, dog walking, picnics; education eg school trips, uniform organisations and youth groups, Forest Schools, raising awareness amongst the general public

*Information and advice:* objectives of information and advice; interpretation methods eg guided walk, leaflet, information board, self-guided trail, poster; points to consider for effective communication eg attracting attention, ease of use, setting, siting, ambience; purpose and condition of woodlands eg amenity, timber production, shooting, nature conservation, size of woodland, type of ownership; facilities eg paths, car parks, toilets, refreshment provision

*Public safety:* identify potential hazards eg timber harvesting operations, dangerous trees, steep slopes, climbing structures, tracks, fallen trees and branches obstructing footpaths or trails, design and placement of safety signs; safety briefings; methods for excluding the general public eg barrier tape, fencing, brash



## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> identify specified locally important and commercial trees and shrubs in and out of leaf [TW, EP]	<b>M1</b> relate the features of specified tree species to their commercial uses	<b>D1</b> compare specified commercially important broadleaved and coniferous trees
<b>P2</b> describe the life cycle of a commercially important broadleaved tree and of a commercially important coniferous tree		
<b>P3</b> identify major parts of trees and shrubs	<b>M2</b> describe in detail the functions and major parts of trees and shrubs	
<b>P4</b> describe the function(s) of the major parts of trees and shrubs		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<p><b>P5</b> explain relationships between trees and other plant and animal species in a given location [CT1]</p>	<p><b>M3</b> categorise relationships as beneficial or detrimental to tree growth and development</p> <p><b>M4</b> suggest ways to improve the impact of human influences on a specified wood or forest.</p>	<p><b>D2</b> explain how woodland management practices can improve woodland ecology.</p>
<p><b>P6</b> evaluate the impact of specified pest species on the growth and development of trees and shrubs [RL4, RL6, EP2]</p>		
<p><b>P7</b> explain major human influences currently affecting a specified wood or forest</p>		
<p><b>P8</b> discuss the sustainable exploitation of forests and woodlands [IE, RL, EP]</p>		
<p><b>P9</b> provide information and advice to encourage members of the public to use a forest or woodland in a way which is consistent with its purpose and condition [IE, CT, RL, TW, SM, EP]</p>		
<p><b>P10</b> maintain the safety of the public and others during visits to forest or woodland.</p>		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participants
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# Essential guidance for tutors

## Delivery

This unit is best delivered using as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised practicals, internet and/or library-based research and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

The purpose of this unit is to develop learners' confidence in working in woodland situations. Although key concepts can be introduced in the classroom, considerable time should be spent in woodland and forest environments to identify species, and do observe the growth and development of trees, and the influence of pests and physical factors on growth. Centres should have access to a variety of woodland types and sizes. If possible, visits should be led by local experts. For example, a countryside warden could talk about their work and the importance of woodlands in maintaining and enhancing biodiversity; a gamekeeper could talk about their work and the importance of woodlands in providing a habitat for wild and reared game birds; or a forest recreation ranger could show learners the different techniques used to attract user groups to their sites and to ensure that visitors have a safe and rewarding experience.

This unit lends itself to interactive teaching sessions in the classroom. For example, most learners will be familiar with some of the major tree parts but may not be fully aware of their functions. Initial knowledge can be assessed using interactive paper-based matching and labelling exercises or technology-based activities (such as those that can be produced using the freely available Hot Potatoes© software) on the internet or within the centre's virtual learning environment. An advantage of the latter approach is that achievement is automatically recorded and updated, allowing individual learner progress to be tracked easily. Similar activities could also be used to reinforce learners' knowledge of tree and shrub species.

Whichever delivery methods are used, it is essential that tutors stress the importance of health and safety and environmental issues. Risk assessments must be carried out before any practical activities. Learners should not undertake any tasks that are beyond their physical capabilities.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units that learners may also be taking as part of their programme of study.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
<b>Assignment 1: Tree and Shrub Species</b> (P1, P2, M1).
Tutor introduces the assignment brief
Identification of trees and shrubs in the field during different seasons
Discussion of the life cycles of trees

Topic and suggested assignments/activities and/assessment
Exploring the commercial uses of different tree species
<b>Assignment 2: Tree Parts</b> (P3, P4, M2, D1)
Tutor introduces the assignment brief.
Identification of major parts of trees and shrubs.
Discussion of the functions of major parts of trees and shrubs.
Comparisons between features of broadleaved and coniferous trees.
<b>Assignment 3: Woodland Relationships</b> (P5, P6, P7, P8, M3, M4, D2)
Tutor introduces the assignment brief.
Discussion of dependencies of species on nature conservation. Importance to trees, woodlands and forests.
Description of damage that can be caused by plant and animal species.
Assessing damage to trees in the field by pest species.
Categorising relationships as beneficial or detrimental to tree growth and development.
Effects of human influence and uses of woodland.
Woodland management practices which benefit ecology and reduce negative impact of human influence. Tree relationships with other species.
Field visits to assess human influences on woodlands.
<b>Assignment 4: Recreation in Forests and Woodlands</b> (P9, P10)
Tutor introduces the assignment brief.
Investigation of the types of recreational uses of woodlands and forests.
Discussion of safety requirements.
Discussion of issues relating to content, siting and design of different media for encouraging safe and responsible use of forests and woodlands.
Preparation for assessment.
Practical assessment: maintain safety and provide information.

## Assessment

For P1, learners will be expected to identify specified, locally important and commercial trees and shrubs in and out of leaf. Where possible, the species used should be the same for each learner to ensure the assessment is fair. Learners should correctly identify, in and out of leaf, at least 10 locally important trees and shrubs and five different commercial trees and shrubs. This could be assessed directly by the tutor during practical activities. If this format is used, suitable evidence would be observation records completed by the learner and tutor and accompanied by appropriate work logs or other relevant learner notes. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor. Alternatively, evidence could take the form of a pictorial presentation with notes (possibly using appropriate software or OHPs), an annotated poster or an illustrated leaflet.

For P2, learners need to describe the life cycle of a commercially important broadleaved tree and a commercially important coniferous tree. Learners may choose tree species that are used to produce evidence for other grading criteria. Evidence could take the form of a pictorial presentation with notes (possibly using appropriate software or OHPs), an annotated poster or a leaflet.

P3 and P4 require learners to identify and explain the functions of the major parts of trees and shrubs. Evidence could be linked to the work being undertaken for P1 and may be in the same form as for P1 or in the form of a laboratory notebook.

For P5, learners will be expected to explain the relationships between trees and other plants and animal species. Learners should provide evidence that shows both beneficial and detrimental relationships, and should include tree relationships with at least four different species. Evidence may be in the same form as for P1.

P6 requires learners to evaluate the impact of specified pest species on the growth and development of trees and shrubs. Tutors should specify the pest species or agree them in discussion with learners. Where possible, the complexity of these should be the same for each learner to ensure assessment is fair. It is expected that learners will provide evidence for at least five different pest species. Learners could include examples of the effects of pest species that they have seen, for example in their work placement or during delivery of this unit. Evidence may be in the same form as for P1.

P7 requires learners to explain the major human influences currently affecting a specified wood or forest. Tutors should specify the wood or forest, or agree it in discussion with learners. Evidence may be in the same form as for P1.

For P8, learners should discuss the sustainable exploitation of forests and woodlands. Evidence for this could be in the form of an oral presentation (using persuasive argument to justify woodland management practices), an illustrated leaflet or an annotated poster.

For P9, learners are expected to provide information and advice to encourage members of the public to use a forest or woodland in a way which is consistent with its purpose and condition. Evidence for this could be in the form of a leaflet or annotated poster, or verbal information and advice recorded on an observation checklist.

For P10, learners need to maintain the safety of the public and others during visits to forest or woodland. This will involve the identification of hazards and could include practical activities to install structures that promote safety. Learners should use a minimum of two different methods of ensuring safety. Evidence could be in the form of a practical observation record or a work log with photographs.

For M1, learners are required to relate the features of specified tree species to their commercial use. Tutors should specify the commercial tree species. It is expected that learners will provide evidence for at least one broadleaved and one coniferous species. These should be the same species that have been used to provide evidence for other grading criteria to avoid an additional assessment burden. Evidence may be in the same form as for P1.

For M2, learners need to extend the work they produced for P3 and P4, and it is expected that evidence will be in the same format.

For M3 learners are required to categorise species relationships with the trees identified in P5 and P6 into those which are beneficial and those which are detrimental. Evidence could be presented as a table, or as annotations on a poster or a leaflet.

Evidence for M4 is expected to build on P7 and P8 and learners are required to suggest ways of improving the impact of human influences on the wood or forest investigated. Evidence may be an extension of a report, or annotations on a poster or a leaflet.

D1 requires learners to compare the features of at least two trees: one broadleaved and one coniferous. These should ideally be trees investigated for other criteria and should include a comparison of characteristics, structural parts, life cycles and commercial use. Suitable evidence for this would be a leaflet or illustrated report.

For D2, learners need to identify how woodland management can help to overcome negative relationships and influences in order to improve woodland ecology.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1	Tree and Shrub Species	You are working at a country park and have been asked to establish a tree trail through the woodland. You will need to identify the selection of trees and shrubs provided and prepare a leaflet showing the life cycle of one broadleaved and one coniferous tree. Relate the features of these trees to their commercial uses.	Practical observation record. Illustrated leaflet.
P3, P4, M2, D1	Tree Parts	As part of your work for the tree trail, provide an informative poster about the parts of trees and their functions. Include a comparison of the features of broadleaved and coniferous trees.	Annotated poster.
P5, P6, P7, P8, M3, M4, D2	Woodland Relationships	Write an article for a countryside magazine called <i>Woodland Relationships</i> . Your article should include the relationships between trees and other animal, plant and pest species, and categorise which of these are beneficial or detrimental. Include human influences and sustainable exploitation. Suggest ways of improving the human impact on woodland. Conclude your article by explaining how woodland management can improve woodland ecology.	Annotated poster. Illustrated report. Leaflet.
P9, P10	Recreation in Forests and Woodlands	As an assistant ranger for the Forestry Commission, you have been given the responsibility for leading a group through an area of forest. You need to provide the group with information and guidance about how to carry out the visit safely and responsibly. After the visit you have been asked to evaluate how well your information, advice and leadership ensured the safe and responsible use of the forest.	Illustrated report. Oral presentation (with accompanying notes).

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element EC1.1 Communicate effectively with the public and others Element EC1.2 Care for members of the public and others	Understanding Principles of Physical and Biological Environmental Processes
Introduction to Environmental Studies	Undertaking Woodland Habitat Management
Conservation and Improvement of British Habitats	Understanding Woodland Management
Undertaking Ecological Surveys and Techniques	Tree Establishment and Protection

## Essential resources

Learners will need access to written sources of information on the ecology of trees, forests and woodlands. They should also be exposed to a variety of forest/woodland types and sizes. Tutors can go online or contact the Woodland Trust or the Forestry Commission for a list of freely accessible woodlands in their area. Local wildlife trusts also have several woodland reserves of historical and biodiversity interest. A store of equipment for surveying woodlands should be available to learners, as well as tools and equipment needed to carry out practical tasks safely.

## Employer engagement and vocational contexts

Centres are encouraged to create links with local farms or country estates, woodland charities (for example Woodland Trust), the Forestry Commission or local authority countryside management teams. Another valuable link would be with a local sawmill so that learners can see the commercial use of tree species.

## Indicative reading for learners

### Textbooks

Broad, K – *Caring for Small Woods: A Practical Manual for Woodland Owners, Woodland Managers, Woodland Craftsmen, Foresters, Land Agents, Project Officers, Conservationists, Teachers and Students* (Earthscan, 1998) ISBN 1853834548

BTCV and Agate, E – *Woodlands: A Practical Handbook* (BTCV Enterprises, 2002) ISBN 0946752338

Fuller, RJ – *Coppiced Woodlands: Their Management for Wildlife* (Joint Nature Conservation Committee, 1993) ISBN 1873701322

Harmer, R and Howe, J – *The Silviculture and Management of Coppice Woodlands* (Forestry Commission, 2003) ISBN 085538591X

Harris E H M, Harris J and Mercer I – *Wildlife Conservation in Managed Woodlands and Forests* (Research Studies Press, 2003) ISBN 0863802060

Mitchell A – *Trees of Britain and Northern Europe* (A&C Black Publishers Ltd, 2006) ISBN 0713672382

Peterken, G F – *Woodland Conservation and Management* (Chapman & Hall, 1993) ISBN 0412557304

Rackham, O – *Ancient Woodland: Its History, Vegetation and Uses in England* (Nottingham University Press, 2003) ISBN 1897604270

### Journals

*British Wildlife*

*Forest Life*

*Quarterly Journal of Forestry*

*Small Woods*

### Websites

[www.btcv.org.uk](http://www.btcv.org.uk)

[www.forestry.gov.uk](http://www.forestry.gov.uk)

[www.rfs.org.uk](http://www.rfs.org.uk)

[www.smallwoods.org.uk](http://www.smallwoods.org.uk)

[www.woodlandtrust.org.uk](http://www.woodlandtrust.org.uk)

British Trust for Conservation Volunteers

Forestry Commission

Royal Forestry Society

Small Woods Association

Woodland Trust

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	carrying out research on the sustainable exploitation of woodlands providing recommendations to ensure visitor safety in a woodland
<b>Creative thinkers</b>	assessing damage to trees and determining the causes discussing different methods to encourage members of the public to visit a woodland exploring different options for ensuring public safety in a woodland
<b>Reflective learners</b>	presenting information on the effects of pests on the growth of trees and shrubs presenting options for promoting the use of woodlands by the general public
<b>Team workers</b>	working together to identify species of trees and shrubs using identification guides determining the best methods for encouraging visitors to woodlands
<b>Self-managers</b>	planning interpretive media to encourage visitors to woodlands
<b>Effective participators</b>	stating their opinions regarding the correct identification of trees and shrubs providing a case for the control of pests in woodlands explaining the needs for and benefits from the sustainable exploitation of woodlands.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Reflective learners</b>	describing the importance and functions of tree parts to an audience
<b>Self-managers</b>	working out the correct identification of a tree or shrub in a limited time period prioritising their work to explain the human influences currently affecting woodlands.
<b>Effective participators</b>	



## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	preparing a report on safety for visitors to a woodland
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	presenting information on visitor use or attitudes concerning a woodland site
Bring together information to suit content and purpose	compiling information for a report on the safe use of a woodland by the general public
Present information in ways that are fit for purpose and audience	preparing information for a tree trail leaflet presenting a case for woodland management to a group of local residents
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	calculating material requirements and costs for implementing a safety plan for a woodland
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	

Skill	When learners are ...
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing the importance of the sustainable exploitation of woodlands
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	<p>researching the effects of physical factors on the growth and development of trees and shrubs</p> <p>gathering information to substantiate opinions on the causes of damage to trees and shrubs</p> <p>preparing information for a discussion on the sustainable exploitation of forests and woodlands</p>
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	<p>producing a report on the safe uses of woodlands</p> <p>using persuasive text in a leaflet or on a poster to attract visitors to a woodland</p> <p>communicating clearly and effectively the hazards that may be present in a woodland and the importance of avoiding unsafe areas.</p>

# Unit 14: Introduction to Practical Forestry Skills

**Unit code:** A/600/9406

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to skills and knowledge in forestry management and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education. Learners will develop their understanding of the management principles and practice for the establishment and growth of tree crops. They will carry out practical tree establishment and felling and develop their knowledge of health and safety in forestry operations.

## ● Unit introduction

One of the primary objectives of forestry operations is to grow and produce a timber resource for future conversion into marketable products. It is, therefore, important for learners to gain an understanding of the broad range of practical skills and techniques necessary to establish and successfully grow a tree crop and produce a marketable product for subsequent conversion. It is also of paramount importance that anybody working in the forestry industry has a good working knowledge and understanding of the health and safety issues that apply, together with an awareness of the potential implications of poor health and safety practices.

In addition, the issues of sustainability and the potential negative environmental impacts of forest operations are increasingly important to the industry and to the customers it serves. An understanding of sound sustainable forest management principles and techniques that have a minimal environmental effect is therefore essential for anyone entering the forestry industry.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Be able to use a range of basic woodland establishment and maintenance techniques
- 2 Be able to carry out basic measurement of standing trees, timber products and woodland sites
- 3 Be able to carry out simple harvesting operations
- 4 Understand environmental and waste management issues associated with woodland operations.

# Unit content

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## **1 Be able to use a range of basic woodland establishment and maintenance techniques**

*Planting and establishment of young trees:* risk assessments for planting and maintaining sites; selection, safe use and maintenance of tools; ground preparation; notch, pit and mound planting of seedlings, transplants and whips; on-site plant handling, storage, transport and layout; individual tree protection eg treeshelters, netting; PPE

Maintenance and aftercare of trees: selection and safe use of hand tools for maintenance operations; replacement of planting losses (beating up); hand weeding and cleaning; brashing and formative pruning of conifer and broadleaved species

## **2 Be able to carry out basic measurement of standing trees, timber products and woodland sites**

*Measurement:* height and diameter at breast height (dbh) of standing trees; volume of felled and standing trees, sawlogs and log stacks; linear and area measurement on the ground; use of simple scales and maps; using measurements to estimate materials for fencing, planting and protection measures; costs of fencing and plant protection methods

## **3 Be able to carry out simple harvesting operations**

*Tree felling:* thinning requirements of forest stands; felling small trees using hand tools; felling site management and risk assessment; introduction to other methods of felling and harvesting eg mechanical, chain saw; PPE; minimise environmental impact

Timber extraction and conversion: whole tree, shortwood, pole length; introduction to extraction methods, their uses, advantages and disadvantages (winches, skidders, skylines, forwarders, horses); safe handling and stacking of produce; extraction and conversion of small trees; PPE; minimise environmental impact

## **4 Understand environmental and waste management issues associated with woodland operations**

*Environmental issues:* importance of conservation of woodlands; importance of woodland biodiversity; environmental impact of forest harvesting operations eg on wildlife, watercourses, habitats; relevant current legislation; protected trees, species and areas; sustainable systems eg coppicing

Forest waste and residue management: methods for dealing effectively with wood residues, pesticides, oils and fuels; local pollution control; relevant current legislation and codes of practice; role of the Environment Agency

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> prepare a site, handle, plant and maintain trees to meet given specifications using hand tools [TW, SM]	<b>M1</b> explain why the replacement of losses is important for the successful establishment of woodland	<b>D1</b> evaluate the effects of pruning on the quality of timber produced
<b>P2</b> outline factors that impact the establishment of woodland [IE]		
<b>P3</b> describe the importance of managing woodlands for bio-diversity and conservation		
<b>P4</b> measure specified standing single trees for height and diameter at breast height (DBH) [SM]	<b>M2</b> accurately calculate the volume of standing conifer and broadleaved trees singly and in small stands	<b>D2</b> accurately calculate the length and cost of materials for a given type of perimeter fence for a specified area of forest.
<b>P5</b> select the choice of extraction method for a given situation [IE]	<b>M3</b> explain why the selection of an appropriate extraction method is important	
<b>P6</b> fell small trees using hand tools, cut to specification, stack and extract produce from a given site [CT, TW, SM]		
<b>P7</b> discuss possible impacts of a specified forest operation on local wildlife and watercourses [IE, CT]	<b>M4</b> suggest how the possible environmental impacts of a specified forest operation could be minimised	
<b>P8</b> explain how the wastes and residues from a specified forest operation should be managed. [IE, CT]	<b>M5</b> explain the role of the Environment Agency in controlling pollution from forestry operations.	

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

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## Delivery

Delivery is likely to be a mixture of classroom learning, discussions, seminar presentations, internet and/or library-based research, the use of personal and/or industrial experience, forest visits and simple practical tree measurement and harvesting operations. Assessment is likely to be in the form of a portfolio of relevant evidence.

Industry placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit prior to any industry-related activities so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to undertake tree-planting operations or be involved in tree felling as part of a habitat conservation project and they should be encouraged to ask for observation records and/or witness statements to be provided as evidence of this. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments the learner may also be taking as part of their programme of study. Delivery should stimulate, motivate, educate and enthuse learners.

Whichever delivery methods are used, it is essential that tutors stress the importance of sound environment management and the need to manage forest resources using legal and sustainable methods. Health and safety issues must be stressed and regularly reinforced, and risk assessments must be undertaken prior to practical activities.

Techniques should be taught initially by demonstration and then through closely supervised practical sessions. The tutor must be able to show current industry best practices. Learners would benefit from access to real planting schemes and harvesting opportunities in realistic industrial settings, although the sites available and the objectives may influence the range of activities that may be undertaken.

As learners develop their skills and confidence they should be encouraged to take more responsibility for their work, but practical operations must not take place without appropriate supervision. Learners are likely to develop their skills at varied rates, so close monitoring of progress should be maintained and allowance made for extra support for the less experienced while giving the more experienced the opportunity to further develop and extend their skills.

Learning outcome 1 covers the range of basic woodland establishment techniques and maintenance operations. It is likely to be delivered by demonstrations, discussions, site visits, forestry practicals and independent learner research. When planning learning and assessment, the tutor must take into account the seasonal nature of many of the common operations and it is recommended that learners should be given the opportunity to work at forest sites throughout the year. They must also have the chance to appreciate the rigours of a full working day in the forest. Health and safety issues must be addressed before learners undertake any practical work with any items of equipment. Adequate PPE must be provided and worn following the production of suitable risk assessments. Visiting expert speakers could add to the relevance of the subject. For example, a forest worker could talk about their job, the situations they face and the methods they use.

Learning outcome 2 covers the methods and equipment required to carry out basic measurements of standing trees, timber products and woodland sites. Tutors should ensure that all learners are provided with appropriate learning support to carry out and understand the calculations to meet the requirements of this learning outcome. In particular they must appreciate the need for accuracy in their work and the importance of checking their calculations. It would be expected that demonstrations, discussions, supervised forestry practicals and site visits would form part of the delivery. Visiting expert speakers could add to the

relevance of the subject. For example, a forestry surveyor could talk about their work and the methods they use.

Learning outcome 3 covers simple forestry harvesting operations. It would be expected that demonstrations, discussions, supervised forestry practicals and site visits would form part of the delivery. Learners are not required or expected to use chainsaws during the delivery and assessment of this learning outcome. Health and safety issues must be addressed before learners undertake any practical work with any items of equipment. Adequate PPE must be provided and worn following the production of suitable risk assessments. Visiting expert speakers could add to the relevance of the subject. For example, a harvesting contractor could talk about their work and the methods they use.

Learning outcome 4 covers the environmental and waste management issues associated with forestry operations and should be linked and integrated into the practical activities associated with the other learning outcomes in this unit. It is likely to be delivered through a series of formal lectures, demonstrations and site visits. Learners should be made aware of the effects that forestry operations can have on the environment and how these challenges are met. Visiting expert speakers could add to the relevance of the subject. For example, a forest manager or representative from the Environment Agency could talk about their work and the methods they use to protect the environment.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
<b>Assignment 1: Tree Planting</b> (P1, P2, P3, M1, D1)
Tutor introduces the assignment brief.
Theory sessions: introduce learners to different planting stock and techniques; establishment considerations and importance of appropriate maintenance and aftercare.
Practical sessions: introduce how to plant trees as well as provide appropriate support and immediate aftercare.
Learners plant a range of trees; provide appropriate support and immediate aftercare.
<b>Assignment 2: Tree Measurement</b> (P4, M2, D2)
Tutor introduces the assignment brief.
Theory sessions: introduce learners to measurement methods, equipment and conventions.
Practical sessions: introduce how to measure trees, wood products, site areas and perimeters.
Learners become familiar with measuring trees, wood products, site areas and perimeters.
<b>Assignment 3: Forest Harvesting</b> (P5, P6, P7, P8, M3, M4, M5)
Tutor introduces the assignment brief.
Theory sessions: introduce learners to the range of extraction methods; how to safely fell small trees; environmental and waste management issues associated with forestry operations.
Practical sessions: learners safely fell, stack and extract produce from a forest site.
Site visits to forest harvesting sites.



## Assessment

For P1, learners will be expected to prepare a site, and to handle, plant and maintain trees to meet given specifications using hand tools. Tutors should identify the given specifications in accordance with the requirements of the site and/or management plan. Within these specifications learners must work safely; risk assessments must be undertaken prior to work beginning. Where possible, the size and complexity of the specifications should be the same for each learner to ensure the fairness of assessment. This criterion could be assessed directly by the tutor during practical activities. If this format is used, observation records completed by the learner and the tutor would be suitable evidence. If assessed during an industry placement, witness statements should be provided and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

For P2 and P3, learners must provide information on the factors that impact on the establishment of woodland and the importance of managing woodlands. Tutors may link the assessment of this criterion directly with the work that is being carried out for P1. Evidence may be in the same format as for P1.

For P4, learners must measure specified standing single trees for height and diameter at breast height (dbh), specified forest products and site areas and perimeters. Tutors should identify the given specifications in accordance with the requirements of the forest site. Within these specifications learners must work safely; risk assessments must be undertaken prior to work beginning. Where possible, the size and complexity of the specifications should be the same for each learner to ensure the fairness of assessment. This criterion could be assessed directly by the tutor during practical activities. If this format is used, observation records completed by the learner and the tutor would be suitable evidence. If assessed during an industry placement, witness statements should be provided and verified by the tutor. Evidence could take the form of a pictorial presentation with notes (possibly using appropriate software), an annotated poster, a leaflet or a project.

For P5, learners must select the choice of extraction method for a given situation. Learners should review the range of extraction methods listed in the unit content and include examples, where possible, of their experiences with the methods they are covering. Evidence for this could take the form of a pictorial presentation with notes (possibly using appropriate software), an annotated poster, a leaflet, a project or short answer questions.

For P6, learners must fell small trees using hand tools, and cut to specification, stack and extract produce from a given site. Tutors should identify the given specifications in accordance with the requirements of the forest site. Within these specifications learners must work safely; risk assessments must be undertaken prior to work beginning. Where possible, the size and complexity of the specifications should be the same for each learner to ensure the fairness of assessment. This criterion could be assessed directly by the tutor during practical activities. If this format is used, the observation records completed by the learner and the tutor would be suitable evidence. If assessed during an industry placement, witness statements should be provided and verified by the tutor. Tutors may link the assessment of this criterion directly with the work that is being carried out for P4. Evidence may be in the same format as for P4.

For P7, learners are required to discuss the possible impact of a specified forest operation on local wildlife and watercourses. The specified forest operation may be the same as that used for other criteria in this unit, such as P5. Evidence for this could take the form of a pictorial presentation with notes (possibly using appropriate software or OHPs), an annotated poster, a leaflet, a project or short answer questions.

For P8, learners must explain how the wastes and residues from a specified forest operation should be managed. The specified forest operation may be the same as that used for other criteria in this unit, such as P5. Tutors may link the assessment of this criterion directly with the work that is being carried out for P5 and P6. Evidence may be in the same format as for P6.

For M1 learners must explain why the replacement of losses is important for the successful establishment of woodland. This may be based upon the same location that is used to provide evidence for other criteria

in this unit and tutors may link the assessment of this criterion directly with the work that is being carried out for P1 and P2. Evidence may be in the same format as for P1.

For M2 learners must accurately calculate the volume of standing conifer and broadleaved trees singly and in small stands. This may be based upon the same location that is used to provide evidence for other criteria in this unit and tutors may link the assessment of this criterion directly with the work that is being carried out for P3. Evidence may be in the same format as for P3.

For M3 learners must explain why the selection of an appropriate extraction method is important. Tutors may link the assessment of this criterion directly with the work that is being carried out for P4. Evidence may be in the same format as for P4.

For M4 learners must suggest how the possible environmental impacts of a specified forest operation could be minimised. Tutors are encouraged to link this grading criterion to the work being undertaken for P5 and P6. Alternatively, tutors may identify the specified situation, or agree it in discussion with the learner. Evidence may be in the same format as for P6.

For M5 learners must explain the role of the Environment Agency in controlling pollution from forestry operations. Tutors are encouraged to link this grading criterion to the work being undertaken for P5 and P7. Evidence may be in the same format as for P7.

For D1, learners must evaluate the effects of pruning on the quality of timber produced. Tutors may link the assessment of this criterion directly with the work that is being carried out for P1. Evidence may be in the same format as for P1. It would be feasible for learners to give verbal explanations to tutors using examples of timber that has been produced from trees with and without pruning. Learners providing pictorial evidence could, for example, use photographs or drawings.

For D2, learners must accurately calculate the length and cost of materials for a given type of perimeter fence for a specified area of woodland. Tutors may identify the specified forest perimeter and type of fence or agree them in discussion with the learner. Where possible the size and complexity of the site and fence should be the same for each learner to ensure the fairness of assessment. Learners are not expected to include the costs of labour within their calculations. They should provide references for the cost of fencing materials. Fences should be planned using realistic designs. This may be based upon the same location that is used to provide evidence for other criteria in this unit and tutors may link the assessment of this criterion directly with the work that is being carried out for P3. Evidence may be in the same format as for P3 and could take the form of a pictorial presentation with notes (possibly using appropriate software), an annotated poster, a leaflet or a project.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1, D1	Tree Planting	Safely prepare, plant and provide appropriate support and aftercare to young trees. Comply with environmental and waste management legislation.	Witness testimony. Practical observation and assessment. Practical work diary. Completed observation checklist.

Criteria covered	Assignment title	Scenario	Assessment method
P4, M2, D2	Tree Measurement	Safely and accurately measure a range of trees, wood products, site areas and perimeters and accurately calculate the volume of trees and the material costs to fence a specified forest area.	Witness testimony. Practical observation and assessment. Practical work diary. Completed observation checklist. Tables/charts. Case study.
P5, P6, P7, P8, M3, M4, M5	Forest Harvesting	Safely fell, stack and extract small trees, select an appropriate extraction method and explain why the selection of an appropriate method is important. Comply with environmental and waste management legislation. Discuss the possible environmental impacts of this work, suggest how these impacts could be minimised, explain how the wastes and residues should be managed and explain the role of the Environment Agency.	Witness testimony. Practical observation and assessment. Practical work diary. Completed observation checklist. Written report. Illustrated poster.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element CU86.1 Prepare sites to create habitats Element CU86.2 Establish and protect vegetation Element EC2.1 Collect and record data on the natural environment	Tree Felling and Chainsaw Use
Undertake Tree Felling Operations	Understanding Greenwood Crafts
Undertake Tree Climbing and Pruning Operations	
Carry Out Ground-based Arboricultural Operations	

## Essential resources

Learners will need access to a suitable range of tree-planting equipment. This includes planting spades (for example Schlick), tree ties, nails, tree guards, tubes, secateurs, treeshelters and stakes. They will also need access to a sufficient quantity of planting stock. There should be adequate access to suitable planting and establishment sites.

A range of appropriate hand tools to fell small trees should be available for learners to use and compare, as well as suitable and sufficient PPE. A range of tree-measuring equipment, such as dbh tapes, callipers and clinometers, must also be available.

The range of resources should reflect the industry locally or regionally important to the learner. There is also a need for adequate classroom and workshop facilities, including video and computer-based presentation equipment. There should be adequate washing and welfare facilities available at the educational establishment and on worksites.

## **Employer engagement and vocational contexts**

This unit focuses on developing practical forestry skills associated with successful tree planting and establishment, basic measurements of forest resources, simple harvesting operations and the significance of environmental and waste management issues. Tutors are encouraged to create and develop links with a range of forestry contractors and managers. Learners should be able to experience a range of forest sites with different characteristics and complexities in order to contextualise and enhance their learning. Wherever possible, learners should be able to participate in as wide a range of activities as possible, perhaps supplemented through a period of relevant industry experience. Tutors should take account of the seasonality associated with forestry activities when planning learner activities.

## **Indicative reading for learners**

### **Textbooks**

Agate E – *Toolcare: A Maintenance and Workshop Manual* (BTCV, 2000) ISBN 0946752249

Agate E – *Fencing: A Practical Handbook* (BTCV, 2001) ISBN 094675229X

Agate E – *Tree Planting and Aftercare: A Practical Handbook* (BTCV, 2001) ISBN 0946752257

Agate E – *Woodlands: A Practical Handbook* (BTCV, 2002) ISBN 0946752338

Hibberd B – *Forestry Practice* (The Stationery Office Books, 1991) ISBN 0117102814

Kerr G – *Growing Broadleaves for Timber* (Forestry Commission, 1993) ISBN 0117103144

Mackie E D and Matthews R W – *Forest Mensuration: A Handbook for Practitioners* (Forestry Commission, 2006) ISBN 0855386215

Mackie E D and Matthews R W – *Timber Measurement* (Forestry Commission, 2008) ISBN 97800855387495

### **Journals**

*Forestry and British Timber*

*Tree News*

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	<ul style="list-style-type: none"> <li>outlining factors that impact the establishment of woodland</li> <li>selecting the choice of extraction method for a given situation</li> </ul>
<b>Creative thinkers</b>	<ul style="list-style-type: none"> <li>felling small trees using hand tools, cut to specification, stack and extract produce from a given site</li> <li>discussing possible impacts of a specified forest operation on local wildlife and watercourses</li> <li>explaining how the wastes and residues from a specified forest operation should be managed</li> </ul>
<b>Team workers</b>	<ul style="list-style-type: none"> <li>preparing a site, handle, plant and maintain trees to meet given specifications using hand tools</li> <li>felling small trees using hand tools, cut to specification, stack and extract produce from a given site</li> </ul>
<b>Self-managers</b>	<ul style="list-style-type: none"> <li>preparing a site, handle, plant and maintain trees to meet given specifications using hand tools</li> <li>measuring specified standing single trees for height and diameter at breast height (DBH), wood products, site areas and perimeters.</li> </ul>

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	evaluating the effects of pruning on the quality of timber produced
<b>Creative thinkers</b>	explaining why the selection of an appropriate extraction method is important
<b>Reflective learners</b>	evaluating their own performance
<b>Team workers</b>	accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands
<b>Self-managers</b>	undertaking risk assessments
<b>Effective participators</b>	suggesting how the possible environmental impacts of a specified forest operation could be minimised.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	producing reports, tables and posters using ICT programmes
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	recording and storage of measurements
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching the internet for current environmental and waste management legislation and guidance
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching the internet for current environmental and waste management legislation and guidance
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	measuring specified standing single trees for height and diameter at breast height (dbh), wood products, site areas and perimeters  accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands  accurately calculating the length and cost of materials for a given type of perimeter fence for a specified area of woodland
Bring together information to suit content and purpose	producing reports, tables and posters using ICT programmes
Present information in ways that are fit for purpose and audience	producing reports, tables and posters using ICT programmes
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	<p>measuring specified standing single trees for height and diameter at breast height (dbh), wood products, site areas and perimeters</p> <p>accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands</p> <p>accurately calculating the length and cost of materials for a given type of perimeter fence for a specified area of woodland</p>
Identify the situation or problem and the mathematical methods needed to tackle it	<p>measuring specified standing single trees for height and diameter at breast height (dbh), wood products, site areas and perimeters</p> <p>accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands</p> <p>accurately calculating the length and cost of materials for a given type of perimeter fence for a specified area of woodland</p>
Select and apply a range of skills to find solutions	<p>measuring specified standing single trees for height and diameter at breast height (dbh), wood products, site areas and perimeters</p> <p>accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands</p> <p>accurately calculating the length and cost of materials for a given type of perimeter fence for a specified area of woodland</p>
Use appropriate checking procedures and evaluate their effectiveness at each stage	<p>measuring specified standing single trees for height and diameter at breast height (dbh), wood products, site areas and perimeters</p> <p>accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands</p> <p>accurately calculating the length and cost of materials for a given type of perimeter fence for a specified area of woodland</p>
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	<p>measuring specified standing single trees for height and diameter at breast height (dbh), wood products, site areas and perimeters</p> <p>accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands</p> <p>accurately calculating the length and cost of materials for a given type of perimeter fence for a specified area of woodland</p>
Draw conclusions and provide mathematical justifications	<p>measuring specified standing single trees for height and diameter at breast height (dbh), wood products, site areas and perimeters</p> <p>accurately calculating the volume of standing conifer and broadleaved trees singly and in small stands</p> <p>accurately calculating the length and cost of materials for a given type of perimeter fence for a specified area of woodland</p>

Skill	When learners are ...
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing possible impacts of a specified forest operation on local wildlife and watercourses
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching the internet for current environmental and waste management legislation and guidance
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	producing reports, tables and posters using ICT programmes.



# Unit 15: Introduction to Game Management

**Unit code:** Y/600/9400

**QCF Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to game management skills and knowledge and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further education. The unit is broad ranging and can be adapted to suit various locations.

## ● Unit introduction

Gamekeepers play an important role in the management and conservation of the UK. In order to achieve their objectives they must understand the complex interactions that occur between and within the animal and plant populations they manage. To be successful, gamekeepers need to also manage relevant business criteria, such as budget and stock control, and customers.

Gamekeeping is often regarded as a 'traditional' occupation. In reality, as external influences create new pressures, modern gamekeepers combine the best traditional methods with new technologies, knowledge and methods. This unit concentrates on the work of gamekeepers in the UK. It is a broad-ranging unit that can be adapted according to the centre's location and the particular aspect of game management that is practised in the area. It could be applied to highland 'keeping' that is practised in Scotland, but also to grouse keeping as practised in the uplands of Britain. However, for most learners the emphasis will be on lowland gamekeeping, whether this be wild game management or the production of released game.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know the role of game/deer management
- 2 Be able to carry out gamekeeping tasks
- 3 Know game species in the UK
- 4 Know game habitats and their key features.

# Unit content

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## 1 Know the role of game/deer management

*Interaction with other land uses:* history and objectives of lowland gamekeeping; roles of an under keeper, beat keeper and head keeper; relationship to other rural land uses eg agriculture, forestry, public recreation and nature conservation; influence of relevant current government schemes eg stewardship schemes (cross-compliance, entry-level stewardship, organic-level stewardship, higher-level stewardship); items in the landscape attributable to game management eg cover crops, hides, high seats, influence of game management activities on other flora and fauna species eg positive aspects of heather management for other species such as upland waders; relevant legislation and codes of practice

## 2 Be able to carry out gamekeeping tasks

*Major tasks:* associated with gamebird production, release and post-release management of gamebirds, pest and predator control, shoot day activities, wild game management; gamebird health management, heather management; deer management, culling, stalking; management of suspected poachers and poaching situations; health and safety; risk assessment; relevant current legislation and codes of practice

## 3 Know game species in the UK

*Key species:* game and gamebird species found in UK, pheasant, red and grey partridge, red and black grouse; deer, hare; major vertebrate pests of agriculture and forestry; avian and mammalian predators of game in a variety of UK habitats; typical signs of presence and/or damage for each species; legal status of each species in terms of level of protection and/or legal control measures

## 4 Know game habitats and their key features

*Habitats:* woodlands; farmland; scrub; rivers; streams; ponds; wetlands; boundaries; field margins; cover crops

*Key features:* physical characteristics of habitats; important features that make the habitat suitable for game and its management eg structure of heather, heather burning, dominant species; features that aid shoot day and stalking activities

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> outline the management of a game or deer species in a given area	<b>M1</b> explain the roles of the under keeper, beat keeper, ghilly and head keeper	<b>D1</b> explain how game management influences other flora and fauna species in a given region
<b>P2</b> describe the relationship between game or deer management and other land uses in a given area		
<b>P3</b> state how gamekeepers should manage specified poaching situations [EI, SM]		
<b>P4</b> carry out routine tasks associated with game or deer management to meet given objectives to cover:  ◇ pest and predator control  ◇ habitat management  ◇ running shoot days  ◇ estate security	<b>M2</b> explain the procedures which should be followed when a gamekeeper is confronted with a poaching situation	
<b>P5</b> identify signs of presence and/or damage of game or deer species [IE, SM]		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P6</b> describe major species of game and deer associated with game management in the UK	<b>M3</b> explain the life cycles and breeding behaviour of specified game species	<b>D2</b> evaluate a specified area in terms of providing a quality shoot for specified game species.
<b>P7</b> state the main geographical locations for specified game and deer species [TW,CT]		
<b>P8</b> identify key game and deer habitats	<b>M4</b> carry out practical habitat management tasks associated with game management.	
<b>P9</b> describe the key features that make a given habitat suitable for game and deer. [IE, SM]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

## Delivery

Tutors delivering this unit should use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised gamekeeping practicals, internet and/or library-based research and the use of personal and/or industrial experience would be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

Work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities are carried out, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to carry out pest and predator control on a lowland shoot and they should ask for observation records and/or witness statements to be provided as evidence. Guidance on the uses of observation records and witness statements is provided on the Edexcel website.

Whichever delivery methods are used, it is essential that tutors stress the importance of animal welfare, sound environmental management and the need to manage resources using legal methods.

Health and safety issues must be stressed and reinforced regularly, and risk assessments must be undertaken before any practical activities.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments learners may also be taking as part of their programme of study.

Learning outcome 1 is likely to be delivered through formal lectures, discussions site visits and independent learner research. Learners will explore the structure and interrelationships of gamekeeping in the UK. Visiting expert speakers could add to the relevance of the subject. For example, a gamekeeper could talk about their work and how it relates to other land-use activities such as agriculture and forestry.

Learning outcome 2 covers the skills associated with gamekeeping. Delivery techniques should be varied, it would be expected that formal lectures, discussions, supervised gamekeeping practicals and site visits would form part of the delivery. Learners should carry out real work activities and not simulated activities when covering the unit content. Health and safety and animal welfare issues must be addressed before learners visit any shoot or game farm. Visiting expert speakers could add to the relevance of the subject. For example, a gamekeeper could talk about their work and the methods they use.

Learning outcome 3 looks at the physical identification characteristics of key species in the UK associated with game management. Delivery techniques should be varied. It would be expected that formal lectures, discussions, supervised gamekeeping practicals and site visits would form part of the delivery. Delivery could be linked to the delivery of similar learning outcomes in other units, for example *Unit 16: Introductory Deer Management*. Learners should be encouraged to keep a diary of the species they have seen and their identification characteristics. Health and safety issues must be addressed before learners undertake any practical work. Adequate PPE must be provided and used following suitable risk assessments. Visiting expert speakers could add to the relevance of the subject. For example, an experienced gamekeeper could talk about their work and the methods they use to identify key species.

Learning outcome 4 looks at the key features of habitats in the UK associated with game management. Delivery techniques should be varied – it would be expected that formal lectures, discussions and supervised site visits would form part of delivery. Suitable risk assessments should have been undertaken before any practical activity. Visiting expert speakers could add to the relevance of the subject. For example, an experienced gamekeeper or representative from a shooting organisation such as the Game & Wildlife Conservation Trust (GWCT) could discuss the importance of habitat management.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
<b>Assignment 1: The Role of Game Management</b> (P1, P2, P3, M1, D1)
Game management; effects of species.
Roles of game management staff: head keeper; beat keeper; under keeper; ghilly.
The influences of game management on flora and fauna species.
<b>Assignment 2: Practical Gamekeeping Tasks</b> (P4, P5, M2)
Practicals.
Handling a poaching situation.
Identification of UK legislation and the effects on the game industry.
<b>Assignment 3: Identification of key game species in the UK</b> (P6, P7, M3)
Identification of game species.
Life cycles and breeding behaviour of game species.
Effects of pest and predator species of game populations.
<b>Assignment 4: Habitats for Gamebirds and Deer in the UK</b> (P8, P9, M4, D2)
Habitats for game species.
Practical habitat management tasks.
Evaluation of shoot quality.

## Assessment

For P1 learners will be expected to describe the game/deer management enterprises in a given area. For P2 and P3 learners are expected to provide information on management of poaching and the relationship between game management and other land uses. Evidence for these criteria could be in the form of a report or an assignment.

P4 requires learners to carry out specified tasks associated with game management, to meet given objectives. Tutors should identify the specified objectives or agree them in discussion with learners. These are likely to be dictated in part by the needs of the estate or shoot that is being used for assessment purposes. Where possible, the size and complexity of the objectives should be the same for each learner to ensure assessment is fair. For P5 learners must demonstrate that they can identify signs of presence and/or damage of game or deer species. These could be assessed directly by the tutor during practical activities. If this format is used, observation records completed by the learner and tutor would be suitable evidence. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

P6 requires learners to identify major species of game/deer associated with game management in a specified area. Tutors should identify the specified area (which may be the same as that used to meet other criteria) or agree it in discussion with learners. For P7 learners must state simply the main geographical locations for specified game and deer species. This is intended to be based on all of the main key game species around the UK. Evidence for these criteria could be presented in a report or an assignment and linked to P1, P2 and P3.

P8 and P9 require learners to identify the main habitats, and their key features, associated with lowland game management in a specified area. Tutors should identify the specified area (which may be the same as that used to meet other criteria) or agree it in discussion with learners. Where possible, the size and complexity of the area should be the same for each learner to ensure assessment is fair. Evidence may be in the same format as for P6.

For M1, learners need to explain the roles of an under keeper, a beat keeper, a ghilly and a head keeper. Learners may use, as an example, keepers they have been working with or have met as part of the delivery of this unit. Evidence may be in the same format as for P1.

For M2, learners must explain how lowland keepers should manage specified poaching situations. Tutors should identify the situation to fit in with other learning activities that have taken place in this or other units. Where possible, the size and complexity of the situation should be the same for each learner to ensure assessment is fair. This could be assessed directly by the tutor during practical activities. If this format is used, observation records completed by the learner and tutor would be suitable evidence. If assessed during the placement, witness statements should be provided by a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website. Alternatively, evidence could take the form of a pictorial presentation with notes.

For M3, learners must explain the life cycles and breeding behaviour of specified game species. Where possible, the size and complexity of the task should be the same for each learner to ensure assessment is fair.

For M4, learners need to carry out practical habitat management tasks associated with game management. The chosen habitat may be the same as that used to produce evidence for other criteria and may have been identified by the tutor or following discussion with learners. This could be assessed directly by the tutor during practical activities. If this format is used, observation records completed by the learner and tutor would be suitable evidence. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website. Alternatively, evidence could be presented in the same format as for P1.

For D1 learners are required to explain how game management influences other flora and fauna species in a specified region. Tutors should identify the specified region or agree it in discussion with learners. Where possible, the size and complexity of the region should be the same for each learner to ensure assessment is fair. Evidence for this could be in the same format as for P1 and P2.

D2 requires learners to evaluate a specified area in terms of providing a quality shoot for specified gamebirds. Tutors should identify the species and specified area (which may be the same as that used to produce evidence for other criteria) or agree them in discussion with learners. Where possible, the size and complexity of the area should be the same for each learner to ensure assessment is fair. Learners should identify the habitats within the area and evaluate their quality for providing good quality gamebird shooting. They should explain why the habitat may or may not provide good quality gamebirds. Evidence for this could be in the same format as for P1 and P2.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1, D1	The Role of Game Management	Working as part of a gamekeeping team requires a well-structured strategy for game management tasks which include the correct procedure for dealing with poachers.	Written report. Presentation.
P4, P5, M2	Practical Gamekeeping Tasks	As an under keeper on a sporting estate you are responsible for a number of routine practical tasks.	Practical with observation sheets. Written report. Presentation.
P6, P7, M3	Identification of Key Game Species in the UK	You are the gamekeeper of a large estate and you have been asked by a local education authority to produce a presentation which identifies the key game species in the UK. It has been requested that a guided walk is available to reinforce the identification of some game species.	Written report. Presentation. Practical guided walk.
P8, P9, M4, D2	Habitats for Gamebirds and Deer in the UK	As the gamekeeper of a large sporting estate you are in charge of the creation, development and management of a wide range of habitats used for released and wild game species.	Written report. Presentation. Practical.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element Ga2.1 Determine game population characteristics Element Ga2.2 Monitor game habitat Element Ga3.1 Maintain game populations	Understanding Principles of Game Management
Introductory Deer Management	Understand Deer Management
Participate in Providing Estate Maintenance	Undertake Estate Skills



## Essential resources

Learners will require access to suitable lowland and upland estates, preferably those already used for shooting and stalking, and gamebird rearing facility. This may require travel to suitable off-site venues.

Equipment required will include PPE, equipment used during game rearing and releasing activities, hand tools used in habitat management and routine maintenance of release pens, stile and high seat repair. Learners will also need access to legal traps for pest and predator control.

Tutors delivering this unit should be competent and experienced lowland or upland gamekeepers. Ideally, they should have recent industrial experience within lowland gamekeeping or show evidence of regular contact with the industry in terms of keeping up to date.

## Indicative reading for learners

### Textbooks

Carne P – *Deer of Britain and Ireland: Their History and Distribution* (Swan Hill Press, 2000) ISBN 1840370912

Chaplin R – *Wild Deer in Britain* (Jarrold Publishing, 1977) ISBN 085306721X

Chapman N – *Fallow Deer: Their History, Distribution and Biology, Second Edition* (Coch-y-Bonduu Books, 1997) ISBN 0952851059

Chapman N – *Fallow Deer* (Mammal Society, 1984) ISBN 090461414X

Clutton-Brock T – *Red Deer: The Behaviour and Ecology of the Two Sexes* (Edinburgh University Press, 1985) ISBN 0852244479

Clutton-Brock T and Albon S – *Red Deer in the Highlands: Dynamics of a Marginal Population* (Blackwell Science, 1989) ISBN 0632022442

De Nahlik A- *Management of Deer and Their Habitat; Principles and Methods* (Wilson Hunt, 1992) ISBN 0907519024

Forestry Commission- *Muntjac Deer* (Forestry Commission, 1996) ISBN 0855383356

Game Conservancy- *Egg Production and Incubation* (Game Conservancy, 1993) ISBN B0000EHNYI

Game Conservancy- *Gamebird Rearing* (Game Conservancy, 1994) ISBN 0950013056

Game Conservancy- *Gamebird Release* (Game Conservancy, 1996) ISBN 1901369005

Hobson J C – *Gamekeeping – A Guide for Amateur Keepers and Shooting Syndicates* (Crowood Press, 1994) ISBN 1852238372

Mayle B, Peace A and Gill R – *How Many Deer? A Field Guide to Estimating Deer Population Size* (Forestry Commission, 1999) ISBN 0855384050

McCall I – *Your Shoot Gamekeeping and Management* (A&C Black, 1990) ISBN 071363206

Putman R - *Sika Deer* (Mammal Society, 2000)

Ratcliffe P- *The Management of Red Deer in Upland Forests* (The Stationery Office Books, 1987) ISBN 0117102105

Ratcliffe P – *Roe Deer Biology and Management* (HMSO, 1992) ISBN 0117103101

Red Deer Commission – *Red Deer Management – A Practical Book of the Management of Wild Red Deer in Scotland* (HMSO, 1981) ISBN 0114916926

## **Journals**

*Deer*

*Game and Wildlife Conservation Trust Annual Reviews*

*Shooting Gazette*

*Shooting Times*

*Shooting and Conservation*

## **Websites**

[www.basc.org.uk](http://www.basc.org.uk)

[www.bds.org.uk](http://www.bds.org.uk)

[www.defra.org.uk](http://www.defra.org.uk)

[www.dcs.gov.uk](http://www.dcs.gov.uk)

[www.forestry.gov.uk](http://www.forestry.gov.uk)

[www.gwct.org.uk](http://www.gwct.org.uk)

[www.hse.gov.uk](http://www.hse.gov.uk)

[www.lantra.co.uk](http://www.lantra.co.uk)

[www.nationalgamekeepers.org.uk](http://www.nationalgamekeepers.org.uk)

British Association for Shooting and Conservation

The British Deer Society

Department for Environment Farming and Rural Affairs

Deer Commission for Scotland

The Forestry Commission

Game and Wildlife Conservation Trust

Health and Safety Executive

Sector Skills Council for the Environment and Land-based Industries

National Gamekeepers Organisation

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	researching legal frameworks, statutory and non-statutory laws which apply to game species and game management researching aspects of game breeding behaviour
<b>Creative thinkers</b>	developing skills in observation and recording when working in a field study situation
<b>Reflective learners</b>	analysing data and performance when surveying habitat damage identifying improvements for practical surveying and recording results
<b>Team workers</b>	carrying out practical habitat management tasks.
<b>Self-managers</b>	

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	researching life cycles and behaviour of game species investigating the statutory and non-statutory laws associated with game species populations.
<b>Creative thinkers</b>	

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using the internet to research appropriate data
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	producing tables and charts as part of habitat damage surveys and recording of data
Bring together information to suit content and purpose	writing and structuring assignments
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	emailing local deer organisations to obtain relevant material
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	

Skill	When learners are ...
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	Preparing presentations and contributing to discussions
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	carrying out research related to ecology and laws relevant to UK deer species
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	writing assignments on a variety of species producing written reports, illustrated reports, and surveys describing elements of deer ecology.



# Unit 16:                      Introductory Deer Management

**Unit code:**                      R/600/9167

**Level 2:**                      BTEC First

**Credit value:**                      5

**Guided learning hours:** 30

## ● Aim and purpose

The aim of this unit is to provide an introduction to the native and non-native species of deer living in the UK. It covers basic ecology, related legislation and management.

## ● Unit introduction

Managing animals successfully requires a working knowledge of their biology and of the environment in which they live. This unit covers the primary characteristics of the deer species living and breeding in the wild in the UK. These characteristics vary from species to species and with the age and sex of the animal. Links between the life cycle of each species, its accepted management, related legislation and good practice are also made.

Observing animals in the wild is often difficult, therefore the unit covers the importance of identifying the common signs that can indicate deer are present in a certain location. Learners will also study the damage to the environment that deer can cause and the importance to the rural environment of recognising the signs of this damage.

As the management of deer is becoming a more important social and political issue in the UK, learners will consider the current legal position on deer control and the use of firearms within management practices.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know deer species in the UK
- 2 Know the signs of typical deer damage
- 3 Be able to carry out legal management operations.

# Unit content

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## 1 Know deer species in the UK

*Species characteristics:* external features of red deer, fallow deer, sika deer, roe deer, muntjac and Chinese water deer; characteristics and terminology that vary between species and with age, sex and season for each species listed eg hummel, switch, knobber or brocket, menil, melanistic, antler, tine, pearling, speller

## 2 Know the signs of typical deer damage

*Signs of damage:* slots and racks; browsing, fraying, stripping and trampling damage; methods of distinguishing between damage caused by deer and other animals eg rabbit, hare and squirrel; habitats/crops affected by different deer species

## 3 Be able to carry out legal management operations

*Management:* reasons for managing deer eg prevention of habitat damage, economic losses and over-population problems eg health deterioration; management operations throughout the year eg population estimation, legal methods of culling, types, uses and maintenance of deer fences, building and maintenance of high seats; deer stalking techniques; health and safety eg risk assessment, Lyme Disease, personal protective equipment (PPE); current relevant legislation/regulations eg Wildlife and Countryside Act 1981, Deer Act 1991, Deer (Scotland) Act 1996, Wildlife (Northern Ireland) Order 1985, Hunting Act 2004, Firearms Act 1968



## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> identify male and female adults and young living wild in the UK	<b>M1</b> describe the identification of young, mature and old deer	<b>D1</b> identify conditions of deer according to season
<b>P2</b> describe seasonal changes and characteristics		
<b>P3</b> describe life cycles of two species of deer living wild in the UK	<b>M2</b> relate the life cycle of a deer species to its management	
<b>P4</b> describe the general biology and behavioural features of a deer species living wild in the UK [RL]		
<b>P5</b> in two given habitats describe the typical signs of deer living wild in the UK	<b>M3</b> survey a habitat for signs of deer.	
<b>P6</b> safely assist in a specified deer management task [EP,TW]		<b>D2</b> produce a cull plan for a given deer population.
<b>P7</b> state the influence of legislation on deer management.		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

## Delivery

Tutors delivering this unit should use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, laboratory practicals, site visits and practicals, internet and/or library-based research and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners. Whichever delivery methods are used, it is essential that tutors stress the importance of animal welfare and the need to manage the resource using legal methods.

Health and safety issues relating to working outdoors must also be stressed and reinforced regularly, and risk assessments must be undertaken before any practical activities. The dangers associated with Lyme disease and ticks must be covered before any outdoor activities take place.

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units learners may also be taking as part of their programme of study.

Learning outcomes 1 and 2 are closely linked and cover the biology of wild deer species in the UK. Delivery methods should be varied. Ideally, learners should have access to either live animals or high quality visual/audio-visual materials (for example, videos taken in the field, TV materials or colour slides). Learners should have the opportunity to visit deer habitats in order to identify, for example, preferred habitats, deer tracks and faeces. It would be expected that formal lectures, discussions and learner presentations would form part of the delivery of these learning outcomes. Relevant local and national deer species terminology should be covered.

Learning outcome 3 is likely to be delivered initially through formal lectures, discussion and demonstration. However, practical site work will also be required. Visiting expert speakers could add to the relevance of the subject. For example, a police wildlife officer could talk about legislation relating to deer management, or a deer manager or gamekeeper could talk about deer management practices. The latter could be incorporated into a site visit. Learners are not expected to take part in a real-life deer-culling operation.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction to the unit.
Deer species identification and ecology – red, fallow, sika, roe, muntjac and Chinese water deer.
<b>Assignment 1 Deer Identification</b> (P1, M1, D1)
<b>Assignment 2 Deer Lifecycles</b> (P2, P3, P4, M2)
Deer habitats – tracks, signs and impact of deer.
<b>Assignment 3 Deer Tracks and Signs Survey</b> (P5, M3)
Practical deer management tasks.

## Topic and suggested assignments/activities and/assessment

### Assignment 4 Deer Management Report (P6, P7, D2)

Unit review.

## Assessment

For P1 learners will be expected to be able to identify adult male and female deer of the species listed in the unit content. This may be achieved in a number of ways, for example by identifying live animals or by using suitable high-quality visual materials. Learners are not expected to write lengthy descriptions to achieve this criterion.

P2 requires learners to describe seasonal changes and characteristics. This must cover a minimum of one species. The tutor could allocate different species to individual learners or groups of learners and could ask learners to feed back to the class as a presentation.

For P3 and P4 learners must describe life cycles, general biology and behavioural features of at least two deer species. Evidence for P3 and P4 could link to that provided for P1 and/or P2.

The same strategy may be used when assessing P5, in which learners are required to describe the typical signs of deer living wild in two given habitats in the UK. This could be achieved via a presentation to the class, in the field, or as an annotated poster or project.

P6 requires learners to assist in a deer management operation; this must be under supervision. The tutor may be responsible for identifying the work required or evidence could be provided from a placement. It is envisaged that this may involve learners in, for example, activities such as maintaining deer fencing or high seats. If assessed directly by the tutor, observation records completed by the learner and tutor would be suitable evidence. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website. Learners are not expected to take part in culling deer.

For P7 learners must state the influence of relevant legislation on deer management. Evidence could be captured during practical activities or through a report or presentation.

For M1 learners should be able to describe the identification of young, mature and old deer relating to deer species listed in the unit content. This could link to evidence produced for P1.

M2 requires learners to relate the life cycle of a deer species to its management. This could link to evidence produced for P3.

M3 requires learners to survey a habitat for signs of deer. Assessment evidence for this criterion is likely to be results and interpretation from the completed survey.

For D1 learners are required to identify conditions of deer according to season. Ideally this should be done in the field and appropriate records should be provided as evidence. However, if this is not possible then it could be achieved with the use of high quality visual materials, eg slides or videos.

D2 requires learners to produce a cull plan for a given deer population. This could take the form of a pictorial presentation with notes (possibly using an ICT-based presentation or OHPs), an annotated poster or a project.

## Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
PI, MI, DI	Deer Identification	Learners will be shown a range of high quality images of UK deer. They will have to correctly identify the species, sex and age and comment on condition.	Class-based identification exercise..
P2, P3, P4, M2	Deer Lifecycles	Learners will describe the annual cycle of two species of deer, including seasonal changes in their behaviour, and then link this to how these species are managed.	Written report.
P5, M3	Deer Tracks and Signs Survey	Describe the signs of deer found in two habitats and then undertake a survey of a given habitat to identify signs of the presence of deer.	Practical observation and assessment. Written/verbal report.
P6, P7, D2	Deer Management Report	Undertake a practical deer management task and then produce a report that includes reference to relevant legislation a risk assessment for that task and a cull plan for a deer population..	Practical observation and assessment. Written/verbal report.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element Ga3.1 Maintain game populations	Understand Deer Management
Introduction to Game Management	Understand Deer Population Monitoring and Management Plans
Introduction to Animal and Plant Husbandry	Captive Deer Herd Management

## Essential resources

Centres will need sufficient high quality images of the six species of deer (both sexes and varying ages). Learners will need access to an area of land large enough to support populations of at least two different species of deer, where surveys of tracks/signs and practical activities can be undertaken. Ideally this would be a sporting estate where the deer population is actively managed.

## Employer engagement and vocational contexts

This unit focuses on practical aspects of deer management and will give learners the necessary ecological background knowledge. Centres are encouraged to create and develop links with local sporting estates. This could be via guest lectures, practical workshops or visits to see gamekeepers actively involved in deer management.

## Indicative reading for learners

### Textbooks

Carne P – *Deer of Britain and Ireland: Their History and Distribution* (Swan Hill Press, 2000) ISBN 1840370912

De Nahlik A J – *Management of Deer and Their Habitat: Principles and Methods* (Coch-y-Bonddu Books, 1992) ISBN 0907519016

Downing G – *The Deer Stalking Handbook* (Quiller Press, 2004) ISBN 190405739X

English Nature – *Deer Management and Woodland Conservation in England* (English Nature, 1997) ISBN 1857162579

Whitehead G K – *The Whitehead Encyclopaedia of Deer* (Swan Hill Press, 1993) ISBN 1904057195

### Journals

*Deer*

### Websites

[www.dcs.gov.uk](http://www.dcs.gov.uk)

Deer Commission for Scotland

[www.thedeerinitiative.co.uk](http://www.thedeerinitiative.co.uk)

The Deer Initiative

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Creative thinkers</b>	relating deer biology to their practical management
<b>Effective participators</b>	undertaking a survey of deer habitats.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Reflective learners</b>	revising deer identification features.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	using the internet to research appropriate data.
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	





# Unit 17: Introduction to Land-based Machinery Operations

**Unit code:** T/600/9596

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to introduce learners to the skills and knowledge associated with land-based machinery operations and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

## ● Unit introduction

This unit is aimed at learners who may wish to take up a career in the land-based sector especially where skills are needed for using tractors or other similar powered vehicles together with the associated machinery and equipment. The unit emphasises practical skills using tractors, power units and machinery covering the essential skills of preparing, operating and maintaining tractors, equipment and machinery. Learners will firstly learn to recognise the different machinery that is available to use for a range of tasks. They will then learn how to prepare the machinery, use it in realistic situations and finally maintain it ready for use again. Learners will also learn the important legislative and environmental requirements that are increasingly important in the land-based industry of today.

## ● Learning outcomes

**On completion of this unit a learner should:**

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.

# Unit content

## 1 Understand safe working principles when using equipment and machinery

*Safe working principles:* personal eg use of barrier cream; risk assessments; accident statistics; pre-start checks; mounting and dismounting; cold starting; fuelling procedures eg keep tank full overnight, bleeding air from pipes; power take off (PTO) procedures (eg guards, speeds, removal of shaft); hydraulics eg couplings, hoses, spool valves; interpret Decals; interpret odometer; locate main controls eg gauges, levers, buttons for electronics, pedals, dipsticks; ground conditions eg hard, soft, slope; use of gears and speed; use of manufacturers' handbooks

Machinery selection: identification and justification of machinery and equipment suitable to operations eg crop production, groundcare; pesticide application equipment

Legal and environmental considerations: current relevant legislation eg Health and Safety at Work Act 1974 (HASAWA), Control of substances hazardous to health 1989 (COSHH), Manual Handling Operations Regulations (1992); Personal Protective Equipment (PPE); age to drive on road; transport widths; transport loads (eg height, ropes and ratchet straps); mud on road

## 2 Be able to prepare land-based equipment and machinery for use

*Tractor/power unit preparation:* pre-start checks eg oil, coolant, diesel; tyres; battery; maintenance schedule eg handbook; wheels eg check wheel nuts, wheel widths to match machine; fore-loader (where applicable); drawbar

Equipment and machinery preparation: appropriate connections for attachment eg top link, PTO, hydraulic pipes, drawbar, lynch pins and clips; check working parts eg nuts and bolts, shear bolts, tines, discs, bearings, coulters, blades, belts, gearbox oil, grease points, electrical connections

## 3 Be able to operate land-based equipment and machinery

*Tractor/power unit operation:* selection of appropriate gear to match ground/road conditions; transport safely to site; warning signals

Equipment and machinery operation: lift in and out of work; use of headlands; carry out adjustments in work (eg forward speed, top link, stabiliser bars, PTO speed, depth control, differential lock)

## 4 Be able to maintain land-based equipment and machinery

*Maintenance:* interpretation of operator handbook for service/maintenance schedules eg oil, fuel, filters, tyre pressures, coolant, lubrication; check and replacement of worn parts; cleaning; workshop safety eg axle stands, PPE, blocks; storage; waste disposal; record keeping; costs (parts, labour)

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> select appropriate equipment for land-based tasks	<b>M1</b> explain appropriate legal and environmental considerations when using a given machine	<b>D1</b> justify the selection of machinery for a specified task
<b>P2</b> explain why manufacturers' instructions should be followed when working with land-based equipment and machines [IE]		
<b>P3</b> explain the legal and environmental requirements associated with specific machines		
<b>P4</b> identify the controls/devices/instruments and other health and safety requirements for machinery and equipment		
<b>P5</b> carry out adjustments on land-based equipment and machines to meet specific requirements prior to use	<b>M2</b> present maintenance requirements for a specified machine	
<b>P6</b> explain the benefits of correct adjustment of equipment and machines		
<b>P7</b> carry out pre-start checks, including fuelling		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P8</b> operate equipment and machines safely and efficiently for different land-based activities <b>P9</b> carry out activities to achieve the desired results when operating land-based equipment and machines <b>P10</b> identify routine maintenance for land-based equipment and machines using manufacturers' instructions [EP] <b>P11</b> identify hazards and comply with risk assessments during maintenance activities [SM] <b>P12</b> carry out different routine maintenance activities safely on a range of equipment and machines [TW] <b>P13</b> record maintenance activities in an appropriate format.	<b>M3</b> monitor the use of machinery and equipment for a specified task <b>M4</b> produce a cost breakdown for replacing worn parts for a specified machine.	<b>D2</b> evaluate the use of machinery and equipment for a specified task.

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

## Delivery

All centres must comply with the requirements of relevant current legislation and codes of practice, for example the Prevention of Accidents to Children in Agriculture Regulations 1998; and associated Approved Codes of Practice, for example the Health and Safety Executive Preventing Accidents to Children in Agriculture. Learners must be made aware of, and have access to, relevant health and safety legislation and know the importance of the use of risk assessment appropriate to each situation. Appropriate risk assessment must precede all practical machinery activities, learners must work in a safe manner at all times when using equipment or working with machinery. Learners must be supervised at all times and tutors must not request learners undertake tasks that are beyond their physical capabilities.

Delivery of this unit will involve both practical assessment and written assessment, visits to suitable collections and will have links to industrial experience placements.

The unit focuses on learners being able to identify, prepare, use and maintain a wide range of machinery and equipment as found on today's farms, countryside and horticultural units. Tutors should therefore endeavour to offer learners this wide range, even though in their specific locality such a range may not be seen so easily. Where there is a shortfall, tutors should aim to offer the learner the experience of recognising and using other machinery through visits to demonstrations, dealers, talks and work experience.

The tutor might wish to bear in mind the seasonality of tractor, power unit and machinery use. Tutors must therefore plan carefully the whole programme according to both seasonality and machinery in their locality. Tutors need to plan their assessment schedule carefully so that it covers not just learners operating machinery at a certain time of year, but throughout the course duration and to include, where appropriate, any work experience.

Learners will be preparing and maintaining various machinery in a workshop setting and so tutors must adhere to all health and safety procedures throughout the course duration. A strict policy of appropriate PPE must be enforced. This will obviously need to be repeated when learners are in working situations in the field and on visits. Learners should experience how workshops are organised, the range of tools and equipment available for machinery maintenance as well as consumables such as lubricants, filters and other items needed.

Learning outcome 1 covers the recognition of a wide range of machinery and equipment. Tutors will need to plan how they will offer learners the wide choice of machinery available. They might at this stage plan a visit to a local dealer, or to a working demonstrations. Tutors need to emphasise the important environmental aspects of using machinery such as soil structure damage.

Learning outcome 2 is about preparing machinery and equipment and therefore will have an element of workshop experience to offer. Tutors must ensure that learners become familiar with using the wide variety of tools available in a modern workshop. Learners need to experience a variety of tractors and powered vehicles and be able to recognise and locate the different instruments, controls and signs or decals such as found on machinery. There is an increasing use of electronic instruments and controls in modern tractors and machinery, and so tutors need to be able to offer learners this choice.

Learning outcome 3 involves learners using machinery and equipment in the field. The ideal setting is either through work experience or at a centre's farm, horticultural unit or estate. Tutors should endeavour to allow learners maximum experience of a range of machinery. Tutors might be in a position to integrate learner experience with a centre's farm or with a local farmer, horticultural unit or countryside/nature park that can complement the range of machinery offered. Where possible learners should be in a position to use the machinery that they helped prepare in outcome 2.

Learning outcome 4 is a logical follow on to the previous outcome. Where possible, tutors should involve learners to maintain equipment that has been experienced, such as that in learning outcome 1 or 3. Tutors need to plan the timing of this outcome so that learners can complete all relevant assessments. It may be necessary for tutors to plan for this outcome to be done after equipment and machine use in order that there are real maintenance tasks to be undertaken.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction to unit and unit overview.
<b>Assignment 1 – Machinery Selection</b> (P1, P2, P3, P4, M1, D1) and briefing.
Practical session: identify machinery, equipment, decals, instruments and gauges, pedals, levers, interpret handbook where relevant, observe/assist in using machinery for cultivations.
Theory session: identify and describe machinery for different purposes, interpret handbook, explain legal and environmental requirements when using machinery and equipment.
<b>Assignment 2 – Safe Machinery and Equipment Preparation</b> (P5, P6, P7, M2) and briefing.
Practical session: prepare machinery and equipment for specified tasks safely, check parts for wear, interpret manufacturers' instructions, workshop safety, workshop tools, lubricate and fuel ready for use.
Theory session: legislation and environmental considerations for using machinery and equipment.
Theory session: recognise working parts of a range of machinery and equipment, reasons for correct preparation of machinery and equipment, fuel and lubricants.
<b>Assignment 3 – Safe Machinery and Equipment Operation</b> (P8, P9, M3, D2) and briefing.
Practical session: carry out specified practical operations with machinery and equipment safely
Theory session: working parts of machinery and equipment, ground/soil conditions needed for efficient working of machinery, efficient operation, safety, necessary field adjustments.
<b>Assignment 4 – Safe Machinery Maintenance</b> (P10, P11, P12, P13, M4) and briefing.
Practical session: workshop safety, maintain specified machinery, identify and replace worn parts, use workshop tools safely.
Theory session: interpret manufacturers' handbook, workshop tools and equipment, health and safety, maintenance schedules, records and job cards.
Unit review.

## Assessment

For P1, learners need to select appropriate equipment for given land-based tasks. Learners must cover a minimum of three different tasks. For agricultural learners, machines selected could cover machinery for cultivations, drilling/planting, crop health, fertiliser/manure application, harvesting and storage. For horticulture and countryside learners, machines could include mowers, trimmers and ground care equipment. Evidence could be captured through direct observation.

For P2, learners need to be able to explain reasons for following relevant manufacturers' instructions in relation to a minimum of two given pieces of equipment and/or machine.

For P3, learners must explain legal and environmental requirements, this must include relevant legislation covering age restriction, roadworthiness, health and safety issues and environmental issues associated with a minimum of two specific machines.

For P4, learners must be able to identify correctly a range of commonly used instruments, levers, pedals and decals found on machinery. They must state specific health and safety issues relevant to a minimum of two specified machines. Evidence for P2, P3 and P4 could be through an assignment or recorded observation using practical activities.

Health and safety must be paramount in any practical assessment.

For P5, learners need to be able to adjust parts of a given piece of machinery that need specific preparation prior to use. This should include use of lubricants such as grease and oils, nuts and bolts for tightness.

For P6, learners need to explain reasons for correct adjustment and preparation of machinery.

For P7, learners must be able to carry out pre-start checks on oil reservoirs (both engine and hydraulic oil), coolant, fuel, tyres and battery as well as re-fuel a machine as a minimum.

For P8 and P9, learners must be able to operate machinery safely, carry out necessary adjustments. For example if they are creating a seedbed, they should be able to use the relevant machinery and comment on the work produced as to whether the ground is suitable for drilling/planting. For horticulture this might cover the setting up and use of a potting machine. Countryside learners might use a post hole rammer for fencing. Evidence for P5 through P9 is likely to be through the use of observation records during practical assessments. As a minimum learners should operate two different machines.

For P10, learners need to recognise when machinery or equipment needs maintenance, such as oil and filter changes on a tractor or power unit, replacing worn cultivator or mower parts.

P11, could be assessed at the same time as P10 and be evidenced through completed risk assessments.

P12, can be assessed as an on-going exercise that learners perform during the year.

P13, could form part of a learners' workshop diary, recording maintenance activities that are carried out at specific times of year.

For M1, learners must explain legislative and environmental reasons for specifying use of machinery.

For example, for agriculture, tutors could select either manure or fertiliser applicators for learners, who then need to describe NVZ and field margin requirements such as deflectors that avoid fertiliser in the hedgerow. Tutors need to ensure that learners are given the same machinery in order to have fairness of assessment. For horticulture and countryside relevant equipment should be chosen, this may include those of power units to reduce environmental impact.

For M2, learners are required to show that they can organise the maintenance requirements of a specified machine including a list of all the necessary replacement parts needed.

For M3, learners need to monitor machinery use over a specified period of time, which must be the same for all learners. Evidence for M2 and M3 could be through a completed monitoring and maintenance record.

For M4, learners could use the same machinery as that selected for M2. Costs should include parts, allocation of labour and time needed for the machine repair.

For DI, in order to justify the selection of machinery for a specified task learners are expected to be able to present clear, logical and cogent reasons for using machinery. They must show evidence that they have compared other machinery and evaluated all considerations including environmental impacts.

For D2, learners are to evaluate how machinery and equipment was used for a specified task. For agriculture, for example, learners might evaluate the use of machinery for forage harvesting grass, planting potatoes, or producing a seedbed for a spring planted crop. For horticulture this might include compost preparation and potting equipment. Countryside might use equipment for preparing a surface, planting, fencing or grounds maintenance. They must include all the machinery used, including any associated machinery, and to evidence understanding of the need to match capacities and work rates of the machinery used.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
PI, P2, P3, P4, M1, D1	Machinery Selection	You are employed at a dealership as an machinery apprentice. You need to select appropriate machinery for three separate purposes and justify your selection. You must identify instruments and health and safety requirements for two of these machines including appropriate legal and environmental considerations.	Practical observation. Written evidence.
P5, P6, P7, M2	Safe Machinery and Equipment Preparation	For a given machine you have been asked to prepare the machinery according to manufacturers' instructions. You need to make adjustments prior to use and explain the reasons for these and carry out all necessary pre-start checks.	Practical observation. Written evidence.
P8, P9, M3, D2	Safe Machinery and Equipment Operation	You must carry out practical operations for specified tasks using machinery safely and efficiently.	Practical observation. Written evidence.
PI0, PI1, PI2, PI3, M4	Safe Machinery Maintenance	Carry out maintenance of machinery. Interpret manufacturers' instructions. Identify and replace worn parts. Produce a list of parts needed. Produce a cost of both replacement parts and labour.	Practical observation. Written evidence.

### Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element CU27.1 Prepare equipment and machines for maintenance Element CU27.2 Carry out maintenance procedures	Undertaking Land-based Machinery Operations
Participate in Providing Estate Maintenance	Undertake Estate Skills
Tractor Driving	



## Essential resources

Learners will need access to a variety of machinery and equipment, a workshop or suitable work area with the necessary safety equipment and fields or similar where they can gain practice and be assessed. Instruction books and relevant workshop tools will be essential. Workshop areas should also include all the relevant consumables such as oil, filters, belts, nuts and bolts that will be needed for the course duration. Access to and use of all of these resources should form part of the learners' experience. Tutors must ensure that the working areas provide a safe environment for learners. An area for washing hands and storage of clothes/PPE should also be on hand.

## Employer engagement and vocational contexts

Tutors should endeavour to promote links with their own centre's farm, with other local dealers and farmers who are willing to cooperate with offering work experience or visits to learners. Where there are local employers involved, tutors must ensure that strict adherence to health and safety is carried out so that learners can work in safety. Learners should also be given opportunities to do national proficiency training and assessment as relevant to their age and experience, such as telescopic forklift, tractor driving and handling, quad bike handling, Pesticide Applications 1 and 2 as well as any other opportunities for further training.

## Indicative reading for learners

### Textbooks

Bell B – *Farm Machinery* (Old Pond Publishing, 2008) ISBN 978-1903366684

Bell B and Cousins S – *Machinery for Horticulture*; 2nd edition (Old Pond Publishing, 1997)  
ISBN 978-0852363690

Culpin C – *Farm Machinery* (Blackwell Science, 1992) ISBN 978-0632031597

### Journals

*Farm Contractor*

*Farmers Weekly*

*Horticultural Week*

*Profi*

### Websites

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment Farming and Rural Affairs

[www.environment-agency.org.uk](http://www.environment-agency.org.uk)

Environment Agency

[www.fwi.co.uk](http://www.fwi.co.uk)

Farmers Weekly

[www.hsegov.uk](http://www.hsegov.uk)

Health and Safety Executive

[www.rbi.co.uk.lantra.co.uk](http://www.rbi.co.uk.lantra.co.uk)

Lantra Sector Skills Council

[www.reedbusiness.co.uk](http://www.reedbusiness.co.uk)

Reed Business Information

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	identifying questions to answer relating to the importance of manufacturers' instructions
<b>Team workers</b>	collaborating with others when carrying out routine maintenance activities
<b>Self-managers</b>	identifying hazards and complying with risk assessments showing flexibility when priorities change
<b>Effective participators</b>	proposing practical ways forward for the maintenance of machinery.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	monitoring use of machinery
<b>Creative thinkers</b>	carrying out their own research and monitoring
<b>Reflective learners</b>	carrying out their own research and monitoring
<b>Team workers</b>	involved in work experience, visits
<b>Self-managers</b>	involved in work experience, national proficiency tests
<b>Effective participators</b>	on work experience.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	engaged in using the internet for presentation purposes
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	<p>calculating speeds, distances, areas covered for a variety of machinery</p> <p>calibrating specific machinery for quantities of fertiliser to be used in the field</p> <p>calculating amounts of manure spread over given areas</p>
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	engaged in group and independent discussions involving the selection, planning, using and maintaining machinery.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	

# Unit 18: Introduction to Coastal Zone Management

**Unit code:** M/600/9161

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

The aim of this unit is to ensure learners understand the features of the coastal zone and the different techniques for managing coastal habitats.

## ● Unit introduction

The interface between the land and sea, known as the coastal zone, is vital for humans and wildlife. Over 40 per cent of the world's population lives in the coastal zone and most of the commercial goods that are moved around the world are handled in seaside ports. In addition, a large number of other activities take place within the coastal zone, for example tourism and fishing. Many wildlife sites, particularly those managing migrating waterfowl, are found along the coast.

Climate change is another major issue affecting the way that coastal areas are utilised. Due to the abundance of available renewable energy from wave, tidal and onshore and offshore wind sources, many new sites may be developed.

This unit introduces the different features found along the coast, such as sand dunes, cliffs and rocky shores. In addition, learners will investigate some of the threats to coastal environments and some of the solutions that are being developed to control them.

The unit has a strong practical element and learners will be able to study a variety of coastal features as well as carry out practical coastal management work.

On completion of this unit, learners will be familiar with a variety of coastal habitats and be able to assess threats to coastal wildlife. In addition to considering different management solutions to coastal threats, learners will develop the practical skills required to carry out management techniques.

Coastal environments can be hazardous, with rapidly advancing tides, changing weather conditions and substrates, such as soft mud, which make walking difficult. Throughout the unit learners will be made aware of the potential hazards and the importance of planning coastal field trips well.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know features of the coastal zone
- 2 Know the threats to the coastal zone
- 3 Understand techniques for managing the coastal zone
- 4 Be able to carry out practical management work on coastal habitats.

# Unit content

## 1 Know features of the coastal zone

*Coastal zone habitats:* eg sand dunes, salt marsh, estuaries, sea cliffs, sandy beaches, rocky shores, islands, mudflats, lagoons, shingle

Physical features: sediment size; profiles; beach formations; sea cliffs; estuaries; features created through erosion eg caves, sea stacks, blowholes

Common plant and animal species: marine species: fish, crustaceans, molluscs, invertebrates, seaweeds; shingle and shore-based species eg seaweeds, invertebrates, sand-fixing plants, shingle nesting birds; cliff and cliff-top species eg salt-tolerant plants, cliff nesting birds, mammals, invertebrates

## 2 Know the threats to the coastal zone

*Human threats:* tourism eg mountain biking, walking/hiking, pet exercising, caravan parks, marinas, campsites; transport, industrial and energy generating activities eg shipping, dredging, fishing activities, wind generation, wave power generation, tidal current turbines

Natural threats: erosion (sea, wind); sediment movement and deposits; sea level rise; ocean warming; changes in ocean currents; tidal surges

*Effects of damaging activities:* habitat loss; trampling; soil compaction; reduction in sediment supply; lowering of water table; effects of pollution eg domestic sewage, toxic and heavy metals; flooding

## 3 Understand techniques for managing the coastal zone

*Techniques:* practical conservation eg planting windbreaks; visitor management techniques (access control, construction of boardwalks); hard engineering eg rock or gabion headlands, artificial reefs, groynes, seawalls; soft engineering eg dune grass planting, dune fencing, beach recycling, sand bag structures, beach nourishment; health and safety; legislation and codes of practice

## 4 Be able to carry out practical management work on coastal habitats

*Monitoring:* review species numbers and types; monitor for signs of erosion; monitor human influence eg visitor counts and type, visitor behaviour, sea traffic flow and patterns

Practical management techniques: visitor management techniques eg fencing, construction of boardwalks, steps or bridges, erection of signposts; soft defences eg dune grass planting, use of brash etc to control erosion, planting windbreaks, construction of geotextile or chestnut paling barriers; health and safety; legislation and codes of practice

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> define the coastal zone	<b>M1</b> explain how selected plants and animals have adapted to physical processes in coastal habitats	<b>D1</b> detail the interactions between selected species living within the coastal zone
<b>P2</b> describe physical features of a selected coastal zone		
<b>P3</b> identify common plant and animal species of a selected coastal zone [TW1]		
<b>P4</b> describe common natural threats to the coastline of the UK	<b>M2</b> discuss the threats to selected sites within the coastal zone	<b>D2</b> recommend ways to reduce the impact of threats to a selected site
<b>P5</b> outline common human threats to the coastline of the UK		
<b>P6</b> evaluate coastal zone management techniques ◇ hard engineering ◇ soft engineering [IE2]	<b>M3</b> evaluate coastal zone management techniques used at a selected site	
<b>P7</b> monitor an area of coastal habitat [IE]	<b>M4</b> plan and carry out practical coastal habitat management and monitoring of an area safely and independently.	<b>D3</b> evaluate the effectiveness of coastal habitat management work carried out.
<b>P8</b> carry out practical management of coastal habitats safely. [EP,TW]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participants



# Essential guidance for tutors

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## Delivery

The purpose of this unit is to familiarise learners with different aspects of the coastal zone. Learners will observe a variety of coastal habitats and be introduced to the techniques available to manage and protect them. Although there will be some classroom sessions, much of the content will be delivered through visits to coastal habitats and tourism sites. If possible, visits led by local professionals, such as a flooding engineer from the Environment Agency or a local authority coast protection officer, would benefit learners. These would provide excellent opportunities to discuss threats to coastal habitats and the different management techniques used to minimise their impact.

Within a classroom setting this unit lends itself to the use of interactive teaching techniques. Some of the unit content will be familiar to learners and sessions can be built around group discussions of personal experiences of trips to a coastal zone. Once the basic concepts have been explained, matching and labelling activities could be used to discuss threats, their effects and possible solutions.

In common with other habitat units, seasonality may affect delivery of this unit. Coastal habitats are best studied in the spring and early summer, particularly when specialist plant species are being identified. Some threats, such as landslips, are often most dramatic following winter storms, while other threats, such as tourism, are most evident during the warmer months.

For centres without easy access to coastal environments, much of the content can be covered using classroom discussion, independent research and the use of interactive resources, but it is essential this is supplemented by at least one substantive field trip to enable learners to carry out practical activities.

As there are numerous hazards associated with coastal habitats, priority must be given to health and safety considerations and the general welfare of learners. Before any activities are carried out in the tidal zone, tide tables must be consulted and mobile phone signals checked to ensure communication with the emergency services. Learners must be made aware of their responsibilities for maintaining the safety of themselves and others and be fully informed of the consequences of irresponsible behaviour whilst on coastal sites.

Wildlife should also be considered and it is important that learners develop an appreciation for the sensitivity of life in coastal environments. Most plant species have adapted to light disturbance, but care should be taken not to damage sensitive species. Some field studies may involve the capture and handling of animals. Marine species which depend on moist conditions should be observed for a short period only before being returned to their natural environment. Slow moving or stationary species, such as limpets, should be studied *in situ* and not removed from their substrate.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

## Topic and suggested assignments/activities and/assessment

### **Assignment 1: Habitats in the Coastal Zone** (P1, P2, P3, M1, D1)

Tutor introduces the assignment brief.

Introduce types of coastal habitats and key species.

Discussion of physical processes and effects on coastal habitats.

Visit coastal habitats and identify key species in the field.

Discuss adaptations of species to coastal environments. Includes time allocated for independent research.

Interaction of species living within the coastal zone.

### **Assignment 2: Threats to Coastal Habitats** (P4, P5, P6, M2, M3, D2)

Tutor introduces the assignment brief.

Discuss threats to coastal habitats and their effects.

Investigate threats to selected coastal sites. Includes time for independent research.

Undertake visits to see the management of important coastal sites.

Discuss effectiveness of the different management practices observed.

Evaluate different solutions to the threats.

### **Assignment 3: Practical Habitat Management** (P7, P8, M4, D3)

Tutor introduces the assignment brief.

Carry out site monitoring.

Undertake practical habitat management work.

## Assessment

For P1, learners are expected to describe the concept of the coastal zone. This could be a pictorial presentation such as an annotated poster showing a typical coastal zone area.

For P2, learners should describe the physical features of a coastal zone. This can be selected by the tutor or chosen by learners in agreement with the tutor. The selected area may contain one or more coastal habitats. Evidence could be an illustrated report or an annotated poster.

For P3, learners are required to identify common plant and animal species found in a selected coastal zone habitat. This can be carried out by learners working in small groups using suitable field identification guides. The site chosen can be the same as for P2. Suitable evidence could be a practical observation record or an addition to the evidence presented for P2.

For P4 and P5, learners need to describe common natural and human threats to the UK coastline. Learners should describe the relevant effects and their potential impact on the coastal zone. Evidence could be an illustrated report, an annotated poster or an illustrated leaflet.

For P6, learners are expected to evaluate coastal zone management techniques. The evaluation criteria to be used should be clarified by the tutor as part of the assessment brief. Evidence could be an illustrated report or a leaflet.

For P7, learners will need to monitor an area of coastal habitat. The habitat can be chosen by the learner in agreement with the tutor or it can be selected by the tutor to ensure a consistent level of assessment. Suitable evidence could be in the form of an annotated poster or an illustrated report.

For P8, learners will need to carry out practical management tasks on coastal habitats. A minimum of two different habitat management tasks should be included in the assessment. The site chosen and the tasks to be completed should be agreed between learners and the tutor before learners begin the tasks. Evidence could be in the form of a practical observation record.

For M1, learners are expected to explain how selected plants and animals living in coastal habitats have adapted. As a minimum, at least one plant or animal species must be chosen for three habitats. Examples include marram grass on sand dunes, limpets on rocky shores or *Salicornia spp* on saltmarsh. Evidence can be in the form of an illustrated report, annotated poster or a leaflet.

For M2, learners need to discuss the threats to selected sites within the coastal zone. This could be through case studies on sites around the UK. A minimum of three sites should be chosen for the assessment. Evidence could be in the form of a leaflet or an illustrated report.

M3 is closely linked to P7. Learners need to apply their evaluation of coastal management techniques to a selected site. The site could be chosen by the tutor or by learners, but if it is the latter it should be agreed by the tutor before learners start to produce their evidence.

For M4 learners need to demonstrate a more independent approach to the practical activity, including planning the tasks to be completed.

For D1, learners will need to detail the interactions between selected species living within the coastal zone. This would involve describing the ecology of two species and how their interactivity has developed. Examples of suitable species include starfish/mollusc or limpet/algae. Evidence could be an illustrated report or an annotated poster.

D2 is closely linked to M2 and M3. Learners need to recommend ways to reduce the impact of the threats identified in M2 based on their evaluations in M3. Evidence could be in the form of an illustrated report or an annotated poster.

For D3, learners are required to evaluate the effectiveness of the habitat management work they have completed. This could be assessed through verbal questioning and included on the practical observation record.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1, D1	Habitats in the Coastal Zone	You are working with a local wildlife trust on a site in the coastal zone. They have asked you to put together some information that could be used in their interpretive displays of coastal habitats. Include a description of the coastal zone and its features, and the common plant and animal species found within it. Explain how some of the plants and animals have adapted to their environment, and the interactions between species.	Annotated poster. Illustrated report.

Criteria covered	Assignment title	Scenario	Assessment method
P4, P5, P6, M2, M3, D2	Threats to Coastal Habitats	You are helping the National Trust warden to prepare a talk on the coast. Create a report which identifies the common human and natural threats to the UK coastline and which evaluates the management techniques used to reduce these threats. Use examples of the threats at three selected sites and evaluate the management techniques used at one of these sites. Recommend ways of reducing the impact of the threats at one site.	Illustrated report.
P7, P8, M4, D3	Practical Habitat Management	You have been asked to assist with the planning and implementation of some management work on a coastal site. On completion of your practical work, evaluate how effectively it has been carried out.	Practical observation record.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element CU87.1 Maintain suitable site conditions Element CU87.2 Manage vegetation	Understanding the Principles of Wildlife Populations, Ecology and Conservation
Element EC34.1 Work with local coastal environments	Understanding Land Use and Environmental Issues
Introduction to Environmental Studies	Understanding Coastal Management
Conservation and Improvement of British Habitats	Understanding Countryside Tourism and Recreation

## Essential resources

Learners will need access to different coastal environments to carry out field work. They will also need access to the internet to obtain information for coastal management. case studies. Appropriate tools and equipment will be required for learners to carry out their practical habitat management work.

## Employer engagement and vocational contexts

This unit introduces learners to a wide variety of habitats and organisations working within the coastal zone. Centres are encouraged to establish links with local authorities and wildlife charities operating in the coastal zone. This would be best within a field context, such as a guided walk around a nature reserve, coastal development site or popular beach area, to see and discuss management issues.

## Indicative reading for learners

### Textbooks

Beatley T, Brower D J and Schwab AK – *An Introduction to Coastal Zone Management* (Kogan Page, 2002) ISBN 1559639156

Brooks A and Agate E – *Sand Dunes: A Practical Handbook* (BTCV, 2001) ISBN 094675232X

Brown K, Tompkins E and Adger N – *Making Waves: Integrating Coastal Conservation and Development* (Earthscan Publications Ltd, 2002) ISBN 1853839124

French P – *Coastal and Estuarine Management* (Routledge, 1997) ISBN 0415137594

Hill M – *Coasts and Coastal Management* (Hodder Murray, 2004) ISBN 0340846380

Kay R and Alder, J – *Coastal Planning and Management* (Taylor & Francis, 2005) ISBN 0415317738

Little C – *The Biology of Soft Shores and Estuaries* (Oxford University Press, 2000) ISBN 0198504268

Little C and Kitching JA – *The Biology of Rocky Shores* (Oxford University Press, 1996) ISBN 0198549350

Soothill E and Thomas M – *Natural History of Britain's Coasts* (New Orchard, 1993) ISBN 1850792224

Stott T, Hindson, J and Crump R – *Sand Dunes, A Practical Coursework Guide* (Field Studies Council, (1993) ISBN 1851538259

Waugh D – *Geography: An Integrated Approach* (Nelson Thornes, 2000) ISBN 9780174447061

### Journal

*British Wildlife*

### Websites

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment Food and Rural Affairs

[www.eclife.naturalengland.org.uk](http://www.eclife.naturalengland.org.uk)

Living with the sea project

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Environment Agency

[www.mcsuk.org](http://www.mcsuk.org)

Marine Conservation Society

[www.naturalengland.org.uk](http://www.naturalengland.org.uk)

Natural England

[www.saltmarshmanual.co.uk](http://www.saltmarshmanual.co.uk)

Salt marsh management

[www.scopac.org.uk](http://www.scopac.org.uk)

SCOPAC (Standing Conference on Problems Affecting the Coastline)

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	carrying out research on coastal case studies monitoring an area of coastal habitat evaluating coastal zone management techniques
<b>Team workers</b>	identifying plants and animals in coastal habitats carrying out practical management work on coastal habitats
<b>Effective participators</b>	carrying out practical management work on coastal habitats.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Creative thinkers</b>	carrying out practical tasks and coping with changing conditions, such as the weather
<b>Reflective learners</b>	assessing the condition of coastal habitats and making suggestions for improvements
<b>Self-managers</b>	planning for practical habitat management tasks.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Manage information storage to enable efficient retrieval	researching information for coastal management case studies
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching case studies on coastal management
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	presenting the results of coastal field studies in a written report or oral presentation
Present information in ways that are fit for purpose and audience	adapting information obtained during coastal studies for an oral presentation, using appropriate software
<b>Mathematics</b>	
Select and apply a range of skills to find solutions	calculating areas of habitats, measuring lengths of fence or calculating numbers of boards for practical habitat management work
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing and deciding on different management options for coastal habitats
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching information for case studies of different coastal development situations
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	writing reports on the evaluation of the habitat management techniques used at a selected site in the coastal zone.





# Unit 19: Tractor Driving

**Unit code:** D/600/9835

**Level 2:** BTEC First

**Credit value:** 5

**Guided learning hours:** 30

## ● Aim and purpose

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.

## ● Unit introduction

This unit is designed for learners who, as part of their chosen career within the land-based industry, will be required to operate tractors, self-propelled and tractor mounted or trailed machines.

It is designed for learners from agriculture, countryside management, forestry, horticulture and ground care sectors. Centres will base delivery and assessment on the equipment that applies to the chosen area of study. Appropriate tractors, all terrain vehicles, off road utility vehicles and self-propelled ground care vehicles could be used providing the requirements for attaching equipment and connecting operating systems can be covered.

On successful completion of this unit, learners will be able to operate land-based machines safely and effectively, carrying out a range of tasks commonly associated with the machine. Learners will begin by identifying key components and controls, carrying out pre-start checks and basic maintenance and ensuring the machine is fit for use. Learners will demonstrate the safe operation of the machine without attachments and in a confined area to demonstrate safe movement and control.

This will progress to the hitching and safe use of the machine with commonly used attachments. Learners will also be able to attach transport equipment and demonstrate safe use of the tractor functions. All centres must comply with the requirements of relevant, current legislation and codes of practice for example the Prevention of Accidents to Children in Agriculture Regulations 1998 and the associated Approved Code of Practice *Preventing Accidents to Children in Agriculture* (especially paragraphs 22 to 27).

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Know 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 a tractor and attachments.

# Unit content

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## 1 Know key components and operator controls on a tractor

*Key components:* components requiring operator attention; fuel system components, air filtration system components, engine cooling system components; cold start devices; wheels/tyres and axles; lubrication points; transmission units, power take off systems; hydraulic and fluid reservoirs; hitching and attachment points, electrical and hydraulic connections

*Operator controls:* steering, clutches and brake controls, transmission and hydraulic controls, electrical controls, operator ergonomics and comfort, instrumentation and warning devices

## 2 Know the relevant legislation and codes of practice for tractor driving

*Legislation:* road transport legislations, Road Traffic Act, 1998; Health and Safety at Work Act, 1974; Provision and Use of Work Equipment Regulations, 1998; Control of Noise at Work Regulations, 2005; Environment Act, 1995; Construction and Use Regulations, 1986

*Codes of practice:* highway code; manufacturers' recommendations; risk assessments; use of PPE

## 3 Be able to carry out simple maintenance tasks and settings to a tractor

*Maintenance tasks:* pre-start checks for site work and road transport operations; fuel levels/re-fuelling procedures, moisture traps, air filtration, engine and transmission oil levels, steering/brake fluid levels, coolant levels and radiator screens, screen wash fluid; windows and rear view mirrors, wheel fastener torque settings, tyre pressures, bulbs, fuses and drive belt.

*Tractor settings:* seat fore/aft position, seat height, seat suspension, seat rotation for fieldwork; rear view vision; cab environment, heat, cool air; air conditioning; wheel track and suspension settings, drawbar, hitch and linkage settings

## 4 Be able to operate a tractor and attachments

*Operate tractor:* correct start procedures; neutral control positions, safety start switches, transmission gear selection, speed; manoeuvres, gradients, power take off drive engagement; use of hydraulic controls, electrical systems, hitching and attaching machines; ground conditions, field procedures, marker systems, tramlining, global positioning systems

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> name the key components that make up the build of a current tractor [IE]	<b>M1</b> explain the relevance of the key components in relation to other components	<b>D1</b> carry out all maintenance in accordance with manufacturers' recommendations, selecting and using PPE correctly
<b>P2</b> identify and explain the purpose of all controls and instrumentation of a modern tractor		
<b>P3</b> outline the relevant legislation that apply to tractor driving [IE]		
<b>P4</b> outline the relevant codes of practice that apply to tractor driving		
<b>P5</b> define the limitations imposed on young or inexperienced tractor drivers		
<b>P6</b> carry out pre-start checks on a tractor	<b>M3</b> explain the consequences of failing to maintain a tractor	<b>D2</b> carry out all operations in accordance with all legislation, codes of practice, and following acceptable working practices.
<b>P7</b> perform pre-operational maintenance tasks prior to undertaking tractor driving operations		
<b>P8</b> carry out adjustments to the tractor to match the tractor to the operator		
<b>P9</b> prepare the tractor to accept a range of selected attachments		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P10</b> drive a tractor safely and efficiently around to meet given objectives	<b>M4</b> operate tractor and attachments safely with minimum assistance.	
<b>P11</b> safely hitch selected attachments to a tractor		
<b>P12</b> operate tractors and attachments safely to meet given objectives		
<b>P13</b> prepare tractors and attachments for storage ensuring they are ready for future use.		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

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## Delivery

Tutors delivering this unit have the opportunity to use a wide range of delivery methods, including lectures, seminars, and discussions to draw on learners' experiences. Emphasis should be on supervised practical sessions to build learners' confidence and competence in tractor and machine operations. A wide range of delivery methods should stimulate and enthuse learners to maintain high levels of motivation and learning.

Whichever delivery methods are used, it is essential that tutors stress the importance of health and safety, environmental issues and the need to manage the resource using legal methods. Risk assessments must be undertaken before practical activities. Learners should not be asked to undertake tasks that are beyond their physical capabilities.

All centres must comply with the requirements of relevant, current legislation and codes of practice for example the Prevention of Accidents to Children in Agriculture Regulations 1998 and the associated Approved Code of Practice *Preventing Accidents to Children in Agriculture* (especially paragraphs 22 to 27).

Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments learners may also be taking as part of their programme of study. Tutors must remember when identifying suitable tasks for learners to undertake that this is a Level 2 unit and are referred to the relevant Level 2 National Occupational Standards for guidance.

Learning outcome 1 looks at the key components of a tractor that an operator needs to be aware of. These key components are likely to be addressed when carrying out pre-start checks, pre-operational maintenance and operational settings and adjustments. Where possible, tutors should enable learners to focus on a range of different tractors rather than on tractors they are already familiar with. Learners should be able to state function and operation of the identified key components.

Learning outcome 2 looks at relevant current legislation that applies to tractor operations. Learners should be made aware of the applicable legislation and have the opportunity to research details using different resources. Codes of practice relevant to tractor operations will be researched and evidenced in the same way. Learners will also need to understand the consequences of an operator not complying with legislation and codes of practice.

Learning outcome 3 requires learners to develop basic maintenance skills that will enable them to check and prepare a tractor for a period of work. Where possible, the tutor should allow maintenance tasks to be performed on the tractors used for driving practice so that learners can familiarise themselves with the chosen tractors. It is essential that learners understand the consequences of a lack of or incorrect maintenance and how this may affect productivity and performance. Learners will be required to develop an understanding of operator/tractor compatibility and to adjust tractor components and settings to suit the individual operator. Learners also need to understand the settings and adjustments required to attach and hitch a variety of machines.

Learning outcome 4 requires learners to carry out basic vehicle manoeuvres safely and efficiently. Learners will develop an understanding of the tractor's capabilities, and suitability for a range of tasks. Learners will operate the tractor smoothly and safely with regard for health and safety at all times. Once learners have demonstrated the basic skills of tractor operation, they will be required to attach a range of machines safely using recommended methods. Machines will be trailed by fixed drawbar and automatic hitch, 3 point rear linkage mounted, and the range of machines should include power drive shaft attachment, hydraulic and electrical service connections.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction to unit.
Health and safety issues.
Legislation and codes of practice.
<b>Assignment 1: Key Components, Instruments and Controls</b> (P1, P2, M1)
Investigate key components, instruments and controls.
Pre-start checks and initial driving practice.
<b>Assignment 2: Legislation and Codes of Practice</b> (P3, P4, P5, M2)
Carry out basic maintenance on tractors.
Carry out settings and adjustments, change and set hitches and linkages.
<b>Assignment 3: Tractor Maintenance and Settings</b> (P6, P7, M3, D1)
Hitch a range of machines.
Manoeuvring and operating practice.
<b>Assignment 4: Tractor Driving and Operations</b> (P10, P11, P12, M4, D2)
Development of driving and operating techniques.
Review assessments and assignments.
Unit review.

## Assessment

For P1 and P2, learners will be expected to provide information on all the key components, instruments and controls of a current, modern tractor that an operator is likely to encounter when carrying out pre-start checks, basic maintenance and practical operations with tractors and machines. A range of tractors may be used if a modern tractor is not available. Tutors could record evidence using a centre-devised observation record sheet.

For M1, learners will be expected to explain the function and purpose of all key components, controls and instruments addressed in P1 and P2. Tutors could extend the observation record sheet to record evidence or devise a separate sheet where P1, P2 and M1 evidence is to be assessed at different times.

For P3, P4 and P5, learners could produce a list that identifies the range of current legislation and codes of practices associated with the field operation and road transport of tractors and machines.

For M2, learners could produce an account of the consequences for the operator, equipment and environment if legislation and codes of practice are not complied with.

For P6 and P7, learners need to carry out pre-start checks on a chosen tractor and prepare the tractor for fieldwork operations. Any discrepancies resulting from checks could be reported to the tutor/ supervisor and actions decided before the tractor is used. Learners will carry out basic maintenance tasks as instructed by the tutor/assessor. All practical tasks must be performed in accordance with manufacturers' recommendations and using appropriate operator manuals. For P8 learners need to carry out adjustments to the tractor to match the tractor to the operator. Evidence for these criteria could be through completed job cards, signed and dated by both assessor and learner. Job cards could include information that identifies the tractor, the maintenance tasks completed and consumable items used.

For M3, learners will be required to explain the consequences for equipment, the operator and work rate expectations of a lack of or incorrect maintenance. If this is assessed orally during the practical maintenance sessions, tutors could record evidence by way of suitable centre-devised evidence records.

For D1, learners will carry out all maintenance tasks safely and effectively in accordance with manufacturers' procedures and tolerances, selecting and using appropriate PPE correctly where required.

For P10, learners need to carry out safe and efficient manoeuvres with their chosen tractor to demonstrate competence in the use of tractor controls. For P9 and P11 learners will be required to demonstrate safe and efficient methods of attaching and hitching a range of machines in preparation for field operations. For P12 and P13 learners must operate tractors and attachments safely to meet given objectives and prepare these for storage. Tutors could record evidence on a suitably formatted evidence record sheet and give written feedback, and discuss action planning for reassessment where required.

For M4, learners will be required to complete practical tasks using tractor and attachments, including initial field settings, manoeuvring tractor and machines around a set course to meet given objectives and operating machines in simulated situations. All tasks must be performed safely and to meet objectives outlined by the tutor/assessor. Tutors will record evidence in the same way as for P10 on an extended or separate evidence record sheet.

For D2, learners are required to complete all practical tasks with regard to relevant current legislation and codes of practice. Learners will demonstrate a high level of competence with the minimum of supervision and assistance. Tutors could record evidence in the same way as for P10 on an extended or separate evidence record sheet.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1	Key Components, Instruments and Controls	Explain key components, instruments and controls for a range of different tractors to potential operators who have no experience of tractor driving.	Verbal Q and A Handbook. Observation. Assessor checklists.
P3, P4, P5, M2	Legislation and Codes of Practice	Explain the range of legislation and codes of practice which apply to a range of tractor fieldwork and road transport operations. Learners will explain the consequences of not complying with legislation and codes of practice.	Written report.

Criteria covered	Assignment title	Scenario	Assessment method
P6, P7, P8, P9, M3, D1	Tractor Maintenance and Settings	Carry out pre-start checks, basic maintenance activities according to manufacturers' instructions and adjust and prepare the tractor for operation. Learner to select, explain and use PPE.	Practical assessment. Q and A. Handbook. Observations.
PI0, PI1, PI2 M4, D2	Tractor Driving and Operations	Complete tractor manoeuvring tasks as directed, hitch or attach a range of different machines and carry out operational tasks safely and efficiently with the minimum of assistance and guidance. Learners will carry out all tasks considering health and safety requirements at all times and in line with relevant legislation and codes of practice.	Practical assessments. Q and A. Assessor checklists.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Introduction to Principles of Land-based Machinery	Understanding Principles of Land-based Machinery
Introduction to Land-based Machinery Operation	Understand and Use Agricultural Spreaders and Sprayers
Introduction to Land-based Workshop Practices	Undertaking Land-based Machinery Operations

## Essential resources

Learners will require access to learning resources in order to research legislation and codes of practice.

A range of modern tractors, ATV, utility vehicles, self-propelled grounds care equipment and suitable machines should be available so learners can complete assessment tasks.

The corresponding manufacturers' handbooks for tractors and machines should also be available.

A suitable maintenance area and tools and equipment to carry out basic tractor maintenance tasks is required, together with a suitable driving area to allow learners to carry out basic manoeuvres with tractors, hitch and operate machines.

## Employer engagement and vocational contexts

Where possible, learners should have relevant work experience to increase their operational development in a commercial situation where it is otherwise difficult or unrealistic to simulate ground conditions and obstacles in the field.



## Indicative reading for learners

### Textbooks

Bell B – *Farm Machinery* (Old Pond Publishing, 2005) ISBN 1 903366682

Cairns B -The Farmers and Groundsmans Guide to Planning Vehicle and Machinery Maintenance (The Crowood Press LTD) ISBN 1 847971 104

Culpin C – *Farm Machinery*, 12th edition, (Blackwell Scientific, 1992) ISBN 0632031597

Witney B – *Choosing and Using Farm Machinery*, First Edition (Longman Higher Education) ISBN 0582456006

### Journals

*Profi International check title*

### Other material

Manufacturers' publications and manuals

Lubrication charts and data sheets

### Websites

[www.bagma.com](http://www.bagma.com)

British Agricultural and Garden Machinery Association

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment, Food and Rural Affairs

[www.hse.gov.uk](http://www.hse.gov.uk)

Health and Safety Executive

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	explaining the relevance of the key components in relation to other components explaining the consequences of not complying with current legislation and codes of practice operating tractor and attachments safely with the minimum of assistance
<b>Reflective learners</b>	operating tractor and attachments safely with the minimum of assistance
<b>Self-managers</b>	operating tractor and attachments safely with the minimum of assistance
<b>Effective participators</b>	explaining the consequences of a lack of maintenance of a tractor.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	arranging work placement opportunities
<b>Creative thinkers</b>	choosing appropriate tractors and machines
<b>Reflective learners</b>	practising tractor and machine hitching and manoeuvring tasks, assessing own progress and trying out different methods to develop competence and confidence
<b>Team workers</b>	working as a group during tractor and machine practice sessions, encouraging each other to try out different strategies.
<b>Effective participators</b>	

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	selecting and using manufacturers' online instruction manuals
Follow and understand the need for safety and security practices	preparing to carry out practical operations using the internet to research legislative information
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching legislation and codes of practice
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	
<b>Mathematics</b>	

Skill	When learners are ...
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	performing maintenance tasks on tractors
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	following manufacturers' information in operator manuals when researching operator controls and performing maintenance tasks
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	producing researched evidence relating to legislation and codes of practice.

# Unit 20: Understand the Basic Principles of Plant Science

**Unit code:** T/600/9808

**Level 2:** BTEC First

**Credit value:** 5

**Guided learning hours:** 30

## ● Aim and purpose

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.

## ● Unit introduction

Every aspect of the horticulture industry relies on scientists to ensure the continued improvement and understanding of plant science to create a better quality plant for a number of different purposes eg bigger flowers or hardier cereal plants. Scientists are people who have the desire to understand the world around them and they long to solve problems as well as trying to explain things in the world around us. A lot of scientific discoveries have both added to our knowledge of the world around us as well as allowing us to turn our knowledge into useful applications.

So, why study plants? Plants are what sustains the Earth. By understanding plants we can use them to our benefit. We can find new medicinal cures, produce better quality food, prevent plant disease and continue to improve our plant production methods.

This unit aims to provide a basic scientific understanding of plant biology for the learner who is interested in horticulture and agriculture, wants to study climate or environmental studies, those interested in plant health benefits and food production as well as those hoping to take their studies further. This unit is also useful as a basis for those hoping to become a botanist or plant scientist that will study plants, fungi, algae – their structure, growth, reproduction, distribution and diseases. So, if you are observant, good at problem solving and interested in plants then plant science is for you!

## ● Learning outcomes

**On completion of this unit a learner should:**

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

# Unit content

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## 1 Know the physical structure of plants

*Plant structures and function:* external structures (roots, shoots, stem, leaves, buds, flowers, fruits, seeds); internal structures (cell structure, cytoplasm, organelles, parenchyma, collenchyma, sclerenchyma, xylem tissue, phloem tissue, cambium); specialised cells, tissues and organs (pericycle, endodermis, lenticels, cotyledons, stolons, rhizomes, storage organs); use of plants related to their structures

## 2 Understand the development and physiology of plants

*Plant growth and development:* life cycle types (ephemeral, annual, biennial, perennial); definition of monocotyledon and dicotyledon and examples of plant species in both; process and stages of germination; types of germination eg epigeal, hypogeal; effects of photoperiod and temperature on reproductive growth; flower structures; pollination and fertilisation; seed production and dispersal; fruit formation; dormancy; asexual and vegetative reproduction; meristems; cell division; formation of roots, shoots, buds, leaves and tillers; function of major plant nutrients and deficiency symptoms (nitrogen, phosphorus, potassium, magnesium, sulphur); function of minor nutrients and trace elements; deficiency symptoms of minor nutrients and trace elements eg sodium, iron, manganese, zinc, copper, molybdenum, boron, cobalt

*Physiology:* Photosynthesis equation; structure and function of chloroplasts; function of pigments eg chlorophyll; factors influencing the rate of photosynthesis eg temperature, humidity, light intensity, position within the canopy, water availability; compensation points; manipulation of limiting factors to enhance plant performance eg weed control, carbon dioxide enrichment, climate control, irrigation, drainage; Definition of aerobic and anaerobic respiration; equation for aerobic respiration; structure and function of mitochondria; factors influencing the rate of respiration eg temperature, water availability, seasonal growth; controlled growing environments eg hydroponics; Water uptake, movement and loss eg osmosis, diffusion, transpiration, plasmolysis, translocation; factors influencing rates of uptake and loss eg humidity, wind speed

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> identify the organs of plants	<b>M1</b> explain the function of specialised cells within plants	<b>D1</b> discuss how plant physiology can be manipulated to purpose.
<b>P2</b> describe the main tissues of plants		
<b>P3</b> identify the functions of leaves, stems, roots and flowers		
<b>P4</b> summarise the processes involved in growth and development	<b>M2</b> describe how and why water uptake can vary in plants.	
<b>P5</b> summarise the processes involved in plant reproduction		
<b>P6</b> define the terms: ◇ Ephemeral ◇ Annual ◇ Biennial ◇ Perennial as they relate to plant life cycles		
<b>P7</b> describe the characteristics of stages of plant growth.		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

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## Delivery

Delivery of this unit will involve practical assessments, written assessment, visits to suitable collections and will have links to industrial experience placements.

Site visits and guest expert speakers may also be appropriate and the learner can be introduced to the work of botanists and plant scientists. If possible a visit to a centre such as the John Innes centre would be ideal to support the learner in applying knowledge as well as seeing manipulation of plant physiology in action. Most providers will have access to basic scientific equipment eg microscopes and bioviewers that can be used to see sections of plants. Data logging equipment can be used to show limiting factors in photosynthesis and this equipment is fairly common in school, college or University science departments. Most providers will have access to a range of plants that can be studied but specimens can be bought in or site visits can be arranged. Another area of possible field work involves visiting a controlled growing environment and carrying out organised practical work. A visit that shows hydroponics working or another soil-less system would be good for the students to reinforce that plant mass is not from soil and plants will grow in other media. The rest of the unit is very much linked to knowledge gained from level 2/GCSE science courses and as such many scientific practical's eg looking at osmosis in potato chips, the effects of mineral deficiency on duckweed, a potometer etc are all suitable ways of explaining ideas to the learner. Material can however be delivered by a wide range of techniques including lectures, discussions, seminar presentations, supervised practical's and research using the internet and/or library resources. Delivery should stimulate, motivate, educate and enthuse learners.

Any site visits should be checked for suitability and a risk assessment of activities carried out. Centres such as the John Innes centre and charities such as the RHS run very well organised and well funded education departments that provide schools with the opportunity to have a supported visit to a number of different sites and provide expert guidance on the specific location as well as sometimes being able to tailor make sessions and practical work. It would be beneficial if learners and supervisors of sites/centres were made aware of the requirements of this unit prior to any activities so that evidence can be collected at the time. For example, learners may have the opportunity to use better quality microscopes and view images from scanning electron microscopes showing the detail of tiny structures in plants. The learner should be encouraged to ask for observation records and/or witness statements to be provided as evidence of this as well as taking and annotating photographs and keeping a diary from any site visits. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.



Topic and suggested assignments/activities and/assessment
Introduction and overview to the unit.
<b>Assignment 1: New Job, New Roles</b> (P1,P2,P3,M1)
Introduction to assignment.
Investigation of plant structure and function.
Research, lectures, guided practical work on plant structures
<b>Assignment 2: The Work Adds Up</b> (P4, P5,M2)
Introduction to assignment.
Research, lectures, guided practical work on plant growth.
<b>Assignment 3: Fame!</b> (P6,P7,M2)
Introduction to assignment.
Research, lectures, guided practical work on plant physiology
<b>Assignment 4: A New Area to the Centre</b> (D1)
Introduction to the assignment.
Introduction to physiological manipulation.
internet research, site visits, library research, guest lectures, demonstrations and guided practical work.
Unit evaluation.

## Assessment

For P1, learners must identify the organs of plants. This could be assessed by a 'game' style task that gets students to match names to parts, students could label a given diagram, students could make a model of a plant to use with younger students or written tasks can be undertaken.

P2 requires the learner to describe plant tissues. This could take the form of a pictorial presentation with notes, an annotated poster, laboratory book or project.

For P3 the learner should identify the functions of structures in the plant. This can be assessed by a question and answer session with the tutor, an annotated series of diagrams, a revision clip session eg bbc bitesize, a gardening magazine article for beginners, a web page article.

P4 requires the learner to explain plant growth and development and factors that affect them. This may be completed during a site visit so can be assessed by witness statement or observation record. If a site visit or guest speaker session is not possible then the learner could prepare a presentation, a booklet, a guide for other students, a mock section of a revision guide or a web page for a plant nursery.

For P5 the learner must explain plant reproduction. The assessment for this can take the same form as P4 or P3.

P6 requires the learner to define a series of terms relating to plant life cycles. This can be assessed by the pupils producing a documentary style piece which can be filmed or written as a story board, a presentation, a series of annotated photographs/diagrams that explain the terms.

P6 requires the learner to describe the stages of plant growth. This criterion can also be assessed as P4 or P3.

For M1 the learner must explain the function of specialised cells. For this the learner could construct models of specialised cells and either talk about each in an interview or display them with a set of descriptive note cards, this could also be assessed as a written task or as a set of posters.

For M2, the learner could carry out a series of practicals that can be photographed. The practical can be supported by results tables, graphs and conclusions. The learner could also complete an internet research project feeding back to the tutor or after practical work a presentation could be given or written piece produced.

D1 can be assessed as a series of notes or a diary by the learner about site visits to centres where physiological manipulation occurs. This could also be assessed as a mock business plan appealing for financial backers explaining the science behind the project.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1.	New Job, New Roles	You have recently got a job at the John Innes centre. You have experience in botany and plant science and your first job is to update the introduction to plant science section of the centres website.	Production of a variety of web pages
P4, P5, M2	The Work Adds Up	Your next task is to compare new varieties of tomatoes and to see how these compare to standard species. Your tests will involve seeing how the plants grow, watering demands and environmental factors that affect them.	Practical notes, photographs, witness statements
P6, P7	Fame!	A TV wildlife programme wants to film a programme on different plants and how they grow. You have been assigned to support the crew as scientific support.	Produce note cards for the crew, create storyboards and scripts
D1	A New Area to the Centre	Your boss has decided to set up an area using alternative media to grow plants. You must try different media and report on their success.	Practical notes, report, annotated photographs

### Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Establish and Maintain Plants Outdoors	Understand the Principles of Soil Science
Element CU76.1 Maintain the health of plants outdoors	

## Essential resources

There are many opportunities for practical and experimental work in this unit. Therefore there should be access to adequate field and laboratory facilities for the investigation of plant structures, germination, photosynthesis, osmosis and transpiration. A suitable range of plants and plant material should be available for learners to study.

There should be access to light microscopes to study cell structures. Learners should have access to current health and safety regulations and equipment. Links with, for example, farmers and growers will enable access to a range of plant types and growing regimes.

Learners should be given access to computers for research and presentation of assignments.

## Employer engagement and vocational contexts

Learners would benefit from having access to a working plant science or botany laboratory. Often this can be achieved by creating links with local businesses or charitable organisations who may even benefit from taking on students. Local authorities can be a useful source of information as can business education alliances. Charitable and government organisations can often provide guest speakers to attend and give lectures as well as demonstrations normally for a minimal cost.

## Indicative reading for learners

### Textbooks

Barnes C and Poore N – *Plant Science in Action* (Hodder Arnold, 1994) ISBN 0340600993

Cutler D, Botha T and Stevenson D – *Plant Anatomy: An Applied Approach* (Blackwell Publishing, 2007) ISBN 1405126795

Davies B, Eagle D and Finney B – *Soil* (Resource Management Series) (Farming Press, 2002) ISBN 0852365594

Graham I – *Soil* (Earth's Precious Resources Series) (Heinemann Library, 2004) ISBN 0431115540

Green N P O, Stout G W and Taylor D J – *Biological Science 1 and 2*, 3rd Edition (Cambridge University Press, 1997) ISBN 0521561787

Hay R K M – *Chemistry for Agriculture and Ecology* (Blackwell Science, 1981) ISBN 0632006994

Hill-Cottingham P and Hill-Cottingham D – *Plant Science* (Biology Advanced Studies Series) (Blackie Schools, 1992) ISBN 0216930316

Lockhart J A R et al – *Lockhart and Wiseman's Introduction to Crop Husbandry*, 7th Edition (Butterworth-Heinemann, 1993) ISBN 0080420036

Raven P, Johnson G, Singer S and Losos J – *Biology*, 7th Edition (McGraw-Hill Higher Education, 2004) ISBN 0071111832

Ridge I – *Plants* (Oxford University Press, 2002) ISBN 0199255482

Roberts M, Reiss M and Monger G – *Biology: Principles and Processes* (Nelson Thornes, 2004) ISBN 0174481764

Soffe R – *The Agricultural Notebook*, 20th Edition (Blackwell Science, 2003) ISBN 0632058293

Stern K – *Introductory Plant Biology*, 9th Edition (McGraw-Hill Education, 2002) ISBN 0071199004

## **Journals**

*Arable Farming*

*Crops*

*Crop Science*

*Landwards*

## **Websites**

[www.agrifor.ac.uk](http://www.agrifor.ac.uk)

[www.bbsrc.ac.uk](http://www.bbsrc.ac.uk)

[www.defra.gov.uk](http://www.defra.gov.uk)

[www.hsegov.uk](http://www.hsegov.uk)

[www.images.botany.org](http://www.images.botany.org)

[www.jic.ac.uk](http://www.jic.ac.uk)

[www.lantra.co.uk](http://www.lantra.co.uk)

[www.rothamsted.ac.uk](http://www.rothamsted.ac.uk)

[www.s-cool.co.uk](http://www.s-cool.co.uk)

[www.saps.plantsci.cam.ac.uk](http://www.saps.plantsci.cam.ac.uk)

[www.sebiology.org](http://www.sebiology.org)

AgriFor

Biotechnology and Biological Sciences Research Council

Department for Environment, Food and Rural Affairs

Health and Safety Executive

Botanical Society of America Online Image Collection

The John Innes centre

Lantra

Rothamsted Research

S-cool

The Science and Plants for Schools Website

The Society for Experimental Biology

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	internet research, library research, questioning experts.
<b>Creative thinkers</b>	suggesting improvements to practical work
<b>Reflective learners</b>	evaluating work completed.
<b>Team workers</b>	group tasks for analysis
<b>Self-managers</b>	meeting deadlines
<b>Effective participators</b>	completing group tasks

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Creative thinkers</b>	applying techniques studied to the working environment
<b>Reflective learners</b>	suggesting improvements to techniques
<b>Team workers</b>	practising techniques
<b>Self-managers</b>	producing written work on time
<b>Effective participators</b>	participating in team activities

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	internet research, Writing presentations.
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	internet research, researching mineral deficiency, data comparison from data logging practical work.
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	presenting written work, presenting data.
Bring together information to suit content and purpose	displaying data from practical work.
Present information in ways that are fit for purpose and audience	presentations
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	calculations and data logging results from scientific practical work
Identify the situation or problem and the mathematical methods needed to tackle it	calculations and data logging results from scientific practical work
Select and apply a range of skills to find solutions	interpreting practical data
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	data analysis
Draw conclusions and provide mathematical justifications	interpreting results
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presentations, video, blogs, group presentations.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	reading information as part of internet and library research
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	completing reports, diaries and other assessments.

# Unit 21: Establish and Maintain Plants Outdoors

**Unit code:** T/600/9968

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

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.

## ● Unit introduction

This unit is an introduction to amenity horticulture. It covers the basic knowledge and skills those entering this aspect of the horticultural industry will need. It covers ground preparation, planting, plant maintenance and health.

The unit begins by looking at how ground can be prepared using different tools and equipment, and then moves on to exploring the methods of planting which take account of each plant's individual needs. Learners will also develop the skills needed to maintain plants and trees, including pruning, weed control, plant health and mulching.

Learners will have the opportunity to work with a range of plants throughout the unit extending their knowledge of plant names and gaining an understanding of their needs, covering trees, shrubs, conifers, climbing and herbaceous plants.

Learners will be given the opportunity to familiarise themselves with the health and safety aspects of horticultural practices, the equipment and materials used and the associated issues. They will also learn how to keep themselves and others around them safe whilst carrying out practical tasks and how to fill out risk assessment forms.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 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.

# Unit content

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## 1 Be able to prepare ground to receive plants

*Preparing for cultivation:* assessment of site eg size, texture and structure of soil, surroundings, obstacles, hazards; selection of appropriate tools

Methods of cultivation: single digging; double digging; rotavating; reasons for using different cultivation methods, affects of cultivation on plants eg tilth, soil structure, levelling, depth; seasonal issues and timing; incorporation of organic matter

Safe use of tools: hand tools eg trowel, spade, fork; safe use of pedestrian operated machines eg self-propelled cultivator; self-propelled rotary mower, strimmer, self-propelled turf cutter; health and safety; personal protective equipment (PPE); risk assessment.

## 2 Be able to plant woody and herbaceous plants

*Plant selection:* types of stock available for planting eg bare rooted, root balled, containerised and container grown; quality of plant for planting eg root and leaf condition, health; height and spread

Planting technique: correct spacing; size of hole; applying fertiliser; back filling; firming; final finish; immediate aftercare eg irrigation, top dressing, mulch, support (if required)

Plant type: trees; shrubs; climbers and wall shrubs; evergreen and deciduous; herbaceous perennials and grasses

## 3 Be able to maintain the health of plants outdoors

*Maintaining plants:* comply with health and safety legislation and codes of practice eg personal protective equipment (PPE), risk assessment, safe working distances; comply with relevant environmental legislation and codes of practice eg disposal of waste items

Threats to plant health: pests; diseases; disorders; nutrient deficiencies; mechanical damage; environmental damage eg frost, wind, heat, excess water, drought

Weed control: reasons for controlling weeds; perennial weeds; annual weeds; pernicious weeds; hand weeding; use of chemicals for weed control; disposal of removed weeds; safe use of tools and equipment

Feeding and watering: types of fertilisers eg organic, inorganic, solid, liquid, straight, compound; application of fertilisers eg hand, spreader, watering can, sprayer, dilutor; irrigation requirement; irrigation systems; timing of irrigation

Surface cultivation: mechanical eg hoeing, raking, safe use of tools, reasons for mulching plants; organic and inorganic materials used for mulching

Pruning: reasons for pruning; formative pruning; routine pruning; timing of pruning; pruning of roses, shrubs and hedging at varying stages of growth eg juvenile, before and after flowering, mature plants; disposal of cut material; equipment use and maintenance; safe use of tools and equipment



#### 4 Know how to maintain the health of plants outdoors

*Maintaining plant health:* factors affecting plant health and survival eg frost, drought, pests, diseases, shade, exposure, extreme temperatures, grazing animals; recognition of symptoms eg leaf damage, discolouration of foliage, wilt, bud/leaf drop, weak or uneven growth; methods of control eg cultural, chemical, physical, biological

*Maintaining plant growth:* supporting plants, pruning techniques; selection and safe use of pruning equipment; timing of pruning operations, risk assessments of maintenance operations; personal protective equipment

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> assess a site to determine the preparation required and identify hazards [IE, TW, CT, SM, EP]		
<b>P2</b> prepare land for planting by hand cultivation methods [TW, SM]	<b>M1</b> assess risks associated with land preparation	<b>D1</b> describe a soil profile
<b>P3</b> prepare land for planting safely using pedestrian operated machines [TW, SM]		<b>D2</b> report on the difference between cultivating land by hand and by machine
<b>P4</b> explain how tilth, soil structure, depth of preparation, seasonality and timing of cultivations affect the establishment of plants [IE, CT]		
<b>P5</b> select plant material in an appropriate condition for planting [TW]		
<b>P6</b> plant a range of woody and herbaceous plants [SM]	<b>M2</b> explain how to recognise if plants are in an appropriate condition for planting	
<b>P7</b> provide immediate aftercare for new plantings [SM]		
<b>P8</b> explain why planting depth and firming have a significant effect on establishment [IE, CT]		
	<b>M3</b> identify a range of woody and herbaceous plants	

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P9</b> maintain plants in a way which complies with environmental and health and safety legislation and codes of practice [IE, TW, SM]		
<b>P10</b> identify a range of threats to plant health: <ul style="list-style-type: none"> <li>◇ pests</li> <li>◇ diseases</li> <li>◇ disorders</li> <li>◇ unfavourable conditions</li> <li>◇ weeds</li> </ul> [IE]	<b>M4</b> explain the importance of weeding and correct disposal of arisings	
<b>P11</b> promote and maintain healthy growth using all the following methods: <ul style="list-style-type: none"> <li>◇ feeding</li> <li>◇ watering</li> <li>◇ surface cultivation</li> <li>◇ mulching</li> </ul> [CT, SM]	<b>M5</b> recommend types of mulch for given situations	
<b>P12</b> prune plants using appropriate techniques, according to species, time of year, stage of development [CT, SM]		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P13</b> describe how to recognise signs of damage or threats to plant health and the appropriate method of control [IE, CT]	<b>M6</b> identify, from given examples, plant problems from signs of damage	<b>D3</b> recommend appropriate methods of control for the identified plant problems.
<b>P14</b> state how seasonal weather conditions and soil condition affect plant growth and health [IE, CT]		
<b>P15</b> describe the methods used to maintain/control plant growth [IE, CT]		
<b>P16</b> explain the relationship between pruning and plant species, to include <ul style="list-style-type: none"> <li>◇ timing</li> <li>◇ types of material for removal</li> <li>◇ method</li> <li>◇ positioning of cuts.</li> </ul> [IE, CT]	<b>M7</b> describe most annual maintenance requirements for given plants.	

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

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## Delivery

Delivery of this unit will involve a variety of teaching and learning techniques including practical observations, lectures, discussions, demonstration, presentations, off site visits, practical activities, research using the internet and/or library resources, guest speakers personal and industrial experience.

Work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities are undertaken, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to undertake maintenance of a planted landscape and they should ask for observation records and/or witness statements to be provided as evidence. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Whichever delivery methods are used, it is essential that tutors stress the importance of health

and safety and environmental issues, with risk assessments being undertaken before any practical activities. Learners should not be required to undertake tasks that are beyond their physical capabilities. Tutors should consider integrating the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments learners may be taking as part of the programme of study.

Learners begin this unit by preparing the ground to receive plants. Ground preparation should include different methods of cultivation and the use of different tools suited to each method. The use of pedestrian operated equipment must be carefully taught ensuring appropriate health and safety measures and PPE are utilised. This is likely to be delivered through formal lectures, supervised off site visits and practical work. Learners must be taught in a safe learning environment with appropriate risk assessments being carried out before they begin each practical task. Visiting expert speakers could add to the relevance of the subject for learners. For example, a landscape gardener could talk about their work and the importance of correct ground preparation and planting.

After preparing ground learners are required to plant woody and herbaceous plants. These should be locally significant plants and cover those plants listed in the unit content. Learners should be taught the different uses of each plant within a landscape or landscapes, immediate aftercare requirements, what can affect their establishment and their common and botanical names. This is likely to be delivered through lectures, scenarios and supervised practical work.

When maintaining plants, learners should fully understand and apply safe working practices. Risk assessments should be completed before any practical tasks. Learners should understand how environmental protection regulations apply to their practical work.

Learners will need access to plant materials displaying symptoms of damage from locally significant pests, diseases and disorders. Guided and independent research may be used to broaden learners' practical observations.

Learners will also require access to plants for pruning practice as detailed in the unit content.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
<b>Assignment 1: Ground Preparation</b> (P1, P2, P3, P4, M1, D1, D2)
Tutor introduces the assignment.
Theory-based sessions: introduction to health and safety to develop underpinning knowledge of the possible hazards and risks involved in practical activities and current environmental legislation and codes of practice for correct waste disposal. How to assess site before work commences. Preparing ground, cultivation, soil structure and tilth.
Independent research sessions.
Practical demonstrations, observations and assessments on ground preparation to include safe use of hand tools and pedestrian operated machinery, PPE and risk assessment.
Personal study.
<b>Assignment 2: Planting and Aftercare</b> (P5, P6, P7, P8, M2, M3)
Tutor introduces the assignment.
Theory session: identification of plant types, selecting plants, planting theory, aftercare.
Practical demonstrations, observations and assessments on planting a broad range of plants and their aftercare.
Personal study.
Independent research sessions.
<b>Assignment 3: Plant Health and Care</b> (P9, P10, P11, P13, P14, M4, M5, M6, D3)
Tutor introduces the assignment.
Theory sessions: identifying risks to plant health, promoting healthy growth in plants, recognising problems and recommending methods to control/maintain plant growth.
Classroom activities: identification of pests, diseases, disorders and weeds.
Personal study.
Independent research sessions.
<b>Assignment 4: Pruning</b> (P12, P15, P16, M7)
Tutor introduces the assignment brief.
Theory sessions: pruning in relation to species, time of the year, development, types of material for removing, maintaining and controlling plant growth.
Practical demonstrations, observations and assessments on pruning, supporting and correct disposal of waste.
Personal study.
Tutorial 1:1 help and guidance.
Unit review.

## Assessment

For P1, sites for preparation should be identified by the tutor and should be the same for all learners to make sure assessment is fair. Assessment of sites could take the form of check sheets or a list of jobs to undertake with hazards clearly identified.

P2 will be covered through supervised practical activities using only hand cultivation tools. Suitable evidence from guided activities would be observation records completed by the learner and tutor. If this is assessed during a placement, witness statements should be provided by a suitable representative and verified by

the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

It is expected that assessment for P3 would be in the same format as for P2 but covering pedestrian operated machines.

For P4, learners should explain how the factors listed in the Grading grid influence plant establishment. Evidence could be in the form of verbal answers to structured questions,

P5, P6 and P7 link well together in practical activities, where possible plants used should be the same for all learners to ensure assessment is fair. Suitable evidence from guided activities would be observation records completed by the tutor. If this is assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor, and linked to P9.

P8 should link directly to the plants planted in P6, and evidence could take the form of verbal or written answers to structured questions.

For P9, it is expected that learners wear PPE and work at safe distances while maintaining plants. Environmental legislation should be enforced with tutors observing correct disposal of waste after practical activities. Evidence for P9 will link directly to observations in P2, P5, P3, P6, P7 and P12.

Evidence for P10, P11, P13 and P14 could be linked in a project on the health of plants. Identification of threats to plant health should cover those listed in the unit content and reflect local conditions. Practical activities should be carried out at the correct time of year. Suitable evidence from guided activities would be observation records completed by the tutor. If this is assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

P12 should be linked to P9 with practical activities taking place at the correct time of year and related to other criteria in this unit. Suitable evidence from guided activities would be observation records completed by the tutor. If this is assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

P15 and P16 could be linked to understand pruning. A pictorial presentation with notes, using appropriate software, flipcharts or OHPs would be suitable evidence.

M1 links to P2 and P3 where learners must individually complete risk assessments for the practical tasks. Evidence could be in the form of risk assessment sheets completed appropriately.

M2 links to P5 where learners should apply their explanation to the practical work undertaken. Evidence could be in the form of verbal questioning after the practical activity or a short report.

Evidence for M3 evidence could be in the form of a plant portfolio and should include all those planted in P6.

M4 could be linked to the project for P10, P11, P13 and P14 or take the form of a customer information leaflet.

For M5, recommendations could be in the form of customer factsheets but should be for given situations as stated by the tutor. This could link to the project for P10, P11, P13 and P14

M6 could be assessed during a visual test given by the tutor or via short-answer questions, and linked to the project for P10, P11, P13 and P14.

For M7, learners could present a maintenance year planner which could be included in the project for P10, P11, P13 and P14 or completed as an annotated poster.

An annotated poster of a soil profile could provide evidence for D1.

D2 should link directly to P2, P3, M1 and M2 and be in the form of a short report or in a table format.

D3 links directly to M6 where learners recommend appropriate planting methods for control of plant

problems identified. Evidence could be included in the plant portfolio.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, M1, D1, D2	Ground Preparation	Preparing the ground to a high standard to receive plants is essential to ensure plants have the soil conditions they need to thrive. You will have the chance to gain skills in using hand tools and pedestrian operated machines while working safely at all times.	Check sheets. Practical observations. Risk assessments. Verbal questioning.
P5, P6, P7, P8, M2, M3	Planting and Aftercare	Working with a range of plants including, trees, shrubs, conifers, climbers and herbaceous this assignment covers planting, aftercare and maintenance.	Practical observations. Risk assessments. Annotated poster. Report.
P9, P10, P11, P13, P14, M4, M5, M6, D3	Plant Health and Care	There are many threats to plant health and many of those will be covered within this assignment. You will have the opportunity to identify a range of threats, gain understanding of how to recognise the signs of threat and how to control it.	Plant health project. Customer factsheet. Maintenance planner.
P12, P15, P16, M7	Pruning	Keeping plants under control is a skill which requires an understanding of plant types and times of the year to get it right. During this assignment you will undertake practical work using correct tools and equipment safely and study the theory behind effective pruning and plant control.	Practical observations. Pictorial presentation.

### Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Element CU76.1 Maintain the health of plants outdoors	Undertake and Review Work Experience in the Land-based Industries
Element L2.1 Prepare ground for establishing plants	
PH3 Monitor and maintain the growth and development of crops	Undertake Identification, Selection and Use of Ornamental Plants
Undertake Work Related Experience in the Land-based Industries	
Understand the Basic Principles of Plant Science	



## Essential resources

Supervised access to landscaped grounds or ornamental garden areas is essential for this unit. Facilities used for practical activities must be of sufficient size and resourced adequately for the planned activities.

A range of trees, shrubs, conifers, climbers and herbaceous plants must be available for learners to use in plant identification and maintenance as well as for looking at plant health problems. Other necessary equipment includes hand tools and pedestrian operated machinery.

## Indicative reading for learners

### Textbooks

Adams C R and Early M P – *Principles of Horticulture* (Butterworth-Heinemann, 2004)  
ISBN 978-0750640435

Brickell C- *RHS Encyclopaedia of Gardening* (Dorling Kindersley, 2007) ISBN 978-1405314541

Coutts J and Edwards A – *Encyclopaedia of Horticulture* (Akashdeep Publishing House, 2004)  
ISBN 978-8171580156

Hessayon D G – *Pest and Weed Expert* (Expert books, 2007) ISBN 978-0903505628

Hessayon D G – *The Tree and Shrub Expert* (Expert Books, 1993) ISBN 978-0903505178

Spence I – *RHS Gardening Through the Year: Your Month-By-Month Guide to what to do when in the Garden* (Dorling Kindersley 2009) ISBN 978-1405347396

Titchmarsh A – *Alan Titchmarsh How to Garden: Pruning and Training* (BBC Books, 2009)  
ISBN 978-1846074004

### Websites

[www.bbc.co.uk/gardening](http://www.bbc.co.uk/gardening)

BBC Gardeners World

[www.defra.gov.uk](http://www.defra.gov.uk)

Department of Food, Environment and Rural Affairs

[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

The Environment Agency

[www.hse.gov.uk](http://www.hse.gov.uk)

The Health and Safety Executive

[www.horticulture.org.uk](http://www.horticulture.org.uk)

The Institute of Horticulture

[www.lantra.org.uk](http://www.lantra.org.uk)

Lantra Sector Skills Council

[www.rhs.org.uk](http://www.rhs.org.uk)

The Royal Horticultural Society

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	assessing a site for ground preparation explaining factors which affect plant establishment maintaining plants within health and safety and environmental legislation
<b>Creative thinkers</b>	assessing a site for ground preparation explaining factors which affect plant establishment promoting healthy plant growth
<b>Team workers</b>	assessing a site for ground preparation preparing land for planting
<b>Self-managers</b>	assessing a site for ground preparation preparing land for planting planting a range of woody and herbaceous plants
<b>Effective participators</b>	assessing a site for ground preparation presenting information on pruning.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	producing a year planner
<b>Creative thinkers</b>	making recommendations
<b>Reflective learners</b>	Reporting on the differences between hand cultivating and using machines
<b>Team workers</b>	providing help and support to peers during tasks
<b>Self-managers</b>	completing risk assessments disposing of waste correctly
<b>Effective participators</b>	identifying problems in plants.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	researching information for their project on plant health
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching information for their project on plant health
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	designing maintenance check sheets presenting leaflets and tables produce a risk assessments for practical tasks producing a plant portfolio
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	producing pictorial presentation on pruning
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	producing a pictorial presentation on pruning

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	producing a risk assessment for practical tasks
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	producing a risk assessment for practical tasks
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	producing a pictorial presentation on pruning responding to verbal questioning
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	producing customer fact sheets producing a maintenance planner
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	report writing producing an annotated poster.

# Unit 22: Presentation and Service for Retailing in the Land-based Sector

**Unit code:** A/600/9356

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

The learner will be able to plan the layout of a land-based retail outlet. The learner 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 products will also be demonstrated. Health and safety considerations of the store will be discussed. The learner will also demonstrate appropriate customer care skills.

## ● Unit introduction

Working within a land-based retail environment will be varied and challenging especially at busy times of the year. Ever changing products, seasonal demand and the needs of customers are essential to the success of retail businesses.

This unit covers the planning and layouts used within retail outlets, products and services available and the preparation and display of products for sale. It also looks at the key areas of customer service and care. It is therefore essential that this unit is delivered in the context of the land-based sector being studied.

Throughout this unit learners will be made aware of the health and safety implications of the work they are carrying out and legislation relating to the subject. Learners will develop skills in a range of customer care activities including processing payments and investigating customer satisfaction.

On completion of this unit learners will have a basic understanding of working within a retail environment and demonstrate skills that relate to their own area of study. The unit will also prepare learners for a range of vocational jobs within retail and will provide a sound foundation for further study at a higher level.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 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.

# Unit content

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## 1 Be able to design a suitable layout for a land-based retail outlet

*Retail outlets:* eg superstore, shop, stall, discount store, in store franchise.

*Planning Layout:* space available, ease of movement, display areas, product positioning, styles of layout and evaluation

*Health and safety:* considerations eg access, egress, fire and accident procedures, first aid facilities, risk assessment, waste disposal;

*Current legislation:* Sale of Goods Act 1979, Trade Descriptions Act 1968, The Supply of Goods and Services Act 1982, Sunday Trading Act 1994, Health and Safety at Work Act 1974; Pet Animals Act 1951

## 2 Understand the products and services provided by a land-based retail outlet

*Land-based retail outlets:* eg garden centre, nursery, florists, pet shop, tack shop, feed supplier, DIY store, Machinery outlet, farm shop.

*Products and services:* types of products, types of services available, seasonal and non-seasonal products; factors affecting choice eg cost, profit margin, lifespan and care of products both perishable and non-perishable, marketing, availability, personal preference, delivery

## 3 Be able to prepare and display products for sale

*Prepare products for sale:* preparation of products both perishable and non-perishable eg adding packaging, wrapping or trims to improve appearance and shelf life, removing damaged products; clear labelling eg price in line with relevant current legislation, attracting customers eg sales, loyalty products, marketing

*Display products for sale:* types of display eg themed, point of sale, window, racks, shelves; principles of display eg colour, texture, shape; health and safety eg tidiness, shelf life

*Maintenance of products:* stock control, stock rotation, shelf life, tidiness of displays, presentation, disposal of spoilt products and those that have reached their sell-by date

## 4 Be able to demonstrate appropriate customer care skills

*Processing payments:* procedures for payment by cash, cheques, debit and credit cards including chip and pin payments, correct procedures for handling payments, completing documentation eg purchases made on business accounts, basic checks for fraudulent payments with cash, cards, cheques, using a cash register; security

*Dealing with customers:* how to greet customers both on the telephone and in person, presentation of self, interpreting body language, own use of body language, bringing out the selling points, offering assistance and advice, creating and closing a sale, dealing with difficult customers and situations

*Customer satisfaction:* quality and availability of products and services, quality of customer care skills, value for money, methods of identifying customer satisfaction eg questionnaire, analysis of complaints

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> plan the layout for a land-based retail outlet [IE, SM]	<b>M1</b> complete risk assessments for given land-based retail outlet	
<b>P2</b> report on the health and safety and legislative requirements of a retail outlet [SM]		
<b>P3</b> justify the layout of land-based retail outlet		
<b>P4</b> review products and/or services in a given land-based retail outlet [IE]	<b>M2</b> suggest ways to add value to perishable and non perishable products	
<b>P5</b> evaluate factors influencing choice of products and services for a given land-based retail outlet [IE, RL]		
<b>P6</b> describe the stocking requirements of products being sold in given land-based retail outlet		
<b>P7</b> prepare products for sale [TW, SM]	<b>M3</b> complete maintenance checks for given land-based retail outlet	<b>D1</b> explain how given displays attract customers
<b>P8</b> display products for sale [TW, SM]		
<b>P9</b> maintain displays within a given land-based retail outlet		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P10</b> perform customer care related activities – processing payments – dealing with customers – customer satisfaction	<b>M4</b> demonstrate appropriate customer service skills to meet given objectives.	<b>D2</b> produce easy to follow guidelines on customer care.
<b>P11</b> describe the importance of customer care in land-based retail outlets. [CT]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

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## Delivery

Tutors delivering this unit have opportunities to use an extensive range of teaching techniques including, lectures, discussions, simulation, role playing, case studies, site visits and practical activities, research using the internet and/or library resources and the use of personal and/or industrial experience. Delivery of this unit should stimulate, motivate and educate the learner.

Health and safety issues relating to work must be stressed and regularly reinforced, and risk assessments must be undertaken prior to practical activities. Learners should be taught safe working practices by demonstration and supervised practical work. Thereafter they should be given sufficient time and guidance to develop practical skills. The underpinning principles of customer care explored in this unit should be related to practical work undertaken and referred to during practical work in order to help learner's associate theory and practice.

The first part of the unit will cover the design and layouts used in land-based retail outlets. Planned visits to a variety of these within the land-based sector being studied will be a useful. This will aid learning and should include activities that encourage learners to explore the scope and significance of work in different types of retail outlet. Centres may use their own retail facilities if they are appropriate to the sector being studied. Visiting expert speakers, for example a manager from those listed in the content, garden centre, nursery, florists, pet shop, tack shop, feed supplier, DIY store, machinery outlet or farm shop could talk about their work and the designs they use. Emphasis should be placed on the health and safety and environmental aspects of the design, in order to increase learner awareness of their responsibilities.

Through a range of formal lectures, discussions, supervised practicals and simulations, learners will develop their knowledge of the main products and services within the industrial sector. It is expected that learners look at the factors that affect customer product choice and the product advice that is given to customers by retail staff or from the product itself. Off site visits to retail outlets, especially during seasonal times could form part of the delivery. Visiting expert speakers could add insight into the subject and embed further skills and knowledge.

When preparing and displaying products techniques should be varied, combining theory and practical sessions. Formal lectures, discussions, simulations and role playing, practicals and presentations by learners could form part of the delivery. Theory should be linked to the practical situation found in appropriate retail outlets. Relevant visits or visiting speakers could add relevance of the subject to the learners.

Customer care skills can be formed via formal lectures, demonstrations, simulations, case studies, role play and supervised practicals. Learners will also be able to develop knowledge and skills through work placement or by working in a centre's own retail facilities (if appropriate). It is expected that learners will develop knowledge of appropriate responses to customers within a range of situations. Visiting a customer service department at a range of outlets will allow expert speakers to talk about the importance of their work.

Learners may have the opportunity to contribute to parts of this unit and its criteria while on work placements. They should be encouraged to ask for observation records and/or witness statements to be provided as evidence. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Tutors should integrate the delivery, private study and assessment relating to this unit with any other relevant units and assessment instruments in the learner's programme of study.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
<b>Assignment 1: Retail Outlet Design</b> (P1, P2, P3, M1)
Tutor introduces assignment brief.
Theory based sessions: Safety at work, developing underpinning knowledge of the risks and hazards within retail outlets.
Theory based sessions: Landbased retail outlets, design, products and services.
Off site visits.
Personal Study.
<b>Assignment 2: Prepare and Display Products For Sale</b> (P4, P5, P6, P7, P8, P9, M2, M3, D1)
Tutor introduces assignment brief.
Theory based sessions: Preparation and display.
Practical demonstrations, observations and assessments on preparation and display.
Work based activities.
Personal Study.
<b>Assignment 3: Customer Care</b> (P10, P11, M4, D2)
Tutor introduces assignment brief.
Theory based sessions: customer care activities.
Practical demonstrations, observations and assessments on customer care activities.
Personal study.
Tutorial 1:1 help and guidance.

## Assessment

All assessment and grading criteria are based around retailing for land-based outlets, where possible these should be related to a real outlet with links to the centre however centres are able to make use of good quality case study materials for those tasks that cannot be undertaken within a real retail context.

For P1 learners have to plan a layout for a land-based retail outlet. Tutors may either choose the retail outlet or may agree it with the learner. It must, however, be linked to the land-based sector being studied.

P2 looks at the health and safety and legislative requirements of a retail outlet. Learners should investigate laws relating to themselves, customers and the general public, other employees and the employer in the context of a selected outlet. It is expected that the evidence to this criterion should be linked to the retail outlet in P1.

P3 requires learners to review the main products and services that are available in a given land-based retail outlet. This could again be the same retail outlet as used in P1.

Evidence for P1, P2 and P3 could take the form of a retail planning project including an annotated poster showing plans.

P4 requires learners to review the products and/or services of a given land-based outlet in terms of what's available, when its available and how they are presented. Evidence could be in the form of a report. P5 and P6 requires a simple evaluation of the factors that influence choice of products and services and description of stocking requirements for a given outlet. Evidence for this could be linked to P4 and follows neatly the review of products undertaken. Where possible the size and complexity of the tasks should be the same for each learner to ensure fairness of assessment.

P7 and P8 require learners to prepare and display products for sale. Where possible the number and quantity of products in each category should be the same for each learner to ensure the fairness of assessment. Simulation exercises could be used to obtain evidence for these criteria. However, it could be assessed directly by the tutor during practical activities within a retail outlet. If this format is used, suitable evidence from guided activities would be observation records completed by the learner and tutor. If assessed during a work placement, witness statements should be provided by a suitable representative and verified by the tutor. Guidance on the use of observation records and witness statements is provided on the Edexcel website. In addition risk assessments should be completed for all practical tasks.

For P9 learners are required to maintain displays and should be linked to P7 and P8 and assessed in the same format as these.

P10 requires learners to perform the customer care related activities of process payments and serve customers. It must be linked to the land-based sector being studied by the learner. Where possible the payments and customers should be the same for each learner to ensure fairness of assessment. Tutors may use difficult customers or scenarios during the assessment process, but they should be the same and fair to all learners. Evidence for this criterion may be gathered in a manner similar to that described for P7 and P8.

P11 requires learners to describe the importance of customer care in land-based retail outlets, this could be achieved using a report style or a leaflet aimed at a new employee for instance.

M1 requires learners to complete risk assessments for the given Landbased retail outlet linking with the P2 criteria.

For M2 simulation exercises could be used to obtain evidence for this criterion and may be linked directly to the retail outlet used in providing evidence for other criteria. It must, however, be linked to the land-based industrial sector being studied by the learner. Where possible the products should be the same for each learner to ensure fairness of assessment. Evidence for this could be in short answer structure questions or through observations completed by tutor/employer and learner.

M3 will require learners to complete a maintenance checklist, this should be related to the retail outlet identified in P1 and could take the form of a table included in the project

For M4 simulation exercises could be used to obtain evidence and this may be linked directly to the retail outlet used in providing evidence for other criteria. Objectives should cover correct processing of payments and good customer service including greeting, own presentation, use of body language, assisting with sales and difficult customers. Evidence is likely to be through observations completed by tutor/employer.

D1 requires learners to give valid explanations of how displays attract customers covering key points. Evidence could be in the form of an advertising poster or flyer highlighting the key points.

For D2 learners need to develop some easy to follow guidelines on ensuring customer satisfaction and dealing with complaints. This could be in the form of an annotated poster or new employee guide to customer care.

## Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1	Retail Outlet Design	The layout and products of retail outlets will not only attract the customer but keep them coming back. In this assignment you will acquire the knowledge to plan a layout and review products of a retail outlet suitable for your own area of study. You will also give consideration to the health and safety and legislation involved.	Retail planning project. Risk Assessments. Annotated Poster showing plans.
P4, P5, P6, P7, P8, P9, M2, M3, D1	Prepare and Display Products for Sale	A practical based assignment in which you will be required to prepare and display actual products for sale as well as add value. Maintenance checks, correct disposal of waste and evaluation skills will also be gained.	Observation records. Witness statements. Risk assessments.
P10, P11, M4, D2	Customer Care	Customers are the reason you have a retail outlet. In this assignment you will perform customer care related activities including processing payments, demonstrating good customer service and describing ways of attracting the customer.	Observations Records. Witness Statements. Leaflet. Flyer. Employee guide and questionnaire.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Undertake Work Experience in the Land-based Industries	Undertake Retail Merchandising for the Land-based Sector

## Essential resources

Access to a retail environment with a range of equipment and products is essential for the delivery of this unit and must relate to the learners' own area of study. Ideally this would be a commercial environment, but centres may use a simulated environment if necessary.

Internet access and support should be available too.

## Employer engagement and vocational contexts

This unit focuses on retail design and customer care. Learners will be encouraged to develop an understanding of the risks and hazards while working in their chosen sector including health and safety of themselves, other employees, employers and their customers. Centres are encouraged to develop links with local businesses within the Landbased retail sector, so that learners can experience what it would be like to work within this area. This could be via off site visits or guest speakers.

## Indicative reading for learners

### Textbooks

Barrow C – *The Essence of Small Business* (FT Prentice Hall, 1998) ISBN 0137486413

Cox R and Brittain P – *Retailing: An Introduction* (FT Prentice Hall, 2004) ISBN 0273678191

Richard Hammond – *Smart Retail: Turn Your Store into a Sales Phenomenon* (Prentice Hall; 2 edition 2007)) ISBN 9780273712770

Ted Johns – *Perfect Customer Care* (Random House Business Books; 2nd New edition of Revised edition 2003) ISBN 9781844131532

## Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
<b>Independent enquirers</b>	planning the layout for a retail outlet exploring from different perspectives reviewing products and/or services evaluating factors influencing choice of products and services
<b>Creative thinkers</b>	describing the importance of customer care
<b>Reflective learners</b>	evaluating factors influencing choice of products and services
<b>Team workers</b>	preparing products for sale displaying products for sale maintaining displays performing customer care activities
<b>Self-managers</b>	report on the health and safety and legislative requirements completing risk assessments preparing products for sale displaying products for sale maintaining displays.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	justifying the layout of retail outlets describing ways to attract customers
<b>Creative thinkers</b>	completing maintenance checklists describing ways to attract customers
<b>Reflective learners</b>	suggesting ways to add value to products making recommendations for change with design
<b>Self-managers</b>	completing risk assessments suggesting ways to add value to products
<b>Effective participators</b>	making recommendations for change with design.

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	presenting information on planning a layout for land-based retail outlet
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching the internet for health and safety and legislative requirements of a retail outlet
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	designing tables for maintenance plans presenting leaflets, flyers, posters producing risk assessments produce easy to follow guidelines on customer satisfaction and dealing with complaints
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	presenting project on planning retail outlets
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	produce a risk assessment for practical tasks
Use appropriate checking procedures and evaluate their effectiveness at each stage	measure retail outlet sizes before planning their design
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	producing a risk assessment for practical tasks measuring retail outlet sizes before planning their design
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presenting information on planning a layout for land-based retail outlet demonstrating good customer service
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	reviewing products being sold in land-based retail outlets
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	report on the health and safety and legislative requirements of a retail outlet describe the stocking requirements of products being sold in given land-based retail outlet Describe the importance of customer care in land-based retail outlets.



# Unit 23: Undertake Tree Felling Operations

**Unit code:** Y/601/0398

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to provide learners with an understanding of tree felling operations and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

## ● Unit introduction

The use of chainsaws for felling and processing trees is an important part of the arboriculture and forestry industries. The need for the operator to be competent, safe and efficient at using a chainsaw is paramount for any employer.

This unit allows learners to identify and evaluate petrol-driven chainsaws and felling techniques currently used within the industry, to develop efficient chainsaw maintenance skills and to carry out basic repairs, whilst adhering to relevant legislation and industry best practice.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Be able to carry out routine operator maintenance on a chainsaw
- 2 Be able to comply with legislation and codes of practice relevant to tree felling operations
- 3 Be able to fell small trees using a chainsaw and felling aids.

# Unit content

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## 1 Be able to carry out routine operator maintenance on a chainsaw

*Chainsaws:* rear handled; major manufacturers; common uses for chainsaws; major components and their function

Inspection and cleaning: chain; guidebar; sprocket; air filter; spark plug; recoil starter

Safety features: standard safety features eg chain brake mechanism optional safety features eg heated handles

Maintenance: manufacturer's recommendations; use of required tools and materials; chain sharpening; fuel and oil; chainbrake; on/off switch; oil flow; recoil spring; common faults; safe starting methods; health and safety; risk assessment; personal protective equipment (PPE)

## 2 Be able to comply with legislation and codes of practice relevant to tree felling operations

*Codes of practice and legislation:* industry codes and guidance sheets; current relevant legislation eg Provision and Use of Work Equipment Regulations 1998; health and safety; risk assessment

Legal considerations: tree preservation orders (TPOs); felling licences; Wildlife and Countryside Act 1981; Health and Safety at Work Act 1974

## 3 Be able to fell small trees using a chainsaw and felling aids

*Felling and cross cutting:* position of cuts (felling, over cross-cutting and under cross-cutting); use of felling aids; delimbing; movement between work positions; nature of tree; nature of ground; equipment; safe handling of products and arisings

Hung-up tree: manual take down; cutting procedure; use of hand tools; winching methods

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> identify standard safety features of common chainsaws [IE]	<b>M1</b> independently produce a users, checklist for carrying out daily and weekly maintenance for a given chainsaw	<b>D1</b> evaluate the need to follow manufacturer's maintenance recommendations for a given chainsaw
<b>P2</b> carry out appropriate daily and weekly maintenance and pre-start checks [EP, SM]		
<b>P3</b> identify and rectify common faults with chainsaws [RL, IE, TW]		
<b>P4</b> identify legislation relevant to tree felling operations [IE, EP]	<b>M2</b> explain the selection and use of PPE for tree felling operations	<b>D2</b> compare and contrast PPE currently available for tree felling operations.
<b>P5</b> carry out a risk assessment appropriate to tree felling operations [SM]		
<b>P6</b> identify and use appropriate Personal Protective Equipment (PPE) [SM]		
<b>P7</b> carry out felling operations safely using appropriate felling methods. [EP, SM, TW]	<b>M3</b> explain the methods available to remove a hung-up tree.	

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

# Essential guidance for tutors

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## Delivery

Tutors delivering this unit have opportunities to use as wide a range of techniques as possible. Lectures, discussions, practical demonstrations, site visits, supervised forestry practicals, research using the internet and/or library resources and the use of personal and/or industrial experience would all be suitable, although not essential.

Tutors should demonstrate industry best practice at all times.

Learners are likely to develop their skills at varying rates and close monitoring of progress should be maintained. Allowance should be made for extra support for the less experienced whilst giving the more experienced the chance to develop their skills.

Work placements, although not essential, will provide realistic opportunities to develop these skills further and should be regularly monitored to ensure the quality of the learning experience. As learners develop their skills and confidence they should be encouraged to take more responsibility for their work, but these operations must not take place without appropriate supervision and regard to tutor learner ratios.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units.

This unit has been designed to develop learners' knowledge of the maintenance requirements of chainsaws. Learners should cover relevant chainsaw manufacturers during the delivery of this unit. They will be aware of the importance of maintaining chainsaws to the appropriate standards.

Legislation and health and safety issues relating to working with chainsaws must be stressed and regularly reinforced, and risk assessments must be undertaken prior to practical activities and before visiting any forest site. Tutors should integrate relevant legislation and industry best practice into the delivery of this unit. This may be in the form of formal lectures, scenario-based activities or guest speakers. Tree preservation orders and felling licences should form part of the delivery of this unit. Whichever delivery methods are used, it is essential that tutors stress the importance of sound environment management and the need to manage the resource using legal methods.

The understanding and practising of correct felling techniques will lead to naturally occurring problems such as hung-up trees. Where these occur they should be discussed at the time. This learning is likely to be delivered primarily through practical activities, although formal lectures, site visits and guest speakers may also be used to support the learning process.

Adequate PPE must be provided and used following the production of suitable risk assessments.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction to unit.
<b>Assignment 1: Maintaining the Chainsaw</b> (P1, P2, P3, M1, D1)
Tutor introduces the assignment brief.
Introduction to chainsaws and parts and function workshop based practical/theory.
General maintenance of saws – workshop-based teaching of maintenance procedures including cleaning and sharpening, to be practised throughout remainder of the unit.
<b>Assignment 2: Felling of Trees</b> (P4, P5, P7, M3)
Tutor introduces the assignment brief.
Introduction to theory of tree felling – classroom based to include introduction to health and safety protocols.
Practical taught/instructed felling operations – this will be developmental, with different students progressing at different rates. These sessions will naturally include chainsaw maintenance.
Theory sessions around the legislation that must be adhered to when carrying out tree felling operations. This will include best practice, British Standards and statute law. Classroom activities can be supported with opportunities for independent research.
<b>Assignment 3: PPE Selection</b> (P6, M2, D2)
Tutor introduces the assignment brief.
Visits to view relevant tree felling operations taking place (eg Forestry Commission sites).
Carrying out practical assessment required for unit.
Unit review.

## Assessment

For P1, P2 and P3 learners will need to complete a series of practical workshop/field sessions involving the maintenance of rear-handled chainsaws. The sessions should be led by a qualified and experienced instructor and health and safety should be a major focus. Each session should build on the previous experiences and should integrate into the other learning outcomes for this unit. For P1 learners will be required to successfully identify the standard safety features of a rear-handled chainsaw, commenting on their purpose and function. P2 requires learners to carry out maintenance operations on selected chainsaws in accordance with manufacturers' recommendations and health and safety guidelines. This must include correct sharpening and chain replacement, knowledge of safety features and parts of the chainsaw, bar maintenance, air filter cleaning and replacement, sprocket types and methods of replacement, chain brake band maintenance and replacement. The effects of poor maintenance and chain tensioning on efficient operation must be understood and commented on. To ensure fairness, learners should be familiar with the model of chainsaw which should be previously specified by the tutor. This criterion could be assessed directly by the tutor during practical activities. If this format is used then suitable evidence from guided activities would be observation records completed by learners and the tutor and accompanied by appropriate worklogs or other relevant learner notes. For P3 learners is required to rectify common faults with the chainsaw identified for use in P2. These faults may be simulated by the instructors although the task should be equal for each learner to ensure fairness of assessment.

For P4 and P5 learners must describe the legislation relevant to tree felling operations and the risk assessment process. (P4) This should include tree preservation orders, felling licences, PUWER98 regulations and COSHH. (P5) requires learners to carry out a full verbal risk assessment prior to commencing selected felling operations. Tutors should identify the felling operations or agree them through discussion with learners. Where possible, to ensure fairness of assessment, the size and complexity of the tasks should be the same for all learners. This may be the same as those providing evidence for other grading criteria.

For P6 learners are required to carry out a correct selection and make use of PPE for tree felling operations. Learners should make reference to the appropriateness of each item of PPE and minimum requirements of each item of clothing as outlined in relevant guidance. This may be the same as those providing evidence for other grading criteria. For P7 learners are required to safely fell and cross cut selected small diameter trees to meet given objectives. Tutors should identify the trees and the objectives or agree them through discussion with learners. Where possible, to ensure fairness of assessment, the size and complexity of the tasks should be the same for all learners. Learners should carry out the tasks with due regard to the species of tree, showing correct sink cuts in proportion to the tree felled and correct hinge and back cuts. Evidence may be in the same form as that provided for P1.

For M1 learners must produce a maintenance checklist to ensure that daily and weekly chainsaw maintenance is carried out on a selected chainsaw in accordance with the manufacturer's recommendations. Tutors should identify the chainsaw or agree it through discussion with learners. Where possible, to ensure fairness of assessment, the size and complexity of the tasks should be the same for all learners. Evidence for this could take the form of a pictorial presentation with notes (possibly using appropriate software or an overhead projector), an annotated poster or leaflet or a written assignment.

For M2 learners are required to explain the selection and use of PPE for use in tree felling operations. Learners should cover the legislation relevant to PPE such as CE markings and class of protection. Evidence for this could take the form of a pictorial presentation with notes (possibly using appropriate software or an overhead projector), an annotated poster or leaflet or a written assignment.

For M3 learners are required to explain the methods available to remove a hung up tree, to include manual handling, use of a winch and other relevant methods. The learner should also describe the possible consequences of not adhering to industry best practice and guidelines when removing a hung-up tree. Evidence for this may be the same as that for P7, but could also take the form of a pictorial presentation with notes (possibly using appropriate software or an overhead projector) or a written assignment.

For D1 learners are required to evaluate the need to follow manufacturers' maintenance recommendations for a given chainsaw. To ensure fairness, learners should be familiar with the model of chainsaw, which should be previously specified by the tutor. Learners are expected to evaluate the benefits of adhering to and possible consequences of not following manufacturers' recommendations when maintaining chainsaws. This assessment could take the form of a supervised individual investigation with a pictorial presentation or written assignment.

For D2 learners, are required to compare and contrast PPE currently available for tree felling operations. It is envisaged that as a minimum learners will compare and contrast trousers, helmets and boots, although to ensure fairness tutors should agree the size and complexity of the task prior to assessment. Evidence for this could take the form of a pictorial presentation with notes (possibly using appropriate software or an overhead projector), an annotated poster or leaflet or a written assignment.

### **Programme of suggested assignments**

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, M1, D1	Maintaining the Chainsaw	<p>You are working as a trainee in an arboricultural/forestry company. You have been asked to prove your knowledge and skills to service the company's range of chainsaws. You will be observed carrying out daily and weekly maintenance on the saws to the required standards, commenting on the safety features whilst identifying and rectifying common faults.</p> <p>You will then produce a user checklist to be implemented at the company. This will be supported by an evaluative justification of why your new boss should follow the manufacturer's maintenance recommendations for a given chainsaw.</p>	<p>Practical observation and assessment.</p> <p>Written evidence.</p>
P4, P5, P7, M3	Felling of Trees	<p>Carry out a verbal risk assessment and outline the relevant legislation prior to the felling of a small tree using appropriate felling methods. Hang up a tree and take down manually, commenting on other appropriate methods of removal.</p>	Practical observation and assessment with question and answers.
P6, M2, D2	PPE Selection	<p>Students should select and use suitable PPE to carry out tree felling operations. Produce a guide for new arboricultural/forestry students for selecting their PPE. The guide should explain the specific reason for the selection of suitable PPE, which will lead into comparing and contrasting different brands of PPE.</p>	Practical observation and written report.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
T10 Fell and sned trees motor-manually	Undertaking Woodland Habitat Management
Undertake Tree Climbing and Pruning Operations	Undertaking Upland Habitat Management

## Essential resources

This is a practical unit and as such access to suitable areas to carry out tree felling operations is essential. Suitable chainsaws and relevant PPE will also be essential for completion of this unit.

## Employer engagement and vocational contexts

This is a practical unit and it is vital that it is delivered by tutors and instructors with relevant vocational expertise. Centres are encouraged to establish links with relevant local facilities such as the Forestry Commission to conceptualise the learning.

## Indicative reading for learners

### Textbooks

Health and Safety Executive – *Basic Chainsaw Felling and Manual Takedown* (Health and Safety Executive, 2003) ISBN 0717626377

Health and Safety Executive – *Chainsaw Snedding* (Health and Safety Executive, 2003) ISBN 0717626385

Health and Safety Executive – *PUWER 98: How the Regulations Apply to Agriculture and Forestry* (Health and Safety Executive, 1998) ISBN

Health and Safety Executive – *Managing Health and Safety in Forestry* (Health and Safety Executive, 2003) ISBN 0717627179

Health and Safety Executive – *Training and Standards of Competence for Users of Chainsaws in Agriculture, Arboriculture and Forestry* (Health and Safety Executive, 1990) ISBN 0118855751

Health and Safety Executive – *Chainsaws at Work* (Health and Safety Executive, 2006) ISBN 071761873

Hodge S – *Research for Practical Arboriculture* (The Stationery Office Books, 1991) ISBN 0117102970

### Websites

[www.aieorg.uk](http://www.aieorg.uk)

Arboricultural Information Exchange

[www.btcv.org.uk](http://www.btcv.org.uk)

British Trust Conservation Volunteers

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment Food and Rural Affairs

[www.forestry.gov.uk](http://www.forestry.gov.uk)

Forestry Commission

[www.hse.gov.uk](http://www.hse.gov.uk)

Health and Safety Executive

[www.lantra.co.uk](http://www.lantra.co.uk)

Lantra Sector Skills Council



## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	producing with tutor guidance and evaluative justification to carrying out chainsaw maintenance to the manufacturers recommendation comparing and contrasting different styles and brands of PPE for suitability
<b>Reflective learners</b>	after carrying out felling operations tutors encourage students to reflect and develop their procedures and techniques
<b>Team workers</b>	when carrying out practical felling operations
<b>Self-managers</b>	with tutor support carrying out individual risk assessments Carrying out felling operations in a self-anonymous manner

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	directed investigation into PPE types and brands
<b>Reflective learners</b>	encourage reflection following practical operations to improve techniques and procedures
<b>Team workers</b>	allocate roles and responsibilities during practical sessions
<b>Self-managers</b>	encourage learners to take responsibility for their own felling operations
<b>Effective participators</b>	each learner should be encouraged to participate in all aspects during practical sessions

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	researching the internet for information on PPE types and styles researching the internet for the appropriate information to go into a maintenance checklist
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	researching the internet for information on PPE types and styles
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	carrying an evaluative justification for adhering to manufacturers maintenance recommendations
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records.</li> </ul>	production of pictorial presentations using PowerPoint style software
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	working out ratios for fuelling saws
Identify the situation or problem and the mathematical methods needed to tackle it	carrying out estimation of tree heights to maintain safe working distances

Skill	When learners are ...
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	carrying out verbal risk assessments prior to felling procedures
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	carrying out independent research to compare and contrast PPE
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	carrying out various written assignments within the unit content.



# Unit 24: Undertake Tree Climbing and Pruning Operations

**Unit code:** D/601/0399

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

This unit aims to provide learners with an understanding of tree pruning operations and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

## ● Unit introduction

The care and maintenance of trees grown for amenity purposes – such as those in parks, open spaces, private gardens and on highways – is the prime consideration for an arboriculturalist. Fundamental to this care is an ability to carry out preventative and remedial work within the canopy of the tree safely and effectively.

Those employed in arboriculture and tree surgery will have a wide range of techniques at their disposal. The essential knowledge and skills necessary to undertake this potentially hazardous and exacting work form the basis of this unit.

Learners will use hand tools to undertake a range of preventative and remedial operations with trees. They will also look at the techniques and equipment used in modern arboriculture to access and move within the canopy of the tree for the purposes of carrying out essential works.

Learners will safely climb trees and select and use appropriate equipment for the purpose. They will also have an appreciation of health and safety issues and associated legislation governing tree climbing.

On completion of this unit learners will be able to access and perform pruning operations with hand tools in the canopy of a tree. These techniques will be conducted within the constraints of best practice and current legislation.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Be able to access trees safely
- 2 Be able to carry out pruning operations
- 3 Be able to comply with legislation and best practice relevant to tree pruning operations.

# Unit content

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## 1 Be able to access trees safely

*Pre-climbing assessment:* assessment of hazards and risks (tree, surrounding area, work equipment, personal protective equipment (PPE)); tree mechanics (Mattheck)

Commonly used equipment: work positioning harness; climbing rope; tree climbing knots (bowline, figure eight, prussik, Blake's hitch); karabiners

*Access methods:* safe procedures with ladders; rope access; selection and checking of equipment; anchor points and supplementary anchors; health and safety

Moving around the canopy: changing of anchor points; re-directs; additional aids (slings, strops, rope grabs, karabiners, ascenders, descenders); health and safety

Correct storage and maintenance: ropes dry and bagged; karabiners functional; all equipment stored in a dry location away from oils and direct sunlight

## 2 Be able to carry out pruning operations

*Pruning operations:* crown cleaning; crown lifting; thinning; reduction; branch removal

Health and safety: reasons for remedial pruning, preventative pruning (safety, aesthetics, tree preservation, tree health, stimulation of particular growth, formative pruning and shape control)

Equipment: pruning equipment (handsaws, secateurs, loppers, pole pruners)

Methods: order of cuts; problems poor practice, tears, stubs and flush cuts.

Shigo and CODIT: compartmentalisation; wound response and problems of flush cutting

## 3 Be able to comply with legislation and best practice relevant to tree pruning operations

*Codes of practice and legislation:* industry codes and guidance sheets; current relevant legislation eg HASAW Act 1974, Management of Health and Safety Regulations 1999 (Risk Assessment), Lifting Operations and Lifting Equipment Regulations 1998, Work at Height Regulations 2005, Provision and Use of Work Equipment Regulations 1998; impact on development of modern tree climbing equipment

Risk assessment: relevant to tree pruning operations

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> carry out a pre-climb hazard inspection [IE, SM]	<b>M1</b> produce a pre-climbing inspection pro-forma	<b>D1</b> suggest remedial pruning operations for given tree hazards
<b>P2</b> carry out appropriate inspection procedures for climbing equipment [IE, SM]		
<b>P3</b> access a tree using safe and appropriate techniques [IE, SM]		
<b>P4</b> demonstrate installation of climbing anchor point [SM]		
<b>P5</b> demonstrate safe work position within the tree canopy [SM]		

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P6</b> carry out tree pruning operations using hand tools safely [SM,TW, EP]	<b>M2</b> explain the reasons for the correct order and position of pruning cuts in relation to CODIT	<b>D2</b> discuss the consequences of not undertaking the correct order and position of pruning cuts.
<b>P7</b> demonstrate knowledge of appropriate tree pruning methods [IE]		
<b>P8</b> demonstrate knowledge of target pruning [IE]		
<b>P9</b> identify legislation relevant to tree pruning operations [IE]	<b>M3</b> illustrate available options for dealing with arisings.	
<b>P10</b> describe legal and environmental considerations when dealing with arisings resulting from tree pruning operations [IE]		
<b>P11</b> carry out a risk assessment appropriate to tree pruning operations. [TW,SM, EP]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators



# Essential guidance for tutors

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## Delivery

Delivery of this unit will involve practical assessments, written assessment and visits to contracting work sites. The unit will have links to industrial experience placements.

Tutors delivering this unit have opportunities to use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised practical sessions, internet and/or library-based research and the use of personal and/or industrial experience would all be suitable.

Health and safety issues relating to tree surgery work must be stressed and regularly reinforced, and risk assessments must be undertaken prior to practical activities or any fieldwork. Adequate personal protective equipment (PPE) must be provided wherever appropriate and used following the production and implementation of suitable risk assessments.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units and assessment instruments learners are taking as part of their programme of study.

Learning outcome 1 is likely to be delivered in practical sessions along with visits to working sites, trade shows and suppliers. Tutors should maintain strong links between theory teaching and best practice in the industry. External speakers may be useful in some aspects of this unit. For instance, an equipment supplier could talk about the range of equipment available or a manufacturer could speak on the issues surrounding product development. Visits to a rope manufacturer or similar could also provide useful insights for learners. The acquisition and practical application of tree climbing skills and knowledge will form a key part of this outcome. Delivery should show a strong practical element and this will be underpinned by formal lectures, discussions and demonstrations.

Learning outcome 2 also has a practical basis and builds on the tree climbing skills acquired in learning outcome 1. The nature and practices of tree pruning operations will be explored, as well as the reasons why trees are pruned. Learners should be encouraged to use a variety of research methods to look at the science and mechanics behind current tree pruning practice. The works of Alex Shigo and Claus Mattheck will be key but not exclusive to this section. Delivery techniques should be as varied as possible, including formal lectures, visual presentations and discussions with access to examples of tree problems to illustrate and underpin the knowledge gained in a more practical setting. Access to a range of trees requiring remedial and preventative work will be necessary for the effective delivery of this learning outcome.

Learning outcome 3 will focus on the best practice and legislation surrounding tree climbing and pruning. Tutors should ensure that environmental and legal considerations are emphasised to learners when delivering this learning outcome. Visits to local councils and their tree officers will allow for excellent contextualisation of the legal framework within which arboricultural contractors must operate. Waste disposal can also be contextualised, linked to recycling and the green agenda through visits to council depots or wood-fueled power stations.

## Outline Learning Plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives an **indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

## Topic and suggested assignments/activities and/assessment

Introduction and overview of the unit.

### **Assignment 1: Tree Access and Movement within the Canopy** (P1, P2, P3, P4, P5)

Tutor introduces the assignment brief.

Site-based practical instruction around pre-climbing inspection of equipment and trees, selecting and installing a suitable anchor point, safe movement around the tree.

### **Assignment 2: Arboricultural Risk Assessment and Pruning Practices** (P6, P7, P8, P11)

Tutor introduces the assignment brief.

Classroom-based theory of pruning; order of cuts, target pruning and reasons for correct pruning.

Site visit to contracting job to see pruning happening and gain an appreciation of how a job site is organised.

Site-based practical instruction around pruning techniques using hand tools, target pruning and work positioning.

### **Assignment 3: Pruning in Relation to CODIT and the Consequences of Ignoring Shigo's Advice** (M2, D2)

Tutor introduces the assignment brief.

Classroom-based sessions with opportunities for independent research on Shigo's work and the CODIT model. How does this relate to the practice of target pruning and the trees' response to wounding?

### **Assignment 4: Pre-climbing Inspection in Relation to Tree Hazards and Remedial Action** (M1, D1)

Tutor introduces the assignment brief.

Theory sessions around the potential hazards that may be picked up in a pre-climbing inspection. This can be linked to the remedial work that could be undertaken to mitigate the dangers.

### **Assignment 5: The Legal Considerations of Arboricultural Operations** (P9, P10, M3)

Tutor introduces the assignment brief.

Theory sessions with opportunities to undertake independent research into the legal and environmental considerations of arboricultural operations.

Visit to a local council tree officer to address the issues around waste disposal and a talk around the legal framework that governs arboricultural operations.

## Assessment

P1 focuses on the need for thorough pre-climbing inspection of trees to identify potential hazards and select an access route. Learners must carry out this inspection, communicate their conclusions to the assessor and describe a possible route to their chosen anchor point within the canopy. Pre-climbing assessment should not ignore the immediate surroundings, so learners must show an awareness of hazards that lie out with the tree they intend to climb.

For P2 learners must carry out a pre-climbing inspection of their climbing equipment. They should check each piece of equipment and be able to explain the type of faults they are looking for. This assessment could be backed up with inspections of damaged equipment to check awareness of potential problems with climbing equipment, such as sticky gates on karabiners or damaged sections of a climbing rope.

For P3, P4 and P5 learners will need to demonstrate their ability to access the tree using safe-efficient methods, install a suitable anchor point and achieve safe work positioning within the canopy. Here the tutor is looking for a safe, methodical climbing technique, with the learner making well-considered decisions based on safety and efficiency. Learners should show knowledge of work positioning which will link to the pruning requirements of P6.

P6, P7 and P8 focus on appropriate pruning techniques with hand tools. Here learners will have to carry out pruning operations in a safe and controlled manner. This will involve correct work positioning based upon skills gained in P3, P4 and P5. Learners will also have to demonstrate knowledge of tree pruning methods by carrying out different operations such as crown thinning or branch reduction. P8 requires a practical demonstration of target pruning and should be further examined through verbal questioning. This leads into the requirements of M2 and D2, offering all learners the chance to show the understanding of the concepts behind target pruning before having to produce a more formal piece of work on the subject.

P9 looks at the legal considerations around arboricultural operations. Learners will need to produce a presentation, leaflet or poster that identifies the main legal constraints faced by arboricultural contractors who undertake tree pruning operations.

P10 builds on the information gathered in P9 and requires learners describe the legal and environmental considerations specifically regarding to the disposal of arisings. As well as describing the legal framework learners, should describe the environmental implications created when disposing of the arisings from tree pruning operations.

For P11 learners will have to carry out a risk assessment prior to tree pruning operations. This outcome links back to P16 and should be assessed in a practical setting where the learner assumes the role of forman and makes decisions about the layout of the job site and the order of events on the site. The risk assessment should be of an industry standard and include all information required by current best practice.

M1 links back to information and knowledge demonstrated in P1. Learners produce a pre-climbing pro-forma to be used before beginning a tree pruning operation. Particular attention should be paid to structural weaknesses that could present an immanent danger to a tree climber. The form should allow all major hazards in a tree canopy to be identified and if appropriate could offer space to suggest remedial action which links across to the requirements of D1.

For M2 learners must explain the reasons for the correct order and position of pruning cuts. The CODIT model should be explained in a written document, with use of pictures and diagrams where appropriate. This criterion links back to P8 and allows learners to present a more detailed explanation of CODIT and its ramifications for tree pruning.

M3 builds upon the information gathered in P10 and requires the learner to research examples of different methods for disposing of the arisings from tree pruning operations. Learners could display their findings in a short presentation or as a written report.

D1 requires learners to suggest options for remedial pruning to mitigate against given tree hazards. Evidence for this can be gathered via one-to-one questioning about given trees or via the inspection pro-forma. The proforma could include a section for remedial action, which learners completed in relation to a given tree.

For D2 learners must rely on a thorough understanding of CODIT and pruning best practice. In a piece of written work they must look at the problems of NOT following best practice with regard to tree pruning and the consequences for the tree in its response to wounding. Some historical perspective would illustrate the issues caused by poor pruning practices.

### **Programme of suggested assignments**

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, P3, P4, P5	Tree access and movement within the canopy	As part of your role within a contracting team you have been asked to demonstrate tree climbing best practice to a group of college students. You will need to show them what should be done before carrying out a tree climbing operation. This should include pre-climbing inspection of your climbing equipment, the tree and climbing methods themselves.	Practical observation.
P6, P7, P8, P11	Arboricultural risk assessment and pruning practices	Following on from your successful demonstration of climbing best practice, you will need to show the student group how to carry out tree pruning with hand tools. They will need to see appropriate pruning methods with an emphasis on target pruning. To contextualise the demonstration you must also carry out an appropriate risk assessment.	Practical observation and assessment. Written evidence.
M2, D2	Pruning in relation to CODIT and the consequences of ignoring Shigo's advice	You have been asked to produce something for the students to take away with them to help them remember some of the points you have demonstrated. The first of these is a guide to pruning and the consequences of incorrect pruning practices.	Written evidence in the form of a leaflet or guide.
M1, D1	Pre-climbing Inspection in Relation to Tree Hazards and Remedial Action	The second item to present to the students is a pre-climbing inspection sheet. This should allow for all possible hazards to be identified. It should also incorporate a section for remedial action that would mitigate the potential threats represented by the hazards that may be identified.	Written evidence in the form of an inspection proforma.
P9, P10, M3	The Legal Considerations of Arboricultural Operations	The council has an ongoing battle with fly tipping. Your new boss has asked you to produce evidence for the local tree officer to show that the company adheres to relevant legislation. He wants you to produce a report that identifies the legislation you know you need to comply with. He also wants you to show that the company has a number of options available to it when it comes to getting rid of arboricultural arisings.	Written evidence in the form of a bound report.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
T26 Carry out off ground arboriculture operations	Undertaking Woodland Habitat
Undertake Tree Felling Operations	Tree Felling and Chainsaw Use
Carry Out Ground-based Arboricultural Operations	

### Essential resources

Learners will need access to a range of suitable work sites for practical work.

Tools, equipment and materials for propping, guying and bracing are needed in

addition to normal tree climbing equipment, pole saws, chainsaws and hand tools such as hand saws, secateurs and loppers. All PPE must be used as appropriate and necessary.

### Employer engagement and vocational contexts

This is a practical unit with many opportunities to engage with employers and arboricultural contractors. Centres are encouraged to make the most of these opportunities as much of the content of the unit will be best received in a highly contextualised setting. Learners will gain more from their practical sessions if they can see first hand how climbing and pruning operations are carried out in the working world. They will also acquire a deeper insight into the practicalities of target pruning if they are exposed to a wide variety of situations in which it is taking place. Good use could be made of local arboricultural officers when it comes to putting the legal considerations into perspective. They could be introduced as guest speakers or met on site visits.

### Indicative reading for learners

#### Textbooks

AFAG 401 – *Tree Climbing Operations* (HSE Publications) ISBN 978 0 7176 6342 2

Arboriculture Association – *A Guide to Tree Pruning* (Arboriculture Association, 1994) ISBN 090097821X

British Standard – *Recommendations for Tree Work* (British Standards Institute, 1989) ISBN 0580171701

Brown G – *The Pruning of Trees, Shrubs and Conifers, Second Edition* (Timber Press, 2004) ISBN 0881926132

Cottam M, McKeown L and White C – *A Guide to Good Climbing Practice* (Arboricultural Association, 2006) ISBN 0900978392

European Arboricultural Council – *European Treeworker Handbook* (Patzner, 2005) ISBN 3876171016

Gilman E – *Illustrated Guide to Pruning, Second Edition* (Delmar, 2001) ISBN 0766822710

James N – *The Arboriculturalist's Companion, Second Edition* (Blackwell Publishers, 1990) ISBN 0631167749

Matheny N and Clark J – *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas* (International Society of Arboriculture, 1993) ISBN 1881956040

Mattheck C and Breloer H – *The Body Language of Trees* (The Stationery Office Books, 1995) ISBN 0117530670

Shetterly R and Blair D – *Arborist Equipment* (International Society of Arboriculture, 1995)  
ISBN 188195613X  
Mattheck C and Breloer H – *The Body Language of Trees: A Handbook for Failure Analysis* (The Stationery Office Books, 1995) ISBN 0117530670

Ong C and Huxley P – *Tree Crop Interactions: A Physiological Approach* (CABI Publishing, 1996)  
ISBN 085198987X

Shigo A – *A New Tree Biology* (Shigo and Trees Associates, 1986) ISBN 0943563127

Shigo A – *Modern Arboriculture* (Shigo and Trees Associates, 1991) ISBN 0943563097

### **Journals**

*Arboricultural Association journal and newsletter*

*Essential Arb*

*FCA News*

*Forest Machine*

*Forestry and British Timber*

*Total Arb*

### **Websites**

[www.aieorg.uk](http://www.aieorg.uk)

Arboricultural information exchange

[www.forestry.gov.uk](http://www.forestry.gov.uk)

Forestry Commission

[www.hse.gov.uk](http://www.hse.gov.uk)

Health and Safety Executive

[www.isa-uki.org](http://www.isa-uki.org)

International Society of Arboriculture United Kingdom and Ireland Chapter

[www.trees.org.uk](http://www.trees.org.uk)

Arboricultural Association

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	carrying out all aspects of tree climbing and pruning researching and describing the legal considerations of arboricultural operations researching the work of Shigo and relating it to target pruning practices
<b>Team workers</b>	carrying out pruning operations within the canopy of a tree conducting a risk assessment prior to tree pruning
<b>Self-managers</b>	carrying out all aspects of tree climbing and pruning conducting a risk assessment prior to tree pruning
<b>Effective participators</b>	carrying out all aspects of tree climbing and pruning conducting a risk assessment prior to tree pruning

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	asking questions of guest speakers or professionals on a work site that they are visiting
<b>Creative thinkers</b>	discovering the links between CODIT and target pruning and then putting this into practice in the tree
<b>Reflective learners</b>	reflecting on their own progress with tree climbing and thinking of ways to improve their techniques
<b>Team workers</b>	supporting fellow learners with the practical parts of the unit considering as a group, the practical problems they are faced with when climbing and pruning trees
<b>Self-managers</b>	managing their own learning and time whilst undertaking assignment completion or independent research
<b>Effective participators</b>	supporting fellow learners who may not be progressing with the practical part of the unit listening to and engaging with guest speakers either in college or on visits

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	researching the legal consideration around arboricultural operations including the disposal of arisings producing a pre-climbing inspection sheet
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records</li> </ul>	
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	



Skill	When learners are ...
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	deciding how much of a branch or tree to prune. They will be using percentages and fractions and lengths to communicate their intentions
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	conducting risk assessments whilst performing the formant role on the job site discussing, organising and communicating with fellow students whilst arboricultural operations are being undertaken.
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	



# Unit 25: Carry Out Ground-based Arboricultural Operations

**Unit code:** R/601/1677

**Level 2:** BTEC First

**Credit value:** 10

**Guided learning hours:** 60

## ● Aim and purpose

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

## ● Unit introduction

The work done on the ground during arboricultural operations is integral to supporting the aerial operations. This unit focuses on developing and improving the skills necessary to successfully carry out ground-based arboricultural operations.

The unit will offer opportunities to develop integral skills to support and carry out ground-based arboricultural operations. These will include the maintenance of hand tools and powered tools, enabling learners to develop good habits in preparation for their roles in industry.

This unit will enable learners to set out job sites and should be related as much as possible to real-life situations. The learning outcomes of this unit should be integrated and support practical elements within other relevant units.

## ● Learning outcomes

**On completion of this unit a learner should:**

- 1 Be able to carry out maintenance on a range of powered equipment and hand tools
- 2 Be able to set out the job site.

# Unit content

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## 1 Be able to carry out maintenance on a range of powered equipment and hand tools

*Maintenance:* information in manufacturers' handbooks and instructions; reasons for following manufacturers' instructions eg safety, warranty; safe working practice in maintenance operations; correct use and storage of tools and equipment

Operator maintenance and inspection: regular maintenance requirements eg tyre pressures, lubrication, fuel, air filter, coolant level; highway pre-use checks eg condition of tyres, mirrors, lights, indicators, hazard warning

Selection of hand tools and equipment: for maintenance tasks eg hammer, spanner, saw, spade, shovel, yard brush, fork, rake, loppers, secateurs, shears, pickaxe, paint brush, wheelbarrow, ladder

Tool and equipment use: safe methods of use, checks and maintenance, safe manual handling, tool and equipment transportation, safe storage

Safety: current legislation, safe working practices including record keeping, manual handling techniques and working distances; personal protective equipment (PPE), risk assessment

## 2 Be able to set out the job site

*Legal considerations:* current tree work related legislation, eg Health and Safety At Work etc Act 1974; COSHH; PUWER98; industry best practice to include HSE guidance

Environmental considerations: disposal of arisings, to include transportation

Layout of jobsite: signing and guarding, relevant legislation and industry best practice; refuelling (public and environmental considerations); specified area for drop zone; storage of tools/equipment onsite

Communication: agreed methods for communication to include verbal, hand and written communication; roles and responsibilities of staff

Job site breakdown: roles and responsibilities; order of events; relevant legislation; customer relations

## Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
<b>P1</b> carry out daily maintenance tasks safely on chainsaws and hand tools [TW, EP, SM]	<b>M1</b> compare the suitability of different powered machines for specified ground based operations	<b>D1</b> compare the suitability and effectiveness of contrasting types of powered equipment in selected forestry or arboricultural applications.
<b>P2</b> carry out operator maintenance on relevant powered equipment safely [TW, EP, SM]		
<b>P3</b> describe legal and environmental requirements when carrying out work on trees [IE]	<b>M2</b> describe the relevant legal considerations when organising and setting out a job site.	
<b>P4</b> set out and put away equipment and resources relevant to operations and to meet the requirements of the job [TW, SM, EP]		
<b>P5</b> carry out risk assessment [SM]		
<b>P6</b> ensure the work site is left clean and tidy. [TW, SM, EP]		

**PLTS:** This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

<b>Key</b>	IE – independent enquirers CT – creative thinkers	RL – reflective learners TW – team workers	SM – self-managers EP – effective participators
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# Essential guidance for tutors

## Delivery

Delivery of this unit will involve practical assessments, written assessment and visits to suitable collections. It will have links to industrial experience placements.

The first part of learning outcome 1 will develop learners' knowledge of the maintenance requirements of hand tools and chainsaws. Learners should cover a variety of hand tools, chainsaw types and manufacturers during the delivery of this learning outcome.

The second part of learning outcome 1 will focus on the suitability and maintenance of powered equipment used in arboriculture.

Delivery of both parts is likely to be via a combination of formal lectures, practical demonstrations, site visits, supervised workshop practicals and independent learner research. Learners will be aware of the importance of efficient and safe use of maintaining chainsaws to the appropriate standards. Visiting expert speakers could add to the relevance of the subject.

Learning outcome 2 will develop the skills required for learners to successfully set out the job site for specific tasks that would be encountered during arboricultural operations. Adequate time should be given to each task to allow for the site requirements for specific tasks to be fully investigated. Learners will be asked to look at the legal and environmental requirements when carrying out work on trees. It is envisaged that the delivery of this will be through formal lectures and site visits but it should also be delivered in a practical context wherever possible. Learners will be required to set out and put away equipment relevant to arboricultural operations. This will enable tutors to stress the importance of controlling members of the public. Delivery is likely to be in a scenario-based context supported by formal lectures and integrated into the delivery of other relevant units.

## Outline Learning Plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and overview of unit including health and safety in the workshop and risk assessment.
<b>Assignment 1: Daily Maintenance Tasks (P1)</b> Tutor introduces the assignment brief.
Workshop-based practical instruction around the need for maintenance, health and safety, tool selection, maintenance techniques, storage. Learners develop the skills to maintain hand tools and chainsaws to an acceptable standard.
<b>Assignment 2: Powered Equipment – Suitability and Maintenance (P2, M1, D1)</b> Tutor introduces the assignment brief.

## Topic and suggested assignments/activities and/assessment

Theory sessions around the variety of equipment available to carry out different tasks on an arboricultural job site. Learners have the opportunity to undertake independent research into different powered equipment.

Visits to manufacturers and work sites to see powered equipment in production and in practical scenarios. Trade shows provide an excellent opportunity to see a wide variety of powered equipment and gather information about their practical applications.

### **Assignment 3: Legal and Environmental Considerations** (P3, M2)

Tutor introduces the assignment brief.

Theory sessions around the legal framework of arboricultural contracting work. Learner will explore the legislation that must be adhered to when carrying out arboricultural operations. This will include best practice, British Standards and statute law. Classroom activities can be supported with opportunities for independent research.

Guest speakers can contextualise the legal requirements, either in college or during a visit to a contracting company.

### **Assignment 4: Setting out the Job Site** (P4, P5, P6)

Tutor introduces the assignment brief.

Introduction of work site principles; the order of events and reasons behind them, safety on the job site, awareness of drop zones, tool storage and onsite refueling.

Job site layout will be addressed in each practical session where either ground-based or aerial arboricultural operations are being undertaken. Particular attention will be paid to the principles mentioned above, with each learner being given the opportunity to act as the foreman for the session or part thereof. An integral part of ground-based arboriculture is the communication between ground person and climber. This will be addressed throughout the practical sessions, as will proper customer care and leaving a job site clean and tidy.

## Assessment

For P1 learners will be observed carrying out routine daily maintenance on hand tools and chainsaws. They will be asked about the reasons for maintenance and the consequences of not doing it. Particular attention should be paid to the accuracy of chainsaw sharpening and appropriate maintenance techniques. Evidence will be gathered in the form of observation records or workshops books that can be signed off by a competent tutor.

For P2 learners will be observed carrying out routine daily maintenance on powered equipment. Operator maintenance and inspection should include regular maintenance requirements eg tyre pressures, lubrication, fuel, air filter, coolant level; highway pre-use checks eg condition of tyres, mirrors, lights, indicators, hazard warning. They will be asked about the reasons for maintenance and the consequences of not doing it. Evidence will be gathered in the form of observation records or workshops books that can be signed off by a competent tutor.

For P3 learners must describe the legal and environmental requirements when carrying out work on trees. This is likely to be assessed by a written assessment during which they will need to describe the minimum legal considerations to include COSHH regulations and industry best practice.

For P4 learners are required to set out and put away equipment and resources relevant to operations and to meet the requirements of the job. This will be a practical-based assessment with recorded evidence in the same form as that for P1. Learners should be assessed for a range of ground-based tasks to include supporting aerial tree pruning, tree felling operations and working in public spaces. Evidence could be taken in conjunction with other learning outcomes and relevant units.

For P5 learners are required to carry out at least two verbal risk assessments in accordance with industry guidance for ground operations. Evidence should be recorded in the same form as for P1 and may be gathered in conjunction with other learning outcomes and relevant units.

For P6 learners should be observed leaving a work site clean and tidy following ground operations; the site should be left safe and free from any arisings created. Evidence may take the same form as that for P1 and could be gathered in conjunction with other learning outcomes/relevant units.

For M1 learners will produce a written report comparing the suitability of different powered machines for their given application. Learners will be able to choose the equipment to report on from the resources available to them and with which they are familiar.

For M2 the learner must describe the relevant legal considerations when organising the job site. This is most likely to be assessed by a written assignment or pictorial presentation with notes. Tutors should suggest a scenario for learners to research. To ensure fairness, the complexity of the task should be the same for all learners. Learners should outline the key pieces of legislation to include the control of members of the public on a job site and how these affect the setup of the work site.

For D1 learners will develop the work done for M1 to compare the suitability and effectiveness of contrasting powered equipment in different arboricultural situations. Here the tutor may present different scenarios within which learners must compare contrasting makes and models of powered equipment. This grading criterion should test the ability of each learner to research and evaluate different aspects of powered equipment currently available.

### Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1	Daily Maintenance Tasks	You have recently been employed by an arboricultural contracting company which uses hand tools and chainsaws in its work. It is vital that this equipment is properly maintained for reasons of safety and efficiency. As part of your new role you will need to carry out routine maintenance on these hand tools and chainsaws.	Observed practical and assessment.
P2, M1, D1	Powered Equipment – Suitability and Maintenance	As well as chainsaws your new employer uses different powered equipment for a number of tasks. You will need to maintain this equipment to an acceptable standard.  Your boss is thinking about changing some of the equipment and wants some information to inform his decisions. You will need to produce a report which looks at how well suited his equipment is to the work it needs to do. He also wants a comparison with other types of powered equipment and how it compares to other machines that are available.	Observed practical and assessment.  Written report.



Criteria covered	Assignment title	Scenario	Assessment method
P3, M2	Legal and Environmental Considerations	Produce a written assignment describing what the minimum legal and environmental requirements are when carrying out work on trees.  Secondly you must describe the relevant legal environmental considerations when organising the job site. This should be relevant to controlling members of the public, storage of hazardous substances and dealing with arisings legally.	Written assignment/ presentation.
P4, P5, P6	Setting out Job Site	During practical sessions job site scenarios will be suggested by the tutor/assessor. You will be required to successfully lay out the job site. During each session. You will be asked to deliver a verbal risk assessment to everyone involved in the task. After completion of the task the job site must be broken down and put away, leaving the site in a clean and tidy manner. Evidence will be recorded by the tutor.	Observed practical and assessment.

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
T22.1 Prepare and Maintain Safe Working Sites for Arboricultural Operations	Tree Felling and Chainsaw Use
Undertake Tree Climbing and Pruning Operations	Undertaking Woodland Habitat Management
Undertake Tree Felling Operations	

## Essential resources

Learners will need supervised access to a suitable range of hand tools and powered equipment including of chainsaws, blowers, wood chippers and stump grinders.

Maintenance tools, materials and suitable workshop facilities are also required.

Available hand tools should include hammer, spanner, saw, spade, shovel, yard brush, fork, rake, loppers, secateurs, shears, pickaxe, paintbrush, wheelbarrow and ladder.

## Employer engagement and vocational contexts

This is very practical unit, with many opportunities to engage with employers and manufacturers of equipment. Centres are encouraged to make the most of these opportunities as much of the content of the unit will be best received in a highly contextualised setting. Learners will gain more from their practical sessions and relate their practice to real life if they can see first hand how a job site functions. They will also acquire a deeper insight into the design and use of powered equipment if they are exposed to a wide variety of makes and models during visits to trade shows or suppliers.

## Indicative reading for learners

### Textbooks

Health and Safety Executive – *Mobile Stump Grinders* (Health and Safety Executive, 2003) ISBN 0717626571

Health and Safety Executive – *Top-Handled Chainsaws* (Health and Safety Executive, 2003)  
ISBN 0717626423

Health and Safety Executive – *Training and Standards of Competence for Users of Chainsaws in Agriculture, Arboriculture and Forestry* (Health and Safety Executive, 1990) ISBN 0118855751

Health and Safety Executive – *Using Petrol-Driven Chainsaws* (Health and Safety Executive, 2003)  
ISBN 0717626369

Health and Safety Executive – *Wood Chippers* (Health and Safety Executive, 2003) ISBN 0717626555

Hodge S – *Research for Practical Arboriculture* (The Stationery Office Books, 1991) ISBN 0117102970

### Websites

[www.aieorg.uk](http://www.aieorg.uk)

Arboricultural Information Exchange

[www.btcv.org.uk](http://www.btcv.org.uk)

British Trust Conservation Volunteers

[www.defra.gov.uk](http://www.defra.gov.uk)

Department for Environment, Food and Rural Affairs

[www.forestry.gov.uk](http://www.forestry.gov.uk)

Forestry Commission

[www.hse.gov.uk](http://www.hse.gov.uk)

Health and Safety Executive

[www.lantra.co.uk](http://www.lantra.co.uk)

Lantra Sector Skills Council

[www.safetynews.co.uk](http://www.safetynews.co.uk)

Specialising in Health and Safety news, training and general information

## Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
<b>Independent enquirers</b>	researching for a written assignment to describe legal and environmental requirements to job site organisation
<b>Team workers</b>	working as a team allocating job roles and responsibilities with tutor support
<b>Self-managers</b>	carrying out verbal risk assessments carrying out daily maintenance tasks on both powered and hand tool
<b>Effective participators</b>	tutors should encourage all students to participate taking on a range of roles during practical sessions throughout the course of the unit

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
<b>Independent enquirers</b>	directing investigation into relevant legislation
<b>Reflective learners</b>	encouraging reflection following practical operations to improve techniques and procedures.
<b>Team workers</b>	allocating roles and responsibilities during practical sessions
<b>Self-managers</b>	encouraging learners to take responsibility for their own ground based operations
<b>Effective participators</b>	being encouraged to participate in all aspects during practical sessions

## ● Functional Skills – Level 2

Skill	When learners are ...
<b>ICT – Use ICT systems</b>	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	carrying out internet-based research into various areas of the unit
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	using computers to create schedules for
Manage information storage to enable efficient retrieval	
Follow and understand the need for safety and security practices	
Troubleshoot	
<b>ICT – Find and select information</b>	
Select and use a variety of sources of information independently for a complex task	
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	
<b>ICT – Develop, present and communicate information</b>	
Enter, develop and format information independently to suit its meaning and purpose including: <ul style="list-style-type: none"> <li>• text and tables</li> <li>• images</li> <li>• numbers</li> <li>• records.</li> </ul>	producing pictorial presentations using PowerPoint style software
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	
<b>Mathematics</b>	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	working out ratios for fuelling chainsaws
Identify the situation or problem and the mathematical methods needed to tackle it	working out distances related to signing for chapter 8 guarding

Skill	When learners are ...
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
<b>English</b>	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	carrying out verbal risk assessments and delivering them to class groups
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	carrying out independent research into legislation relevant to ground-based arboricultural operations
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	carrying out various written assignments within the unit content.



## Further information

For further information please call Customer Services on 0207 010 2188 (calls may be recorded for training purposes) or email: [teachingLandbasedStudies@pearson.com](mailto:teachingLandbasedStudies@pearson.com)

## Useful publications

Further copies of this document and related publications can be obtained by contacting us:

Telephone: 0845 172 0205

Email: [publication.orders@edexcel.com](mailto:publication.orders@edexcel.com)

Related information and publications include:

- Functional Skills publications – specifications, tutor support materials and question papers
- the current publications catalogue and update catalogue.

Edexcel publications concerning the Quality Assurance System and the internal and external verification of vocationally related programmes can be found on the Pearson website and in the Edexcel publications catalogue.

NB: Most of our publications are priced. There is also a charge for postage and packing. Please check the cost when you order.

### How to obtain National Occupational Standards

Lantra

Lantra House

Stoneleigh Park

Coventry

CV8 2LG

Telephone: 0845 707 8007

Email: [connect@lantra.co.uk](mailto:connect@lantra.co.uk)

# Professional development and training

Pearson supports UK and international customers with training related to BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building Functional Skills into your programme
- building in effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on our website ([qualifications.pearson.com](http://qualifications.pearson.com)). You can request customised training through the website or by contacting one of our advisers in the Training from Pearson UK to discuss your training needs.

Calls may be recorded for training purposes.

The training we provide:

- is active – ideas are developed and applied
- is designed to be supportive and thought provoking
- builds on best practice.

Our training is underpinned by the LLUK standards for those preparing to teach and for those seeking evidence for their continuing professional development.



# Annexe A

## The Pearson BTEC qualification framework for the environmental and land-based sector

Progression opportunities within the framework.

Level	General qualifications	BTEC full vocationally related qualifications	BTEC Short Courses	NVQ/occupational
5		Pearson BTEC Level 5 HND Diplomas in: Animal Management, Environmental Conservation, Horse Management, Horticulture		
4		Pearson BTEC Level 4 HNC Diplomas in: Animal Management, Environmental Conservation, Horse Management, Horticulture		
3	Pearson Level 3 Diploma in Environmental and Land-based Studies	Pearson BTEC Level 3 Certificates, Subsidiary Diplomas, Diploma and Extended Diplomas in Agriculture, Animal Management, Blacksmithing and Metalworking, Countryside Management, Fish Management, Floristry, Forestry and Arboriculture, Horse Management, Horticulture, Land-based Technology		Diploma in Work Based Environmental Conservation
2	Pearson Level 2 Diploma in Environmental and Land-based Studies	Pearson BTEC Level 2 Certificate, Extended Certificate and Diploma in Agriculture, Animal Care, Blacksmithing and Metalworking, Countryside and Environment, Fish Husbandry, Floristry, Horse Care, Horticulture, Land-based Technology		Diploma in Work Based Environmental Conservation

Level	General qualifications	BTEC full vocationally related qualifications	BTEC Short Courses	NVQ/occupational
I	Edexcel Level I Diploma in Environmental and Land-based Studies	BTEC Foundation Learning in Land-based Studies	Pearson BTEC Level I in Caring for Horses	
Entry		BTEC Foundation Learning in Land-based Studies		

# Annexe B

## Grading domains: BTEC Level 2 generic grading domains

Grading domain 1	Indicative characteristics – merit	Indicative characteristics – distinction
<b>Application of knowledge and understanding</b> (Learning outcome stem <i>understand or know</i> )	<ul style="list-style-type: none"> <li>• Show depth of knowledge and development of understanding in given situations (for example explain why, make judgements based on analysis).</li> <li>• Apply and/or select relevant concepts.</li> <li>• Apply knowledge to different contexts.</li> <li>• Apply knowledge to non-routine contexts (ie assessor selection).</li> <li>• Make comparisons.</li> <li>• Show relationships between pass criteria.</li> </ul>	<ul style="list-style-type: none"> <li>• Synthesise knowledge and understanding across pass/merit criteria.</li> <li>• Evaluate concepts/ideas/actions.</li> <li>• Analyse/research and make recommendations.</li> <li>• Judges implications of application of knowledge/understanding.</li> <li>• Applies knowledge and understanding to complex activities/contexts.</li> </ul>
Grading domain 2	Indicative characteristics – merit	Indicative characteristics – distinction
<b>Development of practical and technical skills</b> (Learning outcome stem <i>be able to</i> )	<ul style="list-style-type: none"> <li>• Use advanced techniques/processes/skills successfully.</li> <li>• Act under limited supervision/ demonstrate independence (note: pass cannot require support).</li> <li>• Apply to non-routine activities.</li> <li>• Demonstrate within time and/or resource constraints.</li> <li>• Produce varied solutions (including non-routine).</li> <li>• Modify techniques/processes to situations.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate creativity/originality/ own ideas.</li> <li>• Apply skill(s) to achieve higher order outcome.</li> <li>• Select and use successfully from a range of advanced techniques/ processes/skills.</li> <li>• Reflects on skill acquisition and application.</li> <li>• Justifies application of skills/methods.</li> <li>• Makes judgements about risks and limitations of techniques/processes.</li> <li>• Innovates or generates of application of techniques/processes for new situations.</li> </ul>

Grading domain 3	Indicative characteristics – merit	Indicative characteristics – distinction
<b>Personal development for occupational roles</b> (Any learning outcome stem)	<ul style="list-style-type: none"> <li>• Takes responsibility in planning and undertaking activities.</li> <li>• Reviews own development needs.</li> <li>• Finds and uses relevant information sources.</li> <li>• Acts within a given work-related context showing understanding of responsibilities.</li> <li>• Identifies responsibilities of employers to the community and the environment.</li> <li>• Applies qualities related to the vocational sector.</li> <li>• Internalises skills/attributes (creating confidence).</li> </ul>	<ul style="list-style-type: none"> <li>• Manages self to achieve outcomes successfully.</li> <li>• Plans for own learning and development through the activities.</li> <li>• Analyses and manipulates information to draw conclusions.</li> <li>• Applies initiative appropriately.</li> <li>• Assesses how different work-related contexts or constraints would change performance.</li> <li>• Takes decisions related to work contexts.</li> <li>• Applies divergent and lateral thinking in work-related contexts.</li> <li>• Understands interdependence.</li> </ul>
Grading domain 4	Indicative characteristics – merit	Indicative characteristics – distinction
<b>Application of generic skills</b> (Any learning outcome stem)	<ul style="list-style-type: none"> <li>• Communicates using appropriate technical/professional language.</li> <li>• Makes judgements in contexts with explanations.</li> <li>• Explains how to contribute within a team.</li> <li>• Makes adjustments to meet the needs/expectations of others (negotiation skills).</li> <li>• Select and justify solutions for specified problems.</li> </ul>	<ul style="list-style-type: none"> <li>• Presents self and communicates information to meet the needs of a typical audience.</li> <li>• Takes decisions in contexts with justifications.</li> <li>• Produces outputs subject to time/resource constraints.</li> <li>• Reflects on own contribution to working within a team.</li> <li>• Generate new or alternative solutions to specified problems.</li> </ul>

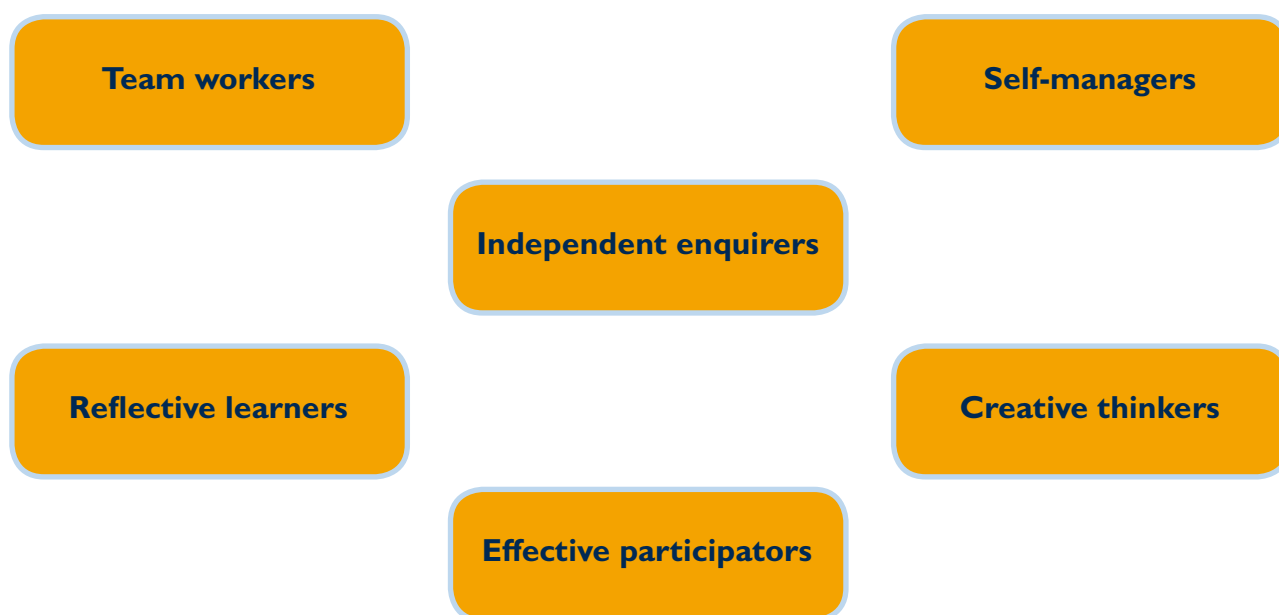
# Annexe C

## ● Personal, learning and thinking skills

### A FRAMEWORK OF PERSONAL, LEARNING AND THINKING SKILLS 11-19 IN ENGLAND

The framework comprises six groups of skills that, together with the Functional Skills of English, mathematics and ICT, are essential to success in learning, life and work. In essence the framework captures the essential skills of: managing self; managing relationships with others; and managing own learning, performance and work. It is these skills that will enable young people to enter work and adult life confident and capable.

The titles of the six groups of skills are set out below.



For each group there is a focus statement that sums up the range of skills. This is followed by a set of outcome statements that is indicative of the skills, behaviours and personal qualities associated with each group.

Each group is distinctive and coherent. The groups are also inter-connected. Young people are likely to encounter skills from several groups in any one learning experience. For example, an independent enquirer would set goals for their research with clear success criteria (reflective learner) and organise and manage their time and resources effectively to achieve these (self-manager). In order to acquire and develop fundamental concepts such as organising oneself, managing change, taking responsibility and perseverance, learners will need to apply skills from all six groups in a wide range of learning contexts 11-19.

## The Skills

### Independent enquirers

#### Focus:

**Young people process and evaluate information in their investigations, planning what to do and how to go about it. They take informed and well-reasoned decisions, recognising that others have different beliefs and attitudes.**

#### Young people:

- identify questions to answer and problems to resolve
- plan and carry out research, appreciating the consequences of decisions
- explore issues, events or problems from different perspectives
- analyse and evaluate information, judging its relevance and value
- consider the influence of circumstances, beliefs and feelings on decisions and events
- support conclusions, using reasoned arguments and evidence.

### Creative thinkers

#### Focus:

**Young people think creatively by generating and exploring ideas, making original connections. They try different ways to tackle a problem, working with others to find imaginative solutions and outcomes that are of value.**

#### Young people:

- generate ideas and explore possibilities
- ask questions to extend their thinking
- connect their own and others' ideas and experiences in inventive ways
- question their own and others' assumptions
- try out alternatives or new solutions and follow ideas through
- adapt ideas as circumstances change.

### Reflective learners

#### Focus:

**Young people evaluate their strengths and limitations, setting themselves realistic goals with criteria for success. They monitor their own performance and progress, inviting feedback from others and making changes to further their learning.**

#### Young people:

- assess themselves and others, identifying opportunities and achievements
- set goals with success criteria for their development and work
- review progress, acting on the outcomes
- invite feedback and deal positively with praise, setbacks and criticism
- evaluate experiences and learning to inform future progress
- communicate their learning in relevant ways for different audiences.

## Team workers

### Focus:

**Young people work confidently with others, adapting to different contexts and taking responsibility for their own part. They listen to and take account of different views. They form collaborative relationships, resolving issues to reach agreed outcomes.**

### Young people:

- collaborate with others to work towards common goals
- reach agreements, managing discussions to achieve results
- adapt behaviour to suit different roles and situations, including leadership role
- show fairness and consideration to others
- take responsibility, showing confidence in themselves and their contribution
- provide constructive support and feedback to others.

## Self-managers

### Focus:

**Young people organise themselves, showing personal responsibility, initiative, creativity and enterprise with a commitment to learning and self-improvement. They actively embrace change, responding positively to new priorities, coping with challenges and looking for opportunities.**

### Young people:

- seek out challenges or new responsibilities and show flexibility when priorities change
- work towards goals, showing initiative, commitment and perseverance
- organise time and resources, prioritising actions
- anticipate, take and manage risks
- deal with competing pressures, including personal and work-related demands
- respond positively to change, seeking advice and support when needed
- manage their emotions, and build and maintain relationships.

## Effective participators

### Focus:

**Young people actively engage with issues that affect them and those around them. They play a full part in the life of their school, college, workplace or wider community by taking responsible action to bring improvements for others as well as themselves.**

### Young people:

- discuss issues of concern, seeking resolution where needed
- present a persuasive case for action
- propose practical ways forward, breaking these down into manageable steps
- identify improvements that would benefit others as well as themselves
- try to influence others, negotiating and balancing diverse views to reach workable solutions
- act as an advocate for views and beliefs that may differ from their own.

## PLTS performance indicator (suggested recording sheet)

<b>Name:</b>	<b>Date:</b>				
	<b>Level of success</b> 1 = low, 5 = high				
<b>Independent enquirers</b>					
Identify questions to answer and problems to resolve	1	2	3	4	5
Plan and carry out research, appreciating the consequences of decisions	1	2	3	4	5
Explore issues, events or problems from different perspectives	1	2	3	4	5
Analyse and evaluate information, judging its relevance and value	1	2	3	4	5
Consider the influence of circumstances, beliefs and feelings on decisions and events	1	2	3	4	5
Support conclusions, using reasoned arguments and evidence	1	2	3	4	5
<b>Creative thinkers</b>					
Generate ideas and explore possibilities	1	2	3	4	5
Ask questions to extend their thinking	1	2	3	4	5
Connect their own and others' ideas and experiences in inventive ways	1	2	3	4	5
Question their own and others' assumptions	1	2	3	4	5
Try out alternatives or new solutions and follow ideas through	1	2	3	4	5
Adapt ideas as circumstances change	1	2	3	4	5
<b>Reflective learners</b>					
Assess themselves and others, identifying opportunities and achievements	1	2	3	4	5
Set goals with success criteria for their development and work	1	2	3	4	5
Review progress, acting on the outcomes	1	2	3	4	5
Invite feedback and deal positively with praise, setbacks and criticism	1	2	3	4	5
Evaluate experiences and learning to inform future progress	1	2	3	4	5
Communicate their learning in relevant ways for different audiences	1	2	3	4	5



Team workers					
Collaborate with others to work towards common goals	1	2	3	4	5
Reach agreements, managing discussions to achieve results	1	2	3	4	5
Adapt behaviour to suit different roles and situations, including leadership roles	1	2	3	4	5
Show fairness and consideration to others	1	2	3	4	5
Take responsibility, showing confidence in themselves and their contribution	1	2	3	4	5
Provide constructive support and feedback to others	1	2	3	4	5
Self-managers					
Seek out challenges or new responsibilities and show flexibility when priorities change	1	2	3	4	5
Work towards goals, showing initiative, commitment and perseverance	1	2	3	4	5
Organise time and resources, prioritising actions	1	2	3	4	5
Anticipate, take and manage risks	1	2	3	4	5
Deal with competing pressures, including personal and work-related demands	1	2	3	4	5
Respond positively to change, seeking advice and support when needed	1	2	3	4	5
Manage their emotions, and build and maintain relationships.	1	2	3	4	5
Effective participators					
Discuss issues of concern, seeking resolution where needed	1	2	3	4	5
Present a persuasive case for action	1	2	3	4	5
Propose practical ways forward, breaking these down into manageable steps	1	2	3	4	5
Identify improvements that would benefit others as well as themselves	1	2	3	4	5
Try to influence others, negotiating and balancing diverse views to reach workable solutions	1	2	3	4	5
Act as an advocate for views and beliefs that may differ from their own	1	2	3	4	5

**Note to learner:** The circled number represents an indication of your PLTS performance so far.

**Note to tutor:** Indicate the level of success by circling the appropriate number during your feedback with the learner.

## Summary of the PLTS coverage throughout the programme

Personal, learning and thinking skills	Unit						
	1	2	3	4	5	6	7
Independent enquirers	✓	✓	✓	✓	✓	✓	✓
Creative thinkers	✓	✓		✓	✓		✓
Reflective learners	✓	✓	✓	✓	✓		
Team workers					✓	✓	✓
Self-managers	✓	✓	✓	✓	✓	✓	✓
Effective participators					✓		✓
✓ – opportunities for development							

Personal, learning and thinking skills	Unit						
	8	9	10	11	12	13	14
Independent enquirers	✓	✓	✓	✓	✓	✓	✓
Creative thinkers	✓		✓	✓		✓	✓
Reflective learners	✓		✓			✓	
Team workers	✓	✓	✓	✓	✓	✓	✓
Self-managers	✓	✓	✓		✓	✓	✓
Effective participators		✓	✓	✓	✓	✓	
✓ – opportunities for development							

Personal, learning and thinking skills	Unit						
	15	16	17	18	19	20	21
Independent enquirers	✓		✓	✓	✓	✓	✓
Creative thinkers	✓	✓				✓	✓
Reflective learners	✓				✓	✓	✓
Team workers	✓		✓	✓		✓	✓
Self-managers	✓		✓		✓	✓	✓
Effective participators		✓	✓	✓	✓	✓	✓
✓ – opportunities for development							

Personal, learning and thinking skills	Unit						
	22	23	24	25			
Independent enquirers	✓	✓	✓	✓			
Creative thinkers	✓	✓					
Reflective learners		✓	✓				
Team workers	✓	✓	✓	✓			
Self-managers	✓	✓	✓	✓			
Effective participators	✓			✓			
✓ – opportunities for development							

# Annexe D

## Wider curriculum mapping

Study of the Pearson BTEC Level 2 Firsts in Countryside and Environment gives learners opportunities to develop an understanding of spiritual, moral, ethical, social and cultural issues as well as an awareness of citizenship, environmental issues, European developments, health and safety considerations and equal opportunities issues.

The Pearson BTEC Level 2 Firsts in Countryside and Environment makes a positive contribution to wider curricular areas as appropriate.

### Spiritual, moral, ethical, social and cultural issues

The qualification contributes to an understanding of:

- spiritual issues – for example moral and ethical issues involved in conservation of the natural environment, flora and fauna
- social and cultural issues – for example issues around food production and ecosystems.

### Citizenship issues

Learners undertaking the Pearson BTEC Level 2 Firsts in Countryside and Environment will have the opportunity to develop their understanding of citizenship issues, for example the public and private involvement in game sports.

### Environmental issues

Learners undertaking the Pearson BTEC Level 2 Firsts in Countryside and Environment will have the opportunity to develop their understanding of environmental issues throughout the units.

### European developments

Much of the content of the Pearson BTEC Level 2 Firsts in Countryside and Environment applies throughout Europe even though delivery is in a UK context.

### Health and safety considerations

The Pearson BTEC Level 2 Firsts in Countryside and Environment are practically based and health and safety issues are encountered throughout the units.

### Equal opportunities issues

Equal opportunities issues are implicit throughout the Pearson BTEC Level 2 Firsts in Countryside and Environment.

## Wider curriculum mapping

### Level 2

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12
Spiritual												
Moral and ethical	✓		✓								✓	
Social and cultural	✓	✓									✓	
Citizenship issues	✓										✓	
Environmental issues			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
European developments		✓		✓								
Health and safety considerations	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Equal opportunities issues		✓										

	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17	Unit 18	Unit 19	Unit 20	Unit 21	Unit 22	Unit 23	Unit 24	Unit 25
Spiritual													
Moral and ethical			✓	✓						✓			
Social and cultural										✓			
Citizenship issues													
Environmental issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
European developments													
Health and safety considerations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Equal opportunities issues													

# Annexe E

## National Occupational Standards/mapping with NVQs

The grid below maps the knowledge covered in the Pearson BTEC Level 2 Certificate, Extended Certificate and Diploma in Countryside and Environment against the underpinning knowledge of the Level 2 NVQ in Environmental Conservation, Level 2 NVQ in Game and Wildlife, Level 2 NVQ in Amenity Horticulture, Level 2 NVQ in Treework.

### KEY

- ✓ indicates that the Pearson BTEC Level 2 Firsts cover all of the underpinning knowledge of the NVQ unit
- # indicates partial coverage of the NVQ unit
- a blank space indicates no coverage of the underpinning knowledge

NVQs	Units												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Level 2 NVQ in Environmental Conservation													
CU19.1,2					#								
CU27.1,2									#				
CU33			#										
CU87.1,2						#							
EC1.1,2													#
EC2.1										#		#	
EC2.1						#							
EC2.2				#						#		#	

NVQs	Units											
	14	15	16	17	18	19	20	21	22	23	24	25
Level 2 NVQ in Environmental Conservation												
CU27.1,2				#								
CU76.1							#	#				
CU86.1,2	#											
CU87.1,2					#							
EC2.1	#											
Level 2 NVQ in Game and Wildlife												
Ga2.1		#										
Ga2.2		#										
Ga3.1		#	#									
Level 2 NVQ in Amenity Horticulture												
L2.1								#				
Level 2 NVQ in Treework												
T10										#		
T22.1											#	
T26										#		

# Annexe F

## Unit mapping overview

BTEC First in Countryside and Environment legacy (specification end date 31/08/2010)/new versions of the BTEC First qualifications in Countryside and Environment (specification start date 01/09/2010) – the BTEC Level 2 Certificate in Countryside and Environment, BTEC Level 2 Extended Certificate in Countryside and Environment and the BTEC Level 2 Diploma in Countryside and Environment.

New units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17
Old units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17
Unit 1	F																
Unit 2		P															
Unit 3			F														
Unit 4				F													
Unit 5					F												
Unit 6						F											
Unit 7								F									
Unit 8									F								
Unit 9										F							
Unit 10											F						
Unit 11												F					
Unit 12																	
Unit 13													F				
Unit 14														F			
Unit 15															F		
Unit 16																F	
Unit 17																	F

### KEY

P – Partial mapping (some topics from the old unit appear in the new unit)

F – Full mapping (topics in old unit match new unit exactly or almost exactly)

X – Full mapping + new (all the topics from the old unit appear in the new unit, but new unit also contains new topic(s))

## Unit mapping in depth

BTEC First in Countryside and Environment legacy (specification end date 31/08/2010)/new versions of the BTEC First qualifications in Countryside and Environment (specification start date 01/09/2010) – the BTEC Level 2 Certificate in Countryside and Environment, BTEC Level 2 Extended Certificate in Countryside and Environment and the BTEC Level 2 Diploma in Countryside and Environment.

New units		Old units		Mapping/comments (new topics in italics)
Number	Name	Number	Name	
<b>Unit 1</b>	Undertake Work Related Experience in the Land-based Industries	<b>Unit 1</b>	Work Related Experience in Countryside and Environment	Unit focuses on documents and skills needed for jobs in Land-Based industry and reporting on work placement after.  Know the range and scope of job roles within an environmental and land-based industry.  Be able to use relevant documents and skills relating to work experience.  Be able to report on the work experience.
<b>Unit 2</b>	Environmental and Land-based Business	<b>Unit 2</b>	Countryside and Environment Industry and Organisations	Sustainability development removed from unit. Focus on land-based industry and business operations.  Carrying out simple administrative tasks.  Common business operations.
<b>Unit 3</b>	Introduction to Animal and Plant Husbandry	<b>Unit 3</b>	Introduction to Animal and Plant Husbandry	N/A
<b>Unit 4</b>	Introduction to Environmental Studies	<b>Unit 4</b>	Introduction to Environmental Studies	Collection of data from ecosystem components.
<b>Unit 5</b>	Participate in Providing Estate Maintenance	<b>Unit 5</b>	Practical Land-based Skills	Focus of unit on estate management.
<b>Unit 6</b>	Conservation and Improvement of British Habitats	<b>Unit 6</b>	Conservation and Improvement of British Habitats	N/A
<b>Unit 7</b>	Introduction to Agriculture and Conservation	–		New unit
<b>Unit 8</b>	Introduction to Land-based Workshop Practice	<b>Unit 7</b>	Introduction to Land-based Workshop Practice	N/A



New units		Old units		Mapping/comments (new topics in italics)
Number	Name	Number	Name	
<b>Unit 9</b>	Introduction to the Principles of Land-based Machinery	<b>Unit 8</b>	Introduction to the Principles of Land-based Machinery	Focus on combustion engines. Layout and function of land-based machinery 12V electrical systems and their components removed from unit. Working principles of combustion engines. Maintenance requirements of machine. Maintain engines on land-based machines.
<b>Unit 10</b>	Undertaking Ecological Surveys and Techniques	<b>Unit 9</b>	Ecological Surveys, Techniques and Records	N/A
<b>Unit 11</b>	Introduction to Countryside Access and Recreation	<b>Unit 10</b>	Countryside Access and Recreation	Promotion of responsible use of the environment.
<b>Unit 12</b>	Introduction to Urban Habitat Ecology	<b>Unit 11</b>	Urban Habitat Conservation	Undertaking of ecological surveys.
<b>Unit 13</b>	Understanding Ecology of Trees, Woods and Forests	<b>Unit 13</b>	Ecology of Trees, Woods and Forests	Promotion of good public use of forests or woodlands.
<b>Unit 14</b>	Introduction to Practical Forestry Skills	<b>Unit 14</b>	Practical Forestry Skills	N/A
<b>Unit 15</b>	Introduction to Game Management	<b>Unit 15</b>	Lowland Game Management	Focus of unit on game keeping in general not just lowland game keeping.
<b>Unit 16</b>	Introductory Deer Management	<b>Unit 16</b>	Deer Management	Life cycles of specified deer species removed from unit.
<b>Unit 17</b>	Introduction to Land-based Machinery Operations	<b>Unit 17</b>	Land-based Machinery Operation	Focus on maintenance and safe working principles of equipment and machinery. Safe working principles when using equipment and machinery. Maintain land-based equipment and machinery.
<b>Unit 18</b>	Introduction to Coastal Zone Management	–		New unit
<b>Unit 19</b>	Tractor Driving	–		New unit

New units		Old units		Mapping/comments (new topics in italics)
Number	Name	Number	Name	
<b>Unit 20</b>	Understand the Basic Principles of Plant Science			New unit
<b>Unit 21</b>	Establish and Maintain Plants Outdoors			New unit
<b>Unit 22</b>	Presentation and Service for Retailing in the Land-based Sector			New unit
<b>Unit 23</b>	Undertake Tree Felling Operations			New unit
<b>Unit 24</b>	Undertake Tree Climbing and Pruning Operations			New unit
<b>Unit 25</b>	Carry Out Ground-based Arboricultural Operations			New unit

# Annexe G

## Examples of calculation of qualification grade above pass grade

Edexcel will automatically calculate the qualification grade for your learners when your learner unit grades are submitted.

The generic examples below demonstrate how the qualification grade above pass is calculated using the following two tables which are also shown in the section earlier on in the specification *Calculation of the qualification grades above pass grade*.

## Points available for credits achieved at different levels and unit grades

The table below shows the **number of points scored per credit** at the unit level and grade.

Unit level	Points per credit		
	Pass	Merit	Distinction
Level 1	3	4	5
<b>Level 2</b>	<b>5</b>	<b>6</b>	<b>7</b>
Level 3	7	8	9

Learners who achieve the correct number of points within the ranges shown in the 'qualification grade' table below will achieve the qualification merit or distinction or distinction\* grade.

Qualification	Points range above pass grade		
	Merit	Distinction	Distinction*
BTEC Level 2 Certificate	85–94	95–99	100 and above
BTEC Level 2 Extended Certificate	170–189	190–199	200 and above
BTEC Level 2 Diploma	340–379	380–399	400 and above

### Example 1

#### Achievement of pass qualification grade

A learner completing a 15-credit Pearson BTEC Level 2 Certificate achieves the credit required to gain a pass qualification grade and does not achieve the points to gain a merit grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	2	5	Pass	5	$5 \times 5 = 25$
Unit 2	2	5	Pass	5	$5 \times 5 = 25$
Unit 3	2	5	Merit	6	$5 \times 6 = 30$
<b>Qualification grade totals</b>		<b>15</b>	<b>Pass</b>		<b>80</b>

### Example 2

#### Achievement of merit qualification grade

A learner completing a 15-credit Pearson BTEC Level 2 Certificate achieves the points required to gain a merit qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	2	5	Pass	5	$5 \times 5 = 25$
Unit 2	2	5	Merit	6	$5 \times 6 = 30$
Unit 3	2	5	Merit	6	$5 \times 6 = 30$
<b>Qualification grade totals</b>		<b>15</b>	<b>Merit</b>		<b>85</b>

### Example 3

#### Achievement of distinction qualification grade

A learner completing a 15-credit Pearson BTEC Level 2 Certificate achieves the points required to gain a distinction qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	2	5	Merit	6	$5 \times 6 = 30$
Unit 2	2	5	Merit	6	$5 \times 6 = 30$
Unit 3	2	5	Distinction	7	$5 \times 7 = 35$
<b>Qualification grade totals</b>		<b>15</b>	<b>Distinction</b>		<b>95</b>

#### Example 4

##### Achievement of merit qualification grade

A learner completing a 30-credit Pearson BTEC Level 2 Extended Certificate achieves the points required to gain a merit qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	2	5	Merit	6	$5 \times 6 = 30$
Unit 2	2	5	Pass	5	$5 \times 5 = 25$
Unit 3	2	5	Distinction	7	$5 \times 7 = 35$
Unit 6	2	10	Pass	5	$10 \times 5 = 50$
Unit 8	3	5	Pass	7	$5 \times 7 = 35$
<b>Qualification grade totals</b>		<b>30</b>	<b>Merit</b>		<b>175</b>

#### Example 5

##### Achievement of merit qualification grade

A learner completing a 60-credit Pearson BTEC Level 2 Diploma achieves the points required to gain a merit qualification grade.

	Level	Credit	Grade	Grade points	Points per unit = credit x grade
Unit 1	2	5	Merit	6	$5 \times 6 = 30$
Unit 2	2	5	Pass	5	$5 \times 5 = 25$
Unit 3	2	5	Distinction	7	$5 \times 7 = 35$
Unit 6	2	10	Merit	6	$10 \times 6 = 60$
Unit 9	1	5	Merit	4	$5 \times 4 = 20$
Unit 10	2	10	Distinction	7	$10 \times 7 = 70$
Unit 11	2	10	Merit	6	$10 \times 6 = 60$
Unit 14	2	10	Merit	6	$10 \times 6 = 60$
<b>Qualification grade totals</b>		<b>60</b>	<b>Merit</b>		<b>360</b>

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