BTEC Level 2

BTEC Firsts
Specification

Pearson BTEC Level 2 Certificate, BTEC Level 2 Extended Certificate and Pearson BTEC Level 2 Diploma in Agriculture

For first teaching September 2010

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Issue 4

ALWAYS LEARNING

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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

These qualifications were previously entitled:

Pearson BTEC Level 2 Certificate in Agriculture (QCF)

Pearson BTEC Level 2 Extended Certificate in Agriculture (QCF)

Pearson BTEC Level 2 Diploma in Agriculture (QCF)

The QNs remain the same.

References to third-party material made in this specification are made in good faith. We do not endorse, approve or accept responsibility for the content of materials, which may be subject to change, or any opinions expressed therein. (Material may include textbooks, journals, magazines and other publications and websites.)

All information in this specification is correct at time of publication.

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Contents

BTEC First qualification titles covered by this specification

Pearson BTEC Level 2 Certificate in Agriculture

Pearson BTEC Level 2 Extended Certificate in Agriculture

Pearson BTEC Level 2 Diploma in Agriculture

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

The qualification titles listed above feature in the funding lists published annually by the DCSF and the regularly updated website www.education.gov.uk/. The Qualification 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 Agriculture	500/9933/4
Pearson BTEC Level 2 Extended Certificate in Agriculture	500/9932/2
Pearson BTEC Level 2 Diploma in Agriculture	500/9547/X

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 are:

Pearson BTEC Level 2 Certificate in Agriculture

Pearson BTEC Level 2 Extended Certificate in Agriculture

Pearson BTEC Level 2 Diploma in Agriculture.

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 'old' (NQF) 2010 and new specifications.

Predecessor BTEC Firsts (accredited 2006)	BTEC Firsts (for delivery from September 2010)
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 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 First Award 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 Agriculture

The BTEC Firsts in Agriculture 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
- provide opportunities for employees who currently work in agricultural and land management 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 Agriculture
- 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 Agriculture

The BTEC Firsts in Agriculture have been developed to provide entry and progression into, and within, agricultural and land management 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 will need from learners entering the sector in the coming years. Pearson have included these in the 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 seeking 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 plant and animal production and management of 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 using 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

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 Agriculture relate to the following NOS:

- Level 2 Agricultural Crops
- Level 2 Livestock Production.

Rules of combination for Pearson BTEC Level 2 First qualifications

The rules of combination specify the:

- total credit value of the qualification
- the minimum credit to be achieved at the level, or above, of the qualification
- the mandatory unit credit
- the optional unit credit
- the maximum credit that can come from other Level 3 BTEC units in this 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.

2 Minimum credit to be achieved at, or above, the level of the qualification: 8.

Pearson BTEC Level 2 Extended Certificate

1 Qualification credit value: a minimum of 30.

2 Minimum credit to be achieved at, or above, the level of the qualification: 16.

Pearson BTEC Level 2 Diploma

1 Qualification credit value: a minimum of 60.

2 Minimum credit to be achieved at, or above, the level of the qualification: 31.

3 Mandatory unit credit: 30.

4 Optional unit credit: 30.

5 A maximum of 10 credits can come from other Level 3 BTEC units to meet local needs.

Pearson BTEC Level 2 Certificate in Agriculture

The Pearson BTEC Level 2 Certificate in Agriculture is 15 credits and has 90 guided learning hours (GLH) qualification. It consists of units that provide for a combined total of 15 credits.

Pearson BTEC Level 2 Certificate in Agriculture			
Unit	**Optional units**	**Credit**	**Level**
3	Introduction to Crop Establishment	10	2
4	Introduction to Farm Animal Production	10	2
6	Introduction to Animal and Plant Husbandry	10	2
8	Participate in Providing Estate Maintenance	10	2
10	Introduction to Principles of Land-based Machinery	5	2
13	Tractor Driving	5	2
14	Assist with Agricultural Crop Production	10	2
15	Introduction to Dairy and Beef Cattle Husbandry	10	2
16	Introduction to Sheep Husbandry	5	2

Pearson BTEC Level 2 Extended Certificate in Agriculture

The Pearson BTEC Level 2 Extended Certificate in Agriculture is 30 credits and has180 guided learning hours qualification (GLH). It consists of units that provide for a combined total of 30 credits.

Pearson BTEC Level 2 Extended Certificate in Agriculture			
Unit	**Optional units**	**Credit**	**Level**
3	Introduction to Crop Establishment	10	2
4	Introduction to Farm Animal Production	10	2
5	Introduction to Land-based Machinery Operations	10	2
6	Introduction to Animal and Plant Husbandry	10	2
7	Introduction to Animal and Plant Biology	10	2
8	Participate in Providing Estate Maintenance	10	2
9	Conservation and Improvement of British Habitats	10	2
10	Introduction to Principles of Land-based Machinery	5	2
11	Introduction to Grass and Forage Crop Production	10	2
12	Introduction to Land-based Workshop Practice	10	2
13	Tractor Driving	5	2
14	Assist with Agricultural Crop Production	10	2
15	Introduction to Dairy and Beef Cattle Husbandry	10	2
16	Introduction to Sheep Husbandry	5	2

Pearson BTEC Level 2 Diploma in Agriculture

The Pearson BTEC Level 2 Diploma in Agriculture is 60 credits and has 360 guided learning hours (GLH) qualification. It consists of three mandatory units **plus** optional units that provide for a combined total of 60 credits.

Pearson BTEC Level 2 Diploma in Agriculture			
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
3	Introduction to Crop Establishment	10	2
	OR		
4	Introduction to Farm Animal Production	10	2
Unit	**Optional units**		
3	Introduction to Crop Establishment	10	2
	OR		
4	Introduction to Farm Animal Production	10	2
5	Introduction to Land-based Machinery Operations	10	2
6	Introduction to Animal and Plant Husbandry	10	2
7	Introduction to Animal and Plant Biology	10	2
8	Participate in Providing Estate Maintenance	10	2
9	Conservation and Improvement of British Habitats	10	2
10	Introduction to Principles of Land-based Machinery	5	2
11	Introduction to Grass and Forage Crop Production	10	2
12	Introduction to Land-based Workshop Practice	10	2
13	Tractor Driving	5	2
14	Assist with Agricultural Crop Production	10	2
15	Introduction to Dairy and Beef Cattle Husbandry	10	2
16	Introduction to Sheep Husbandry	5	2

Assessment and grading

In BTEC Firsts all units are internally assessed.

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 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 different forms, including written reports, graphs and 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 indicated clearly in 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 Edexcel 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 depends 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
Level 2	5	6	7
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 calculations of qualification grades 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 they are 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 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 include:

- 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.

Pearson Quality Assurance Handbook

Centres should refer to the *Handbook for Quality Assurance for BTEC QCF 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 provide 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

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

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 learners' 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

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, Pearson 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 is retained and that the vocational focus is not diluted.

Limitations on variations from standard specifications

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

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 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

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

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

Pearson'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 qualification 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 complete the programme of study successfully 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 grade 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 Pearson 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 Pearson NVQ Qualifications*, which can be found on the Edexcel website (www.edexcel.com). This policy replaces the previous Pearson 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

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.

Unit format

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

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

Level

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 National Occupational Standards (NOS) and/or other sector/professional benchmarks where appropriate.

Credit value

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

Guided learining hours for the unit are defined on page 3.

Aim and purpose

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

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

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

Unit content

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 show 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* – the 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* – amplifies 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.

Units

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.

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 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:**
P1 describe different types of jobs within an environmental and land-based industry [IE]	**M1** prepare a person specification for a job in the chosen sector	**D1** review a job application against a given person specification
P2 describe the skills and qualifications required for different types of jobs within an environmental and land-based industry [CT]		
P3 locate three advertisements for jobs from different sources available within the environmental and land-based industry [IE]	**M2** identify common themes from three job advertisements	**D2** prepare a job advertisement.
P4 produce an application for work experience in the environmental and land-based sector [IE, SM]		
P5 prepare for an interview for work experience [IE, SM]	**M3** prepare questions to be used in a job interview.	
P6 undertake an interview for work experience [IE, SM]		
P7 review own skills and experience against the requirements for a specific industry [RL]		
P8 prepare a self- development plan for work experience [RL]		
P9 review a self-development plan during and after 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:**
P10 gather and prepare evidence during the work experience [IE]		
P11 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 which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

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
Introduction and overview of the unit.
Assignment 1: Advertising a Job in the Land-based Sector (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
Assignment 2: Getting a Job in the Land-based Sector (P4, P5, P6) Introduction of brief.
Theory session.
Compete job application, prepare answers to likely questions, undertake interview.

Topic and suggested assignments/activities and/assessment
Assignment 3: Workplace Self Development (P7, P8, P9)
Introduction of brief.
Theory session.
Review own skills, prepare self development plan, review self development plan.
Assignment 4: My Work Experience Placement (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 last 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.

Criteria covered	Assignment title	Scenario	Assessment method
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
Undertake Work Experience in the Land-based Industries	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

Countryside Jobs Service	www.countryside–jobs.com
Farmers Weekly	www.fwi.com
Horticultural Careers	www.growcareers.info
Land-based Jobs on-line	www.land-force.org.uk/index.aspx
Lantra Sector Skills Council	www.lantra.org.uk
Lantra on-line Competency Framework	www.ruralslp.co.uk/index.aspx
UK Countryside and Nature Conservation	www.naturenet.net

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 …
Independent enquirers	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
Creative thinkers	describing the skills and qualifications required for a job in the land-based sector
Reflective learners	preparing and reviewing a self-development plan presenting information to others on their work experience reviewing their own skills and experience
Self-managers	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 …
Team workers	working with others to carry out interviews.

Functional Skills – Level 2

Skill	When learners are …
ICT – Find and select information	
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
ICT – Develop, present and communicate information	
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
English	
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

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 procedure 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 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:**
P1 describe the structure of one industry within the environmental and land-based sector covering: • size • employment • main activities • geographical influence • economic contribution [IE]	**M1** explain the roles of principal organisations within an industry in the environmental and land-based sector	**D1** discuss how legislation and statutory and representative organisations affect a specified business in the environmental and land-based sector
P2 identify the principal organisations and trade associations within an industry in the environmental and land-based sector [IE]		
P3 identify the main United Kingdom or European legislation and codes of practice relating to one industry within the environmental and land-based sector [IE]	**M2** explain the objectives and purpose of important current United Kingdom or European legislation for the environmental and land-based industry	
P4 identify key requirements of current employment law on the environmental and land-based sector [IE]		

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:**	
P5	describe how common IT software can be used in everyday business operations	**M3**	explain the advantages and disadvantages of using IT for common business tasks	**D2**	discuss the importance of accuracy, security, confidentiality and data back up when completing business tasks.
P6	state the purpose and operation of common business tasks: • financial and banking • marketing • administrative tasks				
P7	use appropriate methods to prepare, present, sort and retrieve information [CT]	**M4**	explain the purpose of specified administrative and accounting tasks.		
P8	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 which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

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 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.
Assignment 1: Industry Structure and Organisations (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.
Assignment 2: Legislation (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.
Assignment 3: Business Tasks and Operations (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 explain 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 Land-based Industries	Business Management in the Land-based Sector

Essential resources

Learners will 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

Business Link	www.businesslink.gov.uk
Business Studies Teaching Resources	www.bized.co.uk
Country Land and Business Association	www.cla.org.uk
Department for Environment, Food and Rural Affairs	www.defra.gov.uk
Environmental regulations	www.netregs.gov.uk
National Farmers Union	www.nfuonline.com

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 …
Independent enquirers	investigating the structure of an industry in the land-based sector researching organisations researching legislation affecting the sector investigating business bank accounts
Creative thinkers	presenting information about an industry using IT software to perform business operations preparing and presenting information
Reflective learners	discussing the importance of customer care discussing the importance of customer care
Self-managers	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 …
Team workers	working with others to complete a stock check
Self-managers	completing assignment work to deadlines.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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	
ICT – Find and select information	
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	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	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	
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	

Skill	When learners are …
Mathematics	
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	
English	
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 Crop Establishment

Unit code: D/600/9382

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 crop establishment 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

Most agricultural holdings in the UK include some cropping, which may be grass, forage crops, cereals, root crops, or a range of alternative crops. The ability to understand and apply crop husbandry principles in establishing crops is therefore important to those involved, or seeking to be involved, in UK agriculture.

This unit focuses on all aspects of crop establishment, and learners will develop their knowledge of crop physiology, ground conditions and preparation, crop planting and nutrient supply. They will apply knowledge gained to develop their practical skills in carrying out soil investigation, cultivations and crop establishment.

Throughout this unit learners will cover the relevant current legislation and codes of practice that are associated with these activities, in particular those relating to health and safety, food safety and protecting the environment.

On completion of this unit a learner should:

1 Know the physiology of crops

2 Be able to investigate soil

3 Be able to prepare and cultivate land for planting

4 Understand the importance of crop nutrients

5 Be able to establish crops.

Unit content

1 Know the physiology of crops

Structure of monocotyledons and dicotyledons: seed structure, differences between monocotyledons and dicotyledons, radicle, plumule, stem, root, rootlets, leaves, buds, flowers, examples of monocotyledons (eg cereals, grasses), examples of dicotyledons (eg beans, clovers, cabbage, potato)

Process of plant growth to maturity: photosynthesis (equation for process, required factors: water, light, chlorophyll, carbon dioxide); respiration; nutrient and water take u, translocation (process of absorption, factors affecting the rate of absorption, xylem, phloem, diffusion, osmosis); transpiration (function of stomata, factors affecting rate of transpiration); germination (process of germination for monocotyledons and dicotyledons, factors affecting germination)

2 Be able to investigate soil

Soil types: major soil types (sand, clay, loam, silt, peat); characteristics (soil structure, particle size, drainage, pH, soil organic matter; soil requirements for different crops (eg pH, tilth, water content, drainage)

Conditions affecting planting: weather (eg rainfall, wind, temperature, humidity); soil (eg soil water content, soil temperature, soil structure, tilth); effects on planting (eg ability to use machinery in the conditions, damage to soil, effects on establishment rates)

3 Be able to prepare and cultivate land for planting

Prepare and cultivate: use of cultivation equipment (eg ploughs, harrows, cultivators); reasons for preparation and cultivation (eg seedbed preparation, rootbed preparation, improvements to soil structure, weed and pest control, incorporation of fertilisers); seedbed requirements; depth of material being planted; appropriate driving technique

Planting: planting methods (eg broadcasting, direct drilling, precision drilling) types of problems (unsuitable weather or soil conditions, equipment breakdown or malfunction, effects of poor seedbed preparation, operator error); importance of checking quantity and quality of plant material required (seed rate, seed viability, cost, effects on establishment rates and crop density)

4 Understand the importance of crop nutrients

Crop nutrients: major nutrients (eg nitrogen, potassium, phosphates, magnesium, calcium, sulphur); minor nutrients (eg copper, manganese, boron, iron, zinc, sodium); effects on plant growth; effects of nutrient deficiencies; methods of maintaining nutrients (use of organic or inorganic fertiliser, crop rotation, methods of fertiliser application, timing and quantity of fertiliser application

5 Be able to establish crops

Plant crops: setting and calibration of equipment; handling and use of seed; use of required seed rates; suitable driving techniques; creation of tramlines

Equipment: types of equipment (eg broadcasters, precision drills, combine drills, direct drills); reasons for selection (eg soil condition, cropping area, tractor power, timing of planting); requirements for storage and maintenance; health and safety (Health and Safety at Work Act 1974, use of correct PPE, risk assessment)

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:**
P1 describe the structure of monocotyledons and dicotyledons	**M1** explain how a knowledge of crop physiology assists crop husbandry	**D1** discuss the optimum conditions required for growth of selected crops
P2 describe the process of plant growth to maturity including: • photosynthesis • respiration • nutrient and water takeup • translocation • transpiration		
P3 collect and classify soil samples [IE]	**M2** explain the soil and seedbed requirements for a given crop	
P4 state the importance of types of soil for a range of production crops		
P5 explain how the conditions (weather, soil) affect planting [IE]		

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:**	
P6	prepare for and cultivate the land for planting [SM]	**M3**	review completed cultivations and suggest areas for improvement	**D2**	recommend methods of cultivation, planting and fertiliser application for a given crop planting situation
P7	state the types of problems which may occur during planting and who these should be reported to [IE]				
P8	describe the importance of checking the quantity and quality of plant material required for planting	**M4**	explain how planting methods and soil nutrients affect crop establishment		
P9	discuss the use of major and minor plant foods in plant growth				
P10	explain methods of maintaining nutrients in crops [IE]				
P11	plant crops in accordance with instructions [SM]				
P12	select, prepare, maintain and store equipment in a safe and effective working condition. [SM]				

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

Delivery

Tutors have the opportunity to use as wide a range of techniques as possible in delivering this unit. Delivery is likely to include a mix of theory and practical sessions, including demonstrations and the opportunity for supervised practice in operating cultivation and planting equipment and machinery. Lectures, discussions, seminar presentations, site visits, internet and library-based research and the use of personal and/or industrial experience would also be suitable. Visiting expert speakers could add to the relevance of the subject for the learner. For example, a crops adviser could talk about soil analysis and how this is used to recommend fertiliser application.

Where used to support delivery of this unit, 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 to be made aware of the requirements of this unit prior to any work-related activities, so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to take part in cultivation or planting work, 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 health and safety, environmental issues and the need to operate within current legislation. Risk assessments must be undertaken prior to practical activities. Tutors should not request learners to undertake tasks that are beyond their physical capabilities.

All centres must comply with the requirements of relevant, current legislation and codes of practice eg 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).

Delivery should be planned carefully to optimise the timing for cultivation and planting practicals in accordance with the locality. This may for some centres mean a frontloading of the delivery of outcomes 3 and 5 in order for learners to take part in autumn cultivations and planting.

Delivery of learning outcomes 1, 2 and 4 is likely to include theory based sessions and laboratory practicals, particularly in enabling learners to view plant structure at first hand, and in analysing soil samples. Visits to see a range of soil types and associated cropping would be beneficial, particularly where centres only have one major soil type on their own land.

Delivery of outcomes 3 and 5 is likely to have a high practical component, with learners requiring sufficient time to develop their skills in the use of cultivation and planting equipment, and in carrying out basic maintenance. It would be particularly helpful for this unit to be preceded by the development of learners' tractor driving skills, so that learners are already able to safely drive a tractor prior to the use of the required attachments. It is recommended that delivery includes coverage of all equipment identified in the range, but that practical skill development for assessment purposes is based around the equipment most relevant to the learners' backgrounds and centre's location.

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
Intro to unit.
Assignment 1: Investigating Soil (P3, P4, P5, M2). Tutor introduces assignment and topic.
Theory session: soil types and characteristics.
Practical session: soil collection, soil experiments to determine properties and characteristics.
Visit to see other soil types and cropping.
Learner research and classroom presentations: soil types for different production crops.
Group activities: effects of weather and soil conditions on planting.
Assessment completion.
Assignment 2: Crop Physiology (P1, P2, M1, D1). Tutor introduces assignment and topic.
Theory session: monocotyledons, dicotyledons, differences, similarities, structure.
Laboratory practical: review of plant structure.
Theory session: plant growth processes, factors affecting growth.
Laboratory practicals: photosynthesis, transpiration.
Classroom activities: how an understanding of physiology affects crop husbandry.
Classroom activities and research: optimum conditions for different crop types.
Assessment completion.
Assignment 3: Cultivations (P6, P7, P8, M3). Tutor introduces assignment and topic.
Practical demonstration: safe use of cultivation equipment, recap on tractor driving techniques covered in other units.
Practical sessions: use of cultivation equipment.
Theory session: when to use which types of cultivation equipment.
Classroom discussion: types of problem, who to report them to, how to avoid/minimise problems during planting.
Theory session: quantity and quality of plant material, importance of checking, reasons for using different seed rates.
Practical assessments.
Assignment 4: Crop Planting (P11, P12). Tutor introduces assignment and topic. Practical demonstration: crop planting, use of drills and broadcasters.
Practical sessions: use of drills and broadcasters.
Practical workshop sessions: maintenance and storage of equipment.
Theory session: reasons for selecting equipment, importance of effective storage and maintenance.
Practical assessments.

Topic and suggested assignments/activities and/assessment
Assignment 5: Crop Establishment (P9, P10, M4, D2). Tutor introduces assignment and topic.
Theory session: major and minor nutrients and their functions, effects and symptoms of deficiencies.
Theory session: reasons for and methods of maintaining nutrients.
Learner research and classroom presentation: use of crop rotation, organic and inorganic fertilisers, advantages and disadvantages.
Theory session: methods of fertiliser application.
Assessment completion.
Unit review.

Assessment

For P1 learners need to describe the structure of monocotyledons and dicotyledons. Assessment may be through completion of an annotated diagram or poster, or an illustrated report following a plant dissection.

For P2 learners need to describe the process of plant growth to maturity, which should include the range shown within the unit content. Evidence may be presented as a written report, leaflet, guide book or series of annotated diagrams.

For P3 learners are required to collect and classify a minimum of three soil samples. The sites for collection may be identified by the tutor or agreed through discussion with the learner, but should include a range of soil types. Evidence may be through observation of practical activity, in which case a checklist or other suitable observation record would be appropriate.

For P4 learners need to state the importance of soil type for a minimum of five different production crops. The crops selected may be identified by the tutor or agreed through discussion with the learner, but should include at least one cereal, grass and root crop as a minimum. Evidence could be a written or verbal report, leaflet, presentation or poster.

For P5 learners need to explain how conditions of the weather and soil affect planting. Evidence could be linked to P4 and presented in the same format.

For P6 learners need to prepare for and cultivate a piece of land for planting. It is expected that learners demonstrate the ability to safely and effectively use one piece of cultivation equipment from the range shown in the unit content. Evidence is likely to be through observation of practical activity, in which case a checklist or other suitable observation record would be appropriate. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

For P7 learners are required to give examples of the types of problem which may occur during planting and who these should be reported to. At least three types of problem should be identified. Evidence may be through verbal questioning, or through completion of a written report, leaflet or case study material.

For P8 learners need to describe the importance of checking the quantity and quality of plant required for planting, which should include the possible consequences of not carrying out these checks. Evidence may be in the same format as for P7.

Assessment of P9 and P10 may be linked. For P9 learners are required to discuss the use of major and minor plant foods in plant growth, which should include how these nutrients are used by plants, and the effect of nutrient deficiencies. For P10 learners need to explain the methods used to maintain nutrients, including crop rotation as well as fertiliser application. Evidence may be in the same format as P4.

For P11 learners are to plant crops according to instructions. Learners will be expected to demonstrate they can safely and effectively plant a crop using one of the methods shown in the unit content. Evidence is likely to be through observation of practical activity, in which case a checklist or other suitable observation record would be appropriate. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

Assessment of P12 may be linked to P11, and may be assessed in the same manner. Learners are required to show they can select equipment for a specific planting situation, prepare it, and then maintain and store it safely and in an effective working condition.

To achieve M1 learners need to explain how a knowledge of crop physiology assists crop husbandry. This is likely to be an extension of work produced for P1 and P2 and may be in the same format. It is expected that learners will provide examples of husbandry practice that is based on crop physiology principles.

For M2 learners need to explain the soil and seedbed requirements for a given crop. The crop may be identified by the tutor or agreed through discussion with the learner. The explanation should include reasons why the crop has particular requirements as well as an explanation of what the requirements are. Evidence may be a verbal or written report, leaflet, poster, case study material or presentation.

For M3 learners are required to review completed cultivations and suggest areas for improvement. This may be the learner's own cultivations, those of another learner or provided by the tutor. Evidence may be through a verbal or written report.

For M4 learners need to explain how planting methods and soil nutrients affect crop establishment. This should include consideration of a range of planting methods and soil nutrients, and may be presented in the same format as M2.

For D1 learners are required to discuss the optimum conditions required for the growth of selected crops. The conditions discussed should include the climate, weather and soil for a minimum of three different crops. The crops may be identified by the tutor or agreed through discussion with the learner, but should be three contrasting ones (ie not, for example, three cereal crops). Evidence may be linked to M1 and M2 and presented in the same format.

For D2 learners need to recommend methods of cultivation, planting and fertiliser application for a given crop planting situation. The situation should be provided by the tutor as a real scenario or case study material, and should include information about the land type, prevailing weather, previous cropping and soil characteristics. Recommendations should have a clear rationale, and evidence may be a presentation, verbal or written report.

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	Crop Physiology	You have decided to enter a competition to write an article for Crops Today. The article should link science to agricultural practice, and you have decided to write about the processes of plant growth, and how knowledge of crop physiology affects crop husbandry. Include a discussion of the optimum conditions required for the growth of three selected crops	Written article.
P3, P4, P5, M2	Investigating Soil	You are assisting a crops adviser with their work. They are currently advising an arable farmer, and you are helping to prepare a report on soil requirements. Collect and classify three soil samples from their farm, and prepare a report which includes the results from the soil samples, the importance of soil types for different crops, how conditions affect planting, and the soil and seedbed requirements for one of their proposed crops.	Practical assessment (soil sampling). Written report.

Criteria covered	Assignment title	Scenario	Assessment method
P6, P7, P8, M3	Cultivations	You are now working for an arable farmer, who has asked you to start the cultivations. A work experience pupil has asked if they can watch your cultivation work. Explain to them the types of problems that may occur and the importance of checking the quantity and quality of plant material required for planting. Prepare for and cultivate the land identified. After completion of the cultivation, review your work and suggest how it may be improved in future.	Practical assessment. Q&A.
P11, P12	Crop Planting	After your successful cultivation work, you have been asked to select and prepare equipment and plant a crop. After planting, carry out basic maintenance and prepare the equipment for storage.	Practical assessment.
P9, P10, M4, D2	Crop Establishment	You are working for an agricultural adviser, who has asked you to design a booklet providing advice about crop establishment and growth. Include the use of major and minor nutrients in plant growth, methods of maintaining nutrients, how planting methods and soil nutrients affect crop establishment, and your recommendations for methods of cultivation, planting and fertiliser application for a given crop planting situation.	Booklet.

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 Animal and Plant Biology	Element AgC5.1 Prepare for planting extensive crops Element AgC5.2 Plant extensive crops
Introduction to Grass and Forage Crop Production	Undertake Agricultural Crop Production
Assist with Agricultural Crop Production	

Essential resources

Learners will need access to a range of soil types, to basic laboratory equipment for soil classification work, and to a range of cultivation and planting machinery and equipment. They will also need access to a piece of land for carrying out cultivations and planting, both during delivery of the unit and in assessment. Learners should also have access to sufficient library and internet facilities to enable research for assessment completion.

Employer engagement and vocational contexts

This is a unit which requires the practical application of cultivation and planting knowledge, and so provides much opportunity for employer engagement, by work placement, supervised farm visits and invited guest speakers. Centres are encouraged to develop appropriate employer links to enable learners to have access to machinery and equipment that is not available at the centre itself.

Indicative reading for learners

Textbooks

Ashman M and Puri G – *Essential Soil Science* (Blackwell Science Ltd, 2002) ISBN 0632048859

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

Bell B – *Farm Machinery* (Old Pond Publishing, 2005) ISBN 1 903366 68 2

Culpin C and Bloxham P – *Culpin's Farm Machinery* (Blackwell Science, 2006) ISBN 0632051825

DEFRA – *Fertiliser Recommendations for Agricultural and Horticultural Crops RB209, 8th Edition* (The Stationery
Office Books, 2008)

Eash N and Green C – *Soil science simplified* (Blackwell Publishing, 2008) ISBN 978-0813818238

Finch H, Samuel A and Lane G – *Lockhart & Wiseman's Crop Husbandry including grassland* (Woodhead publishing, 2002) ISBN 1 85573 5490

Nix J – *Farm Management Pocketbook* (The Andersons Centre, 2009) ISBN 0954120159

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

Journals

Crops

Farm Contractor

Farmers Guardian

Farmers Weekly

Websites

www.bayercropscience.co.uk	Bayer Crop Science
www.defra.org.uk	DEFRA
www.efma.org	European Fertiliser Manufacturers' Association
www.fwi.co.uk	Farmers Weekly interactive
www.hgca.com	Home Grown Cereals Authority
www.hse.gov.uk	Health and Safety Executive
www.newfarmcrops.co.uk	New Farm Crops
www.rothamsted.ac.uk	Rothamsted Research
www-saps.plantsci.cam.ac.uk	The Science and Plants for Schools Website
www.soils.org.uk	British Society of Soil Science

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 …
Independent enquirers	classifying soil samples exploring how weather and soil conditions affect planting identifying types of problems which may occur during planting researching plant nutrients and ways of maintaining them
Self-managers	taking part in practical activities: planting, cultivations, equipment selection, preparation, maintenance and storage.

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 …
Independent enquirers	carrying out experiments on photosynthesis, transpiration etc
Creative thinkers	discussing the advantages and disadvantages of different types and methods of fertiliser application, cultivation and planting
Reflective learners	receiving feedback and reviewing their own performance in developing practical skills of cultivation and planting
Team workers	taking part in practical activities and work experience
Self-managers	taking part in practical activities and work experience
Effective participators	taking part in practical activities and work experience.

Functional skills – Level 2

Skill	When learners are …
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	researching crop nutrients researching how conditions affect planting, and soil requirements of different crops
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	completing written assignments
Bring together information to suit content and purpose	discussing the use of nutrients in plant growth
Present information in ways that are fit for purpose and audience	completing written assignments and/or presentations
Mathematics	
Select and apply a range of skills to find solutions	calculating seed rates
English	
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching plant nutrients, crop physiology, and the effect of soil and weather conditions on planting
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	completing written assignments.

Unit 4: Introduction to Farm Animal Production

Unit code: F/600/9097

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 farm animal production 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.

This unit examines common livestock production systems and gives learners an opportunity to develop the skills and knowledge needed to work with specified farm livestock.

Unit introduction

This unit investigates the husbandry skills and livestock production techniques involved in modern farming systems. The unit is relevant to anyone seeking to work with farm animals and introduces learners to the products, production methods and health and welfare requirements of farm animals. Learners will concentrate on the species traditionally farmed in the UK.

Learners will consider how animal health and welfare needs can be met most effectively whilst still meeting production requirements. Primary production methods will be covered and learners will have the opportunity to perform routine stock and health tasks during the production cycle.

Learning outcomes

On completion of this unit a learner should:

1 Know the common production systems used in livestock farming

2 Know the principles of livestock enterprise management

3 Be able to carry out routine husbandry and animal health duties on common farm livestock.

Unit content

1 Know the common production systems used in livestock farming

Common production systems: dairy production (calf rearing, rearing of replacement heifers, lactation cycle, dry cow period, targets and timing of production cycle); beef production (choice of breeds, cereal beef, silage beef, 18-month and 24-month beef, suckler beef production, finishing of suckled calves, targets and timing of production cycle); sheep production (stratification of UK sheep industry, early lambing, spring lambing, late lambing, store lamb production and finishing, targets and timing of production cycle); pig production (indoor and outdoor production, intensive and extensive, targets and timing of production cycle); poultry production (egg laying and meat production from a range of species eg chickens, ducks, geese, turkeys, targets and timing of production cycle)

2 Know the principles of livestock enterprise management

Principles: for each class of livestock; selection of male and female, signs of oestrus in the breeding animal, service management, care of the animal after mating, care of the new offspring; feeding principles; causes, symptoms, prevention and treatment of common metabolic disorders and diseases; economics of husbandry systems; animal health and wellbeing

3 Be able to carry out routine husbandry and animal health duties on common farm livestock

Duties: feeding, cleaning, moving and monitoring animals; counting, record keeping, interpretation of records

Animal health and welfare: maintain the health and welfare of livestock during production; physical condition and behaviour of healthy livestock; signs which indicate potential problems

Tasks: routine stock tasks for farm livestock eg handling, haltering, disbudding, castration, dosing, temperature taking, feet trimming, ear marking, weighing, selection for slaughter

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:**
P1 describe the production cycles for common livestock enterprises	**M1** describe the female production cycle of two production farm animals	**D1** identify the factors involved in maximising overall productivity of the breeding herd or flock.
P2 state the products of commonly farmed livestock		
P3 describe the breeding and reproduction of common farm livestock [IE]	**M2** describe three diseases or ailments of an identified breeding animal.	
P4 describe the husbandry and management of common farm livestock		
P5 carry out routine husbandry duties on common farm livestock [TW]		
P6 carry out health checks on common farm livestock [EP]		
P7 carry out routine treatments to maintain health and well being of common farm livestock. [SM]		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

Key	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 have opportunities to use as wide a range of techniques as possible. Lectures, discussions, presentations, farm visits, routine farm duties, farm practicals, research using the internet and/or library resources and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

Work placement supervisors should be made aware of the requirements of the unit so that any naturally occurring evidence can be collected.

Whichever delivery methods are used animal health and welfare must be stressed throughout. Health and safety issues must also be stressed and reinforced regularly. Risk assessments must be undertaken before any practical activities and adequate personal protective equipment (PPE) must be provided and used. Group sizes for farm practicals should allow learners to practise demonstrating and consolidating their skills. Opportunities to carry out farm duties are essential so learners can experience commercial activities. This can also be practised through a period of work experience. Visiting expert speakers could add to the relevance of the subject for learners.

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
Know the common production systems used in livestock farming.
Assignment 1: Farm Livestock Systems (P1, P2, M1, D1) Assessment time.
Know the principles of livestock enterprise management.
Assignment 2: Farm Livestock Management (P3, P4, M2) Assessment time.
Be able to carry out routine husbandry and animal health duties on common farm livestock.
Carry out farm practicals.
Assignment 3: Farm Livestock Husbandry (P5, P6, P7) Unit review.

Assessment

For P1, learners will be expected to describe the production cycles for a range of common livestock enterprises as identified by the tutor.

For P2, learners will be expected to describe the products of a commonly farmed animal and a commonly farmed bird as agreed with the tutor. The size and complexity of the subjects being researched should be the same for all learners.

For P3, learners need to describe the breeding and reproduction of a range of common farm animals as identified by the tutor, including gestation length, method of service, care of the animal following mating, signs of parturition, care of the new offspring and weaning.

P4 requires learners to describe the husbandry and management of common farm animals throughout the annual production cycle, as identified by the tutor.

P5 requires learners to care for common farm livestock in a specified farming environment. Tasks will include providing food and water, moving and monitoring animals. Evidence will include observation records completed by the tutor and could be assessed directly by the tutor during farm practicals. If this is assessed during work experience witness statements should be provided by a suitable representative and verified by the tutor.

For P6, learners need to carry out health checks on a range of common farm animals as identified by the tutor. Evidence for this could take the same format as for P5.

P7 requires learners to carry out routine treatments on a range of farm animals, over a period of time, to maintain their health and wellbeing. This could be assessed through a practical test towards the end of the unit.

For M1, learners will be expected to describe the female production cycle of two production farm animals as identified by the tutor, for example a dairy cow and a breeding sow. Learners will describe the typical annual cycle of events for a mature animal.

M2 requires learners to describe three diseases or ailments of an identified breeding animal. This will include symptoms, cause and contributory factors, remedial action required, and preventative measures.

For D1, learners will identify the factors involved in maximising overall productivity of a breeding herd or flock. This will include selection of breeding animals, heat detection, condition scoring, barrenness, feeding, disease prevention, mortality, growth rates and marketing.

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	Farm Livestock Systems	Describe a range of common livestock production cycles in the UK. State the products derived from each. Describe the female production cycle of two production farm animals and factors involved in maximising their productivity.	Written evidence/blog.
P3, P4, M2	Farm Livestock Management	Outline a plan for a range of common farm livestock species. Describe their breeding, reproduction and husbandry needs. Describe at least three diseases/disorders for one chosen breeding animal.	Written evidence/blog.
P5, P6, P7	Farm Livestock Husbandry	Carry out routine livestock duties, health checks and routine treatments to maintain animal health and wellbeing. Produce a diary.	Practical observation. Written evidence/diary/blog.

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 LP7.1 Prepare feed and water supplies for livestock Element LP7.2 Monitor and maintain the supply of feed and water to livestock	Undertake Agricultural Livestock Production
Undertake Work Related Experience in the Land-based Industries	Understanding Livestock Breeding and Nutrition
Introduction to Animal and Plant Husbandry	Understand and Promote Animal Health

Essential resources

It is essential that learners have access to common farm animals so that they can learn and practise stock skills and undertake farm duties. Sufficient numbers of animals need to be available so that learners can practise stock tasks until they reach a working level of confidence. Learners will need to observe different methods of production for different species. Appropriate timetabling and organisation of practical sessions will be essential as most stock tasks are seasonal in nature.

Learners will need access to the equipment/consumables required including handling systems, multiple sets of stock task equipment, syringes, needles, drenching guns, shears, foot trimming shears, spray markers, ear tags and tagging equipment, stomach tubes, elastrators, rubber rings, weigh, and a first aid kit.

Tutors delivering this unit should be competent and experienced in livestock husbandry. Ideally, they should have relevant, recent industrial experience and have regular contact with the industry and technical updating.

Employer engagement and vocational contexts

This is a practical unit and will enable learners to develop a wide range of practical skills. It would be useful to enhance this experience with visits to local farms and the use of guest speakers.

Indicative reading for learners

Textbooks

Allen D – *Planned Beef Production and Marketing, 3rd Edition* (Blackwell Science, 1990) ISBN 063202611 1

Boatfield G – *Farm Livestock* (Farming Press, 1994) ISBN 0852362749

Buckett M – *Introduction to Livestock Husbandry* (Pergamon, 1977) ISBN 008021180 1

Croston D and Pollott G – *Planned Sheep Production, 2nd Edition* (Blackwell Science 1993) ISBN 0632035765

Soffe R and McConnell P – *The Agricultural Notebook, 2nd Edition* (Blackwell Science, 2003) ISBN 0632058293

Journals

Beef Farmer

Dairy Farmer

Farmers Weekly

Farmers Guardian

Pig World

Poultry World

Sheep Farmer

Websites

www.bpex.org.uk	BPEX represents pig levy payers in England
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.eblex.org.uk	English Beef and Lamb Executive
www.npa-uk.org.uk	National Pig 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 …
Independent enquirers	exploring livestock reproduction
Team workers	working with others when carrying out routine husbandry duties on common farm livestock
Self-managers	organising own time when carrying out routine treatments to farm livestock
Effective participators	reporting on health checks to relevant colleagues.

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 …
Creative thinkers	asking questions about production cycles to extend their thinking
Reflective learners	reviewing livestock husbandry progress and acting on the outcomes.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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	using farm software
Follow and understand the need for safety and security practices	
Troubleshoot	
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	using the internet to research information to complete their assessments
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	using farm software
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	producing written assessments using ICT programmes
Bring together information to suit content and purpose	producing written assessments
Present information in ways that are fit for purpose and audience	producing reports
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 …
Mathematics	
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	completing farm records
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	producing results from recording farm data
Draw conclusions and provide mathematical justifications	
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	participating in class discussions and presentations
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	reading material to complete their written assessments
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	writing documents to complete their written assessments.

Unit 5: 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, linch 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 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:**
P1 select appropriate equipment for land-based tasks	**M1** explain appropriate legal and environmental considerations when using a given machine	**D1** justify the selection of machinery for a specified task
P2 explain why manufacturers' instructions should be followed when working with land-based equipment and machines [IE]		
P3 explain the legal and environmental requirements associated with specific machines		
P4 identify the controls/devices/ instruments and other health and safety requirements for machinery and equipment		
P5 carry out adjustments on land-based equipment and machines to meet specific requirements prior to use	**M2** present maintenance requirements for a specified machine	
P6 explain the benefits of correct adjustment of equipment and machines		
P7 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:**
P8 operate equipment and machines safely and efficiently for different land-based activities	**M3** monitor the use of machinery and equipment for a specified task	**D2** evaluate the use of machinery and equipment for a specified task.
P9 carry out activities to achieve the desired results when operating land-based equipment and machines		
P10 identify routine maintenance for land-based equipment and machines using manufacturers' instructions [EP]	**M4** produce a cost breakdown for replacing worn parts for a specified machine.	
P11 identify hazards and comply with risk assessments during maintenance activities [SM]		
P12 carry out different routine maintenance activities safely on a range of equipment and machines [TW]		
P13 record maintenance activities in an appropriate format.		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

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.
Assignment 1 – Machinery Selection (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.
Assignment 2 – Safe Machinery and Equipment Preparation (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.
Assignment 3 – Safe Machinery and Equipment Operation (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.
Assignment 4 – Safe Machinery Maintenance (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, strimmers 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 chose 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 D1, 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
P1, 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.
P10, P11, P12, P13, 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
Undertake Specialist Land-based Machinery Operations	
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 International

Websites

www.defra.gov.uk	Department for Environment Farming and Rural Affairs
www.environment-agency.org.uk	Environment Agency
www.fwi.co.uk	Farmers Weekly
www.hse.gov.uk	Health and Safety Executive
www.rbi.co.uk.lantra.co.uk	Lantra Sector Skills Council
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 …
Independent enquirers	identifying questions to answer relating to the importance of manufacturers' instructions
Team workers	collaborating with others when carrying out routine maintenance activities
Self-managers	identifying hazards and complying with risk assessments showing flexibility when priorities change
Effective participators	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 …
Independent enquirers	monitoring use of machinery
Creative thinkers	carrying out their own research and monitoring
Reflective learners	carrying out their own research and monitoring
Team workers	involved in work experience, visits
Self-managers	involved in work experience, national proficiency tests
Effective participators	on work experience.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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	
ICT – Find and select information	
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	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	
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 …
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	calculating speeds, distances, areas covered for a variety of machinery calibrating specific machinery for quantities of fertiliser to be used in the field calculating amounts of manure spread over given areas
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	
English	
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 6: 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

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 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:**
P1 explain requirements needed to maintain the health and welfare of a specified farmed mammal or a specified farmed bird [IE]	**M1** explain how health and welfare are assessed using the 'five needs'	**D1** explain how good animal husbandry affects the performance of a given species of farmed animal
P2 assess the health and welfare of a specified farmed mammal or a specified farmed bird		
P3 follow a plan for providing food and water to a given species of farmed animal [SM]	**M2** explain the importance of following a feeding plan for a given species of farmed animal	
P4 safely carry out routine feeding and watering tasks for a given species of farmed animal [SM]		
P5 explain the annual production cycles of specified crops [RL]	**M3** explain how factors affect growth and yield of a specified crop	**D2** discuss the importance of good crop husbandry in maximising yield for a specified crop.
P6 state factors that may change the growth and yield of a specified crop [IE]		
P7 identify the nutrient requirements of a crop species at a give site	**M4** monitor the health of a crop species over a given timescale at a given site.	
P8 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 which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

Key			
	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 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

To achieve a pass learners need to meet all eight pass criteria.

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 and 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.

To achieve a merit learners need to meet all four merit criteria as well as fully meeting the pass criteria. It is not anticipated that learners will need to be set separate tasks to achieve all the criteria, but to demonstrate extended knowledge and understanding from the pass criteria.

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.

To achieve a distinction learners must meet the two distinction criteria as well as fully meeting the merit and pass criteria.

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 andWelfare	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.

Criteria covered	Assignment title	Scenario	Assessment method
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
Introduction to Farm Animal 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.

Unit 7: Introduction to Animal and Plant Biology

Unit code: R/600/9783

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 animal and plant biology. 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

Biology is the science of life and living organisms. It shows us how an animal can breathe or why a plant needs light. When working with animals and/or plants we need to know how to help them to grow and live: the study of cells, systems and structures provides the key to many different aspects of animal and plant care and use such as growth, maintenance of health and reproduction.

The concepts of animal and plant biology introduced in this unit are designed to give a solid knowledge base upon which the learner can build in a variety of ways.

Learning outcomes

On completion of this unit a learner should:

1 Know the classification of organisms and the structure of the cell

2 Understand the requirements for nutrition and growth of animals and plants

3 Know the main systems and structures in animals and plants

4 Understand the processes of reproduction and heredity in animals and plants.

Unit content

1 Know the classification of organisms and the structure of the cell

Classification of organisms: characteristics of living organisms; binomial nomenclature; identification keys

Cell biology: comparative structure and function of plant and animal cells (cell wall, cell membrane, cytoplasm, vacuole(s), chloroplasts, nucleus, mitochondria, ribosomes); basic cell specialisation (eg sperm, red blood cell, guard cells, pollen); cells, tissues, organs, systems

2 Understand the requirements for nutrition of animals and plants

Nutritional requirements: aerobic and anaerobic respiration, growth, repair; gestation, lactation in mammals

Nutritional components and sources: water, minerals, process of photosynthesis and limiting factors (plants); water, fibre, carbohydrates, lipids, proteins, vitamins, minerals (animals)

Symptoms of nutritional deficiencies: nitrogen, phosphorous and magnesium deficiencies (plants); copper, vitamin D, calcium, magnesium (animals)

3 Know the main systems and structures in animals and plants

Plants: shoot system: leaf structure, buds, stems and flowers and fruits; auxins and phototropism; root system: roots, tubers and rhizomes; vascular system: xylem and phloem

Animals: Circulatory system: heart, blood vessels and blood components; respiratory system: trachea, bronchi and lungs; digestive system: oesophagus, stomach, small intestine, large intestine, rectum, anus; excretory system: kidneys, ureters, bladder and urethra; nervous system: CNS and PNS; endocrine system: ovaries/testes, adrenal, pancreas, thyroid, pituitary, hypothalamus; skeletal system

Transport of substances: diffusion, osmosis

4 Understand the main processes of reproduction and heredity in animals and plants

Reproduction in animals: structure and function of male and female reproductive systems (mammalian); sexual and asexual reproduction; oviparous and viviparous reproduction; life cycles

Reproduction in plants: asexual: stolons, rhizomes, bulbs, corms, tubers; leaves and roots; sexual – flowering and non-flowering plants

Heredity: functions of chromosomes, genes and alleles; mitosis and meiosis; genetic diagrams, monohybrid inheritance of characteristics (heterozygous and homozygous crosses to F2 generation, examples of complete dominance only)

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:**
P1 identify the components of a plant cell or an animal cell [IE]	**M1** devise a key to identify similar organisms	**D1** describe the structure and functions of specialised animal and plant cells
P2 describe the functions of the main organelles [IE]		**D2** explain the process of cellular respiration
P3 identify a specified organism using an identification key		
P4 identify the requirements for nutrition and growth in animals and plants [IE]	**M2** describe the nutritional requirements for optimum growth of selected species	
P5 describe the sources of nutrition for animals and plants [IE]		
P6 identify the main biological systems in animals and plants	**M3** describe the processes of diffusion and osmosis in animals and plants	**D3** compare the circulatory systems of animals and plants
P7 describe how a specified system functions in animals and plants		
P8 describe the life cycles of animals and plants [IE]	**M4** describe the advantages and disadvantages of asexual and sexual reproduction in plants and animals	**D4** outline how knowledge of methods of reproduction can be applied for commercial purposes.
P9 state how characteristics are inherited. [IE]		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

Delivery

There are many opportunities for delivering this unit and as wide a range as possible should be utilised in order to motivate and engage the learner. Lectures, laboratory practical sessions, discussions, seminar presentations, library research and use of the internet should all play a part in stimulating enthusiasm for learners.

The unit links to many other specialist units and tutors could integrate the delivery and private study relating to this within the teaching of relevant units in the learner's programme of study.

Learning outcome 1 introduces the learner to classification of living things and the components of the eukaryotic cell. The learner should be presented with many opportunities to use keys, identifying photographs or drawings of species as well as living specimens – this could be incorporated into activities or field trips. Understanding how cells work together is of fundamental importance in biology – examining slides under the microscope, independent learner research into cell types and functions, viewing animations of cells and labelling drawings of blank cells are some of the many ways this outcome can be delivered.

Learning outcome 2 covers nutrition and growth for animals and/or plants. It is likely to be delivered through formal lectures, practical sessions and seminars.

For animals, learners could review their own diets, identifying why we need to eat and how different nutritional components function. They could then apply these concepts to two specified animal species. Learners could monitor an animal species from birth to two or three months old, or during gestation, and collect data on growth (for example size, weight). Small groups of learners could be provided with samples of feedstuffs in order to identify nutritional components in each.

For plants, the same concept of balanced nutritional intake could be demonstrated. Lectures and practical sessions involving plant trials could be used to introduce the concepts of plant nutritional components and the effects of a lack of any of these. A field trip to two contrasting habitats could demonstrate the influence of nutrition on plant species (one habitat should be an extreme environment for example moorland or salt marsh). Learners could analyse different soil types using soil testing kits.

Learning outcome 3 requires learners to know the main biological systems in animals and plants. Dissection work could be undertaken in order for the learner to appreciate the complex relationships between organ systems, though the use of high quality audio-visual resources may be equally valid.

Learning outcome 4 covers reproduction and heredity in animals and plants. Lectures backed up by learner research into different life cycles could provide an appropriate start. Lectures on sexual and asexual reproduction could be enhanced by the use of good quality visual/audiovisual materials to show sexual and asexual reproduction. Plant propagation methods (cuttings or growing runners) could be used to demonstrate asexual reproduction in plants. Specimen samples (for example seeds, flowers, tillers) could be used, as well as a visit to a commercial business in which reproduction is managed (for example a plant propagation unit or a livestock unit).

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 to unit.
Assessment of prior learning.
Characteristics of living organisms (making up acronyms etc).
Classification, using familiar objects before living organisms.
Using keys for living things.
Common names, language barriers, binomial system.
Assignment 1: Classification Keys (P1, M1) Tutor introduces brief.
Field work incorporating keys – stream or pond life (evidence may be used for assignment if suitable).
Personal study.
Characteristics of cells (link back to living things).
Cell components and basic functions.
Cell specialisations, guided internet research to find micrographs, short stories on cell types.
Labelling pictures of cells, both ideal and specialised.
Assignment 2: Cell Structure (P2, P3, D1, D2) Tutor introduces brief.
Personal study.
Individual support.
Section review.
Plant systems and structures (celery in food dye demonstration; plant dissections, labelling of blank diagrams).
Plant structure and function, with bonus bingo game.
Assignment 3: Biological Systems and Structures (P6, P7) Tutor introduces brief.
Transport of substances – diffusion (potassium permanganate crystals in water; air freshener sprayed at one end of room and time for scent to reach other end noted), osmosis (carrot or potato discs in various concentrations of sugar solutions, weighed before and after to note change; visking tubing separating strong sugar solution and pure water, test for starch at beginning and end of session to note change).
Lab practical analysis write-up.
Assignment 4: Transport of Substances in Animals and Plants (M3) Tutor introduces brief.
Personal study.
Animal systems – circulatory, respiratory, digestive and excretory (labelling, functions).
Animal systems – nervous and endocrine (reflex tests; senses).
Animal and plant systems – notes and practice.
Assignment 5: Circulatory Systems (D3) Tutor introduces brief.

Topic and suggested assignments/activities and/assessment
Personal study.
Individual support.
Introduction to nutrition – human based at first, expand to animals.
Assignment 6: Animal and Plant Nutrition (P4, P5, M2) Tutor introduces brief.
Examining food labels – learners to obtain – research on what common feedstuffs contain (animals).
Functions of nutritional components.
Requirements of animals – maintenance, gestation and lactation.
Lab practical (use common (basic) food tests for starch, fat and protein to feedstuffs known to contain high levels of each: learners to match up the component to the correct feedstuff).
Requirements of plants – nutritional components, examining fertiliser labels.
Photosynthesis and limiting factors.
Personal study.
Lab practical set-up (investigate factors that limit photosynthesis – light, carbon dioxide).
Nutritional deficiencies in plants (symptoms to be described and specimens to be examined).
Nutritional deficiencies in animals (symptoms to be described and photographic/video evidence to be examined).
Lab practical analysis of results.
Personal study.
Assignment 7: Animal and Plant Reproduction (P8, P9, M4, D4) Tutor introduces brief.
Reproduction – life cycles in animals and plants; oviparous and viviparous reproduction in animals; links to industry.
Asexual reproduction in animals and plants, role of chromosomes, mitosis.
Sexual reproduction in plants – flowering and non-flowering plants (link back to classification; virtual/actual flower dissections). Labelling of blank diagrams.
Sexual reproduction in animals; structure of male and female reproductive systems in mammals.
Blank diagrams of plant and animal structures to complete, first with notes and then without.
Meiosis (link back to specialised cells and role of chromosomes; use modelling clay/basic animations to illustrate; compare and contrast with mitosis).
Monohybrid inheritance of characteristics – genetic diagrams; links to industry.
Completing genetic diagram problems.
Section review.
Personal study.
Individual support.
Unit review.

Assessment

P1 is closely associated with P2 and may be assessed at the same time. Suitable evidence could be in the form of an annotated poster or diagrams of ideal animal and plant cells identifying cellular components and describing each of the structures labelled.

P3 requires the learner to identify an organism using a key. This may be one that has been provided by the tutor and should be of sufficient complexity that the learner is not able to simply guess. Field work could be used to gain evidence and observation record sheets completed by both the learner and the tutor would be suitable evidence.

P4 must link the nutritional requirements to at least one plant and one animal with a basic reference to the role of each in the selected species. If assessment is at the same time as P5, this may be a more logical approach. Evidence for P4 may be an illustrated essay, a presentation with notes or leaflet advising owners of selected species.

P5 requires the learner to describe the sources of nutrition for selected species. One animal and one plant species should be selected either by the tutor or through discussion with learners. The sources of nutrition must be related to the nutritional components required by the species. P5 could be assessed in the form of a poster, leaflet or article for a hypothetical magazine. P5 may also be assessed alongside P4 in the form of a project.

For P6, one animal species and one plant species should be used. The main organs and organ systems in the animal must be identified; the main structures and systems should be identified in the plant. Evidence for this may take the form of an annotated poster or series of diagrams or pictorial presentation.

For P7 the learner must describe how a specified system functions in animals and plants. This could be linked to assessment for P6.

P8 and P9 require learners to provide information on life cycles and inheritance. The role of genes and alleles must be included Suitable evidence for this could be an annotated poster or essay including a genetic diagram.

To achieve a merit grade, learners must fulfil all of the pass grade criteria and the four merit grade criteria.

M1 requires the learner to devise a key to identify similar organisms. These may be plants or animals, with the number of decision-making branches to be more than 2 and less than 10. The final, functioning, key should be sufficient evidence.

For M2, the learner must produce an account of the nutritional requirements for optimum growth in selected species. One animal and one plant species must be selected, either by the tutor or through discussion with learners. Optimum growth in animals may be taken as either juvenile growth to adulthood or the nutrition of the dam during gestation. M3 could be assessed alongside P8. Suitable evidence for M3 would include an illustrated essay, annotated feed/fertiliser plan or presentation with notes.

For M3 a full description of the processes of diffusion and osmosis must be given by the learner. At least one context must be given for each process in one animal and one plant Evidence for M2 may be in the form of an illustrated essay, annotated poster or hypothetical magazine article.

M4 requires the learner to describe the advantages and disadvantages of asexual and sexual reproduction in plants and animals. At least one advantage and one disadvantage of each type of reproduction must be given per species. Only one animal and one plant species is required. M4 could be assessed alongside P10, P11 and D4 as part of an illustrated essay. Other suitable evidence would include presentations, annotated posters or leaflets.

For a distinction grade learners must achieve all of the pass and merit grade criteria and the four distinction grade criteria.

D1 can be achieved through describing the structure and function of specialised animal and plant cells. Two specialised cells from animals and a further two from plants must be given as examples: structure should be clearly linked to function. Evidence for D1 may take the form of a pictorial presentation, illustrated essay or annotated poster. D1 may also be assessed alongside P2 and P3.

D2 must include both word and chemical equations for aerobic and anaerobic respiration. Examples should be drawn from both the plant and animal kingdoms to illustrate the requirements and conditions for each type of respiration to take place, but the overall criterion does not require a particular species to be discussed. D3 may be assessed as an extension to P8.

D3 requires the learner to compare the circulatory systems of animals and plants. Diagrams should be used to illustrate the similarities and differences of each transport system. One (vascular) plant species and one mammalian animal species must be used as examples, which may be selected by the tutor or through discussion with learners. Suitable evidence would include an annotated poster, illustrated essay or pictorial presentation with notes. This criterion may be assessed alongside or as an extension to P4.

D4 requires the learner to outline how knowledge of methods of reproduction can be applied for commercial purposes. One example from commercial plant propagation (such as at a nursery, seed company or horticultural laboratory) and one example from commercial animal production (such as animal breeders or dairy farmers) must be described. Suitable evidence would be an illustrated essay, article for a hypothetical magazine, or a presentation with notes.

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, M1	Classification Keys	Identify the four specimens provided using a key. Ensure you check carefully: all four will need to be correct in order to pass the task! Your tutor will provide you with 10 specimens of animals and/or plants. Study them carefully and refer to your notes: now create a classification key that someone else may use to identify each specimen down to its correct species.	Written/practical element
P2, P3, D1, D2	Cell Structure	Produce an annotated poster to inform others about the structure of animal and plant cells. You should include Describe the adaptations of specialised cells, linking their structures to their functions (at least two animal cells and two plant cells must be covered).	Written
P6, P7	Biological Systems and Structures	Produce a poster showing the main organs/structures in animals and plants. You should draw an outline of your selected species and label the organs and structures of each. Include on the poster a description of the biological system each labelled structure belongs to.	Written
M3	Transport of Substances in Animals and Plants	Write an illustrated essay describing the processes of diffusion and osmosis in animals and plants. Make sure you include why these processes are important for both animals and plants, using examples.	Written
D3	Circulatory Systems	Prepare a presentation comparing the circulatory systems in animals and plants. You should include photographs and/or diagrams to show the circulatory systems, including a description of the vessels used and the methods by which substances are circulated.	Written/presented

Criteria covered	Assignment title	Scenario	Assessment method
P4, P5, M2	Animal and Plant Nutrition	Put together a set of revision notes for other people in your class to use. You should cover the following sections: • Where your selected animal gets i) carbohydrates ii) protein • Why animals and plants require nutrients • How you would identify plants that were not gaining enough i) nitrogen ii) phosphorous iii) magnesium • How you would know if an animal was not gaining enough i) copper ii) calcium iii) magnesium.	Written
P8, P9, M4, D4	Animal and Plant Reproduction	Write an illustrated essay describing how reproduction takes place in animals and plants. You need to cover stages in asexual and sexual reproduction for your selected species, with diagrams to show the organs involved. You must also include a genetic diagram to show how a characteristic can be inherited from parents to the F2 generation. This should be introduced clearly and definitions of all technical terms used must be given. Describe the advantages and disadvantages of both asexual and sexual reproduction for each species you have described. Include a section describing the advantages that knowledge of methods of reproduction bring to commercial plant producers and breeders of animals. This does not have to be limited to the species you have already described.	Written

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 links with all BTEC First land-based units involved with the understanding and management of living organisms.

Essential resources

Identification keys relevant to the species being studied; sufficient laboratory and library resources; access to multimedia computers and the internet.

Employer engagement and vocational contexts

Any plant- or animal-based laboratory, veterinary surgery or horticultural nursery work setting will be of benefit.

Indicative reading for learners

Textbooks

Dallas S E – *Animal Biology and Care, 2nd Edition* (Blackwell Publishing Ltd., 2006) ISBN 978 1405137959

Dodds J – *Biology at a Glance* (Manson Publishing Ltd, 2006) ISBN 978 1840760866

Parsons R – *GCSE Biology Revision Guide* (Coordination Group Publications Ltd., 2007) ISBN 978 1841466385

Roberts M B V – *Biology for Life for GCSE* (Nelson Thornes Ltd, 2000) ISBN 978 0174480969

Websites

www.bbc.co.uk/schools/gcsebitesize	BBC GCSE Bitesize
www.biologyreference.com/	Biology Reference
www.biotopics.co.uk/plants/psfac2.html	BioTopics (photosynthesis experiment protocols)
www.naturegrid.org.uk/children.html	Canterbury Environmental Education Centre (useful for field work)
www.defra.gov.uk	DEFRA
www.societyofbiology.org/education/educational-resources	Institute of Biology (educational resources)
www.kew.org/learn/resources.html	Kew Gardens educational resources
www.saburchill.com/chapters/chap0031.html	The Open Door Website
www.s-cool.co.uk/gcse/biology.html	S-Cool GCSE revision website
plant-hormones.info	Plant-Hormones

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 …
Independent enquirers	using a key to identify organisms describing the main functions of cell organelles describing the main organs in animals describing the main structures in plants identifying sources of nutrition for selected species.

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 …
Independent enquirers	carrying out research into commercial applications of reproductive methods in animals and plants analysing results of laboratory practical investigations
Reflective learners	comparing animal and plant cells contrasting different methods of reproduction in animals and plants
Team workers	working in groups to carry out laboratory practical investigations
Self-managers	working independently in laboratory practical sessions organising time and resources to give presentations.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	word processing notes to accompany electronic presentations
Manage information storage to enable efficient retrieval	saving information from internet sources to include in tasks or assignments
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	finding information about different keys in or
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	using the internet to research relevant sources of nutrition for selected species
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	producing written assignments
Bring together information to suit content and purpose	producing written assignments
Present information in ways that are fit for purpose and audience	producing written assignments, presentations and articles for hypothetical magazines
Mathematics	
Identify the situation or problem and the mathematical methods needed to tackle it	producing genetic diagrams
Select and apply a range of skills to find solutions	analysing genetic diagrams
Use appropriate checking procedures and evaluate their effectiveness at each stage	analysing genetic diagrams
Draw conclusions and provide mathematical justifications	analysing genetic diagrams

Skill	When learners are …
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	presenting information about structure, nutrition or reproduction in selected species
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	carrying out research for written assignments/oral presentations
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	producing written assignments.

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

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

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

Journals

Arable Farming

Crops

Dairy Farmer

Farmers Guardian

Farmers Weekly

Pig Farmer

Poultry World

Websites

www.defra.gov.uk

www.fawc.org.uk

www.hse.gov.uk

www.iah.ac.uk

www.nfu.org.uk

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 …
Independent enquirers	researching what is needed to maintain health and welfare researching factors that affect crop growth and yield researching crop pests, weeds and diseases
Reflective learners	explaining the annual production cycles of specified crops
Self-managers	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 …
Independent enquirers	researching plant nutrients required by crops
Creative thinkers	discussing the importance of the five freedoms in assessing animal health and welfare
Reflective learners	receiving feedback and developing their practical husbandry skills
Team workers	taking part in practical animal health tasks
Self-managers	taking part in practical animal husbandry tasks.

Functional skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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	
ICT – Find and select information	
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	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • imagesv • numbers • records	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 …
Mathematics	
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	
English	
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 8: 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:**
P1 select appropriate tools and equipment for specific estate maintenance tasks [SM]	**M1** explain the importance of correct tool selection, transport, usage and maintenance	**D1** discuss the purpose of practical work completed, suggesting further maintenance work required
P2 lift tools and equipment safely using appropriate techniques [TW, SM]		
P3 transport and use tools and equipment safely [TW, SM]		
P4 maintain and store tools and equipment according to instructions [TW, SM]		
P5 assess the condition of boundaries to determine maintenance requirements [CT]	**M2** plan and carry out the maintenance and repair tasks to agreed timescales and specification	
P6 carry out routine maintenance of boundaries safely [TW, SM]		
P7 carry out routine repairs of boundaries safely [TW, SM]		
P8 dispose of waste materials in line with instructions [TW]		
P9 assess the condition of surfaces or habitats to determine the maintenance requirement [CT]	**M3** plan and carry out the maintenance or repair tasks to agreed timescales and specification	
P10 carry out appropriate maintenance or repairs of surfaces or habitats [TW, 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:**
P11 state the current environmental and health and safety legislation and codes of practice [RL]	**M4** explain the importance of planning estate maintenance work.	**D2** discuss how to plan and carry out specified estate maintenance tasks to overcome problems and demonstrate responsible working practices.
P12 describe how to overcome problems presented by services [IE, EP]		
P13 describe how environmental damage can be minimised [IE, TW, EP]		
P14 describe how organic and inorganic waste may be disposed of. [IE, TW, EP]		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

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.
Assignment 1: Being Safe and Considering the Environment (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
Assignment 2: Tools and Equipment (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.
Assignment 3: Boundary Maintenance (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
Assignment 4: Surface or Habitat Maintenance (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

Learners will need to meet all pass criteria to successfully complete this unit.

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.

In addition to the pass criteria above learners wishing to gain a merit grade will have to meet all merit criteria.

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.

In addition to the merit criteria above learners wishing to gain a distinction grade will have to meet all distinction criteria.

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.

Criteria covered	Assignment title	Scenario	Assessment method
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 Element CU19.2 Construct and maintain paths	Undertake Estate Skills
Undertake Work Experience in the Land-based Industries	
Maintain Animal Accommodation	
Conservation and Improvement of British Habitats	
Understand the Principles and Practices of Animal Establishments	
Introduction to Caring for Horses	

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

Key R – *Garden Surfaces: 20 Projects for Paths, Decks, Steps Patios and Edgings* (Laurel Glen Publishing, 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	British Trust for Conservation Volunteers
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.fwag.org.uk	Farm Wildlife and Advisory Group
www.hse.gov.uk	Health and Safety Executive
www.lantra.co.uk	Lantra Sector Skills Council
www.naturalengland.org.uk	Natural England
www.rhs.org.uk	Royal Horticultural Society

Other Publications

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

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 …
Independent enquirers	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
Creative thinkers	Assessing the condition of boundaries, surfaces or habitats to determine maintenance requirement
Reflective learners	reviewing the purposes of different types of boundaries presenting current environmental and health and safety legislation and codes of practice
Team workers	taking responsibility for the environment carrying out maintenance tasks safely
Self-managers	selecting appropriate tools/equipment for specific estate maintenance tasks Lifting, transporting, maintaining and storing tools and equipment safely using appropriate techniques
Effective participators	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 …
Independent enquirers	investigating key points of the current environmental and health and safety legislation and codes of practice
Creative thinkers	applying techniques to maintenance tasks
Reflective learners	evaluating own performance action planning and target setting for future activities
Team workers	peer help and support during tasks
Self-managers	risk assessment completion
Effective participators	investigating problems that occur when lifting incorrectly.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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	
ICT – Find and select information	
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	
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	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	
Mathematics	
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	

Skill	When learners are …
ICT – Use ICT systems	
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
ICT – Find and select information	
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 9: 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

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, characteritiscs, 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

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:**
P1 identify major British habitat types	**M1** discuss the origins and development of a given habitat type	**D1** explain human influences on the wildlife for a given habitat
P2 describe major British habitat types		
P3 outline characteristics of a given habitat		
P4 describe biotic and abiotic factors that affect a given species of wildlife within a specified habitat	**M2** discuss the population factors that affect a given species of wildlife in a specified habitat	
P5 outline relationships between species within a specified habitat		
P6 select and use survey techniques in accordance with survey specification	**M3** interpret and summarise data collected	**D2** recommend improvements to a specified habitat based on survey information.
P7 conduct a survey of a specified local habitat, recording flora and fauna [IE, TW, SM]		
P8 present data collected [IE]		
P9 select and use appropriate equipment [SM]	**M4** explain the need to improve wildlife habitats.	
P10 carry out habitat improvements safely according to site management plans [TW]		
P11 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 which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

Key	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.
Assignment 1: The Large Blue Butterfly (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.
Learner research and assessment completion.

Topic and suggested assignments/activities and/assessment
Assignment 2: Habitat Survey (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.
Assignment 3: Habitat Management (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 (Maculinea arion) 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.

Criteria covered	Assignment title	Scenario	Assessment method
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 C J – *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 M J – *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 R L and Smith T M – *Ecology and Field Biology* (Benjamin Cummings, 2001) ISBN 0321042905

Townsend C R, Begin M and Harper J L – *Essentials of Ecology* (Blackwell, 2008) ISBN 9781405156585

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

Journal

British Wildlife

Websites

www.defra.gov.uk	Department for Environment, Food & Rural Affairs
www.environment-agency.gov.uk	Environment Agency
www.forestry.gov.uk	Forestry Commission
www.fwag.org.uk	Farming and Wildlife Advisory Group
www.jncc.gov.uk	Joint Nature Conservation Committee
www.lantra.org.uk	Lantra
www.leafuk.com	Linking Environment and Farming
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 …
Independent enquirers	carrying out a survey of a local habitat
Team workers	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
Self-managers	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 …
Creative thinkers	developing solutions to situations encountered during a practical habitat management task
Reflective learners	justifying the benefits of carrying out practical habitat management tasks
Effective participators	carrying out a survey of a local habitat.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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
ICT – Find and select information	
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
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	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
Mathematics	
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
English	
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 10: Introduction to the Principles of Land-based Machinery

Unit code: K/600/9594

Level 2: BTEC First

Credit value: 5

Guided learning hours: 30

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.

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 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:**
P1 describe the uses of combustion engines on a range of machines within a land-based industry [IE]	**M1** state the functions of component parts of a combustion engine	**D1** explain the purpose of land-based machine transmission systems for given situations.
P2 describe the working cycles of 2 stroke and 4 stroke engines [IE]	**M2** describe external differences between 2 stroke and 4 stoke petrol engines	
P3 state the functions of component parts of a combustion engine [EP]		
P4 describe methods of transmitting drive from engines to the working parts of machines		
P5 describe common hazards associated with machine use and maintenance [EP]	**M3** Describe PPE required for maintenance activities **M4** carry out maintenance activities safely, effectively and without damage to the environment with the aid of manufacturers' handbooks.	
P6 state the purpose of common workshop tools		
P7 carry out risk assessment for machine maintenance activities [SM, TW]		
P8 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 which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

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 the 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.

Criteria covered	Assignment title	Scenario	Assessment method
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 1903366682

Cairns B – *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	British Agricultural and Garden Machinery Association
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 …
Independent enquirers	describing the working applications and principles of engines describing the 2 and 4 stroke engine cycles stating the purpose of workshop tools
Self-managers	producing risk assessments
Effective participators	describing common hazards
Team workers	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 …
Independent enquirers	producing job cards and service documentation analysing manufacturers' service information planning servicing tasks
Creative thinkers	trying out different approaches to practical tasks
Reflective learners	completing service documentation which needs to be available for future reference
Team workers	taking part in discussions with tutor/service manager when selecting equipment for service
Self-managers	organising time schedules when completing service tasks.

Functional Skills – Level 2

Skill	When learners are …
Mathematics	
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
ICT – Find and select information	
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
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	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	
Mathematics	
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

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	
English	
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 11: Introduction to Grass and Forage Crop Production

Unit code: D/600/9107

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 grass and forage crop production 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 develop practical skills as well as knowledge and understanding of how grass and forage crops are grown on arable farms in the UK. They will have practical involvement in key stages of production and monitor the management of utilising grass and forage crops.

Unit introduction

The agricultural industry needs a well-trained, skilled workforce, conversant with the modern technology that is found increasingly on many farms in the UK.

This unit focuses, in particular, on learners participating in managing grass and forage crop operations, the aim being for them to experience modern farm arable practice. Learners will monitor grass and forage crops at all stages of production, both in class-taught time and on their own. They will experience crop walks, use modern machinery in the field, be involved in harvesting operations and understand how grass and forage crops are grown and utilised by livestock.

Throughout the unit learners will need to work effectively as part of a team.

There is a strong emphasis on the health and safety of learners throughout the unit.

Learning outcomes

On completion of this unit learners should:

1 Know the common grass and forage crops and the factors that affect their growth

2 Know how to establish and maintain the production of grass and forage crops

3 Know how to operate livestock grazing systems

4 Be able to utilise grass and forage crops.

Unit content

1 Know the common grass and forage crops and the factors that affect their growth

Identify grass and forage crops: identify grass seed and plant species (eg perennial ryegrass, Italian ryegrass, timothy, cocksfoot); identify forage seed and plant species according to locality (eg clover, lucerne, forage maize, brassicas, roots); types of grassland (eg permanent, temporary, hill, lowland)

Factors affecting growth: drainage, soil type (eg clay, sand, loam); water; topography; weather; season; soil pH; type of grass (eg early, medium, late maturity); use of nutrients

2 Know how to establish and maintain the production of grass and forage crops

Establish grass and forage crops: rotation and previous crop; seedbed preparation; methods of establishment (eg undersowing, drilling, re-seeding, slot-seeding)

Maintain grass and forage growth: grass growth curve; nutrients (eg nitrogen, phosphate, potash, organic manures, lime); environmental issues (eg Nitrate Vulnerable Zones (NVZs)), manure management (eg manure spreaders, storage, effluent, biological oxygen demand (BOD)); weed competition (eg identify types); control methods (eg sprays, mechanical); pest control (eg moles, birds, deer, badgers); grazing pressure (eg cattle, sheep); sward deterioration (eg poaching, dung and urine, over- or under-grazing)

3 Know how to operate livestock grazing systems

Grass and forage grazing systems: types of grazing system (eg set stocking, paddocks, rotational, strip, zero); types of fencing (eg electric, post and wire, post and rail); livestock grazing and livestock biting habits; digestibility value of grass

Methods of grass and forage crop conservation: types of conservation system (eg silage, haylage, bales, hay); harvesting machinery (eg precision chop harvesters, double chop, self-propelled, mowers, tedders and rakes, trailers); wilting; effluent; additives; storage methods (eg clamp, barn, silo); fermentation; calculate amount of grass and forage to offer (eg stocking rate, moving fence, forward planning); place in rotation

4 Be able to utilise grass and forage crops

Operate a grazing system: type of fencing (eg electric, post and wire); length of season (eg timing of turnout, grass growth in locality, housing in autumn); preparation for grazing or conservation (eg harrowing, rolling, application of fertiliser); monitoring grass growth (eg grass height, swardstick, grass meter, boot); stocking rates and densities (eg spring, summer, adjust for type of animals)

High quality conserved grass or forage production: use of fertilisers and timing; D values; timing of mowing; wilting; harvesting; clamping; silage analysis (eg methods, interpret figures for livestock ration); yield (eg fresh yield, calculate amount in store)

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:**
P1 identify commonly grown grass and forage crops		
P2 describe the characteristics and use of commonly grown grass and forage crops		
P3 outline the factors affecting grass/forage crop growth and production	**M1** monitor forage crop growth over a given period	**D1** recommend improvements for a forage crop programme
P4 describe seedbed preparation and sowing of grass and forage crops		
P5 describe maintenance of grass and forage crop growth and production		
P6 identify grazing systems	**M2** monitor a grazing system and grass growth over a given period	**D2** recommend improvements for a grazing system
P7 compare the different methods of making high quality conserved grass and forage		
P8 contribute to the operation of a grazing system		
P9 contribute to the making of high quality conserved grass or forage. [IE, CT, RL, TW, SM, EP]	**M3** plan for the making of high quality grass or forage.	**D3** monitor the making of high quality grass or forage and recommend improvements.

Essential guidance for tutors

Delivery

Delivery of this unit will involve practical assessments, written assessments, visits to suitable locations and link to work experience placements.

This unit focuses on learners being involved in the operations associated with grass and forage crop production, in the form of field walks, monitoring crop growth, and assisting practically in crop operations. Tutors need to offer learners as wide a range of learning opportunities as possible. This will involve lectures, regular crop walks, (both in taught and learners' own time) farm practicals, work experience, guest speakers and visits.

For the unit to be effective, tutors will need to choose the timing of the assessments very carefully because of the importance of seasonality. In addition, tutors need to ensure that all relevant forage crops are included. This will include combinable crops that may be used as 'wholecrop', grass, brassicas such as forage rape, stubble turnips, kale, legumes, root crops such as fodder beet, swedes and forage maize. The choice of forage crops will depend on the locality.

Learners will need access to farm crop recording data and previous crop history.

Learning outcome 1 covers the identification of grasses and forage crops and will need to be delivered at the start of the programme, probably in the autumn. Tutors should ensure that the main grass species in the unit content are covered, as well as a wide variety of forage crops according to the locality. However, tutors should aim to include the forage crops commonly grown throughout the UK as well as those grown locally. Internet research may need to be carried out where common crops, such as maize, are not grown in the learners' locality.

Learning outcome 2, ideally, needs to be delivered to coincide with crop growth, which will probably be in both autumn and spring, especially for cereals, grasses and brassicas such as stubble turnips. Where forage crops such as maize are selected tutors should bear in mind that learners will not witness that season's harvesting, but may have observed the harvest for the previous autumn crop. Learners need to develop monitoring skills in relation to areas such as weed and pest damage. This can be carried out through regular field walks and visits to local farms. Emphasis should be on environmental aspects, such as Nitrate Vulnerable Zone regulations, especially those relating to the closed periods for fertiliser application. Learners need to understand the link between manure storage and grass management. In relation to grass monitoring, tutors need to guide learners as to exactly what they need to monitor. Crop walks will enable learners to see what to monitor, and how, and could link in with a farm manager's own monitoring. Tutors might need to produce a monitoring template for learners to use.

Learning outcome 3 will need to be delivered during the grazing season and will consist of lectures, farm practicals, visits and guest speakers. Where livestock are involved health and safety should be emphasised as well as any bio-security measures. Tutors should ensure learners are familiar with the different grazing and conservation systems, in their own locality as well as common ones not found locally. Maize should be included as it has become an important forage crop and is grown in most parts of the UK. Learners should be familiar with this before covering the last learning outcome, which involves using machinery, erecting and moving fences and assessing amounts of grass and forage needed for livestock. Delivery will probably be best during winter and spring.

Learning outcome 4 needs to be planned in accordance with the crop and the season, but in all probability will be delivered in the late spring and early summer. A crop such as grass silage or even cereals used for wholecrop would be suitable. Much of this learning outcome will be delivered through practical sessions and work experience, as well as classroom activities and visits. Health and safety are essential as well as learners using the appropriate PPE, especially where they are involved with machinery, fencing and livestock. Tutors

may find that fencing skills have been covered within another unit. Tutors should aim to integrate learning with either the centre's farm or a farm in the locality in the form of practical sessions and work experience. Tutors will need to plan carefully with a farm manager, who uses a contractor for forage harvesting, exactly what role learners can be given. Tutors should try to avoid learners being `spectators'.

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.
Assignment 1: Identify Grass and Forage Crops (P1, P2) Tutor introduces assignment.
Practical session: walks to observe grass and forage crops.
Theory session: grass and forage crop recognition in field, seed recognition
Assignment 2: Grass and Forage Crop Establishment and Growth (P3, P4, P5, M1, D1) Tutor introduces assignment.
Practical session: prepare seedbeds, observe grass and forage crop growth.
Theory session: grass and forage crops in a rotation, methods of crop establishment, seedbeds.
Theory session: grass growth curve, fertilisers for grass and forage crops, organic manures, NVZs and environmental issues, weed control, pests and diseases, sward deterioration.
Practical session: crop walks, monitor growth stages, identify manure management system.
Assignment 3: Grazing Systems (P6, P7, P8, M2, D2) Tutor introduces assignment.
Practical session: weekly crop walks to observe growth, identify crop conservation machinery.
Theory session: grazing systems, grass growth, D-value, grass height, livestock grazing habits.
Theory session: types of fencing, control methods, calculate amounts for livestock.
Assignment 4: Harvesting and Storing Crops (P9, M3, D3) Tutor introduces assignment.
Practical session: prepare for grazing, erect fencing, stocking rates.
Theory session: harvesting machinery, timing, recognise crop maturity, types of storage.
Practical session: prepare crop storage, assist with harvesting operations.
Unit review.

Assessment

Tutors will need to give out the assessment for P1 at the start of the programme. It should cover all the grass and forage crops including maize, root crops such as turnips and fodder beet, and a selection of other forage crops.

For P2, learners need to understand the link between the use of grass and forage crops in a farm rotation and their end use for livestock.

For P3, learners need to understand what affects grass and forage crop growth and production. They will need to explain soil types suitable for the respective crop, describe the importance of drainage, pH, and the role of organic and inorganic nutrients. Evidence for P1, P2 and P3 could take the form of a presentation using illustrations from the internet.

For P4, learners need to describe the sequence of operations needed to produce the required seedbed for the chosen grass and forage crops. Access to farm records may be needed where learners are using an already established forage crop on the farm such as stubble turnips. Alternatively, maize could be used as a forage crop.

For P5, learners need to describe how growth of the grass and forage crops is maintained and include nutrient applications, weed, pest and disease control, and how livestock can influence growth in a positive and a negative way.

For P6, learners should describe the various grazing systems found throughout the UK and how fencing for livestock is used to manage these systems. Evidence for P4, P5 and P6 could take the form of an assignment or crop production report.

For P7, learners should compare the different methods of grass and forage crop conservation and include silage and hay. Tutors should ensure that learners describe clamp silage even though it may not be used in their locality. Learners need to describe the full range of associated machinery used with their chosen crop.

For P8, learners could be assessed through practical observation and/or work experience with relevant witness statements. Learners need to provide evidence that they can erect and move a fence (either electric or post and wire) and carry out required field operations such as harrowing, spiking or rolling grass and forage crops.

For P9, learners could be assessed in practical situations and/or work experience where they are involved in a crop harvesting situation. However, tutors need to ensure that learners cover the necessary areas and do not, for example, just drive or ride in, a tractor and trailer to and from a field to a clamp.

For M1, learners could produce a field record/diary to evidence their crop growth monitoring. Tutors should give the same crop monitoring requirements to ensure assessment is fair. In order to cover a reasonable period of monitoring, tutors should expect learners to start from crop establishment and go through to spring at least.

For M2, learners need to choose a grazing system and monitor grass growth. Tutors must ensure that learners choose a field which is grazed by livestock, and not to be harvested by machine. A reasonable time span should be set, but should not be less than two months. Learners may need to include more than one field, especially where rotational systems are chosen. For M3, learners need to plan the conservation process of a grass or forage crop. They should include all relevant machinery, timing of cutting according to crop maturity and the storage process. Tutors need to ensure that assessment is timed appropriately and does not impact on the assessment for M2.

For D1, learners need to describe where a forage crop fits into a farm rotation and justify its use. They need to evaluate the benefits of the crop to the farm enterprise in terms of field use, its place in the farm's overall rotation and choice of crop.

For D2, learners need to evaluate a grazing system and recommend improvements. This may mean re-seeding, using different crops or crop varieties, improvements to the fencing, access for stock and machinery, use of tracks, and use of livestock.

For D3, learners need to monitor closely all harvesting and storage operations including use of machinery, labour, contractors, and financial cost to the enterprise. Tutors will need to ensure that learners have sufficient time and access to farm information to carry this out. Evidence for D1, D2 and D3 could take the form of an assignment or crop production report.

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	Identify Grass and Forage Crops	Identify a range of grass and forage crops grown in the UK both as seeds and plants.	Practical observation. Written evidence.
P3, P4, P5, M1, D1	Grass and Forage Crop Establishment and Growth	Prepare seedbeds for forage crops. Produce a diary for monitoring forage crop growth.	Practical observation. Written evidence/diary/ blog.
P6, P7, P8, M2, D2	Grazing Systems	Describe different grazing systems for livestock. Monitor and record grass growth over a specified time and suggest improvements.	Practical observation. Written evidence/diary/ blog.
P9, M3, D3	Harvesting and Storing Crops	Manage grazing for livestock. Establish and move fencing as required. Assist in the harvesting and storage of a crop.	Practical observation Written evidence/diary/ blog.

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 Animal and Plant Husbandry	Undertake Agricultural Crop Production
Introduction to Animal and Plant Biology	Understand Grassland Management
Farm Animal Production	
Agricultural Crop Production	
Element AgC4.1 Prepare sites for cultivation and planting Element AgC4.2 Cultivate sites for planting extensive crops Element AgC5.1 Prepare for planting extensive crops Element AgC5.2 Plant extensive crops Element AgC6.1 Maintain the healthy growth of extensive crops	

Essential resources

Learners will need access to fields covering a range of grass and forage crops, possibly in a centre farm situation and also on local farms where different crops are grown. They will need to be aware of a farm's policy with regard to the environment, such as use of conservation strips or crop margins, manure management and NVZs. Learners must also be able to assist in carrying out crop cultivations and harvesting in a safe manner, using tractors and associated machinery and working with livestock.

Farm visits/guest speakers to local farms and associated enterprises are to be encouraged so learners can experience the full scope of the unit. Learners should have access to a farm's records at relevant times during the programme. The wearing of appropriate PPE and risk assessments must be implemented.

Employer engagement and vocational contexts

The unit focuses on learners participating in the key stages of grass and forage crop production. This will involve use of the centre's farm and other local farms. Tutors should establish links with farms in the area where visits and/or work placements can take place. The health and safety of learners should be given a high priority at all times. All necessary PPE and specific training on the use of machinery must be in place. Indicative reading for learners.

Textbooks

Bell B – *Farm Machinery* (Old Pond Publishing, 2005) ISBN 1 903366 68 2

Culpin C and Bloxham P – *Culpin's Farm Machinery* (Blackwell Science, 2006) ISBN 0632051825

DEFRA – *Fertiliser Recommendations for Agricultural and Horticultural Crops RB209, 8th Edition* (The Stationery Office Books, 2008)

Eash N and Green C – *Soil science simplified* (Blackwell Publishing, 2008) ISBN 13: 978-0-8138-1823-8

Finch H, Samuel A and Lane G – *Lockhart & Wiseman's Crop Husbandry including grassland* (Woodhead publishing, 2002) ISBN 1 85573 5490

Frame J – *Improved Grassland Management* (The Crowood Press, 2002) ISBN 0852365438

UK Pesticide Guide (CABI, 2009) ISBN 978 1 845934 16 3

Wilson P and King M – *Arable plants – a field guide* (Wildguides, 2003) ISBN 1 903657 02 4

Journals

Crops

Dairy Farmer

Farm Contractor

Farmers Guardian

Farmers Weekly

Grass and forage farmer

Websites

www.bayercropscience.co.uk	Bayer Crop Science
www.britishgrassland.com	British Grassland Society
www.defra.org.uk	DEFRA
www.efma.org	European Fertiliser Manufacturers Association
www.fwi.co.uk	Farmers Weekly interactive
www.rbi.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 …
Independent enquirers	monitoring crops individually and in groups
Creative thinkers	monitoring and planning aspects of grass and forage crop production
Reflective learners	monitoring and planning aspects of work experience and crop monitoring
Team workers	engaged in practical activities, work experience and team planning
Self-managers	carrying out farm duties and work experience and taking responsibility for own punctuality and learning
Effective participators	engaged in practical activities, work experience and teamwork.

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 …
Reflective learners	visiting local farms and relevant enterprises
Effective participators	visiting local farms and relevant enterprises.

Unit 12: 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

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 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:**
P1 select and safely use hand and power tools to meet given objectives maintaining or repairing land-based machinery or installations [IE, TW, EP]	**M1** plan the work processes and tool requirements to carry out routine maintenance tasks on land-based machinery	**D1** report on the activities undertaken and equipment and materials used to complete workshop maintenance and repair tasks on land-based machinery
P2 state reasons for the hand and power tools selected [RL]		
P3 safely use basic welding equipment and materials to produce a simple welded joint to meet given objectives [IE, TW]	**M2** review a given simple welded fabrication task suggesting improvements	
P4 state reasons for the basic welding equipment and materials selected		
P5 safely use basic techniques to maintain or repair land-based machinery or installations to meet given objectives	**M3** illustrate safe working procedures for an identified area of work in a land-based workshop environment.	**D2** explain employee responsibilities under health and safety legislation when operating in a land based workshop environment.
P6 state reasons for the basic techniques selected		
P7 explain the importance of health and safety in the workshop [RL, CT, SM]		
P8 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 which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

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. Issue **Assignment 1: Workshop Skill Development (P1, P2, P5, P6, M1, D1) and Assignment 2: Welding Skill Development (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.
Hazards in the welding workshop and controlling risk.
Joint types and terminology.
Welding standards introduction and use.
Materials and suitability for welding.

Topic and suggested assignments/activities and/assessment
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.
Assignment 3: Investigate Health and Safety Implications (P7, P8, M3, D2)
Sources of information and relevance.
Legislation and application to the workplace.
Employer responsibilities formalised.
Employee responsibilities.
Unit review.

Assessment

To achieve a pass grade learners must achieve the eight pass criteria listed in the grading criteria grid.

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.

To achieve a merit grade, the learner must achieve all the pass grade criteria and the three merit grade criteria.

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.

To achieve a distinction grade learners must achieve all the pass and merit grade criteria and the two distinction grade criteria.

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	

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 00802491 16

Journals

Farmers Guardian

Farmers Weekly

Profi International

Websites

www.defra.gov.uk	Department for Environment Food and Rural Affairs
www.environment-agency.gov.uk	Environment Agency
www.hse.gov.uk	Health and Safety Executive
www.lantra.co.uk	Lantra

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 …
Independent enquirers	exploring the safe use of power tools
Creative thinkers	connecting with others' experiences of workshop hazards and safety
Reflective learners	considering the hazards and risks associated with workshops
Team workers	working with others to use basic welding equipment
Self-managers	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 …
Independent enquirers	investigating tool use and maintenance reviewing specifications for welded joints
Creative thinkers	analysing health and safety poster information creating poster campaigns and risk assessments
Reflective learners	stating reasons for tool and equipment usage stating reasons for choice of techniques
Team workers	working on practical tasks researching health and safety information
Self-managers	stating personal reasons for tool and equipment usage stating personal reasons for choice of techniques
Effective participators	participating in practical activities participating in group-work.

Functional skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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	
ICT – Find and select information	
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
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	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	

Mathematics	
Skill	**When learners are …**
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
English	
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 13: 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.

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 vehiclescould 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.

They 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.

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.

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 legislation, 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 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:**
P1 name the key components that make up the build of a current tractor [IE]	**M1** explain the relevance of the key components in relation to other components	**D1** carry out all maintenance in accordance with manufacturers' recommendations, selecting and using PPE correctly
P2 identify and explain the purpose of all controls and instrumentation of a modern tractor		
P3 outline the relevant legislation that apply to tractor driving [IE]	**M2** explain the consequences of not complying with current legislation and codes of practice	
P4 outline the relevant codes of practice that apply to tractor driving		
P5 define the limitations imposed on young or inexperienced tractor drivers		
P6 carry out pre-start checks on a tractor	**M3** explain the consequences of failing to maintain a tractor	**D2** carry out all operations in accordance with all legislation, codes of practice following acceptable working practices.
P7 perform pre-operational maintenance tasks prior to undertaking tractor driving operations		
P8 carry out adjustments to the tractor to match the tractor to the operator		
P9 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:**
P10 drive a tractor safely and efficiently around to meet given objectives	**M4** operate tractor and attachments safely with minimum assistance	
P11 safely hitch selected attachments to a tractor		
P12 operate tractors and attachments safely to meet given objectives		
P13 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 which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

Delivery

All centres must comply with the requirements of relevant 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 assessments 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 ask learners to undertake tasks that are beyond their physical capabilities.

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.

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 the 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 tractor operation skills, 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.
Assignment 1: Key Components, Instruments and Controls (P1, P2, M1)
Investigate key components, instruments and controls.
Pre-start checks and initial driving practice.
Assignment 2: Legislation and Codes of Practice (P3, P4, P5, M2)
Carry out basic maintenance on tractors.
Carry out settings and adjustments, change and set hitches and linkages.
Assignment 3: Tractor Maintenance and Settings (P6, P7, P8, P9, M3, D1)
Hitch a range of machines.
Manoeuvring and operating practice.
Assignment 4: Tractor Driving and Operations (P10, P11, P12, P13, 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 the key components, controls and instruments addressed in P1 and P2. Tutors could extend the observation record sheet to record this evidence or devise a separate sheet where P1, P2 and M1 evidence is 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 on 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 could be 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 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 re-assessment 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 taking account of relevant 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	You work for a agricultural machinery sales firm. You need to explain the 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.

Criteria covered	Assignment title	Scenario	Assessment method
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.
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.
P10, P11, P12, P13, 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 are 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 1903366682

Cairns B – *The Farmers and Groundsmans Guide to Planning Vehicle and Machinery Maintenance* (The Crowood Press Ltd) ISBN 18479711104

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

Other material

Lubrication charts and data sheets

Manufacturers' publications and manuals

Websites

www.bagma.com	British Agricultural and Garden Machinery Association
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
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 …
Independent enquirers	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
Reflective learners	operating tractor and attachments safely with the minimum of assistance
Self-managers	operating tractor and attachments safely with the minimum of assistance
Effective participators	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 …
Independent enquirers	arranging work-placement opportunities
Creative thinkers	choosing appropriate tractors and machines
Reflective learners	practising tractor and machine hitching and manoeuvring tasks, assessing own progress and trying out different methods to develop competence and confidence
Team workers	working as a group during tractor and machine practice sessions, encouraging each other to try out different strategies
Effective participators	completing maintenance tasks before putting tractors and machines to work.

Functional Skills – Level 2

Skill	When learners are …
ICT – Use ICT systems	
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	
Troubleshoot	
ICT – Find and select information	
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
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	
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	
Mathematics	
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	

Skill	When learners are …
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	
English	
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	

Unit 14: Assist with Agricultural Crop Production

Unit code: R/600/9377

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 to carry out agricultural crop production 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 able to develop practical skills as well as knowledge and understanding of how crops are grown on arable farms in the UK. They will have practical involvement in all four key stages, from field cultivations, application of fertilisers, regular crop monitoring through to harvesting and storage.

Unit introduction

Food security is now a high priority on the Government's agenda and the agricultural industry needs a well-trained, skilled workforce, conversant with the modern technology that is increasingly found on many farms in the UK.

This unit focuses on learners participating in all aspects of modern crop production, the aim being for learners to experience modern farm arable practice. Learners will monitor crops at all stages of production, in class taught time and on their own. They will experience crop walks, use modern arable machinery in the field, be involved in harvesting operations and understand how crops are grown.

Throughout the unit learners will need to work effectively as part of a team. There is a strong emphasis on learner health and safety throughout this unit.

Learning outcomes

On completion of this unit learners should:

1 Know agricultural crops and their growth stages

2 Know common crop weeds, pests and diseases

3 Understand how crops are efficiently grown and harvested

4 Be able to assist with growing, harvesting and storage of agricultural crops.

Unit content

1 Know agricultural crops and their growth stages

Recognise crops: grass and cereals; root crops (eg potatoes, sugar or fodder beet); brassicas (eg oil seed rape, stubble turnips); legumes (eg clover, lucerne); alternative crops (eg linseed, miscanthus)

Growth stages: cereals (eg Zadok's scale, tillering, node extension, booting); germination; relevant growth stages for different crops

Photosynthesis, water and nutrients: the photosynthesis process (eg equation, CO2 and global warming); water (eg transpiration, wilting, osmosis); major and minor nutrients (eg nitrogen, phosphate, potash, sulphur, boron, manganese, function of nutrients for plant growth)

2 Know common crop weeds, pests and diseases

Weeds: identify common weeds at different stages of growth; growth (eg annual, perennial, rhizome, dormancy in soil)

Pests: different types in crops (eg insects, birds, rodents, mammals); pest control methods (eg scarecrows, bangers, chemical, netting)

Diseases: identify fungal diseases in crops (eg mildew, septoria, eyespot, yellow rust, blight, phoma, chocolate spot); affect on yield and quality

3 Understand how crops are efficiently grown and harvested

Factors affecting growth and yield: crop rotation; drainage; soil type for crop; pH; establishment (eg timing, type of seedbed, planting depth, row space); legislative requirements (eg field margins); nutrients (eg organic, inorganic, amounts, timing, NVZ regulations, growth regulators, sprays, LERAPs); crop target yields (eg weather, irrigation)

Harvesting: machinery (eg method, crop flow, use of contractor); timing (eg maturity of crop); preparation (eg swathing, dessicating, spraying)

4 Be able to assist with growing, harvesting and storage of agricultural crops

Grow crops: choice of implements (eg non-inversion tillage, conventional, sustainable systems, timing); crop monitoring (eg field walks, agronomist, plant populations, identify growth stages, Zadok's scale); nutrients (eg timing, quantities); disease recognition (eg fungal, pest, viral); identify crop when mature

Harvesting and storage: types of harvester; crop flow; crops needing swathing or dessication; types of store (eg grain floor, bin, dryer, clamp, silo, bale); storage monitoring methods (eg moisture test, ventilation, silage analysis, frost protection, sprouting)

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:**
P1 identify common agricultural crops at different stages of growth		
P2 describe the importance of photosynthesis, water and nutrients to the healthy growth of crops	**M1** monitor the establishment of a specified crop	**D1** evaluate the establishment of a specified crop
P3 identify common weeds, pests and diseases for specified crops including cereals, root and forage crops		
P4 outline the significance of weeds, pests and diseases for specified crops including cereals, root and forage crops		
P5 discuss factors that affect establishment, growth and yield of a specified crop	**M2** monitor the growth of a specified crop throughout its growing season	
P6 explain commonly used methods of harvesting and storing specified crops, including cereals, root and forage crops		
P7 assist in the selection, preparation, use and maintenance of crop cultivation machinery		
P8 grow and monitor agricultural crops [IE, CT, RL, TW, EP, SM]		**D2** justify the use of nutrients and sprays for a specified crop
P9 explain the harvest and storage of crops.	**M3** describe the preparation for the harvesting and storage of a specified crop.	**D3** evaluate the effectiveness of the harvesting and storage of a specified crop.

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Essential guidance for tutors

Delivery

Delivery of this unit will involve practical assessments, written assessment, visits to suitable locations and will link to work experience placements.

The unit focuses on learners being involved in the operations associated with farm crop production, either through field walks, monitoring crop growth, or assisting practically in the various operations. Tutors need to offer learners as wide a selection of learning opportunities as possible. This will involve lectures, regular crop walks, (both in taught and learners' own time), farm practicals, work experience, guest speakers and visits.

For the unit to be effective, tutors will need to choose the timing of the assessments very carefully because of the importance of seasonality. In addition, the tutor needs to ensure that all relevant crops are included. This will include combinable crops, grass, oilseeds, legumes and root crops. 'Alternative' crops should be considered as a form of enrichment, but this will depend on the locality and the alternative crops grown in the area. Learners will need access to farm crop recording data and previous crop history.

Learning outcome 1 will need to be delivered at the start of the programme, probably in the autumn. Tutors should ensure that a wide variety of crops, at different stages of their growth, are available to learners. Learning outcome 2 will need to be delivered to coincide with crop growth, which will probably be both autumn and spring, especially for cereals, oil-seed rape and stubble turnips. Some fungal diseases might be seen in autumn, but the majority will be observed in the spring and summer.

Learning outcome 3 will probably be delivered during the winter months because it relates to aspects of crop production that are not directly observable according to the season, and so lends itself more to classroom activity and field walks.

Learning outcome 4 needs to be planned in accordance with the crop and the season. Tutors need to be mindful of learners being able to complete the assessment before the end of their course. A crop such as grass silage, early or second early potatoes would be suitable. Cereals would probably be harvested in July when learners are no longer at the centre.

The merit grade criteria aim to consolidate learners' observational skills developed from regular crop observation and walking. The distinction grade criteria will challenge learners' reflective 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
Introduction to unit and unit overview
Assignment 1 Crops and their Establishment (P1, P7, M1, D1) Tutor introduces the assignment.
Practical session: crop walks to observe crops, cultivations, field conditions before drilling/planting.
Topic and suggested assignments/activities and/assessment
Theory session: crop recognition, cultivation machinery, soil conditions.
Theory session: seedbeds, seed/plant spacing, row widths, timing.
Assignment 2 Crop Growth (P2, P5, P8, M2) Tutor introduces the assignment.
Practical session: crop walks, observation and monitoring crop growth stages.
Theory session: crop growth stages, crop nutrients, timing.
Assignment 3 Crop Health and Diseases (P3, P4, D2) Tutor introduces the assignment.
Practical session: regular crop walks to observe disease, damage and response to sprays.
Theory session: identify crop weeds and pests.
Theory session: identify crop diseases, use of sprays, environmental guidelines, PA1 and PA2 competence certificates, timing of sprays, growth regulators.
Assignment 4 Harvesting and Storing Crops (P6, P9, M3, D3) Tutor introduces the assignment.
Practical session: carry out/assist with harvesting operations such as silage, hay, visit to a crop store, prepare storage for a crop.
Theory session: harvesting machinery, timing of harvest, recognise crop maturity, types of crop storage, protection of crops in store.
Unit review.

Assessment

Tutors could assess P1 at the start of the programme. It must cover all the cereal, grass and forage crops including maize, root crops such as potatoes and sugar beet and a selection of alternative crops. Evidence could take the form of a presentation using illustrations from the internet.

For P2, learners need to understand the importance of physiological processes and this could be assessed using a formal written test.

For P3, learners need to recognise the common weeds, pests and diseases for the range of crops. Learners should be encouraged to identify weeds not just at the flowering stage but also at the more difficult seedling stage. Pest damage and prevention will probably be observed early on in crop growth, whereas fungal diseases might not be readily observed until late spring and summer.

For P4, learners need to show an understanding of how weeds, pests and diseases affect crop yield, quality and costs to the business. Quality issues would include, for example, wild oats, ergot and mycotoxins in cereals and moulds in harvested grass.

For P5, learners will describe the factors affecting crop growth and should include weather, problems in creating the seedbed, drainage, soil pH and index, nutrient availability and amount used, reference to the previous crop, regular crop monitoring and use and timing of sprays and growth regulators.

For P6, learners must cover the range of crops specified by the tutor which is likely to include combine harvesting and on-floor/in bin drying for cereals, a forage harvester and clamp or bales for grass and forage crops and, for root crops a harvester and outside/indoor clamp. Tutors might wish to specify which crops learners should select according to crops grown in the locality. For example, in the south west Swedes or potatoes are a more likely root crop than sugar beet.

For P7, assessment could be practical depending on group sizes.

For P8, learners need to grow and monitor a minimum of two different agricultural crops. This could be evidenced through regular crop monitoring in the form of a diary and authenticated photographs.

For P9, learners must explain the harvest and storage of crops. This could be assessed verbally using a witness statement/observation record during in a practical situation.

For M1 and M2, learners need to be in the habit of monitoring crops regularly. Evidence could be in the form of field reports, diaries or a web blog. M1 needs to be assessed early in the programme unless tutors wish learners to use crops established in the spring. Whichever time of year is chosen, tutors need to ensure that it is the same for all learners. For M2, tutors need to allow flexibility in learners' choice of crop and should monitor learner progress closely but the decision of an autumn or spring sown crop should be the same for all learners. For M3, the crop being harvested is likely to be maize, grass or possibly wholecrop cereals. Tutors should be mindful of seasonality and the learning opportunity that best fits learners' situations.

For D1, learners should evaluate a specified crop establishment including relevant farm information. Learners will also need to include details of the machinery used for the relevant soil type, and its impact on the environment in terms of soil structure and energy use.

For D2, learners must be able to evaluate a farm's use of sprays and observe and record the state of the crop before the decision to spray. Learners will need to show that they can recognise crop damage and disease and are conversant with the UK Pesticide Guide.

For D3, tutors need to ensure that learners have enough time to complete the assessment. This will probably mean that the chosen crop will be a forage crop, such as grass or maize, rather than a cereal. Learners will benefit if they have been involved in the harvesting and storage operations. They will need to monitor the whole process closely and show evidence of harvest and storage costs in terms of machinery, fuel and labour. D1, D2 and D3 could be assessed through the completion of a crop production report.

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, P7, M1, D1	Crops and their Establishment	You have been hired to work as an assistant farmer. You have been asked to identify a range of crops grown in the UK and, in doing so, choose the necessary cultivation machinery to establish two selected crops. You will assist in using the cultivation machinery, monitor and evaluate the establishment of the selected crops.	Practical observation. Written evidence/diary/blog.
P2, P5, P8, M2	Crop Growth	You need to grow on the selected crops you have established. You will produce a diary to record monitoring of crop growth and include information on the crops' needs, their growth and development and factors that affect this.	Practical observation. Written evidence/diary/blog.
P3, P4, D2	Crop Health and Diseases	Include in your diary for monitoring of crop health, identifying potential crop pests and diseases. Monitor the use of sprays and pest control or prevention and talk about the need for the use of different nutrients sprays in line with the crops' needs and the environment.	Practical observation. Written evidence/diary/blog.
P6, P9, M3, D3	Harvesting and Storing Crops	You must assist in the harvesting and storage of a crop. Identify crop storage pests and how crops are protected in store.	Practical observation. Written evidence/diary/blog.

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 Animal and Plant Husbandry	Undertake Agricultural Crop Production
Introduction to Animal and Plant Biology	Manage Agricultural Environments
Grass and Forage Crop Production	
Element AgC7.1 Prepare for harvest Element AgC7.2 Harvest crops by mechanical means Element AgC8.1 Prepare the storage area and harvested crop for storage Element AgC8.2 Monitor the condition of harvested crops during storage	

Essential resources

Learners will need access to fields covering a range of crops, possibly in both a centre's farm situation and also on local farms where different crops are grown. They will need to be aware of a farm's policy with regard to the environment, such as the use of conservation strips or crop margins and reasons why they are used. Learners must be able to assist in carrying out crop cultivations and harvesting in a safe manner, using tractors and relevant machinery.

Farm visits/guest speakers are encouraged in relation to both local farms and associated enterprises, so learners are able to experience the full scope of the unit. Learners should have access to a farm's records at relevant times during the programme.

Employer engagement and vocational contexts

The unit focuses on learners participating in all stages of crop production. This will involve the centre's farm and other local farms. Tutors should establish links with farms in the area where visits and/or work experience can be undertaken. The health and safety of learners should be given a high priority at all times. All necessary PPE and specific training on using machinery must be implemented.

Indicative reading for learners

Textbooks

Bell B – *Farm Machinery* (Old Pond Publishing, 2005) ISBN 1 903366 68 2

Culpin C and Bloxham P – *Culpin's Farm Machinery* (Blackwell Science, 2006) ISBN 0632051825

DEFRA – *Fertiliser Recommendations for Agricultural and Horticultural Crops RB209, 8th Edition* (The Stationery Office Books, 2008)

Eash N, Green C – *Soil science simplified* (Blackwell publishing, 2008) ISBN 13: 978-0-8138-1823-8

Finch H, Samuel A, Lane G, – *Lockhart & Wiseman's Crop Husbandry including grassland* (Woodhead publishing, 2002) ISBN 1 85573 5490

Nix J – *Farm Management Pocketbook,* (The Andersons Centre, 2009) ISBN 0954120159

UK Pesticide Guide (CABI, 2009) ISBN 978 1 845934 16 3

Wilson P, King M – *Arable plants- a field guide* (Wildguides, 2003) ISBN 1 903657 02 4

Journals

Crops

Farm Contractor

Farmers Guardian

Farmers Weekly

Websites

www.bayercropscience.co.uk	Bayer Crop Science
www.defra.org.uk	DEFRA
www.efma.org	European Fertiliser Manufacturers' Association
www.fwi.co.uk	Farmers Weekly interactive
www.hgca.com	Home Grown Cereals Authority
www.newfarmcrops.co.uk	New Farm Crops
www.rbi.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 …
Independent enquirers	monitoring crops individually and in groups
Creative thinkers	monitoring and planning aspects of crop production
Reflective learners	monitoring and planning aspects of work experience and crop monitoring
Team workers	engaged in practical activities, work experience and team planning
Self-managers	carrying out farm duties and work experience and taking responsibility for own punctuality and learning
Effective participators	engaged in practical activities, work experience and teamwork.

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 …
Independent enquirers	using a telescopic forklift
Creative thinkers	using a telescopic forklift
Reflective learners	visiting local farms and relevant enterprises
Effective participators	visiting local farms and relevant enterprises.

Unit 15: Introduction to Dairy and Beef Cattle Husbandry

Unit code: Y/505/0194

Level 2: BTEC First

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit aims to give learners an understanding of the principles of dairy and beef cattle husbandry and how these principles can be applied in practice. The unit is aimed primarily at learners in a centre-based setting who are looking to progress in the sector or to further education and training.

The purpose of the unit is to give learners an understanding of the husbandry requirements of cattle. Learners will learn about the welfare of cattle, monitoring of cattle food and water, and general health and routine husbandry tasks.

Unit introduction

An understanding of the husbandry requirements of dairy and beef cattle is a key part of agricultural production. This unit introduces the key aspects of cattle husbandry and enables learners to develop related practical skills.

Learners will investigate how good husbandry affects the health and welfare of cattle. 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 cattle, and understand the importance of feed plans and grazing systems.

Learning outcomes

On completion of this unit a learner should:

1 Know the common production systems used in dairy and beef cattle farming

2 Know the principles of cattle management

3 Be able to carry out routine livestock husbandry on dairy and beef cattle

4 Be able to carry out routine health tasks on dairy and beef cattle.

Unit content

1 Know the common production systems used in dairy and beef cattle farming

Common dairy production systems: calf rearing; rearing of replacement heifers; lactation cycle; dry cow period; targets and timing of production cycle

Common beef production systems: choice of breeds; cereal beef; silage beef; 18-month and 24-month beef; suckler beef production; finishing of suckled calves; targets and timing of production cycle

Factors involved in maximising breeding herd productivity: financial eg market price, service charges, labour costs; physical eg disease; production performance; environmental factors

2 Know the principles of cattle management

Selection: selection of male and female stock; signs of oestrus in the breeding animal; service management; care of the animal after mating; care of the new offspring

Feeding: feeding principles; nutritional requirements

Health: causes; symptoms; prevention and treatment of common metabolic disorders and diseases; animal health and wellbeing

Housing: housing requirements and stocking densities

3 Be able to carry out routine livestock husbandry of dairy and beef cattle

Health and safety: risk assessment; animal welfare considerations; relevant welfare codes; environmental requirements; bio-security

Routine stock tasks for beef and dairy cattle: milking cows; identification of signs of heat; keeping dairy cow records; handling cattle; haltering cattle; disbudding; mixing milk substitute powder; feeding calves; taking a calf's temperature; weighing stock; selecting stock for breeding and slaughter; operating a grazing system; feeding cattle

Duties: feeding; cleaning; moving and monitoring animals; counting; record keeping; interpretation of records

4 Be able to carry out routine health tasks on dairy and beef cattle

Cattle health checks: identification of signs of health/ill health; physical condition and behaviour of healthy stock; signs which indicate potential problems

Cattle treatments: routine preventative health treatments; prevention and treatment of common cattle metabolic disorders/diseases

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:**
P1 describe the production cycle for dairy cattle [IE]	**M1** explain the production cycle for given cattle	**D1** explain factors involved in maximising overall productivity of the breeding herd
P2 describe the production cycle for beef cattle [CT]		
P3 describe the selection of male and female stock [SM]	**M2** explain the selection of given male and female stock	**D2** explain the feeding, housing, care and health of given dairy and beef cattle
P4 outline health and welfare requirements for dairy and beef cattle: • care of stock • common disorders and diseases	**M3** describe the prevention and treatment of common cattle metabolic disorders and diseases	
P5 describe the housing requirements of dairy and beef cattle [CT]		
P6 describe the principles of feeding dairy and beef cattle		
P7 carry out routine husbandry of dairy and beef cattle safely: • feeding • cleaning • record keeping • movement of animals [CT, SM]		
P8 assist in the operation of a grazing system to meet given objectives [SM]	**M4** estimate sward productivity	**D3** plan future sward utilisation
P9 assist in activities to milk cows to meet given objectives [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:**
P10 carry out health checks on dairy and beef cattle		
P11 carry out routine treatments to maintain health and wellbeing of dairy and beef cattle		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

Key	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 should be delivered using as wide a range of techniques as possible. For example, lectures, discussions, seminar presentations, supervised cattle livestock practicals, site visits, work placements, and internet and/or library-based research. Delivery should stimulate, motivate, educate and enthuse learners.

Work placements should be monitored regularly 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 during the work placement. Observation records and/or witness statements can serve as evidence of this.

Visiting expert speakers could add to the relevance of the subject. For example, cattle consultants, cattle-breeding managers or large animal veterinaries could talk about their work, the situations their clients face and the systems and methods they use.

Tutors should stress the importance of health and safety, animal welfare, bio-security issues relating to working with and around livestock regularly and the need to manage the resource using approved methods. Risk assessments must be undertaken before any practical activities and visits take place. Following the production of suitable risk assessments, appropriate Personal Protective Equipment (PPE) must be provided and used.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units and assessment instruments in which learners are taking part.

Learning outcomes 1 and 2 are linked. They cover the background knowledge relating to dairy and beef production systems and animal husbandry. This knowledge can be delivered through formal lectures, discussion, site visits and independent learner research. Learners should gain an awareness of the systems used for dairy and beef production and the differences between them. Factors that determine dairy and beef production and production systems should be explored. Learners will investigate the husbandry skills with, and the management of, breeding and growing cattle. Cattle nutrition is also covered.

Learning outcomes 3 and 4 focus on the practical aspects of cattle husbandry, health and welfare, disease diagnosis and control, and stock tasks associated with cattle. Learners are expected to demonstrate a range of dairy and beef husbandry skills. Learners will gain knowledge and practical experience while carrying out husbandry and stock tasks.

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: Dairy and Beef Production Systems (P1, P2, M1, D1)
Tutor introduces the assignment brief
Theory – routine husbandry
Theory – breeding and rearing, production cycles
Theory – introduction to dairy and beef nutrition
Practical stock tasks (introduction)
Assignment 2: Principles of Cattle Management (P3, P4, P5, P6, M2, D2)
Tutor introduces the assignment brief
Theory – routine stock selection
Theory – housing requirements of cattle
Theory – introduction to dairy and beef health and welfare
Theory – introduction to livestock feeding
Assignment 3: Practical Livestock Husbandry (P7, P8, P9, M3, M4)
Tutor introduces the assignment brief
Practical – routine stock tasks (practice and assessment throughout the unit), feeding, cleaning, moving livestock, records
Assignment 4: Practical Livestock Health (P10, P11, D3)
Tutor introduces the assignment brief
Practical – health checks and ill-health identification
Practical – physical and behavioural health and prevention and treatment of ill health
Practical – routine health and wellbeing treatments
Unit review

Assessment

Assessment should involve practical and written assessments, visits to suitable cattle herds and, ideally, will link to work experience placements.

To achieve a pass grade, learners must meet the 12 pass criteria listed in the assessment and grading criteria grid.

For P1 and P2, learners must describe major dairy and beef production cycles. Evidence could take the form of a pictorial presentation with notes (possibly using software or an overhead projector).

For P3, learners need to describe the selection of cattle. Evidence could be collected during practical activities using appropriate observation records.

For P4, P5 and P6, learners need to provide information on the health, feeding and housing of livestock. Evidence could be in the form of a report or assignment.

For P7, P8 and P9, learners must demonstrate practical skills related to routine husbandry, feeding, grazing and milking. Tutors must identify the objectives for P8 (which must include the type of cattle the system is operated for) and P9. Assisting with milking must include working with others to maintain welfare of cows, herd cows safely, ensure udders are clean and work area and equipment is safe and hygienic. Learners should ensure that their activities are in accordance with relevant welfare codes, environmental requirements and bio-security.

For P10 and P11, learners must demonstrate cattle health checks and routine cattle treatments. These criteria could be assessed directly by the tutor during practical activities. If this format is used then suitable evidence from guided activities are observation records completed by learners and the tutor. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

To achieve a merit grade, learners must meet all of the pass grade criteria and the four merit grade criteria.

For M1, learners must explain the production cycle for given cattle. This could be linked directly to work being undertaken for P1 and P2 and evidence may be in a similar format.

For M2, learners need to explain the selection of given livestock, this will be linked to assessment of P3 and could be evidenced during practical activities.

For M3, learners must provide information on the treatment of cattle diseases and disorders. Evidence could be captured during practical activities using appropriate observation records completed by learners and the tutor. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

For M4 learners need to estimate productivity. Evidence could be in the form of an assignment or presentation.

To achieve a distinction grade, learners must meet all of the pass and merit grade criteria **and** the distinction grade criterion.

For D1, tutors should explain factors involved in maximising overall productivity of the breeding herd. Learners must then draw on the factors that are likely to impact on the physical and financial productivity of a breeding herd as well as environmental factors that influence production. Learners should cover all aspects of maximising productivity, for example financial impacts, market price, service charges, labour costs, physical impacts, disease, production performance and environmental factors.

For D2, learners will give a complete explanation of all principles listed in unit content in relation to given dairy and beef cattle. D2 could be assessed together with D1. Learners could contextualise their evidence as described in the pass and merit criteria for learning outcomes 1 and 2. Evidence could be in the form of a report.

For D3, learners need to plan sward utilisation. Evidence could be in the form of an assignment or 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
P1, P2, M1, D1	Dairy and Beef Production Systems	Produce a report of the different dairy and beef production systems and the breeding and reproduction of cattle.	Report. Oral presentation with accompanying notes.
P3, P4, P5, P6, M2	Cattle Management	Produce a report on the husbandry appropriate to dairy and beef production. This should include information on the health and welfare of cattle at all stages of production.	Report. Oral presentation with accompanying notes.
P7, P8, P9, M3, M4	Routine Dairy and Beef Husbandry	Routine husbandry and practical livestock tasks to be assessed by tutor/ work supervisor. Produce a plan for sward utilisation.	Annotated poster. Duty reports from works supervisor or practical assessment by tutor. Witness/observation statements.
P10, P11, D3	Dairy and Beef Health and Welfare	Routine husbandry and practical livestock tasks to be assessed by tutor/ work supervisor.	Oral questioning. Duty reports from works supervisor or practical assessment by tutor. Witness/observation 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
Introduction to Animal and Plant Husbandry	Undertake Dairy Production
Introduction to Farm Animal Production	Undertake Beef Production

Essential resources

It is essential that learners have supervised access to dairy and beef cattle so that they can learn and practise animal husbandry knowledge and skills and observe methods of cattle production. Relevant, high-quality audio-visual resources are required to enhance learning and skills development.

Employer engagement and vocational contexts

Opportunities for work placements should be explored, where possible with farms and/or associated businesses that provide high standards of health and safety and animal welfare. Parental consent is required for all visits and work placements for learners under the age of 18. Visiting speakers, for example animal nutritionists, farmers, feed company representatives, will add to the relevance of the subject.

Indicative reading for learners

Websites

dairyco.org.uk	DairyCo is a levy-funded, not-for-profit organisation working on behalf of Britain's dairy farmers.
fwi.co.uk	*Farmers Weekly* interactive
nationalbeefassociation.com	Charitable association of beef stakeholders
ukagriculture.com	UK Agriculture – online community

Unit 16: Introduction to Sheep Husbandry

Unit code: L/505/0192

Level 2: BTEC First

Credit value: 5

Guided learning hours: 30

Aim and purpose

This unit aims to give learners an understanding of the principles of sheep husbandry and how these principles can be applied in practice. This unit is aimed primarily at learners in a centre-based setting who are looking to progress in the sector or to further education and training.

The purpose of the unit is for learners to understand the husbandry requirements of sheep. Learners will learn about the welfare of sheep, the monitoring of their food and water, and general health and routine husbandry tasks.

Unit introduction

An understanding of the husbandry requirements of sheep is a key part of agricultural animal production. This unit introduces the key aspects of sheep husbandry and will enable learners to develop related practical skills.

Learners will investigate how good husbandry affects the health and welfare of sheep. Learners will learn how to assess animal health and identify the factors that contribute to it. They will also develop the practical skills needed to provide food and water to sheep and gain an understanding of the importance of feed plans and grazing systems.

Learning outcomes

On completion of this unit a learner should:

1 Know the common production systems used in sheep farming

2 Know the principles of sheep management

3 Be able to carry out routine animal husbandry and health tasks on sheep.

Unit content

1 Know the common production systems used in sheep farming

Common sheep production systems: early lambing; spring lambing; late lambing; store lamb production and finishing; targets and timing of production cycle

Factors involved in maximising breeding productivity: financial eg market price, service charges, labour costs; physical eg disease; production performance; environmental factors

2 Know the principles of sheep management

Selection: selection of ewes and rams for breeding; signs of oestrus in the breeding animal; service management; care of the animal after mating; care of the new offspring

Feeding: key nutritional requirements at different life stages of production cycle

Health: causes; symptoms; prevention and treatment of common metabolic disorders and diseases; animal health and wellbeing

Housing: housing requirements and stocking densities

3 Be able to carry out routine animal husbandry and health tasks on sheep

Health and safety: risk assessment; animal welfare considerations; relevant welfare codes; environmental requirements; bio-security

Routine stock tasks for sheep: handling; ageing; foot trimming; detailing; castration; dagging ewes; condition scoring; grazing; feeding; administering animal health treatments; operating a grazing system; feeding cattle; health and safety; risk assessment; animal welfare considerations

Duties: feeding; cleaning; moving and monitoring animals; counting; record keeping; interpretation of records

Sheep health checks: physical condition and behaviour of healthy stock; signs which indicate potential problems

Sheep treatments: routine preventative health treatments; prevention and treatment of common metabolic disorders and diseases

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:**
P1 describe the production cycle for a given lowland sheep flock • lambing • targets and timing [IE]	**M1** explain the production of given sheep breeds	**D1** explain factors involved in maximising overall productivity of the breeding flock
P2 outline the use of local breeds and breed crosses for common production systems		
P3 outline breeding of sheep • selection • signs of oestrus • care of animals after mating • care of newborn lambs [SM]	**M2** justify the selection of male and female stock	
P4 describe health and welfare requirements for sheep: • housing • common disorders and diseases	**M3** describe the prevention and treatment of common sheep health disorders and diseases	
P5 describe the key nutritional requirements of sheep		
P6 carry out routine husbandry of sheep safely: • feeding • cleaning • health checks • record keeping • movement of animals [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:**
P7 assist at lambing to meet given objectives [SM]	**M4** accurately calculate a lambing percentage and a rearing percentage for a given flock	**D2** explain the importance of routine animal husbandry and health tasks during lambing
P8 carry out routine treatments to maintain the health and wellbeing of sheep [SM]		

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills which are embedded in the assessment of this unit. By achieving the criteria, learners will have demonstrated effective application of the referenced elements of the skills.

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

Delivery

This unit should be delivered using as wide a range of techniques as possible. For example, lectures, discussions, seminar presentations, supervised livestock practicals, site visits, work placements, internet and/or library-based research. Delivery should stimulate, motivate, educate and enthuse learners.

Work placements should be monitored regularly 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 during a work placement. Observation records and/or witness statements can be provided as evidence of this.

Visiting expert speakers could add to the relevance of the subject. For example, sheep consultants, sheep-breeding managers or veterinaries (with experience of rural/farm links) could talk about their work, the situations their clients face and the systems and methods they use.

Tutors should stress the importance of health and safety, animal welfare, bio-security issues relating to working with and around livestock regularly and the need to manage the resource using approved methods. Risk assessments must be undertaken before any practical activities and visits take place. Following the production of suitable risk assessments appropriate Personal Protective Equipment (PPE) must be provided and used.

Tutors should consider integrating the delivery, private study and assessment for this unit with other relevant units and assessment instruments in which learners are taking part.

Learning outcomes 1 and 2 are linked. They cover the background knowledge relating to sheep production systems and animal husbandry. This knowledge is likely to be delivered through formal lectures, discussion, site visits and independent learner research. Learners will gain an awareness of the systems used for sheep production, and the differences between them. They will explore the factors that determine sheep production and production systems and will investigate the husbandry skills and management of, breeding and growing sheep. Sheep nutrition is also covered.

Learning outcomes 3 focuses on the practical aspects of sheep husbandry, health and welfare, disease diagnosis and control, and stock tasks associated with sheep. Learners are expected to demonstrate a range of sheep husbandry skills. Learners will gain knowledge and practical experience while carrying out husbandry and stock tasks.

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: Sheep Production Systems (P1, P2, M1, D1) Tutor introduces the assignment brief
Theory – routine husbandry
Theory – breeding and rearing, production cycles
Theory – introduction to sheep nutrition

Topic and suggested assignments/activities and/assessment
Practical stock tasks (introduction)
Theory – routine husbandry
Assignment 2: Principles of Sheep Management (P3, P4, P5, M2) Tutor introduces the assignment brief
Theory – routine stock selection
Theory – housing requirements of sheep
Theory – introduction to sheep health and welfare
Theory – introduction to livestock feeding
Assignment 3: Practical Livestock Husbandry (P6, P7, P8, M3, M4, D2) Tutor introduces the assignment brief
Practical – routine stock tasks (practice and assessment throughout the unit), feeding, cleaning, moving livestock, records
Practical – health checks and ill-health identification
Practical – physical and behavioural health and prevention and treatment of ill health
Practical – routine health and wellbeing treatments
Unit review

Assessment

It should involve practical and written assessments, visits to suitable sites and, ideally, will link to work experience placements.

To achieve a pass grade, learners must meet the 8 pass criteria listed in the assessment and grading criteria grid.

For P1, P2, learners must describe the production cycle and use of breeds. Evidence could take the form of a pictorial presentation with notes (possibly using software or an overhead projector).

For P3, P4 and P5, learners need to provide information on the breeding of sheep and the health, nutritional requirements and housing of livestock. Evidence could be in the form of a report or assignment.

For P6, P7 and P8, learners must demonstrate practical skills related to routine husbandry, feeding, grazing and lambing. Learners should ensure that their activities are in accordance with relevant welfare codes, environmental requirements and bio-security. Tutors must identify the objectives for P7 which must cover preparation for lambing, scheduling of activities, appropriate selection and use of equipment and identification of common problems. These assessment criteria could be assessed directly by the tutor during practical activities. If this format is used then suitable evidence from guided activities are observation records completed by learners and the tutor. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

To achieve a merit grade, learners must meet all of the pass grade criteria and the five merit grade criteria.

For M1, learners must explain the production of given sheep. This could be linked directly to work being undertaken for P1 and P2 and evidence can be in the same format.

For M2, learners need to justify the selection of livestock. This will be linked to assessment of P3 and could be evidenced during practical activities.

For M3, learners must provide information on the prevention and treatment of common sheep diseases/ disorders. Evidence could be captured during practical activities using appropriate observation records completed by learners and the tutor. If assessed during a placement, witness statements should be provided by a suitable representative and verified by the tutor.

For M4, learners need to calculate lambing and rearing percentages. Evidence could be in the form of an assignment or a presentation.

To achieve a distinction grade, learners must meet all of the pass and merit grade criteria **and** the distinction grade criterion.

For D1, tutors should explain factors involved in maximising overall productivity of the breeding flock. Learners must draw on factors that are likely to impact on the physical and financial productivity of a breeding flock. Learners should cover all aspects such as financial impacts, market price, service charges, labour costs, physical impacts, disease, production performance and environmental factors. Learners can contextualise their evidence as described in the pass and merit criteria for learning outcomes 1 and 2. Evidence can be in the format of a report.

For D2 learners must explain the importance of routine animal husbandry and health tasks during lambing. Learners must cover feeding, health checks, good hygiene, record keeping and movement of animals. Evidence could be linked to that provided for 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, D1	Sheep Production Systems	Produce a report of the different sheep production systems and the breeding and reproduction of sheep.	Report. Oral presentation with accompanying notes.
P3, P4, P5, M2	Sheep Management	Produce a report on the husbandry appropriate to sheep production. This should include information on the health and welfare of sheep at all stages of production.	Report. Oral presentation with accompanying notes.
P6, P7, P8, M3, M4, D2	Routine Sheep Husbandry	Routine husbandry and practical livestock tasks to be assessed by tutor/ work supervisor. Produce a plan for future utilisation.	Annotated poster. Duty reports from works supervisor or practical assessment by tutor. Witness/observation 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
Introduction to Animal and Plant Husbandry	Undertaking Sheep Production
Introduction to Farm Animal Production	Understanding Livestock Breeding and Nutrition

Essential resources

It is essential that learners have supervised access to sheep flock so that they can learn and practise animal husbandry knowledge and skills and observe methods of sheep production. Relevant, high–quality, audio-visual resources will be required to enhance learning and skills development.

Employer engagement and vocational contexts

Opportunities for work placements should be explored where possible with farms and/or associated businesses that provide high standards of health and safety and animal welfare. Parental consent is required for all visits and work placements for learners under the age of 18. Visiting speakers, for example, animal nutritionists, farmers or feed company representatives will add to the relevance of the subject.

Indicative reading for learners

Websites

fwi.co.uk	*Farmers Weekly* interactive
Nationalsheep.org.uk	National Sheep Association is an organisation, which represents the views and interests of sheep producers throughout the UK
ukagriculture.com	UK Agriculture – online community

Further information

For further information please call Customer Services on 020 7010 2173 (calls may be recorded for quality and training purposes) or email: teachingLandBasedStudies@pearson.com.

Useful publications

Related information and publications include:

- Functional Skills publications – specifications, tutor support materials and question papers
- the current Edexcel 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.

How to obtain National Occupational Standards

Lantra
Lantra House
Stoneleigh Park
Coventry CV8 2LG

Telephone 02476 696996

Email: reception@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 (www.edexcel.com/training). You can request customised training through the website or by contacting one of our advisers in the Training from Pearson team via Customer Services 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 LSIS 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 Higher National Diplomas in Animal Management, Environmental Conservation, Horse Management, Horticulture		
4		Pearson BTEC Level 4 Higher National Certificates 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		Level 3 Diploma in Work-based Environmental Conservation

Level	General qualifications	BTEC full vocationally-related qualifications	BTEC Short Courses	NVQ/occupational
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		Level 2 Diploma in Work-based Environmental Conservation
1	Pearson Level 1 Diploma in Environmental and Land-based Studies	BTEC Foundation Learning in Land- based Studies		
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
Application of knowledge and understanding (Learning outcome stem *understand* or *know*)	• Show depth of knowledge and development of understanding in given situations (for example explain why, make judgements based on analysis). • Apply and/or select relevant concepts. • Apply knowledge to different contexts. • Apply knowledge to non-routine contexts (ie assessor selection). • Make comparisons. • Show relationships between pass criteria.	• Synthesise knowledge and understanding across pass/merit criteria. • Evaluate concepts/ideas/actions. • Analyse/research and make recommendations. • Judges implications of application of knowledge/understanding. • Applies knowledge and understanding to complex activities/contexts.
Grading domain 2	**Indicative characteristics – merit**	**Indicative characteristics – distinction**
Development of practical and technical skills (Learning outcome stem *be able to*)	• Use advanced techniques/processes/ skills successfully. • Act under limited supervision/ demonstrate independence (note: pass cannot require support). • Apply to non-routine activities. • Demonstrate within time and/or resource constraints. • Produce varied solutions (including non-routine). • Modify techniques/processes to situations.	• Demonstrate creativity/originality/own ideas. • Apply skill(s) to achieve higher order outcome. • Select and use successfully from a range of advanced techniques/ processes/skills. • Reflects on skill acquisition and application. • Justifies application of skills/methods. • Makes judgements about risks and limitations of techniques/processes. • Innovates or generates of application of techniques/processes for new situations.

Grading domain 3	Indicative characteristics – merit	Indicative characteristics – distinction
Personal development for occupational roles (Any learning outcome stem)	• Takes responsibility in planning and undertaking activities. • Reviews own development needs. • Finds and uses relevant information sources. • Acts within a given work-related context showing understanding of responsibilities. • Identifies responsibilities of employers to the community and the environment. • Applies qualities related to the vocational sector. • Internalises skills/attributes (creating confidence).	• Manages self to achieve outcomes successfully. • Plans for own learning and development through the activities. • Analyses and manipulates information to draw conclusions. • Applies initiative appropriately. • Assesses how different work-related contexts or constraints would change performance. • Takes decisions related to work contexts. • Applies divergent and lateral thinking in work-related contexts. • Understands interdependence.
Grading domain 4	**Indicative characteristics – merit**	**Indicative characteristics – distinction**
Application of generic skills (Any learning outcome stem)	• Communicates using appropriate technical/professional language. • Makes judgements in contexts with explanations. • Explains how to contribute within a team. • Makes adjustments to meet the needs/ expectations of others (negotiation skills). • Select and justify solutions for specified problems.	• Presents self and communicates information to meet the needs of a typical audience. • Takes decisions in contexts with justifications. • Produces outputs subject to time/ resource constraints. • Reflects on own contribution to working within a team. • Generate new or alternative solutions to specified problems.

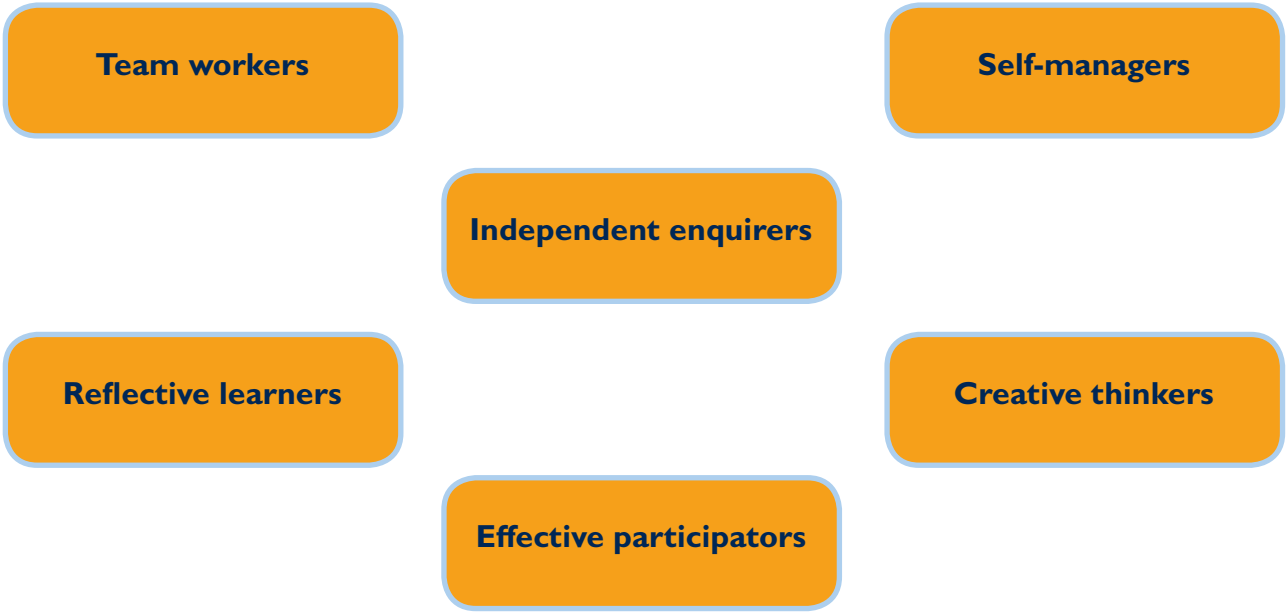
Annexe C

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 are 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.

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	15	16
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 Agriculture 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 Agriculture 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 working with plants and animals
- social and cultural issues – for example issues around public expectations of plant and animal uses as food and fuel.

Citizenship issues

Learners undertaking the Pearson BTEC Level 2 Firsts in Agriculture will have the opportunity to develop their understanding of citizenship issues, for example the public and private involvement in local foods and sustainable agriculture.

Environmental issues

Learners undertaking the Pearson BTEC Level 2 Firsts in Agriculture 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 Agriculture applies throughout Europe even though delivery is in a UK context.

Health and safety considerations

The Pearson BTEC Level 2 Firsts in Agriculture 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 Agriculture.

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	Unit 13	Unit 14	Unit 15	Unit 16
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 Agriculture against the underpinning knowledge of the Level 2 NVQ in Livestock Production, Level 2 NVQ in Livestock Production and Level 2 NVQ in Agricultural Crop Production.

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

	Units															
NVQs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Level 2 NVQ in Livestock Production																
LP7.1,2				#											#	#
LP.11															#	#
LP.12															#	#
LP.13															#	#
LP.19															#	#
LP.24															#	#
LP.25															#	#
CU33						#										
EC2.1,2									#							
CU27.1,2										#						
CU87.1,2									#							
Level 2 NVQ in Agricultural Crop Production																
AgC4.1											#					
AgC4.2											#					
AgC5.1											#					
AgC5.2											#					
AgC7.1,2														#		
AgC8.1,														#		

Annexe F

Unit mapping overview

BTEC First in Agriculture legacy (specification end date 31/08/2010)/new versions of the BTEC First qualifications in Agriculture (specification start date 01/09/2010) – the BTEC Level 2 Certificate in Agriculture, BTEC Level 2 Extended Certificate in Agriculture and the BTEC Level 2 Diploma in Agriculture.

Old units / 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 1	F															
Unit 2		P														
Unit 3	F				P								P			
Unit 4						F									P	P
Unit 5							F									
Unit 6								F								
Unit 7									F							
Unit 8				F											P	P
Unit 9										F						
Unit 10			P											P		
Unit 11											F					
Unit 12												F				
Unit 13																
Unit 14																

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 Agriculture legacy (specification end date 31/08/2010)/new versions of the BTEC First qualifications in Agriculture (specification start date 01/09/2010) – the BTEC Level 2 Certificate in Agriculture, BTEC Level 2 Extended Certificate in Agriculture and the BTEC Level 2 Diploma in Agriculture.

New units		Old units		Mapping/comments (new topics in italics)
Number	**Name**	**Number**	**Name**	
Unit 1	Undertake Work Related Experience in the Land-based Industries	**Unit 1**	Work Related Experience in Agriculture	Unit focuses more on personal skills. *Documents and skills relating to work experience.*
Unit 2	Environmental and Land-based Business	**Unit 2**	Agriculture Industry and Organisations	Focus on Business Operations. *Common business operations and administrative tasks.*
Unit 3	Introduction to Crop Establishment	**Unit 10**	Agricultural Crop Production	Crop harvesting and storage systems removed from unit. Focus on soil and cultivation of land for planting and crop nutrition. *Cultivating land for planting and investigating soil and crop nutrients.*
Unit 4	Introduction to Farm Animal Production	**Unit 8**	Farm Animal Production	Public concerns about animal production and products removed. Focus on livestock.
Unit 5	Introduction to Land-based Machinery Operations	**Unit 3**	Land-based Machinery Operation	Maintenance of land based equipment and machinery.
Unit 6	Introduction to Animal and Plant Husbandry	**Unit 4**	Introduction to Animal and Plant Husbandry	N/A
Unit 7	Introduction to Animal and Plant Biology	**Unit 5**	Introduction to Animal and Plant Biology	Knowledge required of plant and animal biology on all learning outcomes, instead of one or the other.
Unit 8	Participate in Providing Estate Maintenance	**Unit 6**	Practical Land-based Skills	Environmental damage and waste disposal.
Unit 9	Conservation and Improvement of British Habitats	**Unit 7**	Conservation and Improvement of British Habitats	N/A
Unit 10	Introduction to Principles of Land-based Machinery	**Unit 9**	Introduction to the Principles of Land- based Machinery	Layout and function of land based machinery 12V electrical system and their components removed from unit. Focus on the combustion engine.
Unit 11	Introduction to Grass and Forage Crop Production	**Unit 11**	Grass and Forage Crop Production	N/A

New units		Old units		Mapping/comments (new topics in italics)
Number	**Name**	**Number**	**Name**	
Unit 12	Introduction to Land-based Workshop Practice	**Unit 12**	Introduction to Land-based Workshop Practice	N/A
Unit 13	Tractor Driving	**Unit 3**	Land-based Machinery Operation	Purpose of land based machinery removed from unit. Focus of unit on tractors and their operation.
Unit 14	Assist with Agricultural Crop Production	**Unit 10**	Agricultural Crop Production	Be able to assist with growing, harvesting and storage of agricultural crops.
Unit 15	Introduction to Dairy and Beef Cattle Husbandry	**Unit 4**	Introduction to Animal and Plant Husbandry	Unit specific to *cattle production systems*, *management*, husbandry and health.
Unit 15	Introduction to Dairy and Beef Cattle Husbandry	**Unit 8**	Farm Animal Production	Unit specific to *cattle production systems*, *management*, husbandry and health.
Unit 16	Introduction to Sheep Husbandry	**Unit 4**	Introduction to Animal and Plant Husbandry	Unit specific to *sheep production systems*, *management*, *husbandry and health.*
Unit 16	Introduction to Sheep Husbandry	**Unit 8**	Farm Animal Production	Unit specific to *sheep production systems*, *management*, husbandry and health.

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
Level 2	**5**	**6**	**7**
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 × 5 = 25
Unit 2	2	5	Pass	5	5 × 5 = 25
Unit 3	2	5	Merit	6	5 × 6 = 30
Qualification grade totals		**15**	**Pass**		**80**

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 × 5 = 25
Unit 2	2	5	Merit	6	5 × 6 = 30
Unit 3	2	5	Merit	6	5 × 6 = 30
Qualification grade totals		**15**	**Merit**		**85**

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 × 6 = 30
Unit 2	2	5	Merit	6	5 × 6 = 30
Unit 3	2	5	Distinction	7	5 × 7 = 35
Qualification grade totals		**15**	**Distinction**		**95**

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 × 6 = 30
Unit 2	2	5	Pass	5	5 × 5 = 25
Unit 3	2	5	Distinction	7	5 × 7 = 35
Unit 6	2	10	Pass	5	10 × 5 = 50
Unit 8	3	5	Pass	7	5 × 7 = 35
Qualification grade totals		**30**	**Merit**		**175**

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 × 6 = 30
Unit 2	2	5	Pass	5	5 × 5 = 25
Unit 3	2	5	Distinction	7	5 × 7 = 35
Unit 6	2	10	Merit	6	10 × 6 = 60
Unit 9	1	5	Merit	4	5 × 4 = 20
Unit 10	2	10	Distinction	7	10 × 7 = 70
Unit 11	2	10	Merit	6	10 × 6 = 60
Unit 14	2	10	Merit	6	10 × 6 = 60
Qualification grade totals		**60**	**Merit**		**360**

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