Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture

Specification

First teaching from January 2019

First certification from 2021

Issue 4

Pearson
BTEC Level 3 National Extended Diploma in Forestry and Arboriculture

Specification

First teaching September 2019

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Edexcel, BTEC and LCCI qualifications

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About Pearson

Pearson is the world's leading learning company, with 25,000 employees in more than 70 countries working to help people of all ages to make measurable progress in their lives through learning. We put the learner at the centre of everything we do, because wherever learning flourishes, so do people. Find out more about how we can help you and your learners at qualifications.pearson.com

This specification is Issue 4. We will inform centres of any changes to this issue. The latest issue can be found on our website.

Welcome

With a track record built over 30 years of learner success, BTEC Nationals are widely recognised by industry and higher education as the signature vocational qualification at Level 3. They provide progression to the workplace either directly or via study at a higher level. Proof comes from YouGov research, which shows that 62 per cent of large companies have recruited employees with BTEC qualifications. What's more, well over 100,000 BTEC students apply to UK universities every year and their BTEC Nationals are accepted by over 150 UK universities and higher education institutes for relevant degree programmes either on their own or in combination with A Levels.

Why are BTECs so successful?

BTECs embody a fundamentally learner-centred approach to the curriculum, with a flexible, unit-based structure and knowledge applied in project-based assessments. They focus on the holistic development of the practical, interpersonal and thinking skills required to be able to succeed in employment and higher education.

When creating the BTEC Nationals in this suite, we worked with many employers, higher education providers, colleges and schools to ensure that their needs are met. Employers are looking for recruits with a thorough grounding in the latest industry requirements and work-ready skills such as teamwork. Higher education needs students who have experience of research, extended writing and meeting deadlines.

We have addressed these requirements with:

- a range of BTEC sizes, each with a clear purpose, so there is something to suit each learner's choice of study programme and progression plans
- refreshed content that is closely aligned with employers' and higher education needs for a skilled future workforce
- assessments and projects chosen to help learners progress to the next stage. This means some are set by you to meet local needs, while others are set and marked by Pearson so that there is a core of skills and understanding that is common to all learners. For example, a written test can be used to check that learners are confident in using technical knowledge to carry out a certain job.

We provide a wealth of support, both resources and people, to ensure that learners and their teachers have the best possible experience during their course. See *Section 10* for details of the support we offer.

A word to learners

Today's BTEC Nationals are demanding, as you would expect of the most respected applied learning qualification in the UK. You will have to choose and complete a range of units, be organised, take some assessments that we will set and mark and keep a portfolio of your assignments. But you can feel proud to achieve a BTEC because, whatever your plans in life – whether you decide to study further, go on to work or an Apprenticeship, or set up your own business – your BTEC National will be your passport to success in the next stage of your life.

Good luck, and we hope you enjoy your course.

Collaborative development

Learners completing their BTEC Nationals in Forestry and Arboriculture will be aiming to go on to employment, often via the stepping stone of higher education. It was, therefore, essential that we developed these qualifications in close collaboration with experts from professional bodies, businesses and universities, and with the providers who will be delivering the qualifications. To ensure that the content meets providers' needs and provides high-quality preparation for progression, we engaged experts. We are very grateful to all the university and further education lecturers, teachers, employers, professional body representatives and other individuals who have generously shared their time and expertise to help us develop these new qualifications.

Employers, professional bodies and higher education providers that have worked with us include:

- Myerscough College
- The Forestry Commission
- University of Central Lancashire
- University of West of England.

In addition, universities, professional bodies and businesses have provided letters of support confirming that these qualifications meet their entry requirements. These letters can be viewed on our website.

Summary of Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture specification Issue 4 changes

Summary of changes made between the previous issue and this current issue	Page number
The last paragraph of the *Qualification and unit content* section has been amended to allow centres delivering the qualification above to alter the content to reflect the context of the country where it is being delivered.	Page 5

If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

Contents

Introduction to BTEC National qualifications for the forestry and arboriculture sector

This specification contains the information you need to deliver the Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture. The specification signposts you to additional handbooks and policies. It includes all the units for this qualification.

This qualification is part of the suite of forestry and arboriculture qualifications offered by Pearson. In the suite there are qualifications that focus on different progression routes, allowing learners to choose the one best suited to their aspirations.

All qualifications in the suite share some common units and assessments, allowing learners some flexibility in moving between qualifications where they wish to select a more specific progression route. The qualification titles are given below.

Within this suite are BTEC National qualifications for post-16 learners who want to specialise in a specific industry, occupation or occupational group. The qualifications give learners specialist knowledge and technical skills, enabling entry to an Apprenticeship or other employment, or progression to related higher education courses. Learners taking these qualifications must have a significant level of employer involvement in their programmes.

In the forestry and arboriculture sector these are:

Pearson BTEC Level 3 National Foundation Diploma in Forestry and Arboriculture (603/1904/5)

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (603/2678/5).

The Foundation Diploma (540 GLH) is approved as an Tech Level qualification for 2020 performance measures by the DFE. The Extended Diploma (1080 GLH) is not currently recognised for performance measures. Please check our website for details of subsequent availability for future DFE performance measures.

This specification signposts all the other essential documents and support that you need as a centre in order to deliver, assess and administer the qualification, including the staff development required. A summary of all essential documents is given in *Section 7*. Information on how we can support you with this qualification is given in *Section 10*.

The information in this specification is correct at the time of publication.

Total Qualification Time

For all regulated qualifications, Pearson specifies a total number of hours that it is estimated learners will require to complete and show achievement for the qualification: this is the Total Qualification Time (TQT). Within TQT, Pearson identifies the number of Guided Learning Hours (GLH) that we estimate a centre delivering the qualification might provide. Guided learning means activities, such as lessons, tutorials, online instruction, supervised study and giving feedback on performance, that directly involve teachers and assessors in teaching, supervising and invigilating learners. Guided learning includes the time required for learners to complete external assessment under examination or supervised conditions.

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

BTEC Nationals have been designed around the number of hours of guided learning expected. Each unit in the qualification has a GLH value of 60, 90 or 120. There is then a total GLH value for the qualification.

Each qualification has a TQT value. This may vary within sectors and across the suite, depending on the nature of the units in each qualification and the expected time for other required learning.

The following table show all the qualifications in this sector and their GLH and TQT values.

Qualifications, sizes and purposes at a glance

Title	Size and structure	Summary purpose
Pearson BTEC Level 3 National Foundation Diploma in Forestry and Arboriculture	540 GLH (850 TQT). Equivalent in size to 1.5 A Levels. Six units, of which five are mandatory and two are external. Mandatory content (89%) External assessment (44%).	This qualification is designed as a one-year, full-time course, or as part of a two-year, full-time study programme for learners who want to take it alongside another area of complementary study. It is intended as a Tech Level qualification and supports progression to careers in the forestry and arboriculture sector. This qualification is primarily for learners who are intending to gain employment directly, in roles such as trainee forester or forest worker, but can also be used to progress to an apprenticeship or a higher-education course in forestry and arboriculture.
Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture*	1080 GLH (1690 TQT) Equivalent in size to three A Levels. Fifteen units of which twelve are mandatory and three are external. Mandatory content (83%). External assessment (33%).	This qualification is a two-year, full-time course for post-16 learners and is intended as a Tech Level qualification. It is designed for learners who want to focus their studies on the forestry and arboriculture sector with a firm intention of progressing to employment. Learners can select one of two pathways that focus on particular disciplines in either forestry or arboriculture, leading to roles such as a working arborist, or forest worker. Progress could be either directly to employment in Level 3 job roles, or via higher education courses in this area.

Learners must not register on the BTEC Level 3 Nationals in Agriculture, Horticulture or Countryside Management at the same time as the BTEC Level 3 Nationals in Forestry and Arboriculture, due to the overlap of content and assessment.

* This qualification is not currently recognised by DFE for performance measures.

Structures of the qualifications at a glance

This table shows all the units and the qualifications to which they contribute. The full structure for this Pearson BTEC Level 3 National in Forestry and Arboriculture is shown in *Section 2*. **You must refer to the full structure to select units and plan your programme.**

Key

	Unit assessed externally	**M**	Mandatory units	**O**	Optional units

Unit (number and title)	Unit size (GLH)	Foundation Diploma (540 GLH)	Extended Diploma* (1080 GLH)	
			ARBORICULTURE	FORESTRY
1 Professional Working Responsibilities	120	M	M	M
2 Plant and Soil Science	120	M	M	M
3 Contemporary Issues in Land-based Sectors	120		M	M
4 Work Experience in the Land-based Sectors	60	M	M	M
5 Estate Skills	60	O	M	M
6 Identification, Planting and Care of Trees	60		M	M
7 Tree and Shrub Pruning and Maintenance	60		M	M
8 Tree Pests and Diseases	60	O	M	M
9 Tree-felling Activities	60	M	M	M
10 Forestry and Arboricultural Machinery Operations	60		M	M
11 Aerial Arboriculture Skills	60		M	
12 Surveying, Inspecting and Measuring Trees	60		O	
13 Trees in Urban Environments	60		M	
14 Timber Conversion and Utilisation	60		O	M
15 Woodland Management	60		O	O
16 Forestry and Silviculture	60			M
17 Forest Recreation	60			O
18 Wildlife Ecology and Conservation Management	60		O	O
19 Developing a Land-based Enterprise	60		O	O
20 Woodland Project	120	M		

* This qualification is not currently recognised by DFE for performance measures.

Qualification and unit content

Pearson has developed the content of the new BTEC Nationals in collaboration with employers and representatives from higher education and relevant professional bodies. In this way, we have ensured that content is up to date and that it includes the knowledge, understanding, skills and attributes required in the sector.

Each qualification in the suite has its own purpose. The mandatory content provides a balance of breadth and depth ensuring that all learners have a strong basis for developing technical skills required in the sector. Learners are then offered the opportunity to develop a range of technical skills and attributes expected by employers with some opportunity to select between optional units where a degree of choice for individual learners to study content relevant to their own progression choices is appropriate. It is expected that learners will apply their learning in relevant employment and sector contexts during delivery and have opportunities to engage meaningfully with employers.

The proportion of mandatory content ensures that all learners are following a coherent programme of study and acquiring the knowledge, understanding and skills that will be recognised and valued. Learners are expected to show achievement across mandatory units as detailed in *Section 2*.

BTEC Nationals have always required applied learning that brings together knowledge and understanding (the cognitive domain) with practical and technical skills (the psychomotor domain). This is achieved through learners performing vocational tasks that encourage the development of appropriate vocational behaviours (the affective domain) and transferable skills. Transferable skills are those such as communication, teamwork, planning and completing tasks to high standards, which are valued in both the workplace and in higher education.

Our approach provides rigour and balance, and promotes the ability to apply learning immediately in new contexts. Further details can be found in *Section 2*.

Centres should ensure that delivery of content is kept up to date. Some of the units within the specification may contain references to legislation, policies, regulations and organisations, which may not be applicable in the country you deliver this qualification in (if teaching outside of England), or which may have gone out-of-date during the lifespan of the specification. In these instances, it is possible to substitute such references with ones that are current and applicable in the country you deliver subject to confirmation by your Standards Verifier.

Assessment

Assessment is specifically designed to fit the purpose and objective of the qualification. It includes a range of assessment types and styles suited to vocational qualifications in the sector. There are three main forms of assessment that you need to be aware of: external, internal and synoptic.

Externally-assessed units

Each external assessment for a BTEC National is linked to a specific unit. All of the units developed for external assessment are of 120 GLH to allow learners to demonstrate breadth and depth of achievement. Each assessment is taken under specified conditions, then marked by Pearson and a grade awarded. Learners are permitted to resit external assessments during their programme. You should refer to our website for current policy information on permitted retakes.

The styles of external assessment used for qualifications in the forestry and arboriculture suite are:

- examinations – all learners take the same assessment at the same time, normally with a written outcome
- set tasks – learners take the assessment during a defined window and demonstrate understanding through completion of a vocational task.

Some external assessments include a period of preparation using set information. External assessments are available twice a year. For detailed information on the external assessments please see the table in *Section 2*. For further information on preparing for external assessment see *Section 5*.

Internally-assessed units

Most units in the sector are internally assessed and subject to external standards verification. This means that you set and assess the assignments that provide the final summative assessment of each unit, using the examples and support that Pearson provides. Before you assess you will need to become an approved centre, if you are not one already. You will need to prepare to assess using the guidance in *Section 6*.

In line with the requirements and guidance for internal assessment, you select the most appropriate assessment styles according to the learning set out in the unit. This ensures that learners are assessed using a variety of styles to help them develop a broad range of transferable skills. Learners could be given opportunities to:

- demonstrate practical and technical skills using appropriate tools or processes
- complete realistic tasks to meet specific briefs or particular purposes
- write up the findings of their own research
- use case studies to explore complex or unfamiliar situations
- carry out projects for which they have choice over the direction and outcomes.

You will make grading decisions based on the requirements and supporting guidance given in the units. Learners may not make repeated submissions of assignment evidence. For further information see *Section 6*.

Synoptic assessment

Synoptic assessment requires learners to demonstrate that they can identify and use effectively, in an integrated way, an appropriate selection of skills, techniques, concepts, theories and knowledge from across the whole sector as relevant to a key task. BTEC learning has always encouraged learners to apply their learning in realistic contexts using scenarios and realistic activities that will permit learners to draw on and apply their learning. For these qualifications we have formally identified units that contain a synoptic assessment task. Synoptic assessment must take place after the teaching and learning of other mandatory units in order for learners to be able to draw from the full range of content. The synoptic assessment gives learners an opportunity to independently select and apply learning from across their programmes in the completion of a vocational task. Synoptic tasks may be in internally- or externally-assessed units. The particular units that contain the synoptic tasks for this qualification are shown in the structure in *Section 2*.

Language of assessment

Assessment of the internal and external units for these qualifications will be available in English. All learner work must be in English. A learner taking the qualifications may be assessed in British or Irish Sign Language where it is permitted for the purpose of reasonable adjustment. For information on reasonable adjustments see *Section 7*.

Grading for units and qualifications

Achievement in the qualification requires a demonstration of depth of study in each unit, assured acquisition of a range of practical skills required for employment or progression to higher education, and successful development of transferable skills. Learners achieving a qualification will have achieved across mandatory units, including external and synoptic assessment.

Units are assessed using a grading scale of Distinction (D), Merit (M), Pass (P), Near Pass (N) and Unclassified (U). The grade of Near Pass is used for externally-assessed units only. All mandatory and optional units contribute proportionately to the overall qualification grade, for example a unit of 120 GLH will contribute double that of a 60 GLH unit.

Qualifications in the suite are graded using a scale of P to D*, **or** PP to D*D*, **or** PPP to D*D*D*. Please see *Section 9* for more details. The relationship between qualification grading scales and unit grades will be subject to regular review as part of Pearson's standards monitoring processes on the basis of learner performance and in consultation with key users of the qualification.

UCAS Tariff points

The BTEC Nationals attract UCAS points. Please go to the UCAS website for full details of the points allocated.

1 Qualification purpose

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture

In this section, you will find information on the purpose of this qualification and how its design meets that purpose through the qualification objective and structure. We publish a full 'Statement of Purpose' for each qualification on our website. These statements are designed to guide you and potential learners to make the most appropriate choice about the size of qualification suitable at recruitment.

Who is this qualification for?

The Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture is equivalent in size to three A Levels. It is designed to meet the Tech Bacc measure when studied alongside Level 3 mathematics and the Extended Project Qualification (EPQ). Outside the Tech Bacc, it will normally be the only qualification in a two-year study programme. It is ideal for learners who are looking for a full-time course specialising in the forestry and arboriculture sector, and who have a firm intention of progressing to employment in one of the wide variety of roles available.

As well as direct entry to employment, this qualification will prepare learners for higher study such as a specialist degree or a BTEC Higher National Diploma. These routes give learners the opportunity to enter the sector at a higher level or in a more specialist role.

No prior study of the sector is needed but learners should normally have a range of achievement at Level 2, in GCSEs or equivalent qualifications, including English, mathematics and science.

What does this qualification cover?

There are 10 mandatory units that are common to both pathways. The content of these units is designed to give a general grounding that is relevant to all. They cover the following aspects of forestry and arboriculture:

- professional working responsibilities
- plant and soil science
- contemporary issues in the land-based sectors
- work experience in the land-based sectors
- estate skills
- identification, planting and care of trees
- tree and shrub pruning and maintenance
- tree pests and diseases
- tree-felling activities
- forestry and arboricultural machinery operations.

Each pathway has two further mandatory units, the content of which is designed to enable learners to begin to specialise in one area where there are more specific job roles or further training opportunities. The particular pathways covered are:

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Arboriculture)

- aerial arboriculture skills
- trees in urban environments.

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Forestry)

- timber conversion and utilisation
- forestry and silviculture.

Learners will be able to add three optional units to the mandatory content. These have been designed to support progression to a range of employment opportunities in the forestry and arboriculture sector, and to a range of higher education courses. Optional units will introduce learners to a sector-specialist area of their choice, including working in particular environments, and they will link with relevant occupational areas. The optional units cover areas such as the following.

Arboriculture pathway:

- surveying, inspecting and measuring trees
- developing a land-based enterprise
- woodland management.

Forestry pathway:

- wildlife ecology and conservation management
- forest recreation
- woodland management.

While taking this qualification, learners will be required to engage with sector employers as part of their course, including 300 hours of work experience with an employer in the sector, where they will be given opportunities to develop practical skills in preparation for employment.

What could this qualification lead to?

All pathways in this qualification will prepare learners for direct employment in the forestry and arboriculture sector. The pathways are suitable if learners want to enter a particular specialist area of work such as:

- working arborist
- forest worker.

Studying any one pathway does not restrict progression but it does help employers to understand areas that learners have studied.

If learners have taken additional Level 3 qualifications, they could increase their professional industry skills and competencies, and gain increased responsibilities in the above job roles. Additional qualifications include:

- Level 3 Award in Felling Large Trees and Crown Breakdown
- Level 3 Award in Felling and Processing Trees Over 380 mm
- Level 3 Certificate in Silviculture.

There are many roles in this sector where recruitment is at graduate level. This qualification is recognised by higher-education providers as contributing to admission requirements for many relevant courses in the forestry and arboriculture sector, for example:

- BSc (Hons) in Arboriculture and Tree Management
- BSc (Hons) in Arboriculture and Urban Forestry
- BSc (Hons) in Arboriculture
- BSc (Hons) in Forestry
- FdSc in Arboriculture.

Learners should always check the entry requirements for degree programmes with specific higher-education providers.

How does the qualification provide employability and technical skills?

In the BTEC National units, there are opportunities during the teaching and learning phase to give learners practice in developing employability skills. Where employability skills are referred to in this specification, we are generally referring to skills in the following three main categories:

- **cognitive and problem-solving skills:** using critical thinking, approaching non-routine problems applying expert and creative solutions, using systems and technology
- **interpersonal skills:** communicating, working collaboratively, negotiating and influencing, self-presentation
- **intrapersonal skills:** self-management, adaptability and resilience, self-monitoring and development.

There are also specific requirements in some units for assessment of these skills where relevant, for example, where learners are required to undertake real or simulated activities.

Many of the mandatory and specified optional units encourage learners to develop the specific practical skills that employers are looking for.

How does the qualification provide transferable knowledge and skills for higher education?

All BTEC Nationals provide transferable knowledge and skills that prepare learners for progression to university or other higher study either immediately or for career progression. The transferable skills that universities value include:

- the ability to learn independently
- the ability to research actively and methodically
- the ability to give presentations and be active group members.

BTEC learners can also benefit from opportunities for deep learning where they are able to make connections among units and select areas of interest for detailed study. BTEC Nationals provide a vocational context in which learners can become prepared for lifelong learning through:

- reading technical texts
- effective writing
- analytical skills
- preparation for assessment methods used in degrees.

2 Structure

Qualification structure

The structure for the qualification pathways in this specification are:

- Pearson BTEC National Level 3 Extended Diploma in Forestry and Arboriculture (Arboriculture) see *page 11*
- Pearson BTEC National Level 3 Extended Diploma in Forestry and Arboriculture (Forestry), see *page 13*.

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Arboriculture)*

Mandatory units

There are twelve mandatory units, nine internal and three external. Learners must complete and achieve at Near Pass grade or above all mandatory external units. Learners must complete and achieve a Pass or above in all mandatory internal units in Group A.

Learners must complete the mandatory internal units in Group B.

Optional units

Learners must complete at least three optional units.

Learners must complete and achieve at pass grade or above in at least six units across groups B and C.

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Arboriculture)				
Unit number	**Unit title**	**GLH**	**Type**	**How assessed**
	Mandatory units group A – learners complete and achieve all units			
1	Professional Working Responsibilities	**120**	**Mandatory**	External
2	Plant and Soil Science	**120**	**Mandatory**	External
3	Contemporary Issues in the Land-based Sectors	**120**	**Mandatory**	External
6	Identification, Planting and Care of Trees	**60**	**Mandatory**	Internal
9	Tree-felling Activities	**60**	**Mandatory and Synoptic**	Internal
13	Trees in Urban Environments	**60**	**Mandatory and Synoptic**	Internal
	Mandatory units group B – learners complete all units			
4	Work Experience in the Land-based Sectors	**60**	**Mandatory**	Internal
5	Estate Skills	**60**	**Mandatory**	Internal
7	Tree and Shrub Pruning and Maintenance	**60**	**Mandatory**	Internal
8	Tree Pests and Diseases	**60**	**Mandatory**	Internal
10	Forestry and Arboricultural Machinery Operations	**60**	**Mandatory**	Internal
11	Aerial Arboriculture Skills	**60**	**Mandatory**	Internal

* This qualification is not currently recognised by DFE for performance measures.

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Arboriculture)				
Unit number	Unit title	GLH	Type	How assessed
	Optional units group C – learners complete three units			
12	Surveying, Inspecting and Measuring Trees	60	Optional	Internal
14	Timber Conversion and Utilisation	60	Optional	Internal
15	Woodland Management	60	Optional	Internal
18	Wildlife Ecology and Conservation Management	60	Optional	Internal
19	Developing a Land-based Enterprise	60	Optional	Internal

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Forestry)*

Mandatory units

There are twelve mandatory units, nine internal and three external. Learners must complete and achieve at Near Pass grade or above all mandatory external units. Learners must complete and achieve a Pass or above in all mandatory internal units in Group A.

Learners must complete the mandatory internal units in Group B.

Optional units

Learners must complete at least three optional units.

Learners must complete and achieve at pass grade or above in at least six units across groups B and C.

Unit number	Unit title	GLH	Type	How assessed
Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Forestry)				
	Mandatory units group A – learners complete and achieve all units			
1	Professional Working Responsibilities	**120**	**Mandatory**	External
2	Plant and Soil Science	**120**	**Mandatory**	External
3	Contemporary Issues in the Land-based Sectors	**120**	**Mandatory**	External
6	Identification, Planting and Care of Trees	**60**	**Mandatory**	Internal
9	Tree-felling Activities	**60**	**Mandatory and Synoptic**	Internal
16	Forestry and Silviculture	**60**	**Mandatory and Synoptic**	Internal
	Mandatory units group B – learners complete all units			
4	Work Experience in the Land-based Sectors	**60**	**Mandatory**	Internal
5	Estate Skills	**60**	**Mandatory**	Internal
7	Tree and Shrub Pruning and Maintenance	**60**	**Mandatory**	Internal
8	Tree Pests and Diseases	**60**	**Mandatory**	Internal
10	Forestry and Arboricultural Machinery Operations	**60**	**Mandatory**	Internal
14	Timber Conversion and Utilisation	**60**	**Mandatory**	Internal
	Optional units group C – learners complete 3 units			
15	Woodland Management	**60**	**Optional**	Internal
17	Forest Recreation	**60**	**Optional**	Internal
18	Wildlife Ecology and Conservation Management	**60**	**Optional**	Internal
19	Developing a Land-based Enterprise	**60**	**Optional**	Internal

* This qualification is not currently recognised by DFE for performance measures.

External assessment

This is a summary of the type and availability of external assessment, which is of units making up 33 per cent of the total qualification GLH. See *Section 5* and the units and sample assessment materials for more information.

Unit	Type	Availability
Unit 1: Professional Working Responsibilities	• A task set and marked by Pearson and completed under supervised conditions. • The supervised assessment is 3 hours in a specified session timetabled by Pearson. • Written submission of evidence. • 60 marks.	**Jan and May/June** **First assessment January 2020**
Unit 2: Plant and Soil Science	• A written examination set and marked by Pearson. • 1 hour 30 minutes. • Written submission. • 80 marks.	**Jan and May/June** **First assessment January 2020**
Unit 3: Contemporary Issues in the Land-based Sectors	• A task set and marked by Pearson and completed under supervised conditions. • Learners will be given preparatory information before the supervised assessment. • The supervised assessment is 2 hours and 30 minutes in a specified session timetabled by Pearson. • Written submission of evidence. • 64 marks.	**Jan and May/June** **First assessment January 2021**

Synoptic assessment

The mandatory synoptic assessment requires learners to select and apply learning from across the qualification to the completion of defined key vocational tasks.

Learners complete the tasks using knowledge and understanding from their studies of the sector and apply both transferable and specialist knowledge and skills.

In the Arboriculture pathway across the assessment for *Unit 9: Tree-felling Activities*, and *Unit 13: Trees in Urban Environments*, learners complete activities relating to small-diameter tree-felling projects including: inspections of trees, establishing their condition and needs; inspection and assessment the site prior to felling activities; use and maintenance of felling equipment, and the felling of small-diameter trees, disposing of waste. Learners plan for and manage the maintenance of established trees in urban environments, including ground and aerial pruning and/or dismantling, in order to optimise the health and function of trees, and maintain them as a safe urban-planting resource. The assessment draws together arboriculture working principles and practices gained throughout the mandatory content of the qualification pathway.

Learners complete the tasks using knowledge, understanding and skills from their studies of the sector and by applying both transferable and specialist knowledge and skills, including from: *Unit 1: Professional Working Responsibilities*, knowledge of safe working practices in relation to themselves and others, and industry standard waste management practices; *Unit 2: Plant and Soil Science*, knowledge of requirements for healthy tree growth; *Unit 3: Contemporary Issues in the Land-based Sectors* consideration of issues facing the arboriculture sector such as urban greening, *Unit 4: Work Experience in the Land-based Sectors*, experience of and insight into real working practices in the sector; *Unit 5: Estate Skills*, practice relating to the supervision of others involved in practical activities; *Unit 6: Identification, Planting and Care of Trees*, practice relating to the correct identification of trees, and assessment of their maintenance needs; *Unit 7: Tree and Shrub Pruning and Maintenance*, practice relating to the assessment of the structural form and make-up of trees, tree pruning needs, pruning methods, purposes and principles, and knowledge of legal considerations relating to tree pruning and felling; *Unit 8: Tree Pests and Diseases*, knowledge and skills related to the management of tree health; *Unit 10: Forestry and Arboricultural Machinery Operations*, use and maintenance of specialised machinery; *Unit 11: Aerial Arboriculture Skills* high tree inspections, climbing techniques, and techniques for pruning and dismantling trees at height.

In assessing these units assignments will require learners to select from and apply their learning from across their programme. The units provide further information.

In the Forestry pathway, across the assessment for *Unit 9: Tree-felling Activities* and *Unit 16: Forestry and Silviculture*, learners complete activities relating to small-diameter tree-felling projects including: inspections of trees, establishing their condition and needs; inspection and assessment the site prior to felling activities; use and maintenance of felling equipment, and the felling of small-diameter trees, disposing of waste. Learners complete forest and/or woodland tree management activities, including site clearance and tree maintenance, to meet the management objectives of forests and woodlands such as timber production or recreational activities. The assessment draws together forestry working principles and practices gained throughout the mandatory content of the qualification pathway.

Learners complete the tasks using knowledge, understanding and skills from their studies of the sector and by applying both transferable and specialist knowledge and skills, including from: *Unit 1: Professional Working Responsibilities*, knowledge of safe working practices in relation to themselves and others, and industry standard waste management practices; *Unit 2: Plant and Soil Science*, knowledge of requirements for healthy tree growth; *Unit 3: Contemporary Issues in the Land-based Sectors* consideration of issues facing the forestry sector such as forest usage, *Unit 4: Work Experience in the Land-based Sectors*, experience of and insight into real working practices in the sector; *Unit 5: Estate Skills*, practice relating to the supervision of others involved in practical activities; *Unit 6: Identification, Planting and Care of Trees*, practice relating to the correct identification of trees, and assessment of their maintenance needs; *Unit 7: Tree and Shrub Pruning and Maintenance*, practice relating to the assessment of the structural form and make-up of trees, tree pruning needs, pruning methods, purposes and principles, and knowledge of legal considerations relating to tree pruning and felling; *Unit 8: Tree Pests and Diseases*, knowledge and skills related to the management of tree health; *Unit 10: Forestry and Arboricultural Machinery Operations*, use and maintenance of specialised machinery; *Unit 14: Timber Conversion and Utilisation*, production of marketable timber products using conversion equipment.

In assessing these units assignments will require learners to select from and apply their learning from across their programme. The units provide further information.

Employer involvement in assessment and delivery

You need to ensure that learners on this qualification have a significant level of employer involvement in programme delivery or assessment. See *Section 4* for more information.

3 Units

Understanding your units

The units in this specification set out our expectations of assessment in a way that helps you to prepare your learners for assessment. The units help you to undertake assessment and quality assurance effectively.

Each unit in the specification is set out in a similar way. There are two types of unit format:

- internal units
- external units.

This section explains how the units work. It is important that all teachers, assessors, internal verifiers and other staff responsible for the programme review this section.

Internal units

Section	Explanation
Unit number	The number is in a sequence in the sector. Numbers may not be sequential for an individual qualification.
Unit title	This is the formal title that we always use and it appears on certificates.
Level	All units are at Level 3 on the national framework.
Unit type	This shows if the unit is internal or external only. See structure information in *Section 2* for full details.
GLH	Units may have a GLH value of 120, 90 or 60. This indicates the numbers of hours of teaching, directed activity and assessment expected. It also shows the weighting of the unit in the final qualification grade.
Unit in brief	A brief formal statement on the content of the unit that is helpful in understanding its role in the qualification. You can use this in summary documents, brochures etc.
Unit introduction	This is designed with learners in mind. It indicates why the unit is important, how learning is structured, and how learning might be applied when progressing to employment or higher education.
Learning aims	These help to define the scope, style and depth of learning of the unit. You can see where learners should be learning standard requirements ('understand') or where they should be actively researching ('investigate'). You can find out more about the verbs we use in learning aims in *Appendix 2*.
Summary of unit	This new section helps teachers to see at a glance the main content areas against the learning aims and the structure of the assessment. The content areas and structure of assessment are required. The forms of evidence given are suitable to fulfil the requirements.
Content	This section sets out the required teaching content of the unit. Content is compulsory except when shown as 'e.g.'. Learners should be asked to complete summative assessment only after the teaching content for the unit or learning aim(s) has been covered.

Section	Explanation
Assessment criteria	Each learning aim has Pass and Merit criteria. Each assignment has at least one Distinction criterion.
	A full glossary of terms used is given in *Appendix 2*. All assessors need to understand our expectations of the terms used.
	Distinction criteria represent outstanding performance in the unit. Some criteria require learners to draw together learning from across the learning aims.
Essential information for assignments	This shows the maximum number of assignments that may be used for the unit to allow for effective summative assessment, and how the assessment criteria should be used to assess performance.
Further information for teachers and assessors	The section gives you information to support the implementation of assessment. It is important that this is used carefully alongside the assessment criteria.
Resource requirements	Any specific resources that you need to be able to teach and assess are listed in this section. For information on support resources see *Section 10*.
Essential information for assessment decisions	This information gives guidance for each learning aim or assignment of the expectations for Pass, Merit and Distinction standard. This section contains examples and essential clarification.
Links to other units	This section shows you the main relationship among units. This section can help you to structure your programme and make best use of materials and resources.
Employer involvement	This section gives you information on the units that can be used to give learners involvement with employers. It will help you to identify the kind of involvement that is likely to be successful.

External units

Section	Explanation
Unit number	The number is in a sequence in the sector. Numbers may not be sequential for an individual qualification.
Unit title	This is the formal title that we always use and it appears on certificates.
Level	All units are at Level 3 on the national framework.
Unit type	This shows if the unit is internal or external only. See structure information in *Section 2* for full details.
GLH	Units may have a GLH value of 120, 90 or 60 GLH. This indicates the numbers of hours of teaching, directed activity and assessment expected. It also shows the weighting of the unit in the final qualification grade.
Unit in brief	A brief formal statement on the content of the unit.
Unit introduction	This is designed with learners in mind. It indicates why the unit is important, how learning is structured, and how learning might be applied when progressing to employment or higher education.
Summary of assessment	This sets out the type of external assessment used and the way in which it is used to assess achievement.
Assessment outcomes	These show the hierarchy of knowledge, understanding, skills and behaviours that are assessed. Includes information on how this hierarchy relates to command terms in sample assessment materials (SAMs).
Essential content	For external units all the content is obligatory, the depth of content is indicated in the assessment outcomes and sample assessment materials (SAMs). The content will be sampled through the external assessment over time, using the variety of questions or tasks shown.
Grade descriptors	We use grading descriptors when making judgements on grade boundaries. You can use them to understand what we expect to see from learners at particular grades.
Key terms typically used in assessment	These definitions will help you analyse requirements and prepare learners for assessment.
Resources	Any specific resources that you need to be able to teach and assess are listed in this section. For information on support resources see *Section 10*.
Links to other units	This section shows the main relationship among units. This section can help you to structure your programme and make best use of materials and resources.
Employer involvement	This section gives you information on the units that can be used to give learners involvement with employers. It will help you to identify the kind of involvement that is likely to be successful.

Index of units

This section contains all the units developed for this qualification. Please refer to *page 4* to check which units are available in all qualifications in the forestry and arboriculture sector.

Unit 1: Professional Working Responsibilities

Level: **3**

Unit type: **External**

Guided learning hours: **120**

Unit in brief

Learners study professional responsible working practices with a focus on ensuring health and safety, wellbeing, resource management and waste management in the land-based sectors.

Unit introduction

The land-based sectors are made up of diverse industries, with the majority of people being self-employed. The sectors directly manage almost 90% of the UK's land mass. Promoting and maintaining welfare, health and safety, and effective waste management in the working environment is essential for all the sectors. It is also a key requirement for the development of all employees.

In this unit, you will investigate the impact that professional working responsibilities have on personal welfare. You will learn about health and safety legislation, safe working practices, risk assessments, and the professional skills required to work safely and effectively in the land-based sectors. You will develop skills in and knowledge of good practice and professional responsibility towards self and others in the workplace, including the duty of care for the environment, relating this to resource efficiency and responsible management. You will develop your skills to interpret appropriate policies, plans, audits, maps and schematic diagrams in relation to safe working practices, reducing the impact of waste, and analysing documentation to review operational plans. You will develop a sound understanding of personal and professional responsibilities required to enter employment, with a strong awareness of how to be safe and keep others safe. To complete the assessment task within this unit, you will need to draw on your learning from across your programme.

This unit will prepare you for progression to employment in a trainee or supervisory role in the land-based sectors or to set up your own land-based business. You will also gain skills that prepare you for further or higher education courses, including agricultural science, plant science, environmental studies and land management.

Summary of assessment

This unit is assessed by a task set by Pearson.

In the assessed task, learners are given information and will complete a number of activities demonstrating their knowledge and understanding of professional working responsibilities.

The task will be carried out under supervised conditions in a single three-hour session timetabled by Pearson.

The number of marks for the unit is 60.

The assessment availability is January and May/June each year. The first assessment availability is January 2020.

Sample assessment materials will be available to help centres prepare learners for assessment.

Assessment outcomes

AO1 Demonstrate knowledge and understanding of personal and professional working responsibilities and practices, risk management and waste management in the land-based sectors.

AO2 Analyse the application of personal and professional working responsibilities and practices, to risk management, and waste management in the land-based sectors.

AO3 Evaluate approaches to working personal and professional responsibilities and practices, risk management, and waste management in the land-based sectors.

AO4 Make connections between principles and practices of health and safety management in the land-based sectors.

Essential content

The essential content is set out under content areas. Learners must cover all specified content before the assessment.

A Professional responsibilities associated with the workplace

A1 Characteristics of professional working responsibilities and sources of relevant information

- Understanding the scope of professional working responsibilities in the land-based sectors, including:
  o compliance with current legislation and industry codes of practice
  o minimising risk to self, others and the environment
  o following industry best practice
  o working to industry standards
  o developing skills through continuing professional development (CPD).
- Stakeholders associated with developing, promoting and upholding professional responsibilities, including the role of:
  o employers
  o employees
  o government departments and agencies
  o trades unions
  o professional bodies and trade associations.
- Sources of information on professional working responsibilities, including:
  o staff handbooks, staff lists and staff induction documents
  o internet-based resources, including government legislation
  o professional publications
  o codes of conduct
  o contracts of employment.

A2 Characteristics and scope of personal responsibilities in the workplace

- Promoting a working environment and culture that is healthy, safe and effective, including awareness of the role of:
  o industry schemes
  o employer awareness campaigns
  o external training programmes and training providers
  o workplace policies, including whistleblower policies.
- Promoting effective working relationships.
- Awareness of factors that may have a negative impact on own and others' personal welfare and workplace performance, including:
  o personal stress
  o illness
  o work-related stress and workload
  o lone working.
- Accessing sources of assistance and support for wellbeing in the workplace, and their importance, including:
  o NHS services
  o charities
  o professional and trade organisations
  o professional counselling and mental health organisations
  o industry schemes.

- Awareness of the importance of CPD, including:
  - formal and informal opportunities for skills development
  - job shadowing
  - upskilling
  - awareness of industry-specific certificates of competence.

B Health and safety responsibilities

B1 Introduction to health and safety and associated legislation

Awareness of current health and safety legislation that applies in a working environment and how legislation impacts on working activities.

- Statutes and regulations current at the time of assessment:
  - Management of Health and Safety at Work Regulations 1999
  - Health and Safety at Work etc. Act 1974
  - Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013
  - Control of Substances Hazardous to Health (COSHH) Regulations 2002
  - Manual Handling Operations Regulations 1992
  - Work at Height Regulations 2005
  - Provision and Use of Work Equipment Regulations (PUWER) 1998
  - Lifting Operations and Lifting Equipment Regulations (LOLER) 1998
  - The Electricity at Work Regulations 1989.
- Health and safety audit, including:
  - analysis of previous incidents and near misses
  - identifying good practice, poor practice and gaps in health and safety policies and procedures
  - suggesting improvements
  - setting objectives
  - considering cost–benefit implications of issues identified and improvements suggested.

B2 Safe working practices

Awareness of key concepts of safe working practices, with reference to health and safety and the environment.

- The importance of training staff and implementing policies and practices in order to maintain appropriate standards in health and safety practices.
- Access to adequate welfare facilities, including drinking water, toilets, wash facilities.
- Provision of an appropriate and safe working environment, including ventilation, temperature, lighting and adequate maintenance of the working area.
- Provision of first-aid training and equipment, including first aid at work training.
- Using personal protective equipment (PPE) correctly, including when:
  - operating, maintaining and repairing machinery
  - handling organic or hazardous substances
  - requiring protection from ultraviolet (UV) light
  - requiring protection from weather conditions.
- Minimising risk of disease, including:
  - wearing correct clothing
  - using the correct equipment and in the correct manner
  - practising appropriate standards of biosecurity, including hygiene and self-awareness
  - awareness of causes and symptoms of common diseases affecting those working in land-based sectors, including legionnaires' disease, leptospirosis, tetanus, salmonella, Lyme disease, E. coli, cryptosporidium.
- Safe use of machinery, including standard operating procedures (SOPs) for common land-based machinery and the consequences if SOPs are not followed.

- Fire safety, including:
  - fire alarms, extinguishers and blankets
  - ensuring combustible materials are stored in a safe and appropriate way
  - taking reasonable steps to minimise risk of fire and arson in buildings and in the environment.
- Producing and displaying an evacuation plan for all areas, including evacuation in the event of fire.
- Electrical safety, including:
  - requirement for all electrical work to be carried out by a competent person
  - ensuring all electrical equipment is in an appropriate state for use
  - portable appliance testing (PAT) and residual current devices (RCDs)
  - overhead lines and underground cables
  - using rechargeable equipment and tools where appropriate.
- Displaying safety information, including symbols on machinery and product labels.
- Signage, including:
  - fire safety signage
  - signs prohibiting certain behaviour
  - warning signs
  - signs prescribing specific behaviour
  - signs indicating emergency escape or first aid.
- Reporting of accidents and near misses.
- Importance of working in ways that avoid or minimise negative environmental impacts, including:
  - knowledge and application of legislation relevant to environmental impacts
  - being aware of the potential environmental impact, both negative and positive, of activities carried out in the workplace
  - steps that can be taken in order to minimise the negative environmental impacts of work carried out.

B3 Risk assessment

The requirement to carry out risk assessments, dynamic risk assessments and the relationship to current relevant legislation.

- Using and interpreting risk assessments:
  - written or static risk assessments prepared before the activities
  - dynamic risk assessment carried out while undertaking activities
  - qualitative or subjective analysis of risk
  - numerical or objective analysis of risk, including severity and likelihood, hierarchy of controls.
- Risk mitigation strategies and their implementation to manage identified risks, including:
  - cost–benefit analysis of specific mitigation strategies.
- Producing dynamic risk assessments:
  - presence of the general public, employees and contractors
  - interpretation of given information, including product labels, signage and COSHH data sheets
  - lone working practices.

B4 Schematics and maps

The importance of maps and schematic diagrams in establishing the locations of services and drainage, for purposes relating to health and safety, land management and the environment.

- Interpreting and using maps and schematics at a variety of scales.
- Using maps and schematics to analyse and record information, including:
  - the role of Global Positioning System (GPS), aerial photographs and online mapping services.
- Determining and checking the location of services, both overground and underground.

- Equipment and techniques required to locate services accurately, including the:
  - use of cable avoidance tool (CAT) and Genny
  - importance of safe digging techniques
  - importance of isolating services, including gas, water and electric.

B5 Purpose of risk assessment

- Uses and implementation of risk assessments.
- Scenarios for risk assessment use:
  - application of health and safety, environmental and waste management policies and procedures
  - response to a specific incident, including incidents reported in the press
  - the permanent or temporary change of use of land or buildings
  - the purchase or installation of new equipment
  - the development of a new enterprise or new methods of working
  - implementing new initiatives, including changes to legislation.

C Managing waste responsibly and safely

Classify waste, understand the relevant legal responsibilities and develop waste management strategies that consider the cost–benefit implications of waste management.

C1 Animal, plant and non-organic waste

- Definition and sources of organic and inorganic wastes in the land-based sectors, including:
  - aggregates, plastics and metals
  - biodegradable waste
  - controlled waste
  - hazardous waste
  - dirty or foul water
  - grey water.
- Awareness that designated areas in the working environment have specific types of items and processes for waste disposal and management.

C2 Legal responsibilities for waste management

- Current waste management legislation and documentation specific to land-based sectors, including:
  - duty of care
  - waste exemptions
  - waste disposal documentation
  - hazardous and controlled waste
  - custody of waste.
- The waste hierarchy system, including:
  - prevention, including procurement to reduce waste
  - prepare to reuse
  - recycle
  - other recovery, including incineration, anaerobic digestion and gasification, and pyrolysis with energy recovery
  - disposal, including landfill and incineration without energy recovery.
- The potential impact of waste and waste disposal on sustainability, climate change and the environment, including:
  - advantages and disadvantages
  - social factors
  - economic factors
  - environmental factors.
- Innovations in waste management.

C3 Environmental and waste management policies, plans and audits

Documents and processes related to health, safety, the environment and waste management.

- Use of audits to establish the current situation in a business or enterprise.
- Audit procedures, including frequency, checklists, logs, metering and measurements.
- The role of audits to inform or update plans and policies.
- Financial implications and cost–benefit analysis of waste storage and disposal, including:
  - economic advantages and disadvantages of specific waste management strategies
  - environmental advantages and disadvantages of specific waste management strategies.

Grade descriptors

To achieve a grade learners are expected to demonstrate these attributes across the essential content of the unit. The principle of best fit will apply in awarding grades.

Level 3 Pass

Learners will demonstrate knowledge and understanding of basic professional working and safe working in a land-based setting. Learners will demonstrate that they can apply safe working practices to a given context. They will identify areas of good practice, areas where standards could be raised and outline basic methods of doing this. Learners will be able to make some connections between the risks that are associated with a specific activity in a given context, with a range of variables. Learners will apply some valid concepts to the correct and safe management of different types of waste, they will understand the need to apply legal and environmental considerations to this and the management of resources, and its link to sustainability.

Level 3 Distinction

Learners will demonstrate detailed knowledge and understanding of professional working and safe working in a land-based setting. Learners will demonstrate that they can apply justified safe working practices to a given context. They will identify areas of good practice, areas where standards could be raised and outline accurate recommendations for doing this, using a detailed and appropriate action plan. Learners will be able to make appropriate and justified connections between the risks that are associated with a specific activity in a given context, with a range of variables. Learners will apply accurate and detailed concepts to the correct and safe management of different types of waste, they will understand the need to apply legal and environmental considerations to this and the management of resources, and its link to sustainability.

Key words typically used in assessment

The following table shows the key words that will be used consistently by Pearson in our assessments to ensure learners are rewarded for demonstrating the necessary skills.

Please note: the list below will not necessarily be used in every paper/session and is provided for guidance only.

Command or term	Definition
Analyse	Learners present the outcome of methodical and detailed examination either: • to discover the meaning or essential features of a theme, topic or situation • by breaking something down into its components or examining factors methodically and in detail • by identifying separate factors, stating how they are related and explaining how each one contributes to the topic.
Complete	Learners enter relevant information or data as required to a structured item such as a table or diagram.
Dynamic risk assessment	The process of identifying risks and hazards continuously and in response to changes in situations and activities.

Command or term	Definition
Evaluate	Learners review information before bringing it together to form a conclusion or come to a supported judgement of a subject's qualities in relation to its context, drawing on evidence: strengths, weaknesses, alternative actions, significance, relevant data or information.
Health and safety audit	The auditing of information on the effectiveness of health and safety policies and procedures.
Interpretation	Learners are able to draw the meaning, purpose or qualities of something from a stimulus.
Justify/Justification	Learners give reasons or evidence to: • support an opinion and/or decision • prove something right or reasonable.
Recommend	Learners put forward someone or something with approval as being suitable for a particular purpose or role.
Strategies	Method or plan to bring out a desired outcome, such as the achievement of a goal or solution to a problem.
Waste management plan	A plan for the disposal of a range of waste materials, showing consideration of legal requirements, environmental responsibilities and sustainability.

Links to other units

This unit links to:
- Unit 4: Work Experience in the Land-based Sectors
- Unit 20: Woodland Project.

Employer involvement

This unit would benefit from employer involvement in the form of:
- masterclasses
- technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 2: Plant and Soil Science

Level: **3**
Unit type: **External**
Guided learning hours: **120**

Unit in brief

Learners study the structural and functional features of plants and soils that inform management practices.

Unit introduction

Plants are one of the most amazing and varied living organisms on our planet. They supply us with our oxygen, provide us with food and shape our landscape. Understanding how plants grow and what they need to be successful is essential for their management in a range of sectors and for a broad range of purposes, including growing crops for people or livestock, growing decorative plants and providing environments for leisure or habitat conservation.

In this unit, you will develop an understanding of external and internal plant structures, including plant cells. You will learn about the relationship between these structures and their function, such as how they obtain their nutrition and how they reproduce. You will gain an understanding of important life processes of plants and how these are affected by their environment. You will learn about the physical and chemical characteristics of soil. You will also learn different types of soil, their characteristics and the essential nutrition in soils that plants need to ensure their success.

The knowledge and skills gained in this unit are fundamental to any role where you grow, plant, manage or establish plants. Whether you are working in forestry, arable farming, sports turf, landscaping or gardening, this unit will give you a foundation for further study at higher education or roles in your chosen sector.

Summary of assessment

This unit is assessed by an examination set and marked by Pearson.

The examination will last for 1 hour and 30 minutes. The number of marks for the paper is 80.

The paper will consist of a variety of question types, including extended open response.

The assessment availability is January and May/June each year. The first assessment availability is January 2020.

Sample assessment materials will be available to help centres prepare learners for assessment.

Assessment outcomes

AO1 Demonstrate knowledge of structures and functions in plant and soil science

Command words: complete, describe, give, identify, match, name, state

Marks: ranges from 1 to 4 marks

AO2 Demonstrate understanding of plant and soil science, including soil and plant management practices

Command words: define, describe, explain, give, label, link, match, outline

Marks: ranges from 1 to 4 marks

AO3 Apply knowledge and understanding of plant and soil science in the context of managing plant growth

Command words: analyse, assess, compare, discuss, evaluate, examine, explain

Marks: ranges from 6 to 8 marks

AO4 Make connections between managing soil and plant growth in different contexts

Command words: analyse, assess, compare, discuss, evaluate

Marks: ranges from 6 to 8 marks

Essential content

The essential content is set out under content areas. Learners must cover all specified content before the assessment.

A Plant structure and systems

Structures and functions of plants, including cells, life processes and their role in the growing of healthy plants.

A1 Plant cell structure and specialisations

Structure and function of plant cells and their components linked to their role and location.

- Cell structure and organelles: cell wall, plasma membrane, nucleus, vacuole, cytoplasm, ribosome, mitochondria, chloroplasts, rough endoplasmic reticulum, smooth endoplasmic reticulum, Golgi apparatus, microtubules.
- Cell division by mitosis and meiosis, including prophase, metaphase, anaphase, telophase, cytokinesis, genetic differences.
- Cell specialisations, including distribution of chloroplasts:
  o root, including leucoplasts, endodermis, epidermis, stele, apical meristem, parenchyma, root hair, root cap
  o stem, including parenchyma, lenticels, meristems
  o leaf, including guard cells, epidermis, palisade mesophyll, spongy mesophyll, vascular bundle
  o flowering parts, including chromoplasts, pollen, gametes, zygote.

A2 Plant structure and function

Functions of plant structures in relation to plant growth and development, including changes to seasonal conditions.

- Root and stem structure:
  o root structure, including fibrous, adventitious and taproot system; functions, including anchorage, osmosis and absorption of minerals, transport system to plant, food storage
  o storage organs, including bulbs, corms, rhizomes, tubers
  o shoot structure, stem characteristics, node, internode, lateral bud, terminal bud; leaf arrangements, including alternate, opposite and whorled, lenticel; function, including support, bear leaves, transport system of water and nutrients around the plant, growth
  o vascular bundles, including xylem, phloem, cambium.
- Leaf structure:
  o leaf characteristics, petiole, lamina, margin, midrib, apex, base; veination, including reticulated and parallel
  o differences between evergreen and deciduous leaves
  o leaf types, including simple and compound, petiolated and sessile, leaf shapes.
- Characteristics of evergreen plants, to include *Ilex*, *Taxus* and *Picea.*
- Characteristics of deciduous plants, to include *Betula*, *Fagus* and *Fraxinus*.
- Characteristics of grasses: *Triticum* and *Hordeum*.

A3 Plant processes

Processes and requirements for healthy plant growth, including the features, structure and function of relevant plant tissues.

- Photosynthesis, including:
  - o role of chloroplast structure and chlorophylls
  - o light dependent and independent stages, carbon fixation
  - o factors influencing the rate of photosynthesis, to include temperature, carbon dioxide levels, leaf colour, leaf area, light availability, water supply, nutrients.
- Respiration:
  - o aerobic and anaerobic respiration
  - o factors influencing respiration rates, including temperature, oxygen, light, carbon dioxide, water availability, plant growth.
- Compensation point in relation to respiration and photosynthesis, including plasmodesmata.
- The role of osmosis in turgidity, flaccidity and plasmolysis.
- Diffusion of carbon dioxide, oxygen and water vapour into and out of plants.
- Translocation in the phloem.
- Transpiration in the xylem:
  - o factors affecting transpiration, including the sun, air temperature, humidity, air movement, water supply
  - o guard cells and stomata, including regulation of opening and closing to facilitate gas exchange and control transpiration in plants.

A4 Plant nutrition

Nutritional requirements for growth and development of healthy plants.

- Role of the elements required for plant growth:
  - o elements from soil water and the atmosphere, carbon (C), hydrogen (H), oxygen (O)
  - o macronutrients: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulfur (S)
  - o micronutrients: boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), zinc (Zn), nickel (Ni).

Effects of lack of nutrition on growth and development of plants.

- Effects of the lack of macro and micro nutrients and how these are shown in the plant:
  - o signs of deficiencies, chlorosis of the leaves, stunted growth, distorted foliage, aborted flowers or pods, absence of flowering, fruiting, weak stems, leaf striping, leaf spotting, necrosis or plant death
  - o causes of nutritional deficiencies, acidic or alkaline soil, deviation from optimum pH, soil type, leaching, drought, waterlogging.

A5 Reproduction systems

- Structure and function of reproductive parts of flowering plants:
  - o differences between dioecious, monoecious and hermaphrodite flowering plants
  - o angiosperms and characteristics of monocotyledon and dicotyledonous flowers
  - o parts of the flower, receptacle, calyx, corolla, perianth, pedicel, peduncle, bract
  - o androecium, including filament, anther
  - o gynoecium: carpels, ovary, style, stigma.
- Pollination processes:
  - o self-pollination and cross-pollination
  - o entomophilous pollination and anemophilous pollination and pollen transfer.
- Fertilisation processes – development and characteristics of pericarp in:
  - o simple and compound succulent fruit
  - o dry fruit, including dehiscent, indehiscent and schizocarpic seeds.

- Germination:
  - parts of the seed, testa, embryo, including cotyledon(s), epicotyl, plumule, hypocotyl, radicle
  - seed dispersal systems, dormancy, viability, vigour
  - hypogeal germination
  - epigeal germination
  - factors that affect successful germination, including age of seed, light, air, moisture, temperature and viability.
- Asexual reproduction, including rhizome and stolon.

B Soil

The characteristics of soil and the importance of soil fertility in relation to plant health and successful growth.

B1 Soil types and texture

- Soil types, to include sand, silt, clay, chalk, peat and loam.
- Soil texture:
  - soil particles for sand, silt, clay and loam, including water holding capacity, permeability, workability, organic matter, particle size, fertility, pH
  - soil grading and particle sizes, including use of hand texturing.

B2 Soil structure

- Soil profiles and horizons in relation to rooting depths, including aggregates, topsoil, subsoil, parent rock.
- Structural characteristics: single grain, granular, blocky, platy, columnar and prismatic structures, including particles, water and air space, and air-filled porosity.
- Effects of topography and weathering on soil:
  - aspect, shape of the land, slopes, dips, free-draining soils, poor drainage, water table
  - climatic factors, including wind, rain, frost, erosion
  - physical, chemical and biological effects on soil formation.

B3 Biological and chemical activities affecting soil health and fertility

Impact on soil health and fertility, and plant growth, of biological and biochemical activities.

- Biological activity in the soil profile: bacteria, fungus, actinomycetes, saprophytic fungi and mycorrhizae.
- Role of rhizobium bacteria in fixing atmospheric nitrogen.
- Indicators of good soil fertility and impact on soil health:
  - interaction of animals and vegetation with soil and links to biological weathering
  - role of organisms in improving soil condition and health
  - living organisms in the soil profile: slugs, snails, earthworms, woodlice, springtails, beetles and eelworms.
- Sources and cycles of carbon and nitrogen.
- The role of organic matter, including humus, peat, farmyard manure, including pig, horse, cow and chicken, slurry, leaf mulch, bark, composts, seaweed, green manure, sewage sludge, straw, industrial waste.

B4 Soil acidity and alkalinity

- Effects on plant and root growth:
  - plant health, nutrient availability, microbial activity, plant yield
  - characteristics of calcifuge, calcicole plants.
- Interpretation of pH scale test results.
- Causes of changes in soil acidity and alkalinity:
  - applications of lime, aluminium sulfate, ferrous sulfate, organic matter
  - poor drainage, watering, buffering capacity.

B5 Soil water

Processes affecting water availability in soil and its effect on plant growth.

- Relationship of soil characteristics to infiltration and permeability rates.
- Cause and effect of water availability, water tables, natural springs, cultivation techniques and drainage.
- Water stress on soils, including drought and flooding.
- Water content and the relationship between:
  o gravitational water and saturation point
  o capillary rise and field capacity
  o hygroscopic action and permanent wilting point
  o moisture holding and water holding capacity.

C Managing plant growth media

C1 Soil management

Managing soil for optimum plant growth in indoor and outdoor soils, including protective environments, gardens, fields and sports turf.

- Soil aeration: purpose and methods.
- Integration of organic matter: purpose and methods.
- Irrigation methods, including water conservation: recycling and rain capture, plant choice, application timings, use of moisture-sensing equipment/computer control.
- Soil drainage methods, including changes to soil texture, water courses and ditches.
- Characteristics of fertilisers:
  o nitrogen (N), phosphorus (P) and potassium (K) ratios
  o length of nutrient release related to fertiliser form
  o application methods for liquid, granular, powder, pellets, granules, powders, prills, frits.
- Adjusting soil acidity and alkalinity: purpose and methods.
- Effects of over application of fertiliser on soil health and plant growth.
- Impact on environment of fertiliser leaching.

C2 Soil alternatives

Purposes and methods of using soil alternatives.

- Purpose of growing plants without the use of soil: yield increase, quicker growth, less use of chemicals, lower incidences of disease, recycling water solutions.
- Drip irrigation (slow feed system), deep water culture (root immersion in nutrient water supply), ebb and flow (periodic flooding of plants).
- Types and characteristics of non-soil material and loam-free composts:
  o large particle material, to include sand and gravel
  o fibrous material, to include sphagnum peat moss
  o porous and absorbent material, to include perlite, vermiculite, rock wool and oasis cubes
  o composted or aged material, to include pulverised bark, coconut coir.

Grade descriptors

To achieve a grade learners are expected to demonstrate these attributes across the essential content of the unit. The principle of best fit will apply in awarding grades.

Level 3 Pass

Learners demonstrate a basic understanding of the structures and functions of plant cells. They are able to identify the main features and requirements of plants as related to their growth. Learners demonstrate an understanding of the characteristics of different soil types and basic methods for managing and improving soil to promote healthy plant growth.

Level 3 Distinction

Learners demonstrate a thorough understanding of plant structure linked to function, from a cellular to whole plant level. They are able to articulate practices used in soil management for optimising plant growth and yield. Learners can analyse data and information relating to plant and soil science and management practices, interpreting this in order to draw reasoned conclusions. They can make connections between the characteristics of different soils, the requirements of plants and the potential implications of soil management practices.

Key words typically used in assessment

The following table shows the key words that will be used consistently by Pearson in our assessments to ensure learners are rewarded for demonstrating the necessary skills.

Please note: the list below will not necessarily be used in every paper/session and is provided for guidance only.

Command or term	Definition
Analyse	Present the outcome of methodical and detailed examination of information or data to interpret and study key trends and interrelationships.
Apply	Put knowledge, understanding or skills into action in a particular context.
Assess	Evaluate or estimate the nature, ability or quality of something.
Compare	Identify the main factors relating to two or more items/situations or aspects of a subject that is extended to explain the similarities, differences, advantages and disadvantages.
Complete	Place a word(s) or number(s) in a sentence, paragraph, table or graph to give the correct answer/sense.
Define	State or describe the nature, scope or meaning of a subject as objective facts.
Describe	Give an account in words of someone or something, including all of the relevant characteristics, qualities or events.
Discuss	Consider different aspects of a topic, how they interrelate and the extent to which they are important.
Draw	Create a graphical or visual representation of information.

Command or term	Definition
Explain	Understand the origins, functions and objectives of a subject and its suitability for purpose. Give reasons to support an opinion, view or argument, with clear details.
Give	Provide one or more piece(s) of information.
Identify	Establish or indicate the origin, nature or definitive character of something. Usually requires some key information to be selected from a given stimulus/source.
Label	Name or provide key information about a stimulus material.
Name	Give the correct term for something.
Outline	Provide a general description of key principles, usually in relation to a process, method or concept.
State	Express the condition of or facts about something definitely or clearly.

Links to other units

This is an underpinning unit for the qualification.

Employer involvement

Centres can involve employers in the delivery of this unit if there are local opportunities to do so. There is no specific guidance related to this unit.

Unit 3: Contemporary Issues in the Land-based Sectors

Level: **3**

Unit type: **External**

Guided learning hours: **120**

Unit in brief

Learners critically explore contemporary issues in the land-based sectors through research and analysis.

Unit introduction

For those working in a land-based sector keeping up to date with issues affecting the sector, for example environmental politics, emerging technologies and working practices, is essential. When you are exploring contemporary issues, as well as being aware of the 'next big thing', you will need to be able to apply your skills to make judgements about the relevance and importance of the issue to the organisation or sector in which you work.

In this unit, you will study, from a range of perspectives, the different issues that affect your sector, and consider how information and knowledge is transferred across and between land-based industries. You will develop the skills needed to assess the validity and reliability of sources of information as well as how data and information are used or misused in different situations. These skills will help you to form reasoned opinions about the issues you come across in your working life.

Completion of this unit will help you to progress to a management role or to self-employment in the land-based sector. The unit will also prepare you to study a higher education course in your chosen field.

Summary of assessment

This unit is assessed by a task set by Pearson, consisting of Part A and Part B. For Part A, learners will be given information relating to a specific contemporary issue in the land-based sector two weeks before the supervised assessment, in order to carry out monitored preparatory research. Learners are expected to spend approximately six hours on this research.

For Part B, learners will complete the set task using their preparatory research. The task will contain a number of activities enabling them to demonstrate their knowledge and understanding of contemporary issues. Learners will take Part B in a supervised assessment in a single two-hour and 30 minute session timetabled by Pearson.

The number of marks for the unit is 64.

The assessment availability is January and May/June each year. The first assessment availability is January 2021.

Sample assessment materials will be available to help centres prepare learners for assessment.

Assessment outcomes

AO1 Demonstrate understanding of how contemporary issues affect the land-based sectors

AO2 Demonstrate understanding of critical approaches to the reporting of contemporary issues in the land-based sectors

AO3 Analyse information and data from a range of sources to draw conclusions and present findings related to contemporary issues in the land-based sectors

AO4 Evaluate the relevance and validity of information on contemporary issues in the land-based sectors for given contexts

AO5 Make connections between differing perspectives when considering recommendations on contemporary issues in the land-based sectors

Essential content

The essential content is set out under content areas. Learners must cover all specified content before the assessment.

A Land-based contemporary issues

Learners investigate significant issues for the land-based sectors that are affected by current developments in the industries and for which information and research is made available. Learners focus on cross-sector issues and issues related to their specific sub-sector.

A1 Issues facing the land-based sector

People and employment.

- Issues relating to: education; professionalisation of career paths; development and assessment of competencies, including certification and health and safety practices; managing physical and mental health; skills shortages and seasonal employment.
- Sub-sector specific issues, including: *agriculture* – age profile of industry, average wages; *countryside management* – urban job migration, purchasing of second homes in the countryside and the impact on rural services, impact of volunteers on employment opportunities; *forestry and arboriculture* – international trade, imports; *horticulture* – international sourcing.

Technology.

- Issues relating to: mechanisation and automation of systems and processes; technology in monitoring and precision of production; GPS and mapping technology.
- Sub-sector specific issues, including: *agriculture* – varietal improvement, reduction in emissions, research, use of robotics; *countryside management* – erosion control, environmental modelling, climate change modelling; *forestry and arboriculture* – clonal selection, genetic provenance; *horticulture* – development of protected growing techniques, extending the production season to reduce imports.

Land use.

- Issues relating to: loss of rural land to urbanisation; service and leisure focus.
- Sub-sector specific issues, including: *agriculture* – production efficiency, land cost in relation to production costs; *countryside management* – green belt development, impacts of tourists on designated geographic areas such as Sites of Special Scientific Interest (SSSIs), fracking, quarrying, conflict arising from land use for conservation and land use for recreation and other uses resulting in habitat loss; *forestry and arboriculture* – plantation management; *horticulture* – land costs in relation to production or use.

Pests and pest control.

- Issues relating to: awareness of pests, including new threats and available controls, and their risks and limitations; development of resistance to control methods; control of transmissible plant disease.
- Sub-sector specific issues, including: *agriculture* – control of infectious livestock diseases, pesticide use; *countryside management* – impact of pesticides and herbicides on wild populations, impact and control of alien species, impact of the reintroduction of native predatory species; *forestry and arboriculture* – ash dieback, sudden oak death, phytosanitary precautions on imports; *horticulture* – biological and non-chemical controls, genetically modified organisms (GMOs).

Interaction with the public.

- Issues relating to: public opinion and differing perception of rural and urban populations; retail methods; access and rights of way.
- Sub-sector specific issues, including: *agriculture* – GMOs, ethical food production, educating public in food production; *countryside management* – tourism, diversification, education to increase understanding of wildlife and habitats; *forestry and arboriculture* – right to roam, use of forestry and woodland for leisure and recreation; *horticulture* – retail developments and planning, customers, users of amenity green space, public parks and public open spaces.

Environmental management.

- Issues relating to: environmental legislation, climate change and extreme weather events, sources of air, land and water pollution, waste, recycling, biodiversity.
- Sub-sector specific issues, including: *agriculture* – application of fertilisers, Nitrate Vulnerable Zones (NVZs), soil degradation and conservation, stewardship schemes; *countryside management* – environmental interactions, landfill waste, threats to native species, endangered species, disaster mitigation; *forestry and arboriculture* – short rotation coppice for electricity and heat production, land drainage for forestry, returning the landscape to pre-plantation state; *horticulture* – escaping and alien species.

Sustainability.

- Issues relating to: resource and waste management.
- Sub-sector specific issues, including: *agriculture* – food miles, organic production, anaerobic digestion, sustainable production techniques; *countryside management* – government grants for environmental enhancement, wind and solar power, anaerobic digestion; *forestry and arboriculture* – land renewal, afforestation, reforestation and deforrestation, coppicing; *horticulture* – composting, use of non-renewable growing media, e.g. peat.

A2 Perspectives

Perspectives to explore and investigate contemporary issues.

- Political and ideological, including: national and international governments' views and policies, lobbyists, non-governmental organisations (NGOs) and pressure groups.
- Economic, including: funding, cost-effectiveness, business performance.
- Social and cultural, including: history, the needs and views of people from different communities.
- Legal and ethical, including: constraints of national law and ethical considerations on actions.

B Sources of evidence, information and data

B1 Establishing validity and reliability of sources

Methods by which information is gained and disseminated through the industry, and approaches used to recognise reliable sources of information and establish the validity of claims made.

- Peer-review process, e.g. journals and papers.
- Organisations involved in research and development:
  o universities
  o commercial organisations
  o non-governmental government-sponsored bodies, e.g. Forestry Commission (FC), Forestry Commission Scotland, Natural Resources Wales (NRW)
  o UK government areas, e.g. Department for Environment, Food and Rural Affairs (Defra), Office for National Statistics (ONS)
  o charities and community organisations, e.g. National Trust, Forestry Commission (FC), Royal Society for the Protection of Birds (RSPB), Royal Horticultural Society (RHS)
  o media and dissemination of information
  o industry publications and reviews
  o radio and television programmes.

B2 Using evidence to explore contemporary issues

Determining the validity and reliability of sources of evidence available for the exploration of contemporary issues.

- Identifying relevant and reliable sources of information.
- Exploring diverse views and opinions, while recognising potential sources of bias, e.g. 'cherry-picking' evidence, potential gains for the author of endorsing products or opinions, prejudice, vested interest.

- Distinguishing between fact and opinion.
- Style and tone according to intended audience: use of photographs and diagrams, layout, language.
- Use and misrepresentation of information: primary and secondary evidence, reliance on out-of-date or unreliable sources.
- Differences between qualitative and quantitative data.
- Use and misuse of data, including: sample sizes, use of control groups, presentation, statistical significance.
- Interrogating research:
  - the research or activity that has been carried out
  - why the research or activity has been carried out
  - how stakeholders, groups, individuals and the public may be affected by the research or activity
  - the potential positive and negative implications of the research or activity.

C Using research to inform decisions

C1 Research methods

Methods and approaches enabling the development of supported arguments and decisions on contemporary issues.

- Types of research:
  - quantitative – collection and use of data, summarising data presented, inferences obtained from data sources
  - qualitative – gathering information from the written word, analysis of text, understanding reasons to develop opinions, exploratory research to extend knowledge.
- Reading methods:
  - skimming – basic quick reading to determine the quality of the information
  - scanning – reading to locate key words or phrases
  - extensive – reading for pleasure at a relaxed pace
  - intensive – in-depth reading of all the information.
- Researching information:
  - obtaining and selecting information, identifying key details and issues, examining case studies and scenarios
  - relevance of information through use of a variety of sources, books, magazines, journals and the internet.
- Organisation of information, e.g. significance of information and detail, grouping together related points of evidence.
- Analysis of information:
  - examining claims from conflicting interests and perspectives
  - references to factual information and evidence sources.

C2 Evidence-based reasoning

- Presenting researched arguments:
  - use of supporting and opposing evidence, including judgements on reliability and validity
  - presenting information and solutions in a range of formats
  - linking information to source material and use of referencing methods, e.g. Harvard referencing
  - structure of arguments and analysis: introductions, presentation and discussion of research evidence and sources accounting for different perspectives, summaries and conclusions.

Grade descriptors

To achieve a grade learners are expected to demonstrate these attributes across the essential content of the unit. The principle of best fit will apply in awarding grades.

Level 3 Pass

Learners will demonstrate a basic knowledge and understanding of current issues affecting the land-based sector. They will show an understanding of how knowledge is transferred through the sector, applying their knowledge and understanding of how data and information is obtained and presented to establish valid and reliable sources of information. They will be able to make straightforward connections between different issues in the sector and draw conclusions, giving reasoned, evaluative judgements of the sources.

Level 3 Distinction

Learners will be able to integrate relevant knowledge and understanding of current issues to demonstrate a deeper understanding of their own industry and the sector as a whole. They will show a sound understanding of the processes by which valid and reliable sources are judged. Learners will be able to interpret, analyse and evaluate sources of data and information, making effective links between these and their own research. They will apply their knowledge and understanding to rationally justify their own opinions and suggested courses of action, fully supporting their conclusions with appropriate and relevant evidence.

Key words typically used in assessment

The following table shows the key words that will be used consistently by Pearson in our assessments to ensure learners are rewarded for demonstrating the necessary skills.

Please note: the list below will not necessarily be used in every paper/session and is provided for guidance only.

Command or term	Definition
Contemporary issue	A topic or subject related to the land-based sectors as defined in the unit content (section A1).
Perspective	A viewpoint or approach from which to consider an issue, as defined in the unit content (section A2).
Scenario or context	An imagined or real-life situation used in assessment as a means to evidence understanding of an issue.

Links to other units

This unit links to:
- Unit 1: Professional Working Responsibilities
- Unit 2: Plant and Soil Science
- Unit 4: Work Experience in the Land-based Sectors.

Employer involvement

This unit would benefit from employer involvement in the form of:
- masterclasses
- contribution of ideas to unit assignment and project materials
- support from local land-based organisation staff as mentors.

Unit 4: Work Experience in the Land-based Sectors

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners research work opportunities in the land-based sectors and the skills needed to attain them, developing communication and employability skills through study and work experience.

Unit introduction

Where do you picture yourself in five years' time? Do you know about the wide range of career opportunities open to you in the land-based sectors? Discovering these opportunities and understanding the skills and qualifications needed in order to gain employment in these sectors will help you to answer these questions as well as to plan your career.

In this unit, as well as investigating employment opportunities, you will examine how good communication and employability skills can improve your prospects in gaining and staying in employment. You will learn how and where to access information about employment vacancies and further courses of study as well as how to develop your curriculum vitae (CV) and adapt it for specific vacancies. You will also learn how to develop good communication, interview and customer service skills. You will apply for and take on available work experience roles in the sector and reflect on your own progress.

This unit will help prepare you for employment in the land-based sectors in areas such as forestry, arboriculture, aquaculture, landscaping, horticulture, fencing, fisheries management, floristry, gamekeeping, conservation, countryside management and wildlife management, and their related service industries. It will also help you progress to higher education in courses such as BSc (Hons) degrees in agriculture, countryside management, horticulture and forestry management.

Learning aims

In this unit you will:

A Investigate employment opportunities in the land-based sectors to target progression

B Develop communication and interview skills to improve employment prospects in the land-based sectors

C Undertake work experience in the land-based sectors to contribute to personal and professional development.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Investigate employment opportunities in the land-based sectors to target progression	**A1** Scope of the land-based sectors **A2** Requirements for progression **A3** Relevant legislation for work placement opportunities	A portfolio of work-related learning research, completed application documents and mock interview outcomes, e.g. observation, video.
B Develop communication and interview skills to improve employment prospects in the land-based sectors	**B1** Applying for work-related activities **B2** Interview skills **B3** Reflecting on preparation and performance	
C Undertake work experience in the land-based sectors to contribute to personal and professional development	**C1** Practical work experience **C2** Work behaviours **C3** Reflecting on workplace practice	A report reflecting on work experience, informed by employer verification of participation and other feedback.

Content

Learning aim A: Investigate employment opportunities in the land-based sectors to target progression

A1 Scope of the land-based sectors

- Analysis of progression opportunities to determine desirability, suitability and feasibility.
- Land-based sectors – appropriate broad representation of current industries, e.g. production crops, agricultural livestock, aquaculture, environmental conservation, countryside management, fencing, fisheries management, floristry, gamekeeping and wildlife management, land-based engineering, landscaping, production and amenity horticulture, forestry and arboriculture.
- Opportunities – the range of career and progression opportunities available within chosen sector and opportunities within related sectors, e.g. retail, leisure, tourism, hospitality.
- Higher education – UCAS, entry requirements, student loans.
- Apprenticeships – requirements, timescales, pay scales, balance between academic and practical work, assessment, higher apprenticeships.
- Employment sectors:
  o public sector, e.g. education, government, local government, countryside officer/ranger, public grounds and parks
  o private sector, e.g. country parks, garden centres
  o voluntary sector or charities, e.g. wildlife trusts, wildlife parks.
- Employment sectors, to include an appropriate broad representation of current industries, e.g. agricultural sales, food production, aquaculture, floristry, production horticulture, land-based engineering.
- Self-employment, e.g. gamekeeper, agricultural contractor, arborist, gardener.

A2 Requirements for progression

Knowledge of formal and informal requirements for progression.

- Entry criteria, including qualifications, skills and knowledge.
- Self-management, including study skills, presentation and attitude, time management and planning.
- Exit criteria for specific progression routes.
- Soft skills, including communication, problem solving, individual and team and leadership skills, personal management.

A3 Relevant legislation for work placement opportunities

- Safeguarding at work placements.
- Contracts of employment and working hours (in relation to age), including zero-hours contracts/fixed-term/hourly-paid/permanent (full-/part-time) contracts, Working Time Regulations 1998, Pay As You Earn (PAYE), statutory leave, maternity/paternity leave, employment status.
- Different legal status of business: single owner (self-employed)/partnership/limited company/self-employed subcontractor.
- Awareness of the impact of current legislation supporting conduct in the workplace for employers and employees (full-time, part-time, casual, interns and work placements), such as:
  o Health and Safety at Work etc. Act 1974
  o Equality Act 2010
  o Data Protection Act 1998
  o Control of Substances Hazardous to Health (COSHH) Regulations 2002
  o Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013
  o Animal Welfare Act 2006.

Learning aim B: Develop communication and interview skills to improve employment prospects in the land-based sectors

B1 Applying for work-related activities

- Selection of work, including different sources of vacancies such as websites, trade publications and sector-wide bodies, e.g. Lantra.
- Importance of reading job description, personal specification, including relevance of essential or desirable criteria, to include qualifications, skills, experience.
- Completion of CV and adapting CV or job application to specified vacancy.
- Letters of application, supporting statements and completing application forms, to include standing out from the crowd, addressing relevance to employers and how they might shortlist candidates.
- Correct use of language, grammar, spelling and punctuation.

B2 Interview skills

Creating an impression through effective communication.

- Preparation and presentation skills, including:
  - planning and practice for the interview
  - interview styles, e.g. competency or behaviour-based, knowledge-focused
  - personal appearance and hygiene
  - interpersonal skills and attitude
  - body language.
- Listening and talking skills, including:
  - interview conventions
  - use of language – what is/what is not appropriate
  - building rapport
  - developing a dialogue
  - effective listening and questioning
  - non-verbal communication, e.g. eye contact.

B3 Reflecting on preparation and performance

- Reflecting on preparation for interviews and interview performance, including knowledge of employer and role, communication skills, professional behaviour.

Learning aim C: Undertake work experience in the land-based sectors to contribute to personal and professional development

C1 Practical work experience

Operating in workplace practices, including:

- knowledge of the purpose of the business and/or environment
- knowledge of reporting procedures with regard to behaviour and expectations, e.g. lateness, sickness, emergency
- health and safety protocols, e.g. fire safety, emergency procedures
- procedures to maintain confidentiality.

C2 Work behaviours

- Completion of role to add value in the workplace:
  - understanding the extent and limitation of own roles and responsibilities
  - carrying out tasks according to roles and responsibilities
  - following instructions
  - communicating with others
  - self-management
  - working safely
  - reliability, regular attendance and commitment
  - punctuality
  - use of initiative
  - cooperation with colleagues and end users, e.g. customers, clients, other organisations.
- Obtaining feedback, including:
  - timesheets signed by an appointed person at work experience employment, confirming appropriate attendance and punctuality
  - employer or teacher observation/witness statements
  - employer feedback sheets, provided at intervals.

C3 Reflecting on workplace practice

Reflecting on personal performance in relation to own career progression, to include:

- formative feedback from employer(s), colleagues, teacher, stakeholders
- performance self-assessment
- review of areas for development, to include SWOT (strengths, weaknesses, opportunities, threats) analysis, SMART (specific, measurable, achievable, relevant, time-based) target setting, knowledge of SWOT and SMART in learning development.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate employment opportunities in the land-based sectors to target progression		
A.P1 Explain the value of own research and preparation carried out for work experience, related opportunities and progression routes. **A.P2** Explain accurately the relevant legislation relating to a work placement.	**A.M1** Analyse the value of own research and preparation carried out for work experience, related opportunities and progression routes.	**A.D1** Evaluate how effective preparation for work experience can significantly enhance employment prospects. **B.D2** Evaluate own preparation for and performance in work experience interview, including review of all future opportunities.
Learning aim B: Develop communication and interview skills to improve employment prospects in the land-based sectors		
B.P3 Explain the preparation and research carried out for a work experience interview. **B.P4** Demonstrate communication and interpersonal skills as an interviewee for a selected work experience.	**B.M2** Perform proficiently as an interviewee for a selected work experience, using appropriate communication and interpersonal skills.	
Learning aim C: Undertake work experience in the land-based sectors to contribute to personal and professional development		
C.P5 Explain how the work experience undertaken has improved occupational and personal skills for future opportunities. **C.P6** Review how own performance during work experience contributed to the employer.	**C.M3** Assess the value of the occupational and personal skills developed during work experience for future opportunities. **C.M4** Analyse the impact on the employer of own performance during work experience.	**C.D3** Evaluate the effectiveness of the work experience carried out in improving occupational and personal skills to make best use of opportunities for employment.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aims: A and B (A.P1, A.P2, B.P3, B.P4, A.M1, B.M2, A.D1, B.D2)

Learning aim: C (C.P5, C.P6, C.M3, C.M4, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a work experience role, for example work placement, part-time work, volunteering etc. Employers must be external to the centre.

Teachers should consider devising a set of criteria they can use to give feedback when carrying out practice interviews.

Essential information for assessment decisions

Learning aims A and B

For distinction standard, learners will produce a written report evaluating the quality of their own preparation when seeking work experience. This will include their investigation and research carried out, completion of application documents adapted for specific roles, and completion of a mock interview or employer-evidenced real interview. The report will include conclusions about the quality of each step of the preparation, linking this to the teacher's evaluation of the mock interview and the chance of securing employment. Learners will write a conclusion that includes clear understanding of best practice in this area.

For merit standard, learners will produce a written analysis of the quality of their own preparation when seeking work experience. This will include their investigation and research carried out, completion of application documents adapted for specific roles, and completion of a good mock interview or employer-evidenced real interview. The analysis will include a detailed examination of each step of the preparation, linking this to the chance of securing employment. Learners will include an analysis of the teacher's evaluation of the mock interview.

For pass standard, learners will consider the value of their own preparation when seeking work experience, for example investigation and research carried out, completion of application documents adapted to specific roles, and completion of a mock interview or employer-evidenced real interview. Learners will include links to the teacher's evaluation of the mock interview. Learners could include a SWOT analysis.

Learning aim C

Learners need to review and reflect on their time undertaking work experience. This will relate to the number of hours required by the qualification.

For distinction standard, learners will undertake work experience and supply reasoning in their reflective reports to determine the effectiveness of the completed work experience and its capacity to improve their opportunities for employment. Their reasoning will consider the relationship between the occupational and personal skills developed during the work experience and how these may help them in securing future employment. The relationship between learners' own performance during work experience and its impact on the employer will also be covered. Learners will consider how well they prepared themselves for the work experience activities in order to gain the most from the experience(s). Learners' reflections should take account of employer and teacher feedback, and observations of them during their work experience.

For merit standard, learners will undertake work experience and present in their reflective reports a relationship between the occupational and personal skills developed during the work experience, and a discussion about how these skills will help secure employment. Learners will consider the relationship between their own performance during the work experience and its impact on the employer. Learners' reflections should take account of employer and teacher feedback, and observations of them during their work experience.

For pass standard, learners will undertake work experience and present in their reflective reports a consideration of how they developed different occupational and personal skills during their placement. Learners will make a formal assessment of their own performance during work experience based on feedback, including a SWOT analysis, and link this to their contribution to the employer. Learners' reflections should take account of employer and teacher feedback, and observations of them during their work experience.

Links to other units

This unit links with all others in the specification.

Employer involvement

This unit would benefit from employer involvement in the form of:
- technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 5: Estate Skills

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners develop the skills needed to manage and maintain habitats, structures, surfaces, boundaries and services that are found in the land-based sector.

Unit introduction

Managing the physical environment of the land-based sectors means you need to be able to maintain, repair and install a variety of different structures, surfaces, boundaries and services, as well as maintain habitats, ensuring that work is carried out efficiently and safely.

In this unit, you will develop the knowledge and skills needed to manage the repair, maintenance and installation of the fabric of businesses and organisations working in the land-based sectors. These include forestry, horticulture and agriculture as well as more general countryside management. You will learn to plan, implement and reflect on maintenance tasks, including those you carry out yourself and those completed by others such as staff or professional contractors whose work you will manage. In this unit, you will draw on your learning from across the programme to complete assessment tasks.

This unit will give you the skills required to progress to employment as a trainee farm or forestry worker, garden centre assistant or as part of an estate management team. It is also an excellent introduction to a degree in estate management.

Learning aims

In this unit you will:

A Explore estate skills for the management and maintenance of habitats and environments

B Undertake estate skills and their management for the land-based sector

C Carry out the supervision of others engaged in maintenance, repair and installation tasks in the land-based sector.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Explore estate skills for the management and maintenance of habitats and environments	**A1** The nature and scope of estate skills for land-based sector management **A2** Assessing needs **A3** Planning tasks	A portfolio of evidence that plans for estate management projects. The portfolio should include: • surveys • relevant legislation and codes of practice • a plan, including schedules and specifications.
B Undertake estate skills and their management for the land-based sector	**B1** Working safely **B2** Practical estates tasks **B3** Reflecting on tasks undertaken	Evidence of tasks carried out and reflection on task outcomes, to include: • logbooks, observation records and witness statements of tasks undertaken • a review of task outcomes.
C Carry out the supervision of others engaged in maintenance, repair and installation tasks in the land-based sector	**C1** Workforce supervision **C2** Supervise estate skills undertaken **C3** Evaluate estate skills tasks completed	Evidence of the supervision of others in carrying out tasks, to include: • an evaluation framework that includes task outcome and workforce supervision • observation records and witness statements that demonstrate supervision and management of scheduled tasks • a review of the outcomes of tasks carried out by others • a review of own supervision of a workforce.

Content

Learning aim A: Explore estate skills for the management and maintenance of habitats and environments

A1 The nature and scope of estate skills for land-based sector management

Understanding the form and function of estate skills elements that are found in the land-based sector.

- Boundaries, including:
  - deer or rabbit fencing, electric fencing, stock fencing, and post and rail fencing
  - decorative fencing.
- Surfaces, including:
  - paths, tracks, rides, accommodation flooring, grassed surfaces
  - drainage of surfaces, including field drains.
- Structures to provide for land-based management, including:
  - field structures, e.g. field shelters, stiles and way markers, greenhouses, cold frames, raised beds
  - gates and water troughs
  - internal structures, e.g. drinkers, stall furniture and feeders
  - finishes, including paints, varnishes and preservatives.
- Habitat maintenance for land-based management, including:
  - weed and invasive plant control, scrub clearance, hedgerow cutting/layering
  - wildlife refuges, e.g. nesting/resting boxes, woodpiles, hedgehog tunnels.
- Supply, distribution or storage of mains services and utilities, including:
  - water and gas, including bottled gas, electricity, fuel, oil
  - sewerage, including mains, cesspit and septic tank.
- Materials, tools and construction methods used for estate skills tasks:
  - basic construction materials, e.g. wood, concrete, woodchip, tarmac, type 1 aggregate, fencing, galvanised sheets, polypropylene piping
  - common specialist tools and basic test equipment, e.g. circuit tester
  - fixtures and fittings, e.g. hinges, locks, ball valves, pipe connections
  - selection, transport, maintenance and storage of tools, materials and equipment.

A2 Assessing needs

Inspection of boundaries, surfaces, structures, services and habitats.

- Inspecting boundaries, surfaces, habitats and structures for their maintenance, repair, construction and installation needs.
- Inspection and basic fault-finding of electrical circuits and devices using non-contact test equipment.
- Inspection of drainage, gas and water services for leaks and blockages.
- Methods and processes for reporting inspection findings, to include verbal and written, use of appropriate maps, plans and diagrams.

A3 Planning tasks

The application of regulations and specific, current regulations and guidance notes relevant to estate skills for land-based management, including health and safety at work and those relating to animal welfare.

- Government welfare codes of practice for specific animals and plants.
- Use of risk assessments, their purpose and types, including static, dynamic, qualitative and quantitative.
- Correct selection and use of personal protective equipment (PPE).
- Assessing the task, including measuring, estimating, use of maps, diagrams and plans.
- Creating and using schedules of tasks.

- Job specifications, to include job description and rationale, timescales, tools, equipment, materials, location of work, costs, skill sets, health and safety considerations, environmental issues and supervising arrangements.
- Sourcing tools, equipment, materials, skill sets, e.g. internal workforce, external contractors.
- Processes and aids to planning tasks, including budgets, schedules and flow charts.
- The use of IT in raising and monitoring repair and maintenance tasks.
- Communications with contractors and employees to ensure efficient planning.

Learning aim B: Undertake estate skills and their management for the land-based sector

B1 Working safely

- Compliance with appropriate health and safety regulations and guidance, e.g. PPE, animal welfare.
- Selection of the correct tools, equipment and materials.
- Transportation of tools, equipment and materials.
- Preparation of the work area.
- Correct and safe use of tools and equipment.
- Waste disposal in accordance with regulations.
- Maintaining and storing tools, equipment and materials.

B2 Practical estates tasks

Maintenance, repair construction and installation of:

- boundaries, to include post and rail fencing, hedgerows, electric fencing and strained fencing, e.g. stock or chain link fencing
- surfaces, to include aggregate or concrete, woodchip, wood, sand or artificial products, e.g. woodchip or grassed paths, forest access roads, ornamental paving
- structures, e.g. greenhouses, field shelters, gates, stalls, troughs, feeders, stiles, signage
- drainage, e.g. unblocking drains or field drains, clearing an open ditch
- isolation of mains services in the event of leaks or for maintenance, repair, construction and installation tasks
- basic repair of electrical appliances or circuits, e.g. changing a plug or fuse, resetting a circuit
- use of basic equipment to locate underground or hidden services
- installation of temporary electric supply for both indoor and outdoor power requirements, e.g. extension leads, electric fence batteries, small generators
- repair, maintenance or installation of systems to supply water, e.g. to a water trough, irrigation system or to allow a tap and hose to be connected to an existing system
- habitats, e.g. brush clearance, hedgerow cutting, construction of wildlife refuges.

B3 Reflecting on tasks undertaken

Process for reviewing the tasks undertaken to assess the impact on land-based management, to include:

- matching skills to tasks
- taking account of problems that arise and using problem-solving techniques
- comparing the time taken with the time allocated and the time needed
- identifying inefficient working practices
- monitoring actual costs against estimates and identifying cost overruns
- examining specifications to improve clarity and eliminate ambiguity
- monitoring compliance with regulations, guidance and advice notes
- assessing communication to identify improvements.

Learning aim C: Carry out the supervision of others engaged in maintenance, repair and installation tasks in the land-based sector

C1 Workforce supervision

- Identifying skill sets, e.g. internal workforce, external contractors.
- Communicating maintenance, repair, construction and installation needs to in-house teams and outside contractors, to include raising orders, issuing instructions orally and in writing, getting estimates and quotations, commissioning contractors and understanding contracts.
- Using written communication skills:
  - using correct spelling, punctuation and grammar
  - adopting different styles, including formal and informal.
- Using oral communication skills:
  - using tone, inflexion and style when speaking
  - using aids, e.g. maps and plans.

C2 Supervise estate skills undertaken

- Ensuring the work is proceeding according to expectations, e.g. site visits, problem solving and evaluating the progress of estate skills tasks, ensuring compliance with specifications, checking the progress of work against the specification, regulations and codes of practice and risk assessments.
- Using problem-solving skills to assess issues, examine alternative solutions, decide on a course of action, implement solutions and monitor outcomes.

C3 Evaluate estate skills tasks completed

Using evaluation frameworks to enable assessment of completed tasks and workforce management.

- Creating evaluation frameworks using details of the original specification as a checklist.
- Evaluating completed products, including compliance with specifications, regulations, and codes of practice and risk assessments.
- Communicating evaluation outcomes, ensuring correct task completion, including situations where there is a dispute.
- Creating evaluation frameworks for assessing workforce management, to include:
  - selection of workforce
  - communication of task
  - supervision of work in progress
  - application of problem-solving skills
  - feeding back on outcomes of task.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore estate skills for the management and maintenance of habitats and environments		
A.P1 Explain findings of own surveys undertaken to establish estate skills needs. **A.P2** Select information from the findings of own surveys undertaken to plan for the management of an estate skills task.	**A.M1** Analyse the results of own surveys undertaken to produce a schedule for the management of estate skills tasks.	**A.D1** Evaluate the likely impact of the schedule produced for the management of estate skills tasks resulting from own surveys undertaken.
Learning aim B: Undertake estate skills and their management for the land-based sector		
B.P3 Perform simple estate skills tasks to an agreed specification. **B.P4** Explain how own estate skills tasks undertaken meet job specifications.	**B.M2** Perform complex estate skills tasks to an agreed specification and within an agreed timescale. **B.M3** Assess own performance in carrying out estate skills tasks to meet job specifications.	**B.D2** Evaluate the standard of own estate skills tasks undertaken in relation to job specifications.
Learning aim C: Carry out the supervision of others engaged in maintenance, repair and installation tasks in the land-based sector		
C.P5 Demonstrate the management and supervision of a simple estate skills task. **C.P6** Explain the effectiveness of own workforce supervision of an estate skills task.	**C.M4** Demonstrate the management and supervision of a complex estate skills task. **C.M5** Analyse the effectiveness of own workforce supervision of an estate skills task, identifying areas for improvement.	**C.D3** Evaluate the effectiveness of own workforce supervision of a complex estate skills task, detailing improvements.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of three summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.M2, B.M3, B.D2)

Learning aim: C (C.P5, C.P6, C.M4, C.M5, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- a range of common and specialist hand tools, including power tools and testing equipment
- suitable PPE
- a wide range of suitable estate skills tasks, including the provision of mains and temporary services.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will conduct surveys of land-based establishments. They will use a range of appropriate test equipment independently and proficiently. They will readily understand complex estate skills issues, considering causes and making connections with usage and consequences if unaddressed, exploring the situation thoroughly. Learners will present meticulous findings in the form of annotated maps, plans, diagrams and accompanying notes. They will be assured in their assessment of issues and their decisions in respect of repair, maintenance or installation needs.

Learners will produce comprehensive and flexible plans, reprioritising tasks where appropriate in order to use time and resources efficiently. Plans will include a detailed appraisal of work required and a thoroughly considered, time-specific schedule of work. Learners will give a clear rationale for all their recommendations, demonstrating detailed awareness of the influence of relevant governing legislation and codes of practice, and the impact on the establishment if the work is delayed or not completed. Job specifications produced will be comprehensive. Learners will show that they have considered how their plans will be effective in terms of, for example, use of resources, completion of tasks, meeting identified needs.

For merit standard, learners will conduct surveys of land-based establishments. They will use a range of appropriate test equipment safely and without supervision. They will interrogate the causes of issues, suggesting remedial action and, where appropriate, prevention in relation to repair, maintenance or installation needs. They will explore the complexity of faults and issues, considering less obvious factors. Learners will present detailed findings in the form of annotated maps, plans, diagrams and accompanying notes.

Learners will plan proactively with clear timescales for repair, maintenance and installation needs. Their plans will clearly demonstrate an understanding of the need to prioritise work, and an appreciation of realistic timescales and resources. Their planning will demonstrate a detailed assessment of the work required and a time-specific schedule of work. Consideration will be given to relevant governing legislation and codes of practice. Job specifications produced will be clear and detailed.

For pass standard, learners will conduct surveys of land-based establishments. They will use a range of appropriate test equipment, under supervision where necessary. Learners will understand major issues and correctly identify methods of repair, maintenance or installation. They will record correct findings appropriate to each situation surveyed, presenting the information in the form of annotated maps, plans, diagrams and accompanying notes. The notes and annotations will give clear reasoning for their findings.

Learners' plans will address key repair, maintenance and installation needs, correctly prioritising works using broad timescales. Where appropriate, their plans will take into account governing legislation and codes of practice. Job specifications produced will contain key information.

Learning aim B

For distinction standard, learners will carry out complex tasks that require multiple operations, using appropriate equipment and a variety of tools and materials. Tasks will be undertaken efficiently, accurately and completely, meeting the specification. Learners will work to a professional industry standard and they will comply with best workplace practice.

Learners will review the qualitative standard of practical work undertaken to improve the completion of tasks, supporting their views with reasoned judgements.

For merit standard, learners will carry out complex tasks that require multiple operations, using appropriate equipment and a variety of tools and materials. Tasks will be undertaken efficiently, accurately and completely, meeting the specification. Learners will work to the standard of a competent employee. They will carry out complex tasks that require the installation, maintenance or repair of boundaries, surfaces, habitats and either mains or temporary services.

Learners will demonstrate best workplace practice by working safely and in accordance with relevant legislation, ensuring the workplace is prepared and cleared. They will understand the need for, and demonstrate, correct tool, material and equipment procedures, including selection, use, transport, maintenance and storage.

Learners will review their work in light of the job specification and the standard achieved, giving valid suggestions for improvements in tasks.

For pass standard, learners will carry out simple estate skills tasks, requiring few operations and a limited range of tools and materials. Tasks will be undertaken efficiently, accurately and completely, meeting the specification. They will work to the standard of a novice employee. Learners will carry out simple tasks that require the installation, maintenance or repair of boundaries, surfaces, habitats and either mains or temporary services.

Learners will demonstrate acceptable workplace practice by working safely and in accordance with relevant legislation, ensuring the workplace is cleared after task completion. They will demonstrate correct tool, material and equipment procedures, including selection, use, transport, maintenance and storage.

Learners will review their work in light of the job specification.

Learning aim C

For distinction standard, learners will carry out effective and comprehensive workforce supervision that demonstrates clear, concise, unambiguous, oral and written communications suited to the recipient, such as contractors or colleagues.

Learners will delegate responsibilities appropriately according to skill sets and resources. They will monitor and assess task progression, advising only when necessary, using positive and flexible problem-solving skills when needed. They will assess the completed task against the specification and communicate their findings concisely and assertively.

Learners will draw up a valid and reliable evaluation framework to use when assessing their management of completed tasks. They will identify specific areas where their management of the task could have improved efficiency, safety or cost-effectiveness, and will make valid recommendations that would achieve this.

For merit standard, learners will demonstrate they can communicate clearly and appropriately with a workforce, such as contractors or colleagues, both orally and in writing.

Learners will delegate responsibilities. They will accurately assess the progress of a complex task and demonstrate problem-solving skills when needed. They will communicate appropriately their assessment of the progress of a task.

Learners will draw up an accurate evaluation framework to use when assessing workforce management. They will make recommendations for improvements in their own performance.

For pass standard, learners will demonstrate that they can issue simple workforce instructions, both orally and in writing.

Learners will carry out supervision of tasks, including checks on progress and identifying obvious issues that may hinder task completion to the specification. Where problems occur, learners will make suggestions and may intervene directly. Learners will provide basic feedback to the workforce on the progress of the task.

Learners will draw up a simple evaluation framework to use when assessing their management of the workforce, identifying their own strengths and weaknesses.

Links to other units

This unit links to:

• Unit 4: Work Experience in the Land-based Sectors
• Unit 20: Woodland Project.

Employer involvement

This unit would benefit from employer involvement in the form of:

• masterclasses
• technical workshops involving staff from local land-based organisations
• contribution of ideas to unit assignment/project materials
• observation during work experience
• support from local land-based organisation staff as mentors.

Unit 6: Identification, Planting and Care of Trees

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop the skills needed to plant trees and provide their aftercare, and the knowledge to identify trees using botanical nomenclature.

Unit introduction

Trees are one of the most amazing and diverse range of plants on the Earth, thriving in both urban and rural locations. Tree planting occurs for many reasons, including the management of native woodland, the shaping of the landscape, the production of edible fruit, or simply as ornamental, stand-alone specimens. Being able to correctly identify trees is essential for anyone working in the land-based sector, especially when selecting appropriate trees for planting.

In this unit, you will learn the correct botanical nomenclature and terminology used when identifying trees, as well as the individual characteristics that aid their identification. You will research a range of different trees suitable for a given area and select appropriate trees for planting, using your knowledge of their individual requirements. You will complete practical tasks in planting your chosen trees and providing aftercare so that they establish successfully. Understanding tree requirements and providing suitable surroundings and continued aftercare will mean that your trees will flourish and form a significant feature of the landscape for many years to come.

This unit will give you the skills to identify, plant and care for trees. These skills are a huge advantage for progression to employment in roles such as a greenkeeper, gardener in the grounds of a stately home, or an expert who recommends and sells plants in a garden centre. Alternatively, you may wish to continue your study to higher education, for example countryside management degrees.

Learning aims

In this unit you will:

A Understand botanical nomenclature and terminology for the purpose of tree identification

B Explore factors affecting selection of trees and their suitability for use in a given area

C Undertake planting and aftercare of trees in a given area.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Understand botanical nomenclature and terminology for the purpose of tree identification	**A1** Terminology used in tree nomenclature **A2** Categorisation of trees **A3** Characteristics of trees for identification	A written report on the biological nomenclature and tree characteristics that are used to identify trees, including their effectiveness.
B Explore factors affecting selection of trees and their suitability for use in a given area	**B1** Considerations affecting the choice of trees for specific areas **B2** Factors affecting the suitability of trees	Research notes on the factors that affect the selection and suitability of trees for planting, using findings to select trees to plant in a given area. A portfolio of evidence showing how trees are selected, planting activities and aftercare to ensure trees establish successfully.
C Undertake planting and aftercare of trees in a given area	**C1** Preparation for planting **C2** Planting methods **C3** Providing aftercare	

Content

Learning aim A: Understand botanical nomenclature and terminology for the purpose of tree identification

Naming conventions and taxonomic categories used to identify trees based on their features, and the importance of using the correct terminology.

A1 Terminology used in tree nomenclature

- Plant classification order for trees:
  - kingdom
  - phyla, including gymnosperms and angiosperms
  - class, including monocotyledons and dicotyledons
  - family
  - genus
  - species
  - sub-species, variety, form, cultivar, hybrid.
- Importance of botanical names:
  - problems that occur using common plant names, including using the native tongue, regional differences, multiple common names for the same genus
  - binominal system for plant naming.
- Correct format for writing plant names:
  - correct use of capital letters, lower case letters, single quotation marks
  - correct use of symbols and abbreviations
  - correct use of descriptive names to aid identification, e.g. pendula, alba, macrophyllum.

A2 Categorisation of trees

Definition, categorisation and identification of trees from native and non-native species:

- broad-leaved trees
- ornamental trees
- evergreen trees
- conifers.

A3 Characteristics of trees for identification

Methods used to identify trees using tree features and characteristics.

- Morphological features and characteristics used in the identification of trees:
  - foliage, including bark, branch, twig, lenticels, node, internode
  - leaf arrangements, including alternate, opposite and whorled, leaf bud, petiolated and sessile
  - veination, including reticulated and parallel, simple and compound
  - leaf types, including cordate, ovate, lanceolate, linear, oblong, palmate, pinnate, trifoliate, lobed, needles, scales
  - leaf colour
  - flowers, including bud, petals, bract, singular, grouped, shape, colour, arrangement
  - succulent fruits, including berries, fruits, drupes
  - dried fruits, including nuts and seeds
  - seasonal features, including stems, foliage, flowers, seeds, fruits.

- Identification methods and tools:
  - tactile features, including smooth, soft, spiked, rough, spongy
  - smell, including fragrant flowers, foliage, sap
  - visual observations, including growth habit, height, spread
  - form, including oval, columnar, rounded, pyramidal, weeping, irregular, vase
  - illustrated textbooks, nursery catalogues, brochures and labels
  - technology, including smartphone apps
  - identification keys, including flow chart, dichotomous key.
- Sources of information and standards for classification, e.g. Forestry Commission, Royal Horticultural Society, the Woodland Trust.

Learning aim B: Explore factors affecting selection of trees and their suitability for use in a given area

Considerations affecting the selection of trees for planting in specific areas.

B1 Considerations affecting the choice of trees for specific areas

Plant requirements:

- preferred soil type, including clay, sand, silt, loam, pH
- nutrient requirements, including primary/macronutrients, secondary nutrients and trace elements for growth, rigour, establishment, flowering and fruiting
- aspect, including light and shade tolerance, space available, frost and sun pockets, protection, topography, air quality
- support needs, including stakes, canes, guards, guys, anchors, ties
- planting stock type, including bare root, root balled, containerised
- specific requirements, including protection and support type for individual trees, including Quercus, Fraxinus, Betula, Malus, Prunus, Salix, Juglans and Fagus; and for sizes of plant, including seedlings, whip, feathered whip, bush, standard, half-standard, budded/grafted, including maiden, feathered maiden.

B2 Factors affecting the suitability of trees

- Tree growth and habit:
  - size of tree at planting, growth speed, root spread, size, shape and appropriateness of tree for given purpose, including pyramidal, conical, columnar, spreading, rounded, vase shaped, broad.
- Surroundings that affect tree selection:
  - environmental factors, including buildings and structures, overhead and underground services, traffic, highways, climate and microclimate, exposure, drainage, uneven ground, preferred habitat, space
  - public access areas, footpaths, rights of way, potential issues of falling leaves, fruit, overhanging branches, maintenance access
  - aesthetic value, grouping and combinations, arboricultural merit, silvicultural merit
  - soil structure, texture, pH, drainage, nutrient value, depth, including impact on anchorage and support systems.

Learning aim C: Undertake planting and aftercare of trees in a given area

Consideration when preparing to plant, planting and providing aftercare of trees.

C1 Preparation for planting

- Assessing risk and working safely:
  - identification of hazards and risks around the work area (related to tools, equipment, people) and how these can be minimised, including essential personal protective equipment (PPE)
  - legislation, including Environmental Protection Act 1990, Wildlife and Countryside Act 1981, Health and Safety at Work etc. Act 1974, Control of Substances Hazardous to Health (COSHH) Regulations 2002
  - methods for working safely and minimising damage to working areas.
- Use and application of correct tools, materials and equipment to prepare ground for planting:
  - tools, including spade, rake, hoe, trowel, wheelbarrow
  - materials, including stakes, ties, guards, soil conditioners, organic matter, fertiliser base dressing
  - machinery, including cultivator, rotavator, excavator.
- Ground preparation:
  - cultivation by hand or machine, including correct depth, consolidation, level, addition of soil conditioners, ameliorants, fertilisers, anti-desiccants, as appropriate to area
  - removal of debris, weeds, organic and inorganic waste before planting and correct disposal.

C2 Planting methods

Activities undertaken to ensure optimum condition for planting and successful establishment.

- Use and application of correct tools and equipment for planting:
  - tools, including spades, e.g. Schlick, Mansfield, rake, hoe, trowel, secateurs, loppers, wheelbarrow
  - machinery, including hydraulic tree spades, rotary planters, augers.
- Tree preparation, including watering, removal of dead foliage and weeds, pruning.
- Planting:
  - safe working practices to minimise damage to working area and self
  - reviewing ground preparation
  - handling of trees to avoid damage
  - backfilling
  - safe disposal of waste, including organic and inorganic
  - safe removal of tools and equipment.

C3 Providing aftercare

Methods, equipment and materials used for successful establishment and growth.

- Tree protection, including support, e.g. stakes, guys, anchors and guards for protection from animals, people and weather.
- Initial aftercare to ensure successful establishment, including feeding, watering, pruning, mulching with organic and inorganic materials, disposal of waste, including organic and inorganic.
- Continued aftercare, including inspection, nutrition, watering, formative pruning, moisture retention, mulching, adjustment and removal of support, use of pesticides and herbicides.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand botanical nomenclature and terminology for the purpose of tree identification		
A.P1 Explain the botanical nomenclature and terminology used to identify trees. **A.P2** Explain plant classification and different characteristics that aid identification.	**A.M1** Assess how botanical nomenclature and characteristics aid tree identification.	**A.D1** Evaluate the effectiveness of botanical nomenclature and characteristics in aiding tree identification.
Learning aim B: Explore factors affecting selection of trees and their suitability for use in a given area		
B.P3 Explain the factors that affect the selection of trees in a given area. **B.P4** Explain own selection of trees for a given area.	**B.M2** Analyse factors for own selection of trees for a given area.	**B.D2** Evaluate own selection of trees based on factors that affect selection and suitability for a given area. **C.D3** Evaluate methods used to carry out planting and aftercare, with recommendations for future improvements.
Learning aim C: Undertake planting and aftercare of trees in a given area		
C.P5 Demonstrate safe working practices when carrying out ground preparation, planting and aftercare to establish new trees. **C.P6** Explain methods used to carry out planting and aftercare of trees.	**C.M3** Demonstrate efficient working practices when preparing, planting and providing aftercare to establish new trees. **C.M4** Analyse the impact of own methods used to carry out planting and aftercare.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, C.M4, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- a range of trees to study, from young whips to mature trees
- an area to plant and establish new trees
- appropriate, well-maintained tools, equipment and materials for preparing ground, planting and providing aftercare to trees
- suitable PPE.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will provide a thorough and detailed account of the effectiveness of biological nomenclature and physical plant characteristics when identifying trees. They will show depth of understanding by making detailed links between their use and tree identification, using well-selected, accurate examples of how this leads to positive identification. Learners will provide detailed reasoning as to the limitations of using descriptive biological nomenclature and characteristics to identify trees, using well-selected examples of negative identification.

Learners will consider identification methods and tools thoroughly, recommending those that lead to positive identification.

For merit standard, learners will examine the effectiveness of biological nomenclature and characteristics when identifying trees. They will demonstrate their understanding by making clear links between their use and tree identification, using appropriate examples of how this leads to positive identification. Learners will demonstrate awareness of the limitations of these methods to identify trees and support this through the use of examples and an explanation of some of the issues.

Learners will provide a clear understanding of identification methods and tools, and provide clear reasoning as to the link between the methods and positive identification.

For pass standard, learners will demonstrate clear understanding of the approach used in botanical nomenclature and the methods used to obtain a positive identification of trees using physical characteristics. Learners will demonstrate some awareness that there are limitations to their use.

Learners will provide details of a number of identification methods and tools, and the main reasons they may be selected for use.

Learning aims B and C

The assessment requires a given area to carry out the selection, preparation, planting and aftercare of trees.

For distinction standard, learners will demonstrate clear and detailed reasoning for their tree selection through a thorough examination of the given planting area, considering all relevant aspects that may affect successful tree establishment. This will include full details on the tree requirements for successful growth, meticulously linked to the site conditions. Learners will consider their choices carefully and fully justify their selection in relation to factors affecting suitability.

Learners will carry out planting and aftercare that is effective in supporting the successful establishment of their chosen trees. Learners will evidence clear ways to minimise risks and fully demonstrate competent safe working practices throughout. They will select correct tools, materials and equipment, using them safely and to industry standard. They will draw on knowledge from their learning to reflect on the decisions they made when planting and undertaking practical tasks. Efficient care to the tree will be provided throughout the planting and aftercare processes.

Learners will show a comprehensive understanding of tree requirements before planting, during planting and when providing aftercare to support the successful establishment of trees. Learners will review the methods they used for planting and aftercare to thoroughly explore where they were successful and where methods could be improved or carried out differently.

For merit standard, learners will provide evidence that they have researched different trees and tree types to select trees for planting that clearly match the site conditions and the likelihood of successful establishment. Learners will review their selection of trees, presenting well-documented evidence and making reasoned recommendations for their selection, providing clear links between the features of the given planting site and the selected trees.

Learners will carry out planting, showing they have optimised the given area through the preparation of the site and trees, planting with skill, and by demonstrating efficiency in the time taken, the resources used and the minimal disruption to the trees during the planting process. Learners will draw on their knowledge to consider ground conditions and prepare the area appropriately. They will assess the hazards and risks involved in carrying out the practical tasks and use the required tools, materials and equipment safely and competently.

Learners will show detailed knowledge of individual tree requirements in order to provide aftercare that helps to support successful establishment, for example providing tree stakes, ties and protection that match the age of the tree planted.

Learners will reflect on the methods they used and make clear connections to their impact on the successful establishment of trees.

For pass standard, learners will provide details of the features and characteristics of a given area and research a range of suitable trees for the area, demonstrating an understanding of different tree types, requirements and any limiting factors of the area to be planted. Learners will select a range of trees from those researched, making links between site characteristics and tree requirements.

Learners will work safely, with an awareness of the risks and potential issues arising when preparing the ground for planting trees, during the planting process, and when providing aftercare. Learners will use appropriate methods, tools and equipment to prepare and plant their selected trees, leaving the area clean and tidy on completion. Learners will provide basic aftercare for trees, which may include tree guards or support. On completion of the tasks, learners will safely remove and store tools, materials and equipment, disposing of waste materials appropriately.

Learners will provide reasons for their selected methods for tree planting and aftercare, demonstrating some understanding of the impact these methods have on the successful establishment of trees.

Links to other units

This unit links to *Unit 4: Work Experience in the Land-based Sectors*.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses
- technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 7: Tree and Shrub Pruning and Maintenance

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop skills in pruning and maintaining trees and shrubs, assessing them for potential failure and suggesting remedial solutions.

Unit introduction

Trees and shrubs are a much loved and standard part of the landscape. It is vital, therefore, that they are managed properly to maintain or enhance their aesthetic value, guarantee or increase their longevity, and ensure that they do not pose any risks to the people or property around them.

In this unit, you will learn how pruning may be used to manage the growth and development of a range of trees and shrubs, and how pruning techniques will vary according to plant species, age, situation and intended purpose. You will learn the techniques and procedures used to prune trees and shrubs, and then carry out this work safely and effectively. You will also learn how to assess the health of trees and shrubs, to recognise structural and pathological causes of potential failure, and to determine and carry out the appropriate remedial action.

This unit will help you to progress to further horticulture courses in higher education, or to apprenticeships or entry-level roles in the horticulture sector.

Learning aims

In this unit you will:

A Explore how pruning is used as a means of maintaining trees and shrubs

B Investigate how trees and shrubs are assessed for potential failure

C Carry out pruning and maintenance activities on trees and shrubs.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Explore how pruning is used as a means of maintaining trees and shrubs	**A1** Reasons for pruning and maintaining trees and shrubs **A2** Pruning techniques **A3** Considerations when pruning	A report on the importance of the pruning and maintenance of trees and shrubs, the techniques involved, and how to assess and treat trees and shrubs for potential failure.
B Investigate how trees and shrubs are assessed for potential failure	**B1** Assessing trees and shrubs for potential failure **B2** Remedial action to reduce risks of tree failure	
C Carry out pruning and maintenance activities on trees and shrubs	**C1** Pruning requirements **C2** Planning the pruning operation **C3** Carry out appropriate pruning	A log that covers the pruning and maintenance activities, with photographs and written commentary explaining the processes carried out.

Content

Learning aim A: Explore how pruning is used as a means of maintaining trees and shrubs

A1 Reasons for pruning and maintaining trees and shrubs

- Promoting and maintaining the health of trees and shrubs.
- To reduce the spreading of diseases, e.g. coral spot, Dutch elm disease.
- To maintain plant vigour, balance and structural stability.
- To improve the aesthetics of the plant.

A2 Pruning techniques

- Formative pruning – preparing and getting the shape in the early stages of tree development.
- Tree pruning techniques, including crown thinning, crown reduction, crown lifting, and crown cleaning.
- Pruning techniques for trees and shrubs, including pollarding, coppicing, rejuvenation, root pruning.

A3 Considerations when pruning

- The required outcome, e.g. from the client, park manager.
- The seasonality and timing of pruning techniques for the type of tree/shrub.
- The selection of the appropriate technique suitable for the tree type within its particular growing area.
- The landscape where the tree/shrub sits.
- The legal considerations in terms of tree, planning and conservation regulations.
- The health and safety of operatives, and regulations around working at heights, harnessing, and personal liability insurance.

Learning aim B: Investigate how trees and shrubs are assessed for potential failure

B1 Assessing trees and shrubs for potential failure

Carrying out a risk assessment around the probability of tree failure:

- assessing potential failure area of trees dependent on tree type
- consideration of the form and branching characteristics
- evidence of structural weakness and imbalance
- impact of local construction work, changes in soil levels, potential hazards to public and property.

B2 Remedial action to reduce risks of tree failure

Possible solutions and considerations for remedial action:

- removal or pruning options outlined
- physical support, including propping, guying, bracing
- site improvement
- costs and benefits of remedial action proposed
- long- and short-term consequences
- consideration of health and safety legislation.

Learning aim C: Carry out pruning and maintenance activities on trees and shrubs

C1 Pruning requirements

- Methods of assessing pruning requirements and species identification, including plant characteristics consisting of natural size and form, age, vigour, health and physical damage.
- Seasonal pruning requirements in relation to aesthetic considerations and health and safety considerations.

C2 Planning the pruning operation

- Close the site, clear up, cordon sections off, give advance warning and notices.
- Planning the pruning operation – to carry out and consider
  - ○ risk assessment
  - ○ weather conditions
  - ○ access arrangements
  - ○ public safety.
- Selecting appropriate pruning tools and equipment, e.g. types of hand tools.
- Access to equipment and personal protective equipment (PPE).

C3 Carry out appropriate pruning

- Using the appropriate methods, prune trees and shrubs appropriately according to their age, size and desired effect/use within the landscape.
- Pruning different plants, including evergreen shrubs, deciduous shrubs, hedges, wall shrubs, roses and trees.
- Site management in maintaining health and safety, disposal of waste and PPE.

Assessment criteria

Pass	Merit	Distinction	
Learning aim A: Explore how pruning is used as a means of maintaining trees and shrubs		**A.D1**	Evaluate a wide range of pruning techniques and the factors that influence them, analysing their effectiveness in maintaining trees and shrubs.
A.P1 Explain why pruning is important to maintain trees and shrubs. **A.P2** Explain some of the factors that influence the selection of different pruning techniques.	**A.M1** Compare a range of pruning techniques and how they are used to maintain trees and shrubs, assessing their importance and the factors that influence their use.		
Learning aim B: Investigate how trees and shrubs are assessed for potential failure		**B.D2**	Analyse the different methods for assessing trees and shrubs for failure, producing detailed solutions for prevention, remedial care and long-term management.
B.P3 Explain the methods used to assess trees and shrubs for failure. **B.P4** Produce outline solutions for how tree and shrub failure may be prevented or remedied.	**B.M2** Compare the different methods for assessing trees and shrubs for failure, producing solutions for how they may be prevented or remedied.		
Learning aim C: Carry out pruning and maintenance activities on trees and shrubs		**C.D3**	Carry out thorough assessments for a wide range of trees and shrubs, selecting and using the appropriate tools confidently to complete pruning and maintenance activities.
C.P5 Carry out basic assessments of the pruning requirements for trees and shrubs. **C.P6** Carry out simple pruning and maintenance activities on trees and shrubs.	**C.M3** Carry out accurate assessments of the pruning requirements for a range of trees and shrubs, selecting tools to complete most of the required pruning and maintenance activities.		

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aims: A and B (A.P1, A.P2, B.P3, B.P4, A.M1, B.M2, A.D1, B.D2)

Learning aim: C (C.P5, C.P6, C.M3, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to pruning tools and equipment.

Essential information for assessment decisions

Learning aims A and B

For distinction standard, learners will demonstrate a thorough understanding of the importance of pruning for the maintenance of trees and shrubs and the techniques involved, supported by a wide range of examples of specific plants, some of which have quite complex requirements. They will provide a comprehensive analysis of the advantages and disadvantages of different pruning techniques and approaches, suggesting improvements or changes that may be necessary to support the health of trees and shrubs. They will give examples of how to assess failure in trees and shrubs, giving detailed recommendations for the remedial action required and how to plan for the long-term management of possible failures. Learners will show throughout that they understand the importance of the legal implications of pruning and maintaining shrubs and trees, both in terms of health and safety and specific legislation relating to planning and conservation.

For merit standard, learners will give clear and detailed information about the importance of the pruning and maintenance of trees and shrubs, supported with a range of examples. They will compare different pruning techniques and their outcomes, making some comments about the suitability, and the effectiveness of the desired outcome. They will give some information about the methods to assess potential failure in trees and shrubs and the remedial action required for them, showing some consideration of the long-term impact and maintenance plan.

For pass standard, learners will give broad reasons for the pruning and maintenance of trees and shrubs, using a small range of examples, showing consideration of the needs of different landscapes. They will provide information on some of the basic methods for assessing potential failure in trees and shrubs, and suggest some suitable remedial action to reduce the failure and long-term loss of the tree/shrub.

Learning aim C

The assessment activity for learning aim C should cover pruning activities for the following types of tree and shrub: evergreen shrub, deciduous shrubs, hedges, wall shrubs, roses and young trees. Tree access techniques and chainsaw use are not required.

For distinction standard, learners will demonstrate confidence in assessing pruning requirements, selecting and using the correct equipment and tools for pruning trees and shrubs, resulting in skilful pruning. They must demonstrate the capacity to adapt techniques to the needs of the specific tree/shrub, such as taking account of natural size, form and age, and how pruning best manipulates the plant to improve the outcome in its habitat, while maintaining high standards of health and safety to self and others. Learners will work autonomously, solving problems efficiently and resourcefully.

For merit standard, learners will assess the requirements of a range of trees and shrubs, selecting and using equipment and tools that are mostly appropriate, and which result in proficient pruning. They will show a consideration of the landscape and of the tree and shrub size and form. They will work mostly without help but may need some guidance for more complex techniques. They will work safely, showing a consideration for the setting and for others present.

For pass standard, learners will demonstrate that they can assess some of the pruning requirements for a small range of trees and shrubs, and use the appropriate tools and equipment to prune them (although they may need some support in selecting them). They will also demonstrate that they can carry out some basic pruning techniques but may need some support in more complex situations.

Links to other units

This unit links to Unit 1: Professional Working Responsibilities.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses such as gardeners, park managers
- technical workshops on pruning techniques from staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 8: Tree Pests and Diseases

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners develop the skills required to identify, prevent and control common pests and diseases in trees.

Unit introduction

What is wrong with that tree? Pests and diseases can have a significant negative effect on the visual condition of trees, not to mention the economic impact they can have on crop production, such as fruit or timber. Knowing what is wrong with a tree, and what to do about it, is essential for the management of healthy, productive trees.

In this unit, you will learn about the features of a range of pathogens that can affect trees. You will learn how to identify trees and pathogens, along with the signs and symptoms that indicate a tree is under attack from a particular pest or disease. You will explore how to manage tree pathogens using different methods, equipment and techniques in both organic and conventional systems. You will also carry out your own practical investigation into monitoring and managing tree health.

This unit will support your progression to employment in the land-based sector as a trainee forester or forest worker, or to further study in an Apprenticeship or higher education.

Learning aims

In this unit you will:

A Examine tree pests and diseases for the management of tree health

B Explore health management strategies for trees

C Apply methods to prevent and control pests and diseases for effective tree health management.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Examine tree pests and diseases for the management of tree health	**A1** UK tree species **A2** Abiotic and seasonal factors affecting health status **A3** Common pests and diseases affecting trees **A4** Effects of abiotic factors, pests and diseases on health status	A report on the importance of identifying organisms that are key to managing tree health, supported by witness statements of learners' ability to identify key organisms.
B Explore health management strategies for trees	**B1** Monitoring and surveillance methods **B2** Prevention and control of pests and diseases **B3** Planning tree health management	Portfolio on theoretical and practical tree health management: identification, monitoring, prevention and control of pests and diseases, including witness statements from teachers and/or employers.
C Apply methods to prevent and control pests and diseases for effective tree health management	**C1** Safe management of tree health **C2** Preventing and controlling pests and diseases	

Content

Learning aim A: Examine tree pests and diseases for the management of tree health

Types, characteristics and life cycles of trees, pests and diseases.

A1 UK tree species

Recognition of common genera and species of trees in the UK.

- *Betulaceae*, e.g. *Alnus, Betula, Corylus*.
- *Fagaceae*, e.g. *Castanea, Fagus, Quercus.*
- *Liliaceae*, e.g. *Erythronium, Galanthus*.
- *Oleaceae*, e.g. *Fraxinus, Olea.*
- *Pinaceae*, e.g. *Pinus.*
- *Rosaceae*, e.g. *Malus, Prunus, Rosa.*

A2 Abiotic and seasonal factors affecting health status

Processes and impact of factors that predispose trees to pests and disease.

- Water-related, to include drought, waterlogging, water pollution.
- Weather-related, to include frost, shade, sun scorching.
- Damage, to include mechanical, herbicidal.
- Soil-related, to include poor soil aeration, nutrient deficiencies or excesses.

A3 Common pests and diseases affecting trees

Recognition and features of biotic pests and pathogens, including their impact on susceptible host species and significance to tree health management.

- Insect pests, to include *Hemiptera*, *Hymenoptera*, *Lepidoptera* and *Coleoptera spp.*
- Mammalian pests, to include rabbits, grey squirrels and deer.
- Fungi, to include:
  o mutually beneficial relationships, e.g. mycorrhizae, ectomycorrhizae
  o Ascomycetes, e.g. *Nectria*, *Fusarium*, *Ophiostoma* and *Hymenoscyphus*
  o Basiodiomycetes, e.g. *Ganoderma*, *Puccinia* and *Armillaria spp*
  o Oomycetes e.g. *Phytophthora*.
- Bacterial pathogens, e.g. *Xanthomonas*, *Pseudomonas*.
- Features and behaviour of pests and pathogens:
  o life cycles, reproduction methods and rates
  o behavioural characteristics
  o social structure
  o growth and development
  o preferred habitat and food supply
  o natural population controls, e.g. mortality, predation
  o natural spread, e.g. wind, territory
  o living vectors
  o fomites, e.g. vehicles, machinery.

- Purpose and protocol for reporting certain pests and diseases to appropriate organisations, e.g. Forestry Commission, Department for Environment, Farming and Rural Affairs (Defra):
  - American dagger nematodes
  - acute oak decline
  - ash dieback disease
  - Asian longhorn beetle
  - Dutch elm disease
  - elm yellows
  - larch disease
  - oak pinhole borer
  - oak processionary moth
  - oriental chestnut gall wasp.

A4 Effects of abiotic factors, pests and diseases on health status

Mechanisms of action, short- and long-term consequences of abiotic factors, infection and infestation.

- General effects: dieback, premature senescence, canker.
- Seed and fruit: damage, abnormal formation, reduced yield.
- Leaf changes: colour, structure, defoliation.
- Trunk, stem and limbs: fissures, cracks, stem bleeding, stripped bark, fructification, shoot distortion, bore holes.
- Rot types, to include root, seed, wood.
- Damage leading to secondary infection.

Learning aim B: Explore health management strategies for trees

B1 Monitoring and surveillance methods

Suitability, advantages and disadvantages of methods and equipment.

- Health status markers:
  - general appearance of individual and surrounding trees
  - timing, frequency and type of damage and/or decay.
- Collecting evidence of pest problems:
  - trapping of invertebrates, e.g. sweep nets, pooters
  - presence of faeces from larger animals, tracks.
- Identification of pests and disease, e.g. use of hand lenses, digital cameras, preservation of samples.
- Recording and assessment methods, e.g. use of field data sheets, software, graphical representation of changes over time.

B2 Prevention and control of pests and diseases

Prevention and control methods and equipment, their suitability, advantages and disadvantages.

- Species selection and meeting basic needs, e.g. irrigation, drainage, nutrition.
- Breeding for natural resistance and disease tolerance.
- Culling of pest species.
- Pruning.
- Sanitation felling.
- Chemical and biological control:
  - pesticides, fungicides, deterrents and legal responsibilities, e.g. The Plant Protection Products (Sustainable Use) Regulations 2012
  - natural predators.

B3 Planning tree health management

Planning considerations for managing tree health, including responsibilities under UK legislation.

- Integrated pest and disease management (IPDM) planning principles.
- Risk assessments.
- Compliance with the UK Forestry Standard (UKFS).
- Impact of designated status on tree health management planning,
  e.g. Sites of Special Scientific Interest (SSSI), Tree Preservation Orders (TPOs).
- Purpose and effects of Plant Health Orders:
  o protection for growers and producers
  o certification of planting material
  o restrictions on importing, exporting, moving or keeping particular plants, plant pests
    and other materials such as soil, to include plant passports and scientific licences.
- Planning stages and processes:
  o establishing existing habitat types, woodland structure and other parameters,
    e.g. location, topography, climate
  o use of maps and visual tools
  o identification of potential threats, e.g. to plant health, soil erosion, wild mammals
  o identifying priorities and key objectives
  o suitability of applying chemical or biological controls for pests and diseases
  o waste disposal, e.g. tree tubes, chemical containers
  o disposal of infected material, e.g. branches.

Learning aim C: Apply methods to prevent and control pests and diseases for effective tree health management

C1 Safe management of tree health

Equipment and techniques required to work safely and avoid spreading pests and diseases.

- Safety measures:
  o appropriate personal protective equipment (PPE), e.g. safety glasses, masks, gloves
  o preparation of, and compliance with, risk assessments
  o safe transport, carrying and use of tools and equipment, e.g. chainsaws, pruning
    shears, ladders
  o safe working procedures to ensure protection of self and others
  o compliance with relevant legislation, e.g. Health and Safety at Work etc. Act 1974,
    Control of Substances Hazardous to Health Regulations 2002 (COSHH),
    The Plant Protection Products (Sustainable Use) Regulations 2012.
- Biosecurity measures:
  o checks of tree stock health and accompanying documentation
  o actions to minimise spread of pests and diseases, e.g. cleaning and disinfection
    of equipment, removal of soil and debris from boots and transport
  o appropriate actions near water courses to prevent spread of pests and
    diseases downstream
  o methods of disposal of infected and non-infected material.

C2 Preventing and controlling pests and diseases

Techniques, equipment and processes involved in preventing and controlling pests and diseases.

- Application of protective barriers, e.g. tree tubes, mesh, fences.
- Removal of tree parts and appropriate movement of timber.
- Sourcing, preparing and application of treatments, to include calculation of required
  amounts, e.g. liquids, sprays, powders.
- Animal traps and repellents.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Examine tree pests and diseases for the management of tree health		
A.P1 Explain methods and importance of correctly identifying tree pests and diseases. **A.P2** Explain the factors that contribute to the acquisition of pests and diseases of trees.	**A.M1** Discuss the characteristics of pests and pathogens that affect trees.	**A.D1** Assess the impact of pests and pathogens on tree health.
Learning aim B: Explore health management strategies for trees		
B.P3 Perform simple monitoring and surveillance of tree health. **B.P4** Plan simple tree health management strategies, providing reasoning.	**B.M2** Perform complex monitoring and surveillance of tree health. **B.M3** Complex tree health management strategies, providing reasoning.	**B.D2** Justify complex health management strategies for prevention and controlling pests and diseases of trees. **C.D3** Demonstrate efficient, complex tree health management, evidencing reasoned conclusions as to effectiveness of methods used.
Learning aim C: Apply methods to prevent and control pests and diseases for effective tree health management		
C.P5 Perform simple health management strategies to prevent and control pests and diseases. **C.P6** Explain own methods used in tree health management.	**C.M4** Perform complex health management strategies to prevent and control pests and diseases. **C.M5** Assess the effectiveness of own methods used in tree health management.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, B.M3, C.M4, C.M5, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- a range of trees in different habitats
- images and samples of common pests
- a range of equipment and methods used to monitor, prevent and control pests and diseases.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will identify three tree species, two pests and two diseases correctly, with little need to refer to other sources. They will give a wide-ranging account of common and uncommon pests, and diseases relevant to the health management of trees, the purposes of monitoring their spread, and the impact on UK tree populations, linking these to the impact on individual trees, woodlands and local ecosystems. Learners will provide a comprehensive overview linking features such as life cycle, reproduction, preferred habitats and modes of movement of pests and disease with particular geographical locations, susceptible host species and abiotic factors affecting the transmission and severity of affliction. Their accounts will demonstrate a thorough understanding of the similarities and differences between different pests and diseases, and the importance of correctly identifying both host and pest/disease to managing tree health in context.

For merit standard, learners will use standard methods to correctly and efficiently identify three tree species, two pests and two diseases, providing sound reasoning for the choices they make. They will give detailed accounts of the features of pests and pathogens, such as the different parts of their life cycles and modes of movement. Learners will give careful consideration to the factors determining how and why pests and pathogens come to affect their hosts, including how abiotic factors can affect host susceptibility in both individual and groups of trees. Their accounts will demonstrate a sound depth of understanding of the links between pests, pathogens and diseases in trees.

For pass standard, learners must provide essential detail of the features and processes used to identify trees, pests, pathogens and related diseases. They will correctly identify a minimum of three trees, two pests and two diseases. They will demonstrate understanding of how fungi, bacteria, viruses, insects, gastropods and mammals affect trees, including the linked symptoms displayed by affected trees. Learners will demonstrate basic knowledge and understanding of how host trees are made more or less susceptible to attack from pests and pathogens.

Learning aims B and C

For distinction standard, learners will complete tasks of a similar complexity to those at merit standard with an efficient use of time and resources. They will consider their practical tasks and written work in a manner that demonstrates a comprehensive understanding of how tree health can be managed effectively to reduce the impact of pests and pathogens. Learners will give a good account of a number of organic and conventional contexts in the management of pests and disease, commenting on how current prevention and control strategies may impact future management, such as the development and prevention of pesticide resistance. They will consider the impact of UK tree health legislation on their planning and implementation. Learners' approaches to tree health management strategies will reflect research into alternative strategies available, and reasoned decision making behind choices made.

They will review their strategies for monitoring the effectiveness of methods implemented, commenting on tree health status, pest and disease prevention and control. Written work will be logically structured and illustrated appropriately throughout.

For merit standard, learners will plan for and carry out more complex tasks, such as the monitoring of multiple sites, or through completion of a longer-term project requiring accuracy and dedication for effective management. They will apply their understanding of monitoring methods to specific examples, identifying the most suitable methods to use after careful consideration of the factors affecting a given situation, such as the need to prevent disease in a certified organic system. Learners will carry out pest and disease monitoring, prevention and control techniques in a manner which demonstrates familiarity with the correct methods to achieve the desired outcomes. They will review the stages of their tree health management plans, making reasoned judgements on how effective the implemented methods were in preventing and controlling pests and disease at key stages.

For pass standard, learners will outline the pests and diseases which may present particular problems in a given area of woodland, the potential and current impacts on the health of the tree, and the likely consequences if control measures are not put in place. They will make straightforward and appropriate plans for managing tree health. Learners must demonstrate understanding of the basic methods of monitoring levels of pests and diseases. They will correctly and safely use equipment and resources to perform one organic and one conventional method for preventing and controlling pests and disease. Throughout the practical work they will monitor and record the pest and disease status in each case.

Links to other units

This unit links to:
- Unit 2: Plant and Soil Science
- Unit 6: Identification, Planting and Care of Trees
- Unit 7: Tree and Shrub Pruning and Maintenance
- Unit 20: Woodland Project.

Employer involvement

This unit would benefit from employer involvement in the form of:
- masterclasses
- technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 9:   Tree-felling Activities

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners plan and carry out the key vocational task of tree felling of small-diameter trees. This, requires them to apply skills in chainsaw operation and maintenance, and to draw on their wider knowledge of forestry and arboriculture.

Unit introduction

A key part of the role of a groundsperson in the forestry and arboriculture sectors is managing the felling of small-diameter trees. To carry this out effectively, the groundsperson needs to assess tree-felling needs, plan the best felling approaches and clearing of sites after felling, and ensure there is professional management of the crop or environment to meet its purpose. This work involves using chainsaws so being confident and safe in their use is essential.

In this unit, you will develop cross-cutting techniques using chainsaws. You will undertake the chainsaw maintenance required for safe and efficient operation, including how to identify common problems and resolve them. You will assess sites and trees for their tree-felling needs and use a chainsaw to undertake basic felling and cross-cutting of small-diameter trees, including dismantling trees on the ground.

The unit contains the key vocational assessment task of felling operations, in which you will assess a site to determine tree-cutting needs, plan activities selecting appropriate application of techniques, cut small-diameter trees and manage the safe clearing of the felling area. You will then evaluate the success of activities. You will need to select and apply knowledge and skills developed in your study of the mandatory content and your wider learning from across the programme. You will select and apply your knowledge and skills from *Unit 1: Professional Working Responsibilities*, *Unit 2: Plant and Soil Science*, *Unit 6: Identification, Planting and Care of Trees* and *Unit 7: Tree and Shrub Pruning and Maintenance*. You will also use your experience of real work practices in the sector from *Unit 4: Work Experience in the Land-based Sectors*.

The skills you learn in this unit are key to employment in the forestry and arboriculture sectors. These skills are also useful in other land-based sectors where tree felling is required, including countryside management, farming and conservation. The unit will enable you to progress to relevant certificates of competence and to a higher education course such as a Foundation or Bachelor Degree in Arboriculture.

Learning aims

In this unit you will:

A Develop tree-felling cross-cutting techniques through the safe use and maintenance of chainsaws
B Plan activities for chainsaw felling of small-diameter trees
C Carry out planned felling and clearing activities for small-diameter trees.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Develop tree-felling cross-cutting techniques through the safe use and maintenance of chainsaws	**A1** Chainsaws and their safe use **A2** Maintaining the engine and saw **A3** Cross-cutting techniques	A demonstration and report on the safe use and maintenance of chainsaws, and the cross-cutting techniques used for felling small-diameter trees.
B Plan activities for chainsaw felling of small-diameter trees	**B1** Assessing needs **B2** Planning activities	Planning and management of chainsaw-felling activities to meet a set brief. The recommended portfolio of evidence includes: • a site and tree inspection • planning documents – schedules, job specification • logbooks, observation records and witness statements of activities undertaken • a review of own performance. Learners will be expected to select and apply learning from other mandatory units and optional units as appropriate.
C Carry out planned felling and clearing activities for small-diameter trees	**C1** Working professionally **C2** Evaluating tree-felling activities	

Content

Learning aim A: Develop tree-felling cross-cutting techniques through the safe use and maintenance of chainsaws

A1 Chainsaws and their safe use

- Chainsaw types, uses, characteristics and features:
  - types and styles of chainsaw, relationship to use and wood type
  - engine size and guide bar length for task
  - two-stroke engines and their main components
  - environmental factors relevant to chainsaw design, to include fuel efficiency, emissions reduction, use of bio oils rather than mineral oils.
- Safe use of a saw:
  - safety features, including anti-kickback devices, stop/off switch, safety (dead hand) throttle, chain catchers, anti-vibration mounts, chain brake
  - personal protective equipment (PPE), including helmet, visor, earmuffs, protective trousers, protective boots, jacket and gloves
  - safe working techniques – correct methods to hold and manipulate saws, health and safety considerations, including safety of self and others, e.g. passers-by, the public, co-workers
  - environmental considerations, to include noise, pollution, waste disposal.
- Chain safety features:
  - depth gauges and correct chain, chain catcher in place, use of safety guide bar.
- Chain inspection and maintenance:
  - chain – tension, height of depth gauge, condition of teeth-cutting edge, wear of teeth
  - guide bar – straightness, wear of channel, signs of bluing (overheating), lubrication
  - wear on sprocket, including signs of damage.

A2 Maintaining the engine and saw

Processes and techniques used in routine maintenance:

- use of operator's manual, service intervals, visual checks
- identification and mixing of correct fuel petrol/oil ratio
- safe refuelling
- use of chain oil for lubrication
- location of spark plug and its use as an indicator of problems, replacement of spark plug
- location of air filter and its cleaning and replacement
- cleaning the external and internal surfaces of the saw.
- Sharpening the chain:
  - use of guides to check depth gauges and use of appropriate flat files to adjust accordingly
  - selecting appropriate round file and using guide, with reference to operator manual to sharpen chain, each tooth sharpened to the same length, working to left- and right-handed teeth.

A3 Cross-cutting techniques

The importance of safe and competent use of the chainsaw in cutting branches using cross-cutting techniques.

- Stance and holding the saw in a way that minimises kickback risk.
- Understanding and recognising tension and compression in limbs and the dangers of them.
- Offering the saw to the wood, including:
  - avoiding using the tip
  - sequence of cuts to reduce risk of saw becoming pinched in the wood.
- Assessing risk, including dangers from released tension and dropping cut wood.

- Methods and requirements for felling difficult trees:
  - o felling methods
  - o escape routes
  - o safe working distance
  - o use of felling aids, e.g. felling levers, wedges, winches, round slings, strops and ropes.

Learning aim B: Plan activities for chainsaw felling of small-diameter trees

In undertaking the key vocational task, planning and carrying out chainsaw tree-felling activities for small-diameter trees, learners must select and apply learning from *Unit 1: Professional Working Responsibilities*, *Unit 2: Plant and Soil Science*, *Unit 6: Identification*, *Planting and Care of Trees*, *Unit 7: Tree and Shrub Pruning and Maintenance* and *Unit 4: Working in the Land-based Sectors*.

B1 Assessing needs

- Site inspection:
  - o condition of site and tree, direction of fall
  - o surroundings, including site access, environmental considerations, topography
  - o access and escape routes.
- Tree inspection, problem trees, their issues, identification and felling solutions, to include:
  - o hung-up trees
  - o leaning trees
  - o diseased or hollow trees
  - o multi-stem trees
  - o windblown trees
  - o branches under tension.

B2 Planning activities

- Risk assessment, their purpose and types and potential hazards.
- Processes and aids to planning activities, including budgets, schedules and flow charts.
- Correct selection and use of personal protective equipment (PPE).
- Job specification to include job description and rationale, timescales, tools, equipment, materials, location of work, costs, skill sets, health and safety considerations, environmental issues.
- Sourcing tools, equipment, materials, skill sets, e.g. internal workforce, external contractors.
- Consideration of potential impact on the environment and sustainability:
  - o impacts on wildlife, e.g. bat roosts, badger setts, cavity-nesting birds
  - o saproxylic species (animals that feed on dead wood) and importance of dead wood in woodland ecosystems
  - o statutory designations, e.g. Sites of Special Scientific Interest (SSSIs), Tree Preservation Orders (TPOs), current legislation and guidelines
  - o replacement planting.

Learning aim C: Carry out planned felling and clearing activities for small-diameter trees

C1 Working professionally

Establishing a safe working site.

- Compliance with appropriate health and safety regulations and guidance, e.g. PPE, use of warning signs, exclusion zones.
- Selection and transportation of the correct tools, equipment and materials.
- Preparation of the work area and positioning of equipment and fuel/oil storage.
- Pre-start checks, starting the saw (cold and warm starts).
- Consideration of ground conditions, including firmness and impediments to access and escape, e.g. brambles, ivy, fences, boggy ground.
- Using a chainsaw to fell a small-diameter tree:
  - deciding on direction of fall, including lean of tree, possible problems and desired direction
  - consideration of environmental conditions, e.g. wind speed and direction, rain
  - using correct sequence of cuts and system
  - position of cuts for the notch, size and direction of cuts, and the felling cut
  - maintenance of a suitably-sized hinge
  - awareness of possible use of felling aids, including wedges and felling lever.
- De-limbing and clearing up:
  - moving safely between work positions
  - work methods
  - tree condition
  - ground conditions
  - ancillary equipment, e.g. log tongs, hooks and picks
  - safe handling of products and arisings
  - awareness of methods for stump removal, including stump grinders, chemicals, heavy plant, winching systems, jacks, fire, hand digging
  - methods of waste disposal and their consequences for the environment and sustainability, including sale of by-products, timber stacks, eco-piles, dead hedges, chipping, burning.
- Team working – communicating clearly with supporting team members.

C2 Evaluating tree-felling activities

- Taking account of problems that arise and using problem-solving techniques.
- Comparing the time taken with the time allocated.
- Identifying inefficient working practices.
- Monitoring actual costs against estimates and identifying cost overruns.
- Monitoring compliance with regulations, guidance and advice notes.
- Assessing communication to identify improvements.
- Using evaluation frameworks to enable assessment of completed activities
  - evaluating completed products, including compliance with specifications, regulations, and codes of practice and risk assessments
  - communicating evaluation outcomes, ensuring correct task completion, including situations where there is a dispute.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Develop tree-felling cross-cutting techniques through the safe use and maintenance of chainsaws		
A.P1 Demonstrate simple cross-cutting techniques, explaining use and effectiveness of own performance. **A.P2** Perform simple chainsaw maintenance, explaining techniques used, and the effectiveness of own performance.	**A.M1** Demonstrate complex cross-cutting techniques, assessing use and own performance. **A.M2** Perform complex chainsaw maintenance, assessing techniques used, and the effectiveness of own performance.	**A.D1** Evaluate techniques used and own proficient performance for chainsaw maintenance, and complex cross-cutting techniques.
Learning aim B: Plan activities for chainsaw felling of small-diameter trees		
B.P3 Perform site- and tree-inspection activities. **B.P4** Produce a simple plan for felling of small-diameter trees, explaining the reasons for planning decisions.	**B.M3** Perform detailed inspections and produce a complex small-diameter tree-felling management plan, with rationale for decisions.	**B.D2** Justify own planning decisions for comprehensive small-diameter tree-felling activities arising from own detailed inspections.
Learning aim C: Carry out planned felling and clearing activities for small-diameter trees		**C.D3** Carry out proficient, complex felling and cross-cutting management activities to selected small-diameter trees, meeting planned objectives, evaluating the effectiveness of processes used and own planning.
C.P5 Carry out competent, simple felling and cross-cutting activities to selected small-diameter trees to meet planned objectives. **C.P6** Explain the effectiveness of processes used, and own planning, of felling activities.	**C.M4** Carry out competent, complex felling and cross-cutting management activities to selected small-diameter trees, meeting planned objectives. **C.M5** Analyse the effectiveness of processes used, and own planning, of felling activities.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of three summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.M2, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M3, C.M4, C.M5, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- a selection of chainsaws
- tools for the maintenance of chainsaws, including files, gauges, brushes, spanners and screwdrivers
- suitable PPE specific to chainsaw use
- fuels, oils, greases and cleaning materials
- a safe location in which to work
- suitable small-diameter trees.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will carry out routine operator maintenance on a chainsaw to a high standard and with confidence, considering all relevant issues and producing robust solutions. Learners will carry out felling a tree in a direction opposite to its lean, to avoid obstacles such as buildings and other trees. Learners will demonstrate cross-cutting of small-diameter trees to a high standard and with confidence, covering all the relevant issues. They will accurately select and use tools and equipment such as log tongs, picks and hooks to carry out maintenance and cross-cutting activities proficiently and to a standard that reflects what is expected in the workplace. The work will be carried out without assistance, other than use of the relevant manufacturer's recommendations, and will be technically correct and in accordance with relevant legislation. Learners will show complete competence in the use of skills and techniques, including positioning of self, manipulation of saw, position and depth of cuts used, working independently and safely at all times. They will fully assess the associated risks and hazards.

Learners will ensure the workplace is prepared and cleared after task completion in line with practices, showing depth of understanding of environmental issues and sustainable waste disposal.

Learners' evidence will demonstrate a consistent use of accurate and relevant terminology.

Learners will keep detailed and accurate records as appropriate to the tasks being carried out.

For merit standard, learners will carry out routine operator maintenance on a chainsaw safely and efficiently, considering most of the relevant issues and producing efficient solutions. Learners will carry out felling of a tree in a given direction and cross-cutting of small-diameter trees safely and efficiently, considering most of the relevant issues. They will select and use some of the available tools and equipment to carry out maintenance and cross-cutting activities safely and efficiently, in accordance with legislation and codes of practice. Learners will use manufacturer recommendations with some confidence and with minimal assistance. They will demonstrate an understanding of the importance of carrying out each aspect of pre-start checks before maintenance is carried out and of the maintenance itself. Their reasoning will be technically accurate and clear. Learners will show some competence in the use of skills and techniques when undertaking cross-cutting activities, including positioning of self, manipulation of saw, position and depth of cuts used. They will assess the associated risks and hazards, organising their work to carry out tasks in a logical sequence, which they will explain clearly.

Learners will ensure that the workplace is prepared and cleared after task completion in line with standard practices, showing some understanding of environmental considerations and the principles of sustainable waste disposal.

Learners will keep records, as appropriate to the tasks and with sufficient detail, so it is clear what has been carried out.

For pass standard, learners will carry out pre-start checks and routine operator maintenance on a chainsaw that requires a limited range of tools and equipment. Learners will carry out felling and cross-cutting of small-diameter trees safely. They will show a realistic awareness of risks and potential issues. Learners will explore possible common faults with chainsaws and explain them in a way that shows an awareness of the concepts that is realistic and acceptable but possibly limited in scope. They will carry out maintenance and cross-cutting activities, demonstrating acceptable workplace practice by working safely and in accordance with relevant legislation. Learners will show that they can follow manufacturer's recommendations but may need some limited supervision and assistance in determining sensible sequences of work.

Their use of the chainsaw may contain minor inefficiencies in technique, such as positioning and depth of cuts, but there will be no crucial errors or health and safety shortfalls. Learners will demonstrate breadth of knowledge in how different techniques or methods may be applied in specific contexts to safely fell and cross-cut a small-diameter tree.

Learners will ensure the site is cleared after task completion and that waste is disposed of appropriately, showing a realistic awareness and understanding of sustainability concepts and practices relating to tree felling.

Learners will show an appropriate awareness of the importance of keeping appropriate records that provide the key information.

Learning aims B and C

In completing the assessment for learning aims B and C, learners must individually plan and carry out small-diameter, tree-felling activities. Learners are required to independently select, apply and demonstrate appropriate knowledge and skills relating to working practices from *Unit 1: Professional Working Responsibilities*, knowledge of tree growth from *Unit 2: Plant and Soil Science*, tree identification and maintenance needs from *Unit 6: Identification, Planting and Care of Trees*, maintenance methods and assessments from *Unit 7: Tree and Shrub Pruning and Maintenance* and of sector standards from *Unit 4: Work Experience in the Land-based Sectors*.

For distinction standard, learners will carry out a site- and tree inspection to a standard that reflects what is expected in the workplace. They will readily understand complex tree-felling and cross-cutting skills issues, considering methods and impact on the environment, exploring the situation thoroughly. Learners will present meticulous findings in the form of annotated maps, plans, diagrams and accompanying notes.

Based on their inspection, learners will produce complex, comprehensive and flexible plans, reprioritising tasks where appropriate in order to use time and resources efficiently. Plans will include a detailed appraisal of work required and a thoroughly considered, time-specific schedule of work. Learners will give a clear rationale for all their recommendations, demonstrating detailed awareness of the influence of relevant governing legislation, codes of practice and certification requirements, and the impact on the environment if the work is delayed or not completed. Job specifications produced will be comprehensive. Learners will show that they have considered how their plans will be effective in terms of, for example, use of resources and completion of tasks, meeting identified needs.

Learners will manage complex felling of problem trees such as leaning trees or those tangled in others. They will demonstrate cross-cutting skills activities that require multiple operations, using appropriate equipment and techniques. Activities will be undertaken efficiently, accurately and completely, fully meeting the plan they have devised for the task.

Learners will review the qualitative standard of practical work undertaken to improve the completion of activities, supporting their views with reasoned judgements.

Learners will carry out effective and safe teamwork that demonstrates clear, concise, unambiguous, oral and written communications with team members.

Learners will monitor and assess task progression, advising only when necessary, using positive and flexible problem-solving skills when needed. They will assess the completed task against the specification and communicate their findings concisely and assertively. Learners will keep detailed and accurate records as appropriate to the tasks being carried out.

Learners will draw up a valid and reliable evaluation framework to use when assessing their management of completed activities. They will make specific, reasoned references as to why and how the various aspects of the work meet the given objectives, making specific references to the feedback received and providing suitable and insightful justifications for the recommendations for improvement.

For merit standard, learners will carry out a site and tree inspection, making efficient use of time and resources. They will understand tree-felling and cross-cutting skills issues and methods, and the impact on the environment, considering less obvious factors. Learners will present detailed findings in the form of annotated maps, plans, diagrams and accompanying notes.

Based on their inspection, learners will prepare plans with clear timescales for undertaking tree-felling and cross-cutting activities. Their plans will clearly demonstrate an understanding of the need to prioritise work and an appreciation of realistic timescales and resources. Their planning will demonstrate a detailed assessment of the work required and a time-specific schedule of work, with a detailed and balanced analysis of the risks associated with felling and cross-cutting, with mostly relevant suggestions for minimising these risks. Consideration will be given to relevant governing legislation, codes of practice and certification requirements. Job specifications produced will be clear.

Learners will manage complex tree felling of trees to fall in a given direction and cross-cutting activities that requires multiple operations, using appropriate equipment and materials. Learners will demonstrate best workplace practice by ensuring safety in accordance with relevant legislation and fulfilling the plan they have devised for the task.

Learners will review approaches adopted and their own work in light of the job specification and the standard achieved, giving valid suggestions for improvements in activities.

Learners will demonstrate that they can communicate clearly and appropriately with a work team.

Learners will accurately assess the progress of a complex task and demonstrate problem-solving skills when needed. They will communicate appropriately their assessment of the progress of a task. Learners will keep records as appropriate to the tasks, with sufficient detail so it is clear what has been carried out.

Learners will draw up an accurate evaluation framework to use when assessing workforce management. They will make recommendations for improvements in their own performance.

For pass standard, learners will carry out a site and tree inspection appropriately but may need some supervision at times. Learners will demonstrate some relevant understanding of the concepts and practices of sustainability in relation to tree felling. They will record correct findings appropriate to each situation surveyed, presenting the information in the form of annotated maps, plans, diagrams, and accompanying notes. The notes and annotations will give clear reasoning for their findings.

Based on their inspection, learners will produce a limited, realistic plan that addresses key tree-felling and cross-cutting activities, correctly prioritising works using broad timescales. Where appropriate, their plans will take into account governing legislation, certification and codes of practice. Job specifications produced will contain key information.

Learners will demonstrate some understanding of the risks associated with a site and with the actual felling and subsequent operations but this may be limited in scope. Learners' evidence will be realistic and may be supported by limited use of relevant examples.

Learners will manage a simple tree-felling and cross-cutting skills activity, requiring few operations and a limited range of tools and materials. Learners will demonstrate acceptable workplace practice, including ensuring safe working practice in accordance with relevant legislation and following the plan they have devised.

Learners will demonstrate that they can issue simple team instructions, both orally and in writing. They will carry out monitoring of activities, including checks on progress and identifying obvious issues that may hinder task completion to the specification. Where problems occur, learners will make suggestions and may intervene directly. Learners will give basic feedback to the workforce on the progress of the task.

Learners will show an appropriate awareness of the importance of keeping appropriate records that provide key information.

Learners will draw up a simple evaluation framework to use when assessing their management of the workforce, identifying the effectiveness of approaches used and their own strengths and weaknesses.

Links to other units

For the Pearson BTEC National Extended Diplomas in Forestry and Arboriculture, this unit should be completed towards the end of the programme. In order to complete the synoptic assessment task in this unit, learners should build on the assessments from across the mandatory content, selecting and applying appropriate knowledge and skills, including knowledge and skills relating to working practices from *Unit 1: Professional Working Responsibilities*, knowledge of tree growth from *Unit 2: Plant and Soil Science*, the identification and maintenance needs of trees from *Unit 6: Identification*, *Planting and Care of Trees*, maintenance methods and assessments from *Unit 7: Tree and Shrub Pruning and Maintenance*, and of sector standards from *Unit 4: Work Experience in the Land-based Sectors*. This unit also links to Unit 20 in the BTEC National Foundation Diploma in Forestry and Arboriculture.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses
- technical workshops involving staff from local land-based organisations
- the contribution of ideas for unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 10: Forestry and Arboricultural Machinery Operations

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will investigate specialised forestry or arboricultural machinery and carry out routine tasks to maintain and operate forestry or arboricultural machinery.

Unit introduction

Specialised machinery is used throughout the forestry and arboriculture sectors for a range of purposes, including tree felling, processing and working at height, as well as for general transport and as a traction or power source. The correct selection, maintenance and use of this machinery are important to the success of forestry and arboricultural enterprises and sustainable working practices.

In this unit, you will explore specialist machinery relevant to your sector of the industry. You will develop practical skills and understanding of the purpose and importance of this machinery. You will learn how to carry out fault-finding and maintenance tasks on these machines. You will also learn how to safely use and operate the machinery for a variety of tasks. The skills and knowledge you gain in this unit will help you to manage the hazards involved in operating specialist forestry or arboricultural machinery. They will also enable you to carry out tasks effectively in a way that prioritises safety and consideration of environmental impacts.

This unit will support your progression to employment in the forestry or arboriculture sectors in a role such as forest worker, groundsperson or assistant arborist, to an Apprenticeship or to higher education.

Learning aims

In this unit you will:

A Investigate the types and purposes of specialised machinery for use in forestry or arboriculture

B Carry out routine maintenance of specialised forestry or arboricultural machinery to sustain its effectiveness

C Operate specialised forestry or arboricultural machinery to perform routine tasks.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Investigate the types and purposes of specialised machinery for use in forestry or arboriculture	**A1** Machine types and purposes **A2** Criteria for selecting machines and selecting for a specified purpose	A presentation or report on the different types of specialist forestry or arboricultural machinery, including: • an evaluation of the purpose and selection criteria for different types of specialised machinery used in forestry or arboriculture • a selection of appropriate forestry and arboricultural machinery for specified tasks, supported by reasons for selection choices.
B Carry out routine maintenance of specialised forestry or arboricultural machinery to sustain its effectiveness	**B1** Machinery components and maintenance requirements **B2** Maintenance methods and equipment **B3** Fault-finding and correction	Evidence of carrying out fault-finding and maintenance tasks for a variety of forestry or arboricultural machinery, evaluating the effectiveness of the methods used. Evidence of the use of forestry or arboricultural machinery to carry out routine tasks, evaluating the effectiveness of the operation methods used.
C Operate specialised forestry or arboricultural machinery to perform routine tasks	**C1** Working safely **C2** Operating machinery **C3** Disposing of waste **C4** Post-use checks and storage	

Content

Learning aim A: Investigate the types and purposes of specialised machinery for use in forestry or arboriculture

A1 Machine types and purposes

Variety of machine types and purposes relevant to the forestry sector or the arboriculture sector.

- Planting, e.g. soil drills, tree planters, disc planters.
- Tree felling and/or processing, e.g. chainsaws, winches, forwarders, skidders, harvesters, timber trailers.
- Section felling, tree or stump removal, e.g. mobile elevating work platforms (MEWPs), lowering equipment, stump grinders, winches, tree spades.
- Cutting, e.g. reciprocal cutters, flailing equipment, tractor-mounted rotavators.
- Pruning, e.g. chainsaws, brush cutters, pole pruners.
- Vegetation management, e.g. strimmers, clearing saws, brushcutters.
- Waste processing and woodland residue machinery, e.g. chippers, tree shredders, mulchers.
- General purpose vehicles, e.g. all-terrain vehicles (ATVs), tractors, trailers, quad bikes.
- Timber processing machinery, e.g. mobile sawmills, logsplitters.

A2 Criteria for selecting machines and selecting for a specified purpose

Factors that influence the selection of machines and their specified purposes for the forestry sector or the arboriculture sector.

- Fitness for purpose, e.g. safe operation, requirements of the task, necessity for certificates of competence or operator licences, topography, slopes, weather, ergonomics and working conditions and their effect on operator productivity.
- Machine specification, e.g. safety features and safe operation, power requirements, fuel type, rollover protection systems (ROPS) and falling object protection systems (FOPS), working width, capacity, dimensions, ease of operator use, complexity, road legality, stability on slope, specialist attachments, electronics, height/width restrictions.
- Costs, including procurement costs (e.g. purchase, lease, contract hire), depreciation and expected lifespan of the machine, value for money, running costs, fuel costs, cost of transport and storage.
- Maintenance, including service and repair, requirements, availability of spares, consumables and tools required for maintenance.
- Environmental and sustainability factors, e.g. fuel type, fuel consumption rate, exhaust emissions, air and noise pollution, ground pressure, recycling of products, machine lifespan, ecological impact.
- Selection of machines for specified purposes.

Learning aim B: Carry out routine maintenance of specialised forestry or arboricultural machinery to sustain its effectiveness

B1 Machinery components and maintenance requirements

- Components, e.g. engine, drive system, electrics, hydraulics.
- Following manufacturer's guidelines and operator manuals for maintenance requirements.
- Operator maintenance before, during and after use of machinery.
- Regular maintenance schedules, e.g. daily, weekly, monthly, annually.
- Using maintenance logs.

B2 Maintenance methods and equipment

- Carrying out maintenance tasks safely, including the use of a risk assessment, personal protective equipment (PPE), certificates of competence, legal and organisational requirements relating to safe working practices and applicable to relevant home country, e.g. Health and Safety at Work etc Act 1974, Control of Substances Hazardous to Health (COSHH) Regulations 2002, Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) and Provision and Use of Work Equipment Regulations 1998 (PUWER).
- Resources required, including a variety of tools and consumables, e.g. fuels, lubricants, hydraulic fluid, cleaning agents, cloths.
- Routine maintenance tasks, tools and equipment, e.g. tyre pressure, lubricating/hydraulic oil, chain sharpening.
- Storage; handling; recycling or disposing of waste materials and parts safely and in line with accepted sustainable practice, e.g. recycling of waste oil, recycling of tyres, use of exchange parts and return.

B3 Fault-finding and correction

- Identifying and logging faults and problems that require correcting, servicing or repair.
- Methods and equipment for correcting or repairing faults, including diagnostic tools.
- Professional servicing according to manufacturer's recommendations, including service intervals, available options for carrying out servicing and repairs, advantages and disadvantages of the different options for carrying out servicing and repairs, e.g. availability, time, warranty and cost.

Learning aim C: Operate specialised forestry or arboricultural machinery to perform routine tasks

C1 Working safely

- Following legal requirements and codes of practice applicable to relevant home country, e.g. organisational requirements relating to safe working practices, certificates of competence, The Forest Industry Safety Accord (FISA) guides, Ladders and The Work at Height Regulations 2005, Health and Safety at Work etc Act 1974, Control of Substances Hazardous to Health (COSHH) Regulations 2002, Lifting Operations and Lifting Equipment Regulations 1998 (LOLER), Provision and Use of Work Equipment Regulations 1998 (PUWER), Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013, Manual Handling Operations Regulations 1992.
- Minimising risk to self, others and the environment, e.g. risk assessments, safety zones, working under appropriate supervision, completing operator training, practising appropriate standards of biosecurity.
- Use of personal protective equipment (PPE), e.g. chainsaw protective clothing and equipment.
- Using the manufacturer's operator manuals.
- Potential consequences of not complying with health and safety requirements, e.g. injury to self and others, prosecution, invalidating insurance, ineffective and inefficient machines, damage to the environment.

C2 Operating machinery

- Selecting appropriate machinery to ensure work can be carried out safely and correctly.
- The importance of operator training and competence.
- Preparing and checking machines before use and operation, e.g.:
  - daily checks, adjustment, attachments, lubrication
  - pre-start checks, e.g. oil, fuel, water, ancillary fittings, tyres, visual checks, lights
  - safety checks to be carried out before use, including checking machine safety features before use in order to ensure that the safety features are effective and operable, e.g. safety guards on PTOs.
- Normal operation:
  - machine safety features and procedures for operation, e.g.:
    – safe starting procedures, e.g. starting the machine when it is out of gear, starting the machine with the operator in the driving position
    – safety features to prevent starting of the machine, e.g. out of gear, being on seat, depressed clutch
    – engine stop, e.g. key and fuel cut off
    – access, to include steps and guards
    – other safety features, e.g. anti-reverse features, safety cabs or frames, seat belts
  - range of conditions in which machinery may be operated, e.g.:
    – site conditions such as slopes, size of field/working area and topography, soil types and ground conditions
    – site access considerations
    – weather and seasonality such as normal conditions, drought, wet, tasks in relation to time of year and seasons.
- On-site or in-work problem solving:
  - unexpected changes in ground conditions, e.g. through flash flooding
  - accidental damage, breakages, break-down, spills
  - chainsaw faults, e.g. carburettor incorrectly adjusted.

C3 Disposing of waste

- Processing, handling, transporting, recycling or disposing of waste materials and parts safely and in line with accepted sustainable practice, e.g. recycling of waste oil, recycling of tyres, processing/removal of plant waste.
- Importance of complying with relevant waste policies, including UK waste policy and equivalent waste strategies for relevant home country.
- Waste carrier licences.
- Environmental Permitting (England and Wales) Regulations 2016 and equivalent legislation for relevant home country.
- Biosecurity considerations, e.g. disposal of diseased wood, disinfecting machinery in control areas.

C4 Post-use checks and storage

- Checking machinery after operation to promote safety and efficiency, e.g.:
  - cleaning and lubrication
  - protection in storage, e.g. chain guards.
  - sharpening and periodic removal of effects of use, e.g. chainsaw chain and bar.
  - replacement of wearing parts, e.g. hitch pins, winch cables, chain sprockets.
  - periodic calibration and fault-finding.
- Correct storage of machinery and associated items:
  - storage environment, e.g. storage temperature and humidity, damp and rust prevention, transport and security considerations, fuel stability
  - material storage, waste matter storage and disposal, safe chemical handling, transport considerations, biosecurity requirements
  - stock control and replacement of used consumables and stock items.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate the types and purposes of specialised machinery for use in forestry or arboriculture		**A.D1** Evaluate the purpose and selection criteria for different types of specialised machinery used in forestry or arboriculture, accurately selecting specialised machinery for specific forestry or arboricultural purposes.
A.P1 Explain the purpose and selection criteria for different types of specialised machinery used in forestry or arboriculture. **A.P2** Select specialised machinery for specific forestry or arboricultural purposes.	**A.M1** Compare the purpose and selection criteria for different types of specialised machinery used in forestry or arboriculture, correctly selecting specialised machinery for specific forestry or arboricultural purposes.	
Learning aim B: Carry out routine maintenance of specialised forestry or arboricultural machinery to sustain its effectiveness		**B.D2** Perform, with a high degree of accuracy, complex maintenance and fault-finding tasks for forestry or arboricultural machinery, evaluating the effectiveness of methods used. **C.D3** Demonstrate, with a high degree of accuracy, use of forestry or arboricultural machinery to carry out complex routine tasks, evaluating the effectiveness of operation methods used.
B.P3 Competently perform basic operator maintenance and fault-finding tasks for forestry or arboricultural machinery. **B.P4** Review the importance of own maintenance and fault-finding methods used.	**B.M2** Proficiently perform complex operator maintenance and fault-finding tasks for forestry or arboricultural machinery. **B.M3** Assess the effectiveness of own maintenance and fault-finding methods used.	
Learning aim C: Operate specialised forestry or arboricultural machinery to perform routine tasks		
C.P5 Demonstrate competent use of forestry or arboricultural machinery to carry out basic routine tasks to meet given objectives. **C.P6** Review the importance of own operation methods used.	**C.M4** Demonstrate efficient use of forestry or arboricultural machinery to carry out complex routine tasks to meet given objectives. **C.M5** Analyse the effectiveness of own operation methods used.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, B.M3, C.M4, C.M5, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:
- a range of specialist forestry or arboricultural machinery, equipment and attachments
- a range of common and specialised tools needed for maintenance tasks
- appropriate sites on which to operate and maintain forestry or arboricultural machinery
- basic workshop facilities, including vices, benches, fuels and lubricants.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will thoroughly investigate the effectiveness and selection of different types of machines available to the forestry or arboriculture sector in a way that is logical, coherent and considers all relevant factors. Learners will make insightful references to all key factors in the selection of different types of machines, including consistently valid and accurate references to relevant aspects of safety, cost and sustainability. They will provide justification for their evaluation which links logically to their views. Learners' evidence will demonstrate breadth and depth of understanding in all areas, using specific terminology accurately and consistently throughout to support a considered, well-reasoned response. Learners will correctly choose appropriate machinery for specified purposes according to a given brief. They will fully evaluate their choices and include recommendations that show the validity of their decisions and decision-making process.

For merit standard, learners will give clear, balanced comparisons between the purpose, selection criteria and selection of different types of machines available to the forestry or arboriculture sector. They will make mostly relevant references to appropriate factors in the selection of different types of machines, including clear references to relevant aspects of safety, cost and sustainability. They will demonstrate breadth and some depth of understanding, giving generally valid reasons for their views. Learners' evidence will be technically correct and show use of generally accurate terminology. They will correctly select appropriate machinery for specified tasks according to a given brief. Learners will give mostly valid reasons for their choices.

For pass standard, learners will give a realistic but undeveloped explanation of the purpose of, and selection criteria for, different types of machines available to the forestry or arboriculture sector. They will show some breadth of understanding and give some reasons for their views but these may be superficial or inaccurate in parts. Learners will make some relevant references to appropriate factors in the selection of different types of machines, including discussion of safety, cost and sustainability, although their ideas will be limited in scope. Evidence will show some use of specialist terminology, though this may be limited and inaccurate in parts. Learners will be able to select machinery for specified tasks according to a given brief. They will give some relevant but undeveloped reasons for their choices.

Learning aims B and C

For distinction standard, learners will accurately use the correct tools and equipment to perform complex maintenance and fault-finding tasks, and they will operate forestry or arboricultural machinery to a very high standard, fully meeting the objectives of a given brief. The brief will include complex machines using different power systems, for example hydraulic, power take-off or three-point linkage. They will work to a standard that reflects best workplace practice at all times.

Learners will confidently carry out all maintenance and fault-finding tasks and machinery operation, showing a high degree of initiative within the limits of their responsibility. All the tasks will require multiple operations and the use of a variety of tools, equipment or processes. Learners will demonstrate a robust understanding of how to look after machinery and equipment to a very high standard. They will accurately select and use appropriate tools and equipment to identify faults on forestry or arboricultural machinery, and they will maintain it proficiently and to a standard that reflects best workplace practice. The work will be carried out with efficient use of the relevant operator manuals and will be technically correct. Learners will thoroughly investigate the machine both before the maintenance work, in order to identify issues and produce robust solutions, and after the work is carried out, to check satisfactory completion. The maintenance tasks will be carried out in a sensible, logical order, demonstrating learners' confidence and proficiency.

Learners will demonstrate highly efficient workplace practice by working safely and accurately with forestry or arboricultural machinery in accordance with relevant legislation, ensuring the workplace is cleared after task completion. Post-operation checks and cleaning tasks will be carried out thoroughly and accurately. All storage requirements for machinery or other resources will be met in a way that reflects best workplace practice.

Learners will provide evidence of effective strategies used to minimise risks while operating specialist forestry or arboricultural machinery. They will dispose of any waste materials in a manner that fully complies with accepted practices, and which shows full regard for the importance of sustainability in waste management. They will keep detailed and accurate records as appropriate to the tasks being carried out.

Learners will thoroughly review the effectiveness of the techniques and practices used to carry out the completion of maintenance, fault-finding and operational tasks, supporting their views with well-reasoned judgements that cover all relevant factors. Learners will evaluate and report on how the techniques and practices used resulted in operator maintenance, fault-finding and machinery operation tasks being carried out efficiently, accurately and completely. The evidence will use relevant and accurate terminology throughout.

For merit standard, learners will use the correct tools and equipment to perform complex maintenance and fault-finding tasks, and they will operate forestry or arboricultural machinery proficiently and completely to meet a given brief. The brief will include complex machines using different power systems, for example hydraulic, power take-off, or three-point linkage. They will work to the standard of a competent employee.

Learners will work efficiently, showing some initiative within the limits of their responsibility. They will complete all tasks appropriately, complying with health and safety requirements and assessing the risks. The tasks will require multiple operations and the use of a variety of tools and equipment. Learners will demonstrate mostly relevant and accurate knowledge and skills. They will demonstrate breadth of understanding of how to look after machinery and equipment safely and effectively, minimising resource wastage. They will select and use tools and equipment to identify faults on forestry or arboricultural machinery and maintain it safely and efficiently. Learners will show a clear understanding in their use of operator manuals. They will investigate the machine both before the maintenance work, in order to identify issues and produce clear, mainly relevant solutions, and after the work is carried out, to check satisfactory completion. The maintenance tasks will be carried out competently and efficiently, meeting most of the identified requirements.

Learners will demonstrate proficient workplace practices by working safely with forestry or arboricultural machinery in accordance with relevant legislation, ensuring the workplace is cleared after task completion. They will show a clear understanding of sustainable waste practices. All storage requirements for machinery or other resources will be met competently.

Learners will assess, in a mostly relevant way, the risks and hazards associated with operating specialist forestry or arboricultural machinery. They will dispose of any waste materials in a manner that fully complies with accepted practices. Learners will keep records as appropriate to the tasks with sufficient detail, so that it is clear what has been carried out.

Learners will give a balanced and mainly relevant analysis of the effectiveness of the techniques and practices used to carry out the completion of maintenance, fault-finding and operational tasks. They will show breadth and some depth of knowledge in providing reasons for their analysis.

The evidence will use mostly relevant and accurate terminology.

For pass standard, learners will use the correct tools and equipment to perform basic maintenance and fault-finding tasks and operate forestry or arboricultural machinery competently and safely to meet a given brief, although some minor errors may occur. The brief will include simple powered machines that require a limited range of operations for their use. Learners will work to the standard of a novice employee.

Learners will complete tasks appropriately but show little initiative within the limits of their responsibility. They will work safely, adhering to health and safety requirements but showing limited knowledge of associated risks and their controls. Learners will demonstrate a basic understanding of how to look after machinery and equipment safely and correctly. They will use the appropriate tools and equipment to identify faults on forestry or arboricultural machinery and maintain it safely and competently. Learners will show that they can use operator manuals to assist in the tasks to be carried out. They will perform basic checks on the machine before the maintenance work in order to identify issues and produce realistic but limited solutions, with some supervision. Learners will check the work carried out, but their checks may be limited and lacking in depth and understanding. The maintenance tasks will be carried out safely, meeting the key requirements of the activity.

Learners will demonstrate safe workplace practices with forestry or arboricultural machinery in accordance with relevant legislation, ensuring some after-use cleaning and clearing after task completion. They will show a realistic understanding of the storage requirements for machinery or other resources.

Learners will show a realistic awareness of the risks and potential issues that could arise while operating specialist forestry or arboricultural machinery. Through the work carried out, they will demonstrate a realistic but superficial understanding of the practices that relate to environmental issues and sustainable waste disposal. Learners will show an appropriate awareness of the importance of keeping the required records and providing the key information, although this will lack detail and clarity.

Learners will give a basic review of the effectiveness of the techniques and practices used to carry out the completion of maintenance, fault-finding and operational tasks. They will give some relevant reasons for their views which will be realistic although unbalanced or limited in parts.

The evidence will make some use of accurate terminology.

Links to other units

This unit links to:
- Unit 1: Professional Working Responsibilities
- Unit 4: Work Experience in the Land-based Sectors
- Unit 7: Tree and Shrub Pruning and Maintenance
- Unit 9: Tree-felling Activities.

Employer involvement

This unit would benefit from employer involvement in the form of:
- technical workshops and masterclasses with staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from a local land-based organisation's staff as mentors.

Unit 11: Aerial Arboriculture Skills

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners will develop aerial arboriculture skills using techniques in climbing, pruning and dismantling at height, and considering the relevant health and safety and legal requirements.

Unit introduction

The care and maintenance of trees grown for amenity purposes, such as those in parks, open spaces, private gardens and highways, is fundamental to the role of an arborist. Tree climbing, pruning and dismantling are all skills in which practitioners need to develop proficiency.

In this unit, you will develop the skills and techniques needed to be able to carry out aerial arboricultural operations, including operations relating to the pruning and dismantling of trees at height. You will focus on health and safety considerations and the selection of the appropriate equipment needed to carry out aerial arboriculture operations safely.

Completion of this unit will help you to prepare for employment in a number of roles such as arboricultural supervisor, lead climber and arboricultural consultant. You could also progress to higher education or to associated sectors such as countryside management.

Learning aims

In this unit you will:

A Examine the legal, and health and safety considerations in aerial arboriculture

B Develop plans to access, climb and inspect trees

C Undertake effective aerial arboriculture operations on trees.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Examine the legal, and health and safety considerations in aerial arboriculture	**A1** Legislation and codes of practice	A report based on case studies and examples of the need for legislation, codes of practice and standards, and health and safety considerations for aerial arboriculture operations.
B Develop plans to access, climb and inspect trees	**B1** Visual tree assessments (VTAs) **B2** Aerial arboricultural equipment **B3** Tree access and climbing techniques **B4** Planning considerations	A portfolio of evidence that includes: • an inspection of a tree that identifies defects, and/or aboricultural objectives and their significance • a plan detailing required operations, equipment and techniques • a practical demonstration of aerial arboriculture techniques for a given brief, supported by a tutor observation and a learner log of activities carried out.
C Undertake effective aerial arboriculture operations on trees	**C1** Pruning techniques and operations within canopies **C2** Techniques for dismantling trees	

Content

Learning aim A: Examine the legal, and health and safety considerations in aerial arboriculture

A1 Legislation and codes of practice

The key aspects of current legislation and codes of practice, and their impact on working practices, equipment selection and operation.

- Legislation relating to aerial arboriculture, including: The Work at Height Regulations 2005, Lifting Operations and Lifting Equipment Regulations 1998.
- Industry best practice and guidelines, to include: Arboriculture and Forestry Advisory Group (AFAG), Forestry Industry Safety Accord (FISA); A Guide to Good Climbing Practice (Arboricultural Association), A Guide to the use of MEWPs in Arboriculture (Arboricultural Association).
- Health and safety legislation, e.g. Health and Safety at Work etc. Act 1974; Management of Health and Safety at Work Regulations 1999.
- Town and Country Planning Act 1990, including Tree Preservation Orders (TPOs).
- Countryside and Rights of Way Act 2000.
- Habitat regulations e.g. Wildlife and Countryside Act 1981, The Conservation of Habitats and Species Regulations 2010, Conservation *(Natural Habitats, &c)* Regulations (Northern Ireland) 1995.
- British Standard 3998: 2010 Recommendations for Tree Work.

Learning aim B: Develop plans to access, climb and inspect trees

B1 Visual tree assessments (VTAs)

- Pre-climbing assessment, to include: risks to climbers, ground staff and others; buildings and structures, e.g. greenhouses, vehicles.
- Identifying tree defects and their significance, e.g. evidence of decay, biotic and abiotic factors.
- Inspection of installed support systems, e.g. bracing systems.
- Inspection of wildlife and consideration of relevant legislation e.g. nesting birds, identification of bat habitat.
- Produce a pre-climbing assessment with recommendations, including a risk assessment.

B2 Aerial arboricultural equipment

Characteristics of aerial arboricultural equipment and suitability for specific operations.

- Climbing equipment:
  o climbing hardware karabiners, micro-pulleys, friction devices, throw-lines, throw-bags, ropes, harnesses, side-strops, flip-lines, spikes
  o personal protective equipment (PPE), e.g. personal first-aid kit, climbing helmet.
- Rigging and lowering equipment:
  o selection of appropriate equipment, to include: rigging ropes, pulleys, lowering devices, slings, zip-lines, rigging plates, karabiners.
- Cutting equipment, including: chainsaws, handsaws, secateurs, pole-pruners, associated felling aids.

B3 Tree access and climbing techniques

Identifying primary and preferred methods of access.

- Tree access techniques, to include: use of ladders, mobile elevated work platforms (MEWPs), spikes and flip-lines.
- Rope access methods, including: single-rope technique (SRT), double-rope technique (DRT).
- Moving around the canopy and work positioning, including: use of multiple anchor points, redirects, changing anchor points, false anchor points.
- Selection and use of appropriate chainsaw, e.g. electronic, rear-handled.

B4 Planning considerations

- Planning work according to work specification.
- Feasibility, to include location, cost, site access, skilled personnel resource, equipment availability.
- Timing and seasonality, including: tree species, pests and disease, weather.

Learning aim C: Undertake effective aerial arboriculture operations on trees

C1 Pruning techniques and operations within canopies

Use of pruning techniques appropriate to pruning operation and tree condition.

- Tree pruning techniques such as natural target pruning, reduction cuts, pruning of co-dominant stems, coronet cuts.
- Tree pruning operations: crown cleaning, crown thinning, crown raising, crown reduction, restoration pruning, conservation pruning.

C2 Techniques for dismantling trees

Methods and systems for branch and tree removal.

- Branch removal using a range of cutting techniques, e.g. handheld and free-fall techniques; use of natural and false anchors for rigging systems.
- Section felling of stems, e.g. shock loads in stems, systematic lowering of stem sections, free fall.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Examine the legal, and health and safety considerations in aerial arboriculture		
A.P1 Explain legal, and health and safety factors for given aerial arboriculture operations. **A.P2** Explain codes of practice and industry standards that need to be followed for given aerial arboriculture operations.	**A.M1** Assess the importance of legislation, codes of practice and industry standards for given aerial arboriculture operations.	**A.D1** Justify the importance of legislation, codes of practice and industry standards in relation to given aerial arboriculture operations.
Learning aim B: Develop plans to access, climb and inspect trees		
B.P3 Perform a tree inspection to establish basic arboricultural tasks and their significance. **B.P4** Produce a plan for basic aerial arboricultural operations.	**B.M2** Produce a plan for aerial arboricultural operations, based on own detailed tree inspection, giving reasons for equipment and techniques selected.	**B.D2** Produce a plan for complex aerial arboricultural operations, based on own detailed tree inspection, evaluating the equipment and techniques selected. **C.D3** Demonstrate a range of complex rigging, pruning and dismantling techniques for aerial arboricultural operations, giving a detailed rationale for the effectiveness of the techniques used.
Learning aim C: Undertake effective aerial arboriculture operations on trees		
C.P5 Demonstrate safe rigging, pruning and dismantling techniques for aerial arboricultural operations. **C.P6** Explain the selection and effectiveness of aerial arboricultural techniques used during own performance.	**C.M3** Demonstrate a range of safe rigging, pruning and dismantling techniques for aerial arboricultural operations. **C.M4** Analyse the effectiveness of a range of aerial arboricultural techniques used during own performance.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, C.M4, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a range of:

- woodland to carry out assessment and practical tasks
- commonly used equipment for pruning and dismantling trees
- appropriate safety equipment for aerial arboriculture operations.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will carry out a comprehensive assessment of the legislation relating to methods for accessing, climbing and using specific equipment to inspect and carry out arboricultural operations, fully exploring and articulating the reasoning relating to the need for relevant legislation, codes of practice and industry standards. Learners will use well-chosen, specific examples or case studies to illustrate their findings, clearly differentiating hazards and risks to the tree, surrounding areas and the arborist.

For merit standard, learners will carry out a detailed assessment of the legislation related to accessing, climbing and using equipment to inspect trees and carry out arboricultural operations. They will give examples to determine the need for legislation, codes of practice and industry standards. Learners will include in their findings identified hazards and risks to the tree, the surrounding area and the arborist.

For pass standard, learners will give a broad explanation of the legislation related to accessing, climbing and using specific equipment to inspect trees and carry out aboricultural operations. Learners will be able to demonstrate their understanding, in general terms, of the need for legislation, codes of practice and industry standards. Examples or case studies, where provided, are likely to be superficial. Learners will demonstrate a general understanding of hazards and risks, with limited differentiation of these in relation to the tree, the surrounding areas as well as the arborist.

Learning aims B and C

Learners will carry out an inspection of a tree for arboricultural operations and produce a plan to implement those operations. Learners will then carry out aerial arboricultural operations to an agreed plan that is either devised by the learner or provided by the centre.

For distinction standard, learners will conduct an inspection of a tree, identifying defects or arboricultural objectives that require complex aboricultural operations. This could include defects affecting multiple limbs, a variety of causal factors (for example decay and breaks), proximity to buildings/highways and more advanced pruning objectives (for example crown reduction), dismantling/section felling, working with trees that are large, of mature/old/veteran age or poor condition.

Learners will then develop a plan to carry out the appropriate arboricultural operations. In their planning, learners will consider a variety of solutions and they will evaluate a range of rigging, climbing, cutting and lowering systems, and equipment and techniques, making informed and appropriate decisions. Learners will demonstrate a clear understanding of the factors influencing their choices, explaining their choice of technique, equipment and characteristics of the wood.

Learners will then carry out a range of complex techniques, working with multiple branches/dismantling/section felling and using redirects to effect more efficient rigging, climbing or lowering. They will demonstrate the impact of natural/organic and manufactured redirects on the rope angle and rigging forces, and the limitations placed on cordage, webbing and hardware. Learners will be proficient in single- and two-line techniques. Learners will select and use the appropriate chainsaws, placing cuts accurately to ensure safe, efficient and controlled removal when pruning and dismantling/section felling. Communication with, and direction of, ground crew will be precise, and highly effective. Learners will review the techniques they chose for pruning and dismantling/section felling trees, and assess the effectiveness of the methods implemented, considering safety, the future health of the tree, efficiency and environmental impact. Learners will consider alternatives that improve effectiveness, giving valid reasons for their observations.

For merit standard, learners will carry out an assessment of a tree, identifying some defects that require complex arboriculture operations, and selecting appropriate equipment and techniques for the task(s) to be carried out.

Learners will produce a detailed plan for the arboricultural operations. In their planning, learners will demonstrate an understanding of the factors influencing their choices, including the range of available equipment, techniques and characteristics of the wood. They will give valid reasons for their choices, relating their choices to the specified task(s).

Learners will demonstrate a range of techniques working with single branches and using natural and artificial redirects to affect more efficient rigging or climbing. Learners will use chainsaws, placing cuts accurately to ensure safe, efficient and controlled removal when pruning and dismantling. Learners will communicate with ground crew and direct their operations. They will apply their understanding of different techniques for pruning and dismantling trees, and be able to assess the effectiveness of their chosen techniques and equipment in terms of safety, efficiency and environmental impact, that may include the future health of the tree.

For pass standard, learners will be able to conduct an inspection of a tree, identifying defects that require simple arboriculture operations. In this context, simple operations will mean those requiring a restricted range of equipment and techniques to address limited defects or arboriculture objectives. This may include, for example, operations confined to single limb removal, or dismantling/section felling on small/young trees or where buildings, highways and other obstructions have a limited impact.

Learners will produce a plan for simple arboriculture operations, selecting appropriate equipment and techniques for the task to be carried out. They will be able to give reasons for their choices.

Learners will be able to safely demonstrate tree-climbing and aerial arboriculture techniques. They will demonstrate basic rigging and climbing techniques, working with single branches. Learners will use chainsaws, placing cuts to ensure safe, efficient and controlled removal when pruning and dismantling. Learners will communicate with ground crew. Learners will include basic explanations of the techniques and equipment used.

Links to other units

This unit links to:
- Unit 1: Professional Working Responsibilities
- Unit 7: Tree and Shrub Pruning and Maintenance
- Unit 8: Tree Pests and Diseases
- Unit 9: Tree-felling Activities
- Unit 10: Forestry and Arboricultural Machinery Operations.

Employer involvement

This unit would benefit from employer involvement in the form of:
- masterclasses or technical workshops
- observation of practical tasks during work experience
- support from local arboricultural organisations as mentors.

Unit 12: Surveying, Inspecting and Measuring Trees

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop the skills to carry out tree surveys. They will inspect and measure individual trees to produce an inspection report.

Unit introduction

Effective management of trees in forestry, arboriculture or countryside management relies on acquiring and interpreting quantitative data on trees and their growth. The majority of this data comes from tree surveys, field measurements of individual trees and the use of geographic information technologies. Effective surveys and inspections enable those working in the land-based sectors to assess the potential impact of trees in an environment and make recommendations.

This unit gives you the practical knowledge and skills you need to be able to undertake surveys and apply information from relevant reports for specific purposes. You will learn how to survey and assess individual trees in different settings, which could include woodland and urban environments. This will enable you to assess the condition of tree species in relation to location and habitat, and make judgements on tree management.

The skills that you learn in this unit are key to employment in the land, forestry and conservation sectors. The skills are also relevant to many aspects of habitat and property management. The unit will help you to progress to relevant certificates of competence and higher-education courses.

Learning aims

In this unit you will:

A Investigate the tree-surveying process for work planning and management

B Inspect and measure individual trees to gather data for a tree-inspection report

C Produce a tree-inspection report to provide recommendations for future management.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Investigate the tree-surveying process for work planning and management	**A1** Reasons for undertaking tree surveys **A2** Specific resources and information associated with carrying out tree surveys **A3** Data-collection and sampling methods used in surveys	A report evaluating the importance of tree surveys and data-collection and sampling methods, supported by images and explanations from research, case studies and investigative fieldwork.
B Inspect and measure individual trees to gather data for a tree-inspection report	**B1** Purpose of individual tree inspections and data collection **B2** Conventions for tree inspections and individual tree parameters **B3** Techniques used for detecting decay in individual trees **B4** Legislation, health and safety considerations	A portfolio showing evidence of tree surveys, using tree-inspection techniques and relevant information to produce a tree-inspection report to meet a given brief.
C Produce a tree-inspection report to provide recommendations for future management	**C1** Purpose of a tree-inspection report **C2** Data analysis and inspection recommendations **C3** Tree-inspection report structure	

Content

Learning aim A: Investigate the tree-surveying process for work planning and management

A1 Reasons for undertaking tree surveys

- Street-tree monitoring.
- Woodland management.
- Inventory.
- Pest and disease monitoring.
- Health and safety investigations, e.g. structural damage, storm impact, proximity to overhead power cables.
- Fulfilling responsibilities of tree ownership and maintenance.
- Tree preservation, including general purpose of tree preservation, protected species, fulfilling legal requirements.
- Work planning and logistics related to site ownership and development, including stock take of trees, obtaining information on location and condition of trees.

A2 Specific resources and information associated with carrying out tree surveys

- Survey equipment required, e.g. visual tree assessment, notebook or tablet, global positioning systems (GPS), tree-decay detection equipment, rangefinder.
- Mensuration equipment, including clinometer, callipers.
- Health and safety considerations, e.g. tree stability, lone working, inclement weather.
- Personal protective equipment (PPE) required, e.g. hard hat, visibility jacket, eye protection, safety boots.
- Information gathering for surveying:
  - location of trees
  - tree species
  - age (estimation or from planting records)
  - height and trunk size, estimate of the extent of the roots and potential impacts
  - health and vigour, including any signs of pests and disease that may affect safety of tree
  - importance of trees (asset value)
  - protection of trees, e.g. protected area, conservation designations, Tree Preservation Order (TPO).
- Further assessment on surroundings, including location, e.g. proximity to buildings, sightlines, streetlights, access roads; environmental factors, e.g. nuisance, watercourses, priority habitats, requirements for European Protected Species (EPS).
- British Standard 5837 (BS5837):
  - key principles of surveying trees in relation to construction and preparation of plans for development.

A3 Data collection and sampling methods used in surveys

- Commonly-used technologies, e.g. geographic information technologies (GIT), global positioning system (GPS), geographic information systems (GIS)
- Other data collection methods used, e.g. remote sensing, chain and offset and triangulation
- Importance of selecting the appropriate data collection method.
- Benefits and disadvantages of different data collection methods, e.g. quantitative, qualitative, suitability to sample area, difficulty of data collection, human error.
- Meeting a brief to provide specific information required, e.g. customer request, council guidelines, Tree Preservation Order (TPO).

- Sampling methods used for surveying in different environments:
  - methods that can be used, including simple random, stratified random and systematic sampling, comments on sources of bias
  - plant sampling for tree health, including biosecure handling, clear sample labelling, biosecurity.
- Sampling units used, e.g. point, transect and plot and include plot size, plot shape, plot intensity and plots on boundaries.
- Other key factors in surveying, e.g.
  - influence of stocking density on sampling schemes
  - canopy classes
  - appropriate trees for a crown thinning and stem thinning.

Learning aim B: Inspect and measure individual trees to gather data for a tree-inspection report

B1 Purpose of individual tree inspections and data collection

Individual species inspections carried out to gather specific information.

- Information on individual tree safety and hazard analysis.
- Information on tree ownership and responsibility for management associated with commonly occurring scenarios, including mortgage requirements, property damage, property management, maintenance, health, development proposals, Environmental Impact Assessment reports, Tree Preservation Orders (TPOs) and obtaining possible evidence of criminal activity.
- Required tree-inspection information, linked to:
  - ownership, history
  - location, e.g. conservation area
  - species, age, diameter at breast height (DBH), height, height to crown, crown spread
  - surroundings, e.g. proximity to buildings, sightlines, streetlights, overhead power cables
  - tree specifics, e.g. tree condition (physical and physiological), whether regarded as a nuisance, recommended work actions, hazard-rating system.

B2 Conventions for tree inspections and individual tree parameters

Sizing, scaling and measuring individual trees.

- Units of measurement used, relevant to location.
- The difference between accuracy and precision.
- Measurements, including:
  - solid volume
  - cubic metres
  - height, weight
  - diameter and basal area.
- Tree-specific information, including:
  - overbark and underbark measurements
  - stocking trees, leaning trees, trees on slopes
  - diameter at breast height, diameter classes, diameter limits, forked trees
  - deformed trees, e.g. coppiced stools.

B3 Techniques used for detecting decay in individual trees

- Non-invasive and semi-invasive techniques:
  - non-invasive decay-detecting techniques, including visual tree assessment (VTA), tapping, tree radar unit (TRU), thermal imagery
  - semi-invasive decay-detecting techniques, including Arborsonic™, PiCUS® sonic tomography, micro hammer
- Invasive decay detecting techniques, including drilling, increment borer, fractometer, Sibert drill, Resistograph.

B4 Legislation, health and safety considerations

- Legal factors that may affect surveys and inspections:
  - current relevant legal considerations, e.g. Wildlife and Countryside Act 1981, Town and Country Planning Act 1990, Town and Country Planning (Trees) Regulations 1999
  - additional legal considerations such as common law, statute law, nuisance, negligence and occupiers liability
  - insurance conditions such as professional indemnity insurance and insurance implications
  - health and safety requirements relevant to carrying out tree surveys and inspections, e.g. PPE, relevant legislation, tree climbing
  - biosecurity.

Learning aim C: Produce a tree-inspection report to provide recommendations for future management

C1 Purpose of a tree-inspection report

A tree-inspection report provides different types of information depending on the report objectives and the requirements of the inspection brief.

- Potential objectives for the report and types of information required:
  - description of the site(s) and the proposed works
  - information on existing trees and vegetation
  - detailed description for each tree regarding dimensions, state of health, work requirements and timescales to complete work
  - map of tree locations
  - recommendation of potential additional reports, e.g. mortgage and insurance reports, report on impact trees may have on properties.

C2 Data analysis and inspection recommendations

- Using maps, tables and charts to gather information.
- Applying collected data in order to develop future recommendations.
- Developing recommendations based on age, structure, species, condition, locations, work required and hazard analysis.

C3 Tree-inspection report structure

- The importance of structuring a report appropriately so that it can be used effectively for future guidance.
- Inspection report structure, e.g. title, summary, background, map, findings or results, discussion, conclusions, recommendations.
- Using the Helliwell system.
- Differences between report types and styles in order to meet client requirements and contexts, e.g. tree-related mortgage reports, tree-related insurance reports, tree health and safety reports.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate the tree-surveying process for work planning and management		
A.P1 Explain purposes, resources and information associated with carrying out tree surveys. **A.P2** Explain different data collecting and sampling methods used to carry out tree surveys.	**A.M1** Analyse factors associated with carrying out tree surveys, including different data collecting and sampling methods.	**A.D1** Evaluate the importance of tree surveys and different data-collecting and sampling methods used.
Learning aim B: Inspect and measure individual trees to gather data for a tree-inspection report		
B.P3 Competently perform surveys to inspect and measure trees in order to meet a given brief. **B.P4** Explain the purposes of, legislation, and health and safety considerations associated with the tree surveys carried out.	**B.M2** Efficiently perform tree surveys to inspect and measure trees in order to meet a given brief. **B.M3** Analyse the purposes of, legislation, and health and safety considerations associated with the tree surveys carried out.	**B.D2** Perform individual tree surveys with a high degree of accuracy, evaluating the effectiveness of the surveys in meeting a given brief, including relevant legislation, and health and safety considerations. **C.D3** Produce a comprehensive tree-inspection report to meet a given brief, including inspection recommendations for future management.
Learning aim C: Produce a tree-inspection report to provide recommendations for future management		
C.P5 Produce report aims and objectives for a tree-inspection report in order to meet a given brief. **C.P6** Produce a basic tree-inspection report to meet a given brief, including inspection recommendations for future management.	**C.M4** Produce a detailed tree- inspection report to meet a given brief, including inspection recommendations for future management.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, B.M2, B.M3, B.D2, C.P5, C.P6, C.M4, C.D3).

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- survey location and visual imagery
- a variety of trees and tree groups, both woodlands and urban, that give examples of various types of tree decay
- decay-detection equipment
- general survey and inspection equipment, e.g. DBH tapes, linear tape measures, drag tapes, logging tapes, surveyor's chains, measuring wheels, callipers, compasses, scale rulers, planimeters, clinometers, hypsometers and relascopes, dinometers
- tree-management software, e.g. GIS.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will show depth and breadth of understanding in evaluating the importance of tree surveying, providing a convincing, in-depth account of management and tree preservation. They will apply valid, specific knowledge from researching methodology and the suitability of surveys in a logical way. Their comprehensive evaluation will be based on correctly referenced information and will include specific, accurate references to industry-standard methodology and practices. The evidence will show logical and insightful evaluation of the advantages and disadvantages of at least three contrasting data-collection methods. Sampling methods used for surveying in different environments will be fully considered. Learners will demonstrate robust understanding of the importance of tree surveying in relation to health and safety, biosecurity and habitat management.

The evidence will make use of specific, accurate surveying terminology throughout.

For merit standard, learners will demonstrate their breadth of understanding of factors associated with tree surveying and at least three contrasting data-collection methods. Learners will make reasonable, analytical judgements on the benefits and disadvantages of the data-collection methods. They will demonstrate mainly accurate and clear understanding of data-collection methods, different sampling methods and the importance of gathering information correctly. Learners will demonstrate clear understanding of the importance of tree surveying in relation to health and safety, biosecurity and habitat management.

The evidence will be detailed and supported by mostly relevant examples. It will be structured and use appropriate survey-related terminology.

For pass standard, learners will give a realistic but limited explanation of the reasons behind tree surveying and the required resources and information for surveying. They will demonstrate basic, undeveloped knowledge of at least three different data-collection methods, including some generic examples and descriptions, commenting appropriately on their importance for surveying. Learners will demonstrate a realistic, undeveloped understanding of data-collection methods, different sampling methods and of the importance of gathering information correctly. They will show a generally appropriate regard for health and safety and biosecurity in relation to tree surveying, making basic links between tree surveying and habitat management.

There may be some minor irrelevancies or imbalance in the evidence and some surveying terminology may be omitted.

Learning aims B and C

For distinction standard, learners will carry out two individual tree surveys with a high degree of accuracy, meeting the requirements of a given brief. They will carry out the tasks confidently and show initiative in doing so within the limits of their responsibility. Learners will produce a comprehensive survey storyboard, including images and in-depth descriptions of activity, health and safety, and legislative considerations, supported by specific, valid justification of how adequately the requirements of the brief have been met. They will justify the use of tree measurements and inspection techniques and the value of such surveys. Learners' rationales will be based on relevant primary data, supported by additional, referenced research and practical surveying, which is linked logically and specifically to the primary data obtained. In carrying out the surveys, learners will use accurate terminology consistently and demonstrate highly effective and accurate skills in sizing, scaling and measuring individual trees, and reporting on tree decay.

Learners will show the breadth and depth of their understanding by producing a tree-inspection report to a very high standard. The aim of the report will be robust and linked logically to the given brief. The report objectives will be comprehensive and entirely valid in supporting the overall aim. Learners will articulate convincing, specific conclusions on the state of the trees inspected, including any tree decay. They will reach valid conclusions on any potential future issues the trees might cause and offer insightful, valid recommendations for future management. The evidence will be comprehensive and supported by fully relevant examples. The evidence will make use of specific, accurate terminology throughout.

For merit standard, learners will carry out two individual tree surveys efficiently to meet a given brief, showing some initiative within the limits of their responsibility. The survey will include mostly relevant and valid measurements, and tree-specific information, it will give clear, reasonable, analytical judgements on tree decay based on the survey outcome. In carrying out the surveys, learners will efficiently demonstrate skills in sizing, scaling and measuring individual trees. Learners will make clear and mostly relevant references to health and safety and legislative considerations, providing a balanced analysis related to the purpose of the surveys. The evidence will be detailed and adequately supported by mostly relevant examples and images. It will be structured and use appropriate terminology.

Learners will produce a methodical tree-inspection report, including detail of methodology used, detailed background information and a logical conclusion on findings. The aim of the report will be clear and will be supported by at least three relevant, detailed objectives to be carried out to achieve the aim. The evidence will be thorough and supported by mostly relevant examples. The report objectives will be clear and reasonable. The report will be structured appropriately and will use appropriate terminology. Learners will make mostly relevant suggestions for future management of issues relating to the trees surveyed, providing mainly logical justifications for their suggestions.

For pass standard, learners will carry out competently two surveys to inspect and measure trees. A minimum of two individual trees will be inspected and measured safely and competently, although learners may show little initiative within the limits of their responsibility. Learners will give a realistic but limited explanation of the key purposes, legal requirements and health and safety considerations relevant to the surveys, and show a generic understanding of the links between these factors. In carrying out the surveys, learners will use some relevant terminology and competently demonstrate skills in sizing, scaling and measuring individual trees. Learners will also show some competence in assessing tree decay. Learners will show that they can work with appropriate regard for health and safety, and legislative requirements.

Learners will produce a basic tree-inspection report with some evidence of structure to include the key information title, map, background information and basic tree-measurement results. They will provide at least one realistic report aim to show the overall intention of the report. They will also provide three realistic report objectives to show how the overall aim of the report will be achieved.

The report will be produced to a realistic, acceptable standard and may be supported with generic or undeveloped explanations. Learners will make some relevant suggestions for future management of issues relating to the trees surveyed but these suggestions may not be supported by justifications or explanations. The evidence will show some use of relevant terminology but there may be omissions.

Links to other units

This unit links to:

- Unit 1: Professional Working Responsibilities
- Unit 2: Plant and Soil Science
- Unit 4: Work Experience in the Land-based Sectors
- Unit 6: Identification, Planting and Care of Trees
- Unit 8: Tree Pests and Diseases.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 13: Trees in Urban Environments

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners will develop the skills to introduce new trees and maintain established trees in urban environments.

Unit introduction

Trees can be found in a wide range of urban environments, including parks, gardens, avenues and community spaces. In each environment, the trees have been planted to perform specific functions. These functions are often associated with enhancing the health and wellbeing of the local population, including the improvement of air quality and as a sound barrier against urban noise, or for their aesthetic value. Urban trees also provide habitats for wildlife, which help to create greater biodiversity in our towns and cities. Urban trees require careful management to enable them to carry out their function and to remain a safe presence in urban environments.

In this unit, you will learn about the different characteristics of trees and their suitability to carry out specific functions in the environment. You will learn to plant trees in an urban setting, considering the factors that impact the choice of species and location. You will learn to assess the health and condition of established trees, and carry out required maintenance to optimise their health and ensure the safety of those who come into contact with them.

This unit builds on the tasks carried out in *Unit 9: Tree-felling Activities* and it is expected that you will select and apply learning from the content of the units related to that part of the assessment. You will draw on the skills and knowledge developed in *Unit 3: Contemporary Issues in the Land-based Sectors*, *Unit 6: Identification, Planting and Care of Trees*, *Unit 8: Tree Pests and Diseases*, *Unit 10: Forestry and Arboricultural Machinery Operations* and *Unit 11: Aerial Arboriculture Skills*. You will also use the experience of real working practices in the sector that you gained in *Unit 4: Work Experience in the Land-based Sectors*.

This unit will support your progression to employment in roles such as park warden, gardener, community project officer and arboreal planning. This unit will also enable you to progress to higher education courses such as tree and forestry management.

Learning aims

In this unit you will:

A Explore the history, purpose and characteristics of trees in urban environments

B Undertake activities to plan and establish trees in an urban environment

C Carry out management and maintenance of trees in an urban environment.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Explore the history, purpose and characteristics of trees in urban environments	**A1** History and management of urban trees **A2** Function of urban trees **A3** Urban tree characteristics **A4** Problems associated with urban trees	A written report on the history, roles and characteristics of trees in an urban environment.
B Undertake activities to plan and establish trees in an urban environment	**B1** Planning tree siting **B2** Planting and establishment of trees	Portfolio of evidence: • planning and practical tasks required for the introduction of trees, including site investigation, how trees are selected, planting activities and initial aftercare • planning and practical tasks for the management of established trees, including tree inspection and needs analysis, and management operations to optimise tree health. Learners will be expected to select and apply learning from other mandatory units and optional units as appropriate.
C Carry out management and maintenance of trees in an urban environment	**C1** Planning tree management **C2** Maintaining and managing existing trees	

Content

Learning aim A: Explore the history, purpose and characteristics of trees in urban environments

A1 History and management of urban trees

Origins and uses of trees in urban environments, and the responsibilities of owners and management organisations.

- Urban tree history and politics:
  - communal trees, e.g. urban parkland, avenues, urban farms
  - trees of local significance, including local distinctiveness – ancient or recent; local identity; references in literature/folklore; oldest tree; largest tree, e.g. girth, height
  - remnant trees, in place prior to urban development
  - Tree Preservation Orders (TPOs), individual and block/group, their importance and legality
  - political conflicts, e.g. protection campaigns, developer interests.
- Ownership, legal and management responsibilities for trees in urban areas, including private urban gardens; commercial business premises; public amenity parks and gardens; streets; community project environments, e.g. private land owners, borough councils, community management, churchyards.

A2 Function of urban trees

Environmental, aesthetic and cultural functions of trees located in an urban setting.

- Health and wellbeing benefits to include:
  - greening – improving air quality, e.g. CO_2 reduction, removal of particulates; noise reduction; heat island effect, i.e. shading and cooling
  - water treatment, e.g. surface run-off, water absorption and drainage, odour elimination
  - aesthetic functions resulting in physical and mental wellbeing, e.g. shelter, views, screening.
- Socio-cultural benefits, including crime reduction, property value, recreation and leisure, tourism.
- Wildlife habitats, including nesting birds, roosting bats, hibernating mammals.
- Wildlife feeding environments, including mammals, e.g. squirrels; birds; insects, e.g. butterflies, bees.
- Food and fuel, e.g. orchards, community food projects, urban wood fuel production.

A3 Urban tree characteristics

Tree characteristics and suitability for desired or required function.

- Form, including size type, e.g. dwarf, semi-dwarf, standard, espalier; shape, e.g. tree, shrub, hedge; leaf morphology, e.g. bifoliate, imparipinnate, trifoliate and fruits.
- Resistance to pollution and urban activity, e.g. London plane bark peeling, the willow's ability to be pollarded.
- Bird- or animal-friendly fruit, to minimise fruit falling on to paved areas.
- Climate and microclimate tolerance.
- Design aesthetics, including age, variety, leaf morphology, colouration and variegation, blending/contrasting with surroundings.

A4 Problems associated with urban trees

The impact of problems associated with urban trees and management solutions.

- Impact on buildings and municipal facilities, and associated costs, e.g. blocking light, subsidence, roots blocking drains or lifting pavements.
- Growth, including impact on overhead services and cables; obscuring views and clearance for traffic, e.g. junctions, bends, road signs; shading on other flora.
- Tree debris, e.g. dropping limbs, leaves, cones, bud scales.
- Pollen and tree seedlings.
- Wind-tunnel effect.

Learning aim B: Undertake activities to plan and establish trees in an urban environment

In carrying out urban tree planning, establishment and maintenance activities, learners must select and apply learning from across the mandatory content of the qualification, building on the synoptic assessment undertaken in *Unit 9: Tree-felling Activities*.

B1 Planning tree siting

Considerations when designing urban tree planting.

- Legal, social and cultural:
  - planning permission – consultation and planning rulings: legislation, including Environmental Protection Act 1990, Wildlife and Countryside Act 1981, Health and Safety at Work etc. Act 1974, Control of Substances Hazardous to Health (COSHH) Regulations 2002
  - impact on local inhabitants – consultations, including local organisations, communities, local businesses, schools, county or parish councils, landowners, wildlife groups, greening initiatives, charities.
- Land type and characteristics:
  - history, e.g. disused underground objects, previous trees, soil-borne diseases
  - soil type, e.g. sand, silt, loam
  - soil consistency, e.g. compaction, depth, bedrock
  - water, e.g. drainage, flooding, waterlogging
  - run-off, e.g. poisons, toxins.
- Environmental and usage:
  - location of underground services plans, e.g. gas pipes, electric cable, sewage
  - prospective problems relating to growth.
- Production of tree-siting plans:
  - design methods, including technical drawings and designs, e.g. aerial view, height, access; tree shape
  - tree characteristics, tree health and suitability to purpose.

B2 Planting and establishment of trees

Activities carried out to ensure optimum conditions for planting and successful establishment.

- Working safely, including risk assessment for public health, staff health and traffic and pedestrian safety.
- Recording methods, e.g. town-planning maps, Ordnance Survey maps, labelling tree as to year planted.
- Selection of tools appropriate to task:
  - digging, e.g. spade, shovel, pick
  - levelling, e.g. theodolite, staff, rake
  - positioning, e.g. compass, wind meter
  - consolidation, e.g. hammer, sledgehammer, penetrometer
  - consumables, e.g. stakes, tree braces, tree guards.

- Ground preparation, to include:
  - planting hole, e.g. size, shape
  - compaction, to include soil smearing, root blocking, run-off
  - application of fertiliser, e.g. nitrogen, potassium, phosphorous
  - decreasing surface run-off, e.g. contaminants flooding on to tree roots, waterlogging
  - assessing soil type, e.g. sand, silt, clay
  - avoiding compaction, to include too compact, too loose
  - testing and altering soil pH to include acid, neutral, alkaline
  - increasing organic content, water capacity, avoiding drought; installation of 'direct to root' watering/aeration systems.
- Planting:
  - correct handling of trees to avoid damage; depth, e.g. bury deep, bury shallow, covering grafts
  - identifying the planting line; angle, e.g. straight, slanted, layered
  - supporting posts, e.g. round edges, prevailing wind side of tree, attaching braces; angle, e.g. straight next to tree, diagonal, bark rubbing
  - mulching, e.g. bark, sand, gravel, stone, slate, glass chippings, concrete, rubber
  - safe disposal of waste, including organic and inorganic.
- Protection from environment, animals and people: fencing, e.g. rabbit fencing; guards, e.g. net, metal guards, boxes.

Learning aim C: Carry out management and maintenance of trees in an urban environment

C1 Planning tree management

Activities to ensure the continued protection of high standards of health in established trees.

- Environment assessment, including location; road and pedestrian traffic; tree supports; nearby developments that may impact health, e.g. new run-off, cutting roots, effect on ground water.
- Tree health assessment:
  - recognising health features and signs of decay, including rotten limbs, hollows, fungi, diseases, e.g. ash dieback, Dutch elm disease
  - evidence of damage, including:
    - animals, e.g. deer browsing
    - vandalism, e.g. engraving, fire
    - local usage, e.g. nailed posters, swings
    - accidental damage, e.g. collisions
    - weather damage, e.g. lightning
  - live plant requirements, e.g. soil fertility, water availability and run-off water containing poisons or other pollutants.
- Civil organisation, to include closing roads, warning signs, closed working environments.
- Safe working procedures to ensure protection of self and others:
  - risk assessment, including historical records, e.g. accidents, safety development; specific assessment, e.g. use of area maps, trees leaning over roads or buildings, overhead services, required safety equipment
  - insurance, e.g. public liability, professional indemnity.
- Equipment:
  - cost and availability, including access equipment, e.g. mobile elevated work platforms (MEWP), ladders, climbing equipment, harnesses; pruning and felling equipment, e.g. handsaws, chainsaws; personal protective equipment (PPE), e.g. gloves, helmet, chainsaw trousers
  - equipment maintenance and transport.

- Development of management plans, to include:
  - o aims and objectives, with justifications
  - o expected work rate, e.g. work required, work rate per person and estimated time to completion
  - o disruptions, e.g. city events, public services and weather conditions
  - o personnel required and levels of expertise
  - o site plan, to include maps, e.g. fire assembly point, amenities, first-aid point
  - o work schedule comprising:
    - – maintenance tasks and operations, including organisation of tasks to optimise use of resources and effectiveness of habitat management
    - – timelines, milestones and expected milestone completion dates
    - – safety management, e.g. road or footpath closure, completed risk assessment
    - – logistics, e.g. staff parking, access for machinery and facilities (staff toilets, eating space)
    - – project scheduling such as Gantt charts
    - – production of public information, e.g. signs referring to expected completion dates, information about points of contact.

C2 Maintaining and managing existing trees

Activities carried out to ensure optimum condition for established trees.

- Working according to management plan.
- Working safely within scope of training, including safe use and maintenance of equipment, e.g. guards, oiling, sharpening.
- Working responsibly and professionally with others, e.g. colleagues, groundsmen, members of the public.
- Management tasks:
  - o cutting, e.g. pruning, limbing, felling, pollarding
  - o maintenance, e.g. fertilising, mulching
  - o weeding, e.g. suckers, ivy; resting, processes and methods
  - o waste management.
- Selection and use of correct tools and equipment: plant, e.g. mobile elevated work platforms (MEWP), JCBs, tractors; cutting, e.g. handsaws, pole saws, chainsaws; elevation, e.g. ropes, winches, harnesses.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore the history, purpose and characteristics of trees in urban environments		**A.D1** Evaluate the effectiveness of trees in an urban environment to meet their function, referencing their historical origins and uses.
A.P1 Explain the history and function of trees in urban environments. **A.P2** Explain how the characteristics of trees enable them to meet their function.	**A.M1** Discuss the history of trees in urban environments and their suitability to perform their function.	
Learning aim B: Undertake activities to plan and establish trees in an urban environment		**B.D2** Perform efficient, complex tree introduction activities, in line with own comprehensive introduction plan for trees in an urban environment. **C.D3** Demonstrate complex management of trees in an urban environment with a high degree of efficiency and accuracy in line with own comprehensive management plan.
B.P3 Plan simple tree introduction in an urban environment. **B.P4** Demonstrate simple planting and initial aftercare of urban trees.	**B.M2** Plan detailed tree introduction in an urban environment. **B.M3** Demonstrate complex planting and initial aftercare of urban trees.	
Learning aim C: Carry out management and maintenance of trees in an urban environment		
C.P5 Plan simple management of established trees in an urban environment. **C.P6** Demonstrate simple management of trees in an urban environment.	**C.M4** Plan complex management of established trees in an urban environment. **C.M5** Demonstrate complex management of trees in an urban environment.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, B.M3, C.M4, C.M5, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- common equipment used in tree planting and management: pick, spade, ground breaker, post knocker, tree guards, cable ties, tree ties, posts, shovel, hammer, string, saw, shears, branch loppers, axe, chainsaw, rope
- appropriate personal protective equipment (PPE)
- trees and materials for planting: saplings, compost, feed
- trees for management
- identification guides for plants, trees, tree pests and diseases, fungi.

Essential information for assessment decisions

Learning aim A

Learners produce a report on five different types of trees in urban environments.

For distinction standard, learners will give a detailed and thorough account of the history of urban trees and the complexities of ownership and management, for trees covering a wide range of functions. Learners will include several key historical aspects, such as the original purposes of planting, preservation orders, past issues of specific trees or areas, or the historical effects of litigation.

Learners will demonstrate a depth and breadth of knowledge and understanding of the links between tree characteristics and their selected purpose, including compound or linked characteristics where appropriate. Learners will consistently support their account with well-reasoned examples, such as a tree's ability to produce a high canopy and create shade in a recreational park or similar area that is of benefit to people's recreation, a tree's capacity to produce edible fruits or nuts, its impact on air quality.

For merit standard, learners will give a clear, considered account of the history of trees in urban environments, exploring a variety of functions. Learners will consider in detail the management responsibilities for individuals or organisations of owning urban trees, including relevant historical aspects, for example preservation orders, or common issues such as maintenance or safety of the public in the immediate area.

Learners will make clear links between tree characteristics and their function in the urban environment, demonstrating a breadth and some depth of knowledge of how different purposes require different tree characteristics. Learners will support their account with mostly relevant examples, such as in relation to greening, provision of shelter, shade or draining systems.

For pass standard, learners will give a basic account of the history of trees in different urban environments, giving simple details of ownership and management responsibilities. They will show a realistic awareness of historical aspects such as original purposes of planting.

Learners will demonstrate an understanding of the link between specific tree characteristics and their function and purpose in the environment. Learners will support their account with broad or undeveloped examples of how and why trees are used in urban settings, such as for recreational purposes, food production and drainage.

Learning aims B and C

In completing the assessment for learning aims B and C, learners must individually conduct investigations into a planting site, producing a consequent planting plan with a rationale; and an established tree site, producing a consequent management plan and rationale. Learners complete practical activities arising from their plans. They are required to independently select, apply and demonstrate appropriate knowledge and skills from across the mandatory content of the qualification, and should build on and make connections between their tree management in this unit, and the assessment tasks related to tree management activities completed in *Unit 9: Tree-felling Activities*. Teachers should ensure that the management activities carried out by learners provide sufficient scope for them to complete the assessment fully.

For distinction standard, learners will produce a comprehensive planting plan that will include detailed, logical aims and objectives that accurately meet the needs of the area and trees, resource planning, costs and the impact on the public and environment. Learners will clearly articulate the practical methods to be used in the planting and aftercare of urban trees to a detail of industry standard. The plan will show a robust organisation of tasks with a fully justified selection of tasks to be carried out. The plans will demonstrate a depth and breadth of understanding of all aspects that affect successful tree establishment, such as tree requirements, growth habits, soil type and other environmental factors.

Practical planting tasks will be organised, assured and efficient, with learners demonstrating a high degree of safety awareness and practice throughout.

Learners will produce a comprehensive management plan for established trees based on their own investigation and tree assessment. The plan will include accurate and assured consideration of the factors that impact the management of urban trees, their health and function, for example the complexities of location, such as the wind tunnel effect, or microclimates. Learners will demonstrate a consistently accurate application of knowledge and skills from the assessment completed in *Unit 9: Tree-felling Activities*, by fully considering the potential risks arising from the proposed maintenance activities and planning for their mitigation, and by providing a clear and detailed rationale for the selection of maintenance activities.

During practical tree-management activities, learners will show an assured understanding of the requirements of established trees, demonstrating the capacity to adapt techniques to the needs of the specific tree. Learners will consistently carry out the practical tasks to a professional standard, showing a high degree of initiative within the limits of their own responsibility. They will be fully cognisant of health and safety issues, adapting operations accordingly as the situation requires. Use of equipment will be safe and accomplished. Consumable materials will be used efficiently.

For merit standard, learners will produce a detailed planting plan, that includes a considered discussion on the selection and suitability of the area and trees, and due consideration of the key planting objectives. The plan will demonstrate sound accounting for health and safety risks, and appropriate and methodical organisation of the practical tasks involved. They will provide a detailed rationale for their logically reasoned planning decisions.

For their practical tasks, learners will demonstrate that they can work safely and organise the required tasks methodically, showing some initiative within the limits of their own responsibility. Learners will carry out tasks in a way that ensures the efficient use of time and resources. They will competently assess the hazards and risks involved in carrying out the practical tasks.

Learners will produce a complex plan for the management of established trees, based on their own investigation and tree assessment. The plan will take account of, and address, the concerns and issues identified in their site investigation and tree assessment. Leaners will consider a wide range of potential dangers such as dropping branches, falling from branches, or risk of injury from improper use of equipment, which demonstrates a clear and mostly relevant application of their knowledge and skills from the assessment completed in *Unit 9: Tree-felling Activities*.

Learners' plans will consider a range of management tasks such as pruning using ground and aerial arboricultural operations, tree protection and support, and protection against pests and diseases through physical, chemical and natural processes. The plans will be organised and sequential, and with detailed consideration of the tasks involved, and equipment and skills required to achieve them. Learners will give clear and accurate reasoning for their management decisions.

Learners will complete practical tasks, showing they can work safely and efficiently. Learners will have a constant awareness of health and safety risks when carrying out their work, adapting their approach to the situation as required to maintain good safety standards. Their use of tools, equipment and materials to suit the task will be correct and efficient.

In both planting and management activities, learners will show a good understanding of the trees they are working with and their specific characteristics and requirements, adapting techniques as required to meet the needs of the situation or species of tree.

For pass standard, learners will produce a simple planting plan that outlines the features and characteristics of the area and the selected trees, and which shows some consideration of the key planting objectives. The plan will demonstrate a limited but realistic awareness of health and safety risks, and consideration of how to organise the practical tasks involved, including aftercare. They will provide a brief rationale for their planning decisions, with appropriate but limited reasoning. Learners will use some relevant terminology but there may be omissions.

In carrying out basic practical tasks, learners will show that they can work safely with a realistic awareness of risks to themselves and others. They will use tools, equipment and materials appropriate to the task and these will be detailed in their planting plan.

Learners will produce a simple management plan for established trees based on their own site investigation and tree assessment. The plan will demonstrate a realistic but undeveloped awareness of the factors that impact on the management of urban trees, such as the proximity to roads or clear evidence of disease, and will include limited but realistic consideration of how to organise the management tasks involved. Learners will detail some of the practical methods to be used, such as pruning using ground and aerial arboricultural operations, giving some relevant explanations as to why they have selected the tasks in their plan. Learners' management plans will show a limited application of their knowledge and skills from the assessment completed in *Unit 9: Tree-felling Activities* through consideration of their safe practice and management tasks.

Learners will complete basic practical tasks, showing that they can work safely both from the ground and during aerial operations. They will correctly use tools, equipment and materials to suit the specific task.

In both planting and management activities, learners will show some understanding of the trees they are working with and their specific characteristics and requirements, with an awareness that techniques may need adapting.

Links to other units

This unit should be completed towards the end of the programme. In order to complete the synoptic assessment task in this unit, learners should select and apply the relevant knowledge and skills from other areas of the mandatory content. Learners should build on their knowledge of site inspections and cross-cutting with chainsaws from *Unit 9: Tree-felling Activities*, selecting and applying appropriate knowledge and skills, including those relating to working practices from *Unit 1: Professional Working Responsibilities*; knowledge of tree growth from *Unit 2: Plant and Soil Science*; issues facing the arboriculture sector *from Unit 3: Contemporary Issues in the Land-based Sectors*; the supervision of others taking part in management activities from *Unit 5: Estate Skills*; the selection, planting and aftercare of trees from *Unit 6: Identification, Planting and Care of Trees*; maintenance methods and assessments from *Unit 7: Tree and Shrub Pruning and Maintenance*; the management of tree health from *Unit 8: Tree Pests and Diseases*; safe working practice and maintenance of machinery from *Unit 10: Forestry and Arboricultural Machinery Operations*; and tree assessments, climbing, pruning and dismantling at height from *Unit 11: Aerial Arboricultural Skills*.

Additionally, learners will have completed *Unit 4: Work Experience in the Land-based Sectors* and will be able to apply their experience of and insight into real working practices in the sector.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses or technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Employer involvement

Unit 14: Timber Conversion and Utilisation

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners will investigate timber preparation and utilisation processes, and use and carry out maintenance on timber conversion and processing machinery and equipment to produce products.

Unit introduction

The conversion and processing of timber into added-value market products is an increasingly important aspect of industries associated with tree harvesting and removal, both as a core business and as a business diversification activity. A range of specialised processes, machinery and equipment is used in converting and processing timber to meet market requirements.

In this unit, you will explore preparation and utilisation processes for preparing and processing timber. You will develop an understanding of different product types and production processes. You will learn how to operate machinery and equipment safely for a variety of tasks, and how to carry out routine maintenance on specialist machinery and equipment. The skills and knowledge you gain in this unit will help you to manage the potential dangers involved in operating specialist timber conversion and processing machinery and equipment. You will be able to carry out tasks in ways that prioritise safety and consideration of the environmental impact.

This unit will support your progression to employment in the forestry sector in timber processing, for example working with specialist machinery and equipment in timber conversion and fine wood production. The unit will also help you to progress to further study in an apprenticeship or in higher education.

Learning aims

In this unit you will:

A Investigate machinery and equipment used for timber processing and utilisation in order to determine product requirements

B Produce marketable products through the use of timber conversion and processing machinery and equipment

C Carry out maintenance on timber conversion and processing machinery and equipment.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Investigate machinery and equipment used for timber processing and utilisation in order to determine product requirements	**A1** Types of machinery and equipment used to produce timber products **A2** Timber seasoning and preparation **A3** Health and safety factors	A report or presentation evaluating the importance of the processes, machinery and equipment associated with producing different types of timber products, including consideration of health and safety requirements.
B Produce marketable products through the use of timber conversion and processing machinery and equipment	**B1** Working with product specifications **B2** Preparation and use of machinery and equipment **B3** Preparing products for market	• Evidence of the use of timber conversion or processing machinery and equipment to produce a timber product. • An evaluation of the key requirements of a product specification. • Evidence of carrying out fault-finding and maintenance tasks for timber conversion or processing machinery and equipment. • An evaluation of the importance of appropriate maintenance of machinery and equipment.
C Carry out maintenance on timber conversion and processing machinery and equipment	**C1** Importance of appropriate maintenance **C2** Maintenance procedures	

Content

Learning aim A: Investigate machinery and equipment used for timber processing and utilisation in order to determine product requirements

A1 Types of machinery and equipment used to produce timber products

* Types of machinery and equipment and their purposes in harvesting, preparation or processing of timber, e.g. forwarders, skidders, stump grinders, mobile or static sawmills, debarking machinery and equipment, chippers, log splitters, peeler/pointing machine, charcoal kilns.
* Market characteristics and demand for timber products, e.g. tree trunks, planks, sawn timber, pulp and paper, pellet residues, fencing, rough construction, wood fuels, furniture, veneer, fine furniture.
* Maximising the value of the wood by understanding the market.
* Wood characteristics, including species and size.
* Different types of products and residues, including residue use.
* Sawing methods, including band saws and circular saws, advantages and disadvantages.
* Cutting patterns, including through and through, radial, quarter sawn, advantages and disadvantages.

A2 Timber seasoning and preparation

* Drying processes, e.g. air or kiln drying.
* Preservation for different types of wood and timber, including if it is required and appropriate types of preservation, e.g. chemical or heat treated.
* Treatment types and processes, e.g. for fire retardancy.
* Use of preservatives for end products, including wood preservatives and flame retardants appropriate to wood type and end use.
* Use of specific machinery, equipment and methods to apply preservatives, e.g. immersion, brushing, spraying, pressure methods.
* Using safe working practices for drying processes, applying preservative chemicals and working with treated timber.

A3 Health and safety factors

* Following safe working practices in relation to:
  o timber seasoning, preparation and processing
  o machinery and equipment operation
  o maintenance tasks.
* Key aspects of safe working practices, including procedures regarding dust, noise, moving vehicles, working with heavy timber, manual handling, using hazardous substances, pollution control, waste disposal.
* Use of personal protective equipment (PPE) appropriate to the task, machinery and equipment type, e.g. ear defenders, safety boots, overalls, eye protection, gloves.
* Minimising risk to self, others and the environment, e.g. carrying out risk assessments, working under appropriate supervision, completing operator training, practising appropriate standards of biosecurity.
* Following legal requirements and codes of practice in relation to:
  o timber seasoning, preparation and processing
  o machinery and equipment operation
  o maintenance tasks.
* Current key legal requirements and codes of practice, e.g. Health and Safety at Work etc. Act (HSWA) 1974, Control of Substances Hazardous to Health regulations (COSHH) 2002, Lifting Operations and Lifting Equipment Regulations (LOLER) 1998, Provision and Use of Work Equipment Regulations (PUWER) 1998, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR), Ladders and the Working at Height Regulations (WAHR) 2005, Manual Handling Operations Regulations (MHOR) 1992.

Learning aim B: Produce marketable products through the use of timber conversion and processing machinery and equipment

B1 Working with product specifications

* Measurement.
* Standard sizes of product.
* Product tolerances.
* Moisture content.

B2 Preparation and use of machinery and equipment

* The importance of operator training and competence.
* Daily checks, e.g. adjustment, attachments, lubrication.
* Pre-start checks.
* Safety checks to be carried out before use, e.g. checking safety features before use in order to ensure that they are effective and operable.
* Use of safe systems of work, including written procedures for processes and tasks.
* Use of aids for lifting and handling timber products.
* Checking machinery and equipment after operation to promote safety and efficiency.
* Correct, secure storage of machinery and equipment, and associated items after operation.
* Handling and disposing of waste correctly and in line with sustainable practices.

B3 Preparing products for market

* Producing products according to market specifications and quality requirements, e.g. shape, size, weight, moisture content.
* Preservation and storage.
* Waste and environmental considerations, including:
  o importance of complying with relevant, current waste policies, including UK Waste Policy and equivalent waste strategies for relevant home country
  o waste carriers licences
  o Environmental Permitting (England and Wales) Regulations (EPR) 2016 and equivalent legislation for relevant home country
  o biosecurity considerations.

Learning aim C: Carry out maintenance on timber conversion and processing machinery and equipment

C1 Importance of appropriate maintenance

* Impact of maintenance on operation and safety of machinery and equipment, product quality and general workplace productivity.
* Types of machinery and equipment to be maintained, including those for harvesting and those for processing.
* Use of regular, recommended maintenance schedules, e.g. daily, weekly, monthly, annually.
* Maintenance before and after use of machinery and equipment.

C2 Maintenance procedures

- Assessing machinery and equipment needs, identifying faults and problems that require servicing and repair.
- Guarding and safety features.
- Maintenance methods and responsibilities, including:
  - carrying out routine operator maintenance
  - identifying non-routine maintenance tasks
  - knowing when to outsource maintenance to specialists, e.g. maintenance of stump grinders for sharpening
  - following manufacturer's guidelines and operator manuals for maintenance requirements
  - understanding and monitoring service intervals
  - handling, recycling or disposing of waste materials and parts safely, and in line with accepted sustainable practice, e.g. recycling of waste oil, recycling of worn or damaged parts
  - use of maintenance logs.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate machinery and equipment used for timber processing and utilisation in order to determine product requirements		
A.P1 Explain the variety and purposes of different types of machinery and equipment used for timber conversion or processing. **A.P2** Explain different timber product types and their associated preparation processes, including health and safety requirements.	**A.M1** Analyse different timber product types, their associated machinery and equipment, preparation processes and the importance of health and safety requirements.	**A.D1** Evaluate the importance of the processes, machinery and equipment, and health and safety requirements associated with producing different types of timber products.
Learning aim B: Produce marketable products through the use of timber conversion and processing machinery and equipment		
B.P3 Explain the key requirements of a product specification. **B.P4** Demonstrate competent use of timber conversion or processing machinery and equipment to produce a timber product to meet given objectives.	**B.M2** Analyse the key requirements of a product specification. **B.M3** Demonstrate efficient use of timber conversion or processing machinery and equipment to produce a timber product to meet given objectives.	**B.D2** Demonstrate, with a high degree of accuracy, the use of timber conversion or processing machinery and equipment to produce a timber product to meet given objectives, evaluating the key requirements of a product specification.
Learning aim C: Carry out maintenance on timber conversion and processing machinery and equipment		
C.P5 Explain the importance of appropriate maintenance of different types of timber conversion or processing machinery and equipment. **C.P6** Competently perform basic operator maintenance tasks and fault-finding for timber conversion or processing machinery and equipment.	**C.M4** Analyse the importance of maintenance of different types of timber conversion or processing machinery and equipment. **C.M5** Proficiently perform complex operator maintenance tasks and fault-finding for timber conversion or processing machinery and equipment.	**C.D3** Perform, with a high degree of accuracy, complex maintenance tasks and fault-finding for timber conversion or processing machinery and equipment, evaluating the impact of appropriate maintenance of the machinery and equipment.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, B.M3, C.M4, C.M5, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- a range of timber conversion and processing machinery and equipment
- a range of common and specialised tools needed for maintenance tasks
- appropriate sites on which to maintain and operate timber conversion and processing machinery and equipment
- appropriate personal protective equipment (PPE).

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will show an in-depth investigation of the significance of different types of specialist machinery and equipment, timber products and residues, the preparation involved and associated health and safety considerations. They will show both breadth and depth of understanding of machinery and equipment available for timber conversion and utilisation by making accurate, comprehensive links between specific machinery and equipment and its effectiveness in achieving its purpose. Learners will demonstrate insight in their evaluation of how the features and operation of different machinery and equipment aids the production of specified timber products. They will also fully consider the links between product type, product treatment processes and health and safety in a way that is logical, coherent and considers all relevant factors. Learners will make insightful references to all key factors in timber utilisation, including consistently valid, accurate references to relevant aspects of timber processes, safety, economic value and sustainability. They will provide justification for their evaluation which links logically to their views. Learners' evidence will demonstrate breadth and depth of understanding in all areas, using specific terminology accurately and consistently throughout, to support a considered, well-reasoned response.

For merit standard, learners will give a clear, balanced analysis of the importance of different types of specialist machinery and equipment, timber products and residues, the preparation involved, and associated health and safety considerations. They will show breadth and understanding of machinery and equipment available for timber conversion and utilisation by making generally valid links between specific machinery and equipment and its effectiveness in achieving its purpose. Learners will demonstrate clear understanding of how the features and operation of different machinery and equipment is linked to the production of specified timber products. They will also give detailed consideration to product types, product treatment processes and health and safety, providing generally valid reasons for their views. Learners will make mostly relevant references to key factors in timber utilisation, including clear references to appropriate aspects of timber processes, safety, economic value and sustainability. They will demonstrate breadth and some depth of understanding. Learners' evidence will be technically correct and show use of generally accurate terminology.

For pass standard, learners will give a realistic but undeveloped explanation of different types of specialist machinery and equipment, timber products and residues, the preparation involved and associated health and safety considerations. They will show basic, realistic understanding of machinery and equipment available for timber conversion and utilisation, making some relevant links between the machinery and equipment and its intended purpose. Learners will demonstrate undeveloped understanding of how the features and operation of different machinery and equipment are linked to the production of specified timber products. They will also make basic references to different types of timber products and residues, the preparation involved and associated health and safety considerations, showing some breadth of understanding. Learners will provide some reasons for their views but these may be superficial or inaccurate in parts. Learners will make some relevant references to appropriate factors in timber utilisation, including discussion of timber processes, safety, cost and sustainability, although their ideas will be limited in scope. Evidence will show some use of specialist terminology, though this may be limited and inaccurate in parts.

Learning aims B and C

For distinction standard, learners will accurately use the correct tools and equipment to perform complex maintenance tasks and fault-finding and operate timber conversion or processing machinery and equipment to a very high standard and fully meet the objectives of a given brief to produce a timber product. They will work to a standard that reflects best workplace practice at all times.

Learners will demonstrate highly-efficient workplace practice by working safely and accurately with timber conversion or processing machinery and equipment in accordance with relevant legislation, ensuring the workplace is cleared after task completion. Post operation checks and cleaning tasks will be carried out thoroughly and accurately. All storage requirements for machinery, equipment or other resources will be met in way that reflects best workplace practice.

Learners will provide evidence of effective strategies used to minimise risks whilst operating timber conversion or processing machinery and equipment. They will dispose of any waste materials in a manner that fully complies with accepted practices and which shows full regard for the importance of sustainability in waste management. They will keep detailed and accurate records as appropriate for the tasks being carried out.

Learners will thoroughly evaluate the key requirements of a given product specification. The techniques and practices used by learners to undertake the completion of maintenance and operational tasks will link specifically and accurately to the requirements of the product specification and machinery and equipment involved. Learners will support their discussion of the product specification with well-reasoned judgements that cover all relevant factors. The evidence will use relevant and accurate terminology throughout.

Learners will confidently carry out all maintenance tasks, fault-finding and machinery and equipment operation, showing a high degree of initiative within the limits of their responsibility. They will comply with health and safety requirements and fully consider the risks. All the tasks will require multiple operations and the use of a variety of tools and machinery and equipment as appropriate to the timber product being produced. Learners will demonstrate a robust understanding of how to look after machinery and equipment to a very high standard. They will accurately select and use appropriate tools and equipment to identify faults on timber conversion or processing machinery and equipment and maintain it proficiently and to a standard that reflects best workplace practice. The work will be carried out with efficient use of the relevant operator manuals and will be technically correct. Learners will investigate thoroughly the machinery and equipment both before the maintenance work, in order to identify issues and produce robust solutions, and after the work is carried out, to check satisfactory completion. The maintenance tasks will be carried out in a sensible, logical order, demonstrating learners' confidence and proficiency.

Learners will show insight into the reasons for appropriate machinery and equipment maintenance. They will demonstrate both breadth and depth of knowledge in considering all relevant aspects of the consequences of carrying out or not carrying out appropriate maintenance, including its wider impact on workplace productivity.

For merit standard, learners will use the correct tools and equipment to perform complex maintenance tasks and fault-finding, and operate timber conversion or processing machinery and equipment proficiently and competently in order to meet the objectives of a given brief to produce a timber product. They will work to a standard of a competent employee.

Learners will demonstrate proficient workplace practices by working safely with timber conversion or processing machinery and equipment in accordance with relevant legislation, ensuring the workplace is cleared after task completion. Post-operation checks and cleaning tasks will be carried out efficiently. All storage requirements for machinery and equipment or other resources will be met competently.

Learners will assess, in a mostly relevant way, the risks and hazards associated with operating timber conversion or processing machinery and equipment. They will dispose of any waste materials in a manner that fully complies with accepted practices. Learners will keep records as appropriate to the tasks, with sufficient detail so it is clear what has been carried out.

Learners will give a balanced and mainly relevant analysis of the key requirements of a given product specification. The techniques and practices used by learners to undertake the completion of maintenance and operational tasks will link appropriately to the requirements of the product specification and machinery and equipment involved. Learners will show breadth and some depth of knowledge in providing reasons for their views on the product specification. The evidence will use mostly relevant and accurate terminology.

Learners will carry out all maintenance tasks, fault-finding and machinery and equipment operation efficiently, showing some initiative within the limits of their responsibility. They will comply with health and safety requirements and assess the risks. All the tasks will require multiple operations and the use of a variety of tools and machinery and equipment as appropriate to the timber product being produced. Learners will demonstrate mostly relevant and accurate knowledge and skills. Learners will demonstrate breadth of understanding of how to look after machinery and equipment safely and effectively, minimising resource wastage. They will select and use tools and equipment to identify faults on timber conversion or processing machinery and equipment, and maintain them safely and efficiently. Learners will show clear understanding in their use of operator manuals. They will investigate thoroughly the machinery and equipment both before the maintenance work, in order to identify issues and produce clear, mainly relevant solutions, and after the work is carried out, to check satisfactory completion. The maintenance tasks will be carried out competently and efficiently, meeting most of the identified requirements.

Learners will show breadth and some depth of understanding of the reasons for appropriate machinery and equipment maintenance. Their analysis will consider most of the relevant aspects of the consequences of carrying out or not carrying out appropriate maintenance, with some understanding of its wider impact on workplace productivity.

For pass standard, learners will use the correct tools and equipment to perform basic maintenance tasks and fault-finding and operate timber conversion or processing machinery and equipment competently and safely in order to meet the objectives of a given brief to produce a timber product, although some minor errors may occur. They will work to the standard of a novice employee.

Learners will demonstrate safe workplace practices with timber conversion or processing machinery and equipment in accordance with relevant legislation, ensuring some after-use cleaning and clearing after task completion. Post-operation checks and cleaning tasks will be carried out competently although some non-critical omissions may occur. They will show realistic understanding of storage requirements for machinery and equipment or other resources.

Learners will show a realistic awareness of the risks and potential issues that could arise while operating timber conversion or processing machinery and equipment. Through the work carried out, they will demonstrate realistic but superficial understanding of practices that relate to environmental issues and sustainable waste disposal. Learners will show an appropriate awareness of the importance of keeping the required records and providing the key information, although this will lack detail and clarity.

Learners will give a basic review of the key requirements of a given product specification. The techniques and practices used by learners to undertake the completion of maintenance and operational tasks will link appropriately to the requirements of the product specification and machinery and equipment involved, although there may be some minor errors in their technical approach. Learners will give some reasons for their views on the product specification. Their explanations will be realistic although unbalanced or limited in parts. The evidence will use some relevant and accurate terminology.

Learners will carry out appropriately all maintenance tasks, fault-finding and machinery and equipment operation, showing little initiative within the limits of their responsibility. They will work safely, adhering to health and safety requirements but showing limited knowledge of associated risks and their controls. Learners will use tools and machinery and equipment as appropriate to the timber product being produced. They will demonstrate a basic understanding of how to look after machinery and equipment safely and correctly. They will use the appropriate tools and equipment to identify faults on timber conversion or processing machinery and equipment, and maintain it safely and competently. Learners will show that they can use operator manuals to assist in the tasks to be carried out. They will perform basic checks on the machinery and equipment before the maintenance work, in order to identify issues and produce realistic but limited solutions, with some supervision. Learners will check the work carried out but their checks may be limited and lacking in depth and understanding. The maintenance tasks will be carried out safely, meeting the key requirements of the activity.

Learners will show some relevant understanding of the reasons for appropriate machinery and equipment maintenance. Their understanding of the link between machinery and equipment maintenance and workplace productivity will be limited in scope.

Links to other units

This unit links to:
- Unit 1: Professional Working Responsibilities
- Unit 4: Work Experience in the Land-based Sectors
- Unit 10: Forestry and Arboricultural Machinery Operations.

Employer involvement

This unit would benefit from employer involvement in the form of:
- masterclasses or technical workshops
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from a local forestry organisation's staff as mentors.

Unit 15: Woodland Management

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners develop the skills needed to manage woodland environments, from initial structure and condition surveys to undertaking practical tasks to manage biodiversity.

Unit introduction

Well-managed woodlands, with a variety of structural features, contribute greatly to the biodiversity of the UK. Several key indicator species, such as the silver-washed fritillary butterfly, dormouse and pied flycatcher, depend on properly managed woodlands for their survival. In commercial forestry management (silviculture), efficient timber production takes priority, but the environment also provides key habitats for specialist species. People also enjoy using woodlands as places for informal recreation. Managing woodlands correctly to meet these diverse demands has become an issue of renewed importance for countryside workers.

In this unit, you will focus on the management of UK woodlands, investigating elements of the woodland ecosystem. You will learn to recognise and survey key features of woodland habitats and suggest woodland management techniques to ensure a diversity of habitats. You will develop practical woodland habitat management skills to help meet the aims of management planning.

Completion of this unit will help you prepare for employment in a number of roles such as an education officer or assistant woodland officer. You could also progress to the role of an advanced apprentice, or following further study, to higher education courses such as Forestry (BSc) or Ecology and Wildlife Conservation (BSc).

Learning aims

In this unit you will:

A Understand woodland types and habitats to manage biodiversity
B Understand the structure and condition of a woodland environment to plan its management
C Undertake practical woodland management to enhance the woodland environment.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Understand woodland types and habitats to manage biodiversity	**A1** Natural and planted UK woodlands **A2** Woodland biodiversity **A3** Woodland habitats and their management	A report exploring management methods used to enhance biodiversity for two different types of woodland.
B Understand the structure and condition of a woodland environment to plan its management	**B1** Woodland structure and features **B2** Woodland condition and ecology	Portfolio of evidence, to include: • structural and ecological woodland surveys • brief woodland management plan • evidence of practical woodland management tasks • a report on the effect of practical management tasks on biodiversity.
C Undertake practical woodland management to enhance the woodland environment	**C1** Managing woodland habitats safely **C2** Managing habitats for wildlife conservation	

Content

Learning aim A: Understand woodland types and habitats to manage biodiversity

A1 Natural and planted UK woodlands

The history and purpose of natural and planted UK woodlands.

- Historical overview:
  - o initial special colonising following Ice Age
  - o human impact on woodland cover, to include the first gatherers, Mesolithic man, the first farmers, Neolithic man, Bronze Age, Iron Age, Domesday Book, 20th-century industrialisation and agriculture
  - o the role of the Forestry Commission.
- Silviculture woodland:
  - o structure and features, e.g. clear-fell, planting arrangement
  - o current Forestry Commission policies and species trials
  - o key conifer species and their end use
  - o impacts of conifers on the landscape.
- Grazed woodland:
  - o structure and features, e.g. livestock use, pollarding
  - o protection of trees from browsing through pollarding.
- Coppiced woodland:
  - o structure and features, e.g. standards, coppice stalls
  - o aims of pure coppice stands, e.g. hazel, sweet chestnut, willow.
- Ancient woodland:
  - o structure and features, e.g. ancient trees, wood banks.

A2 Woodland biodiversity

The ecology of common national and regional species of flora and fauna.

- National species:
  - o trees and shrubs, e.g. oak, ash, birch, hazel, hawthorn
  - o flowers, e.g. bluebell, wood anemone, dog's mercury, lesser celandine, honeysuckle
  - o woodland birds, e.g. chiffchaff, great spotted woodpecker, nuthatch, goldcrest, tawny owl
  - o mammals, e.g. common shrew, wood mouse, stoat, muntjac deer, pipistrelle bat
  - o invertebrates, e.g. speckled wood, lesser stag beetle, wood ants, wasps.
- Regional species:
  - o trees and shrubs, e.g. lime, Sitka spruce, juniper
  - o woodland birds, e.g. pied flycatcher, capercaillie, jay
  - o mammals, e.g. red squirrel, Scottish wild cat, polecat
  - o invertebrates, e.g. chequered skipper, purple hairstreak, stag beetle
  - o locally important species, e.g. flowers, fungi, bryophytes, mosses, rushes, sedges, grasses
  - o protected species and the laws pertaining to them, e.g. dormice, great crested newt, bats.

A3 Woodland habitats and their management

Habitat types and management methods.

- Glades – mowing, strimming, scrub removal.
- Rides – scalloping, retention of pinch points, mowing.
- Dead wood, standing, fallen and hanging – making safe, non-intervention.
- Hedges – cutting, laying, planting.
- Streams and ponds – clearing and reducing vegetation, creating hibernacula.
- Coppice compartment:
  o length and sequence of a coppice rotation
  o selection of standards, their density and distribution
  o consideration of the height of cut.
- Standard trees – pollarding.
- Impacts of management on biotic and abiotic conditions.

Learning aim B: Understand the structure and condition of a woodland environment to plan its management

B1 Woodland structure and features

- Characteristics of the vertical structure, including the ground, herbaceous, shrub and tree layers:
  o species within each layer
  o class of tree using the DAFOR (dominant, abundant, frequent, occasional, rare) scale
  o British National Vegetation Classification (NVC).
- Characteristics of the horizontal structure, including ponds, streams, ditches, glades, rides, woodland margins, dead wood, cord wood, boundaries, e.g. walls, wood banks, hedgerows and veteran trees.
- Features, including war trenches, water pumping stations, old railway lines, forts, pits, tumuli, ancient trackways, earthworks, barrows, saw pits, charcoal platforms.
- Research sources for obtaining historic, land-use data, e.g. historic maps, records office, archaeological societies.

B2 Woodland condition and ecology

Assessing the condition of woodland biodiversity.

- Signs of pests and diseases:
  o common pests, including deer, squirrel, rabbit, caterpillar, beetles
  o regional pests, e.g. boar, beaver
  o common diseases, including Dutch elm disease, chestnut leaf miner, acute oak decline, ash dieback, *Phytophthora ramorum*
  o signs of pests, including ring barking, browse line, bore holes, tracks
  o signs of diseases, including crown dieback, leaf discolouration, defoliation, canker.
- Impact of pests and disease on woodland environment, including habitat loss, clearfell, reduction in economic value.
- Ecological surveys:
  o selection and use of equipment for surveying species of flora or fauna, to include quadrats, transects, measuring tapes, nets, light meters, thermometers, pitfall traps, Longworth traps, movement sensor camera, clinometers, recording sheets.
- Surveying process:
  o diversity and abundance, setting out equipment, seasonal considerations, timing of survey, legal considerations
  o interpretation of data using frequency, e.g. mean, median, mode
  o presentation of data, including tables and graphs.

Learning aim C: Undertake practical woodland management to enhance the woodland environment

C1 Managing woodland habitats safely

- Health and safety procedures when working in woodland habitats, to include:
  - personal protective equipment (PPE)
  - preparation and use of risk assessment; risks, e.g. to learners, public
  - correct selection of tools and equipment for undertaking tasks
  - safe transport, carrying and use of tools and equipment
  - safe working procedures to ensure protection of self and others.
- Correct maintenance of tools and equipment, including cleaning and storage.
- Practical management techniques, including coppicing, pruning, thinning, cutting or mowing.
- Protection of coppiced stools from browsing animals.
- Removal of cut material or use as dead hedging, wildlife habitats.

C2 Managing habitats for wildlife conservation

Impact of practical management on woodland habitats.

- Recognition of the positive effect of woodland habitat management work on biodiversity.
- Methods to minimise potentially harmful effects of habitat management on sensitive features by careful management of waste.
- Awareness of woodland ecology to manage the timing of management works.
- Identification of species being managed.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand woodland types and habitats to manage biodiversity		
A.P1 Explain the relationship between woodland type and biodiversity. **A.P2** Discuss how habitat management methods enhance biodiversity.	**A.M1** Analyse the habitat management methods used to enhance biodiversity in woodlands.	**A.D1** Evaluate the effectiveness of woodland management strategies to enhance biodiversity.
Learning aim B: Understand the structure and condition of a woodland environment to plan its management		
B.P3 Perform competent woodland structure and ecological surveys. **B.P4** Produce a basic woodland management plan based on own survey and secondary research.	**B.M2** Perform comprehensive woodland structure and ecological surveys. **B.M3** Demonstrate efficient management of woodland habitats.	**B.D2** Produce an industry-standard woodland management plan based on own survey and secondary research. **C.D3** Evaluate the ecological impact of own practical woodland management tasks.
Learning aim C: Undertake practical woodland management to enhance the woodland environment		
C.P5 Perform safe management of woodland habitats. **C.P6** Explain contribution of woodland management tasks in enhancing biodiversity.	**C.M4** Demonstrate efficient management of woodland habitats. **C.M5** Assess anticipated impact of management tasks on woodland ecology.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, B.M3, C.M4, C.M5, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to a range of:

- commonly used hand tools
- woodlands to visit, with differing species, structures and purpose
- woodland habitats to carry out practical management tasks.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will use the case studies of two different types of woodland to provide a thorough, detailed and accurate account of the differences between woodland types and habitat characteristics. They will draw on a depth of knowledge and synthesis of understanding from across the learning aims to provide clear and logical reasoning as to the consequent ecology of the woodlands.

Using the case studies, learners will provide a detailed discussion of the objectives of planned habitat management, and a clearly reasoned account of how it affects biotic and abiotic conditions, and its impact on the woodland ecology. Their account will include a comprehensive case study, reviewing the success or failure of the management strategy, to positively affect a target species. They will show evidence of their full appreciation of the interrelationship between the target species and other named species and their environment. Detailed statistical evidence will be presented and accurately interpreted.

For merit standard, learners will use case studies of two different types of woodland to demonstrate their understanding of the interrelationship between woodland types and habitat characteristics, and the range of flora and fauna species found in each.

In considering habitat management in the two woodlands, learners will provide detailed information of the methods selected and their intended outcomes. They will show a clear understanding of the relationship between these methods and the impact on biotic and abiotic conditions. Learners will clearly demonstrate an understanding of the complexity of the relationship between management methods undertaken, and the response of the target species and other species found in the woodlands. Statistical evidence will be presented and there will be some interpretation of the figures.

For pass standard, learners will use case studies to provide details of two different types of woodland from the unit content, referring to superficial differences between woodland types, and listing key flora and fauna species found in each. Learners will demonstrate an understanding of the link between each woodland type and habitat characteristics, and the wildlife identified within it.

Learners will consider how appropriate woodland management methods can be used to improve the habitat for wildlife. They will outline the chief objectives of a planned habitat management strategy, providing information on the processes and methods used. They will demonstrate some understanding of the relationship between management undertaken and the response of target species. Learners will show a basic knowledge of the connection between the management of the target species and the impact on other species found in the woodlands.

Learners will present a simple data table to support their discussions.

Learning aims B and C

For distinction standard, learners will carry out proficient visual surveys, identifying the full range of structures and features. Valid conclusions as to the presence or absence of pests and diseases will be clearly based on available evidence. Learners will engage fully in ecological surveys, providing full and accurate findings.

Learners will produce a systematically considered management plan of at least seven objectives, with at least two specific activities for each objective. The given timescale to meet the objectives will evidence robust consideration of the timeframes required. Meticulous secondary research will be evidenced, including copies of historical maps, and recorded evidence of historical land use.

Learners will actively promote safety throughout woodland management tasks, ensuring the safety of themselves and others, anticipating dangers and acting accordingly. They will prepare and operate tools and equipment safely and to industry standard. Woodland management tasks will be conducted thoroughly throughout, with meticulous attention to detail and according to instructions given in the task brief.

In their report, learners will clearly demonstrate an understanding of the complex links between the tasks undertaken and the impact on woodland ecology, providing examples of the abiotic and biotic consequences, such as changes in temperature, humidity and light, and the impact on wildlife.

For merit standard, learners will complete accurate and detailed visual surveys, identifying a broad range of structures and features. Evidence of the presence or absence of pests and diseases will be carefully considered. Learners will actively carry out ecological surveys, providing a detailed record of findings.

In their management plan, learners will produce at least five objectives, with at least two specific activities for each objective. The given timescale to meet the objectives will be logical and realistic. Detailed secondary research will be evidenced, such as the inclusion of copies of historical maps, or recorded evidence of historical land use.

Learners will work safely and show an awareness of potential dangers to themselves and others. They will prepare and use required tools and equipment safely and competently. Woodland management tasks will be undertaken in a time-efficient manner, with clear reference to the brief.

In their report, learners will make some connections between the tasks undertaken and the potential impacts on the woodland ecology.

For pass standard, learners will complete visual surveys mostly accurately, identifying limited structures, features, and indicating the presence or absence of major pests and diseases. Learners will carry out ecological surveys using correct equipment and methods, as indicated in the unit content, and presenting limited data.

In their management plan, learners will produce at least three objectives, with at least one general activity for each objective. The given timescale to meet the objectives will be realistic. Some secondary research will be evidenced, such as the inclusion of copies of historical maps.

Learners will carry out woodland management tasks safely, which will include assessing the site for trip hazards and other dangers such as overhanging dead wood, or the presence of broken glass or other rubbish. Learners will use appropriate PPE, such as gloves or suitable footwear. They will carry and use required tools and equipment safely and appropriately, ensuring that other personnel are not in danger from their activities, such as colleagues in line with falling trees. Learners will complete tasks in line with the brief given to them by the teacher, ranger or other supervisor. Woodland management may include tasks such as coppicing, pruning, cutting or other activities given in the unit content. On completion of the task, learners will safely remove and store tools and equipment, and dispose of waste materials appropriately.

Learners will provide limited understanding of the link between the tasks undertaken and the impact on biodiversity.

Links to other units

This unit links to *Unit 1: Professional Working Responsibilities*.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses
- technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

Unit 16: Forestry and Silviculture

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners will develop the skills needed to plan, establish, maintain and manage forest and woodland areas.

Unit introduction

Workers in the forestry sector use an array of different skills to complete the wide range of activities needed in forest and woodland areas to establish, maintain and produce crops of timber.

In this unit, you will develop your knowledge of silviculture – how crops of trees are grown and maintained – and the different silviculture systems used. You will then learn the skills and techniques to successfully establish and maintain forest and woodland areas. You will investigate the various pests and diseases that affect these areas. You will learn and apply the processes to plan, establish, maintain and manage forest or woodland areas.

This unit builds on the tasks carried out in *Unit 9: Tree-felling Activities* and it is expected that you will select and apply learning from the content of the units related to that part of the assessment. You will draw on the skills and knowledge you developed in *Unit 3: Contemporary Issues in the Land-based Sectors*, *Unit 6: Identification, Planting and Care of Trees*, *Unit 8: Tree Pests and Diseases*, *Unit 10: Forestry and Arboricultural Machinery Operations* and *Unit 14: Timber Conversion and Utilisation*. You will also use your experience of real work practices in the sector that you gained in *Unit 4: Work Experience in the Land-based Sectors*.

The skills you develop in this unit are key to employment in the forestry sector in a role such as forest worker. These skills may also help you to progress towards gaining forestry equipment certificates of competence and to a higher education course such as a degree in forestry.

Learning aims

In this unit you will:

A Examine common silviculture systems in relation to different forest or woodland objectives

B Undertake activities to plan and establish forest and woodland trees

C Undertake activities to maintain and manage forest or woodland areas.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Examine common silviculture systems in relation to different forest or woodland objectives	**A1** Silviculture systems and management regimes **A2** Establishment of forests and woodland **A3** Common harvesting and extraction systems	A report on the relationship between silviculture systems, establishment and harvesting processes, and the intended outcomes.
B Undertake activities to plan and establish forest and woodland trees	**B1** Site clearance and plant preparation **B2** Ground preparation **B3** Setting out and planting	A practical portfolio on the establishment and management of forest and woodland areas: • work planning and rationale • observation records • logbooks. Learners will be expected to select and apply learning from other mandatory units and optional units as appropriate.
C Undertake activities to maintain and manage forest or woodland areas	**C1** Protection of forests and woodland **C2** Silviculture management	

Content

Learning aim A: Examine common silviculture systems in relation to different forest or woodland objectives

A1 Silviculture systems and management regimes

Features and characteristics of forests and woodlands, silviculture systems and management regimes.

- Site classification, including location, e.g. upland and lowland, access and proximity to markets, soil type, aspect and terrain.
- Age, structure, and yield class.
- Continuous cover forestry.
- Clearfell.
- Coppice and coppice with standards.
- Underwood.
- High forest.
- Wood pasture.
- Shelterwood, e.g. protecting built structures, nurse planting.
- Selection systems, e.g. halo thinning.
- Objectives of management, including timber, game, wildlife and biodiversity, recreation.
- Planting plans, including maps and designs.

A2 Establishment of forests and woodland

Requirements, methods and processes for successful establishment.

- Silvicultural characteristics of different species such as shade tolerance, natural growth forms, seeding years, requirements for optimal growth.
- Tree-planting methods, including notch and pit planting.
- Soil preparation for establishment and afforestation.
- Tree nursery production.
- Natural regeneration.
- Weeding and beating-up.
- Crop protection, including fencing, tree shelters, rabbit guards, individual tree protection, whole crop/site protection, chemical protection from weeds and pests.

A3 Common harvesting and extraction systems

Methods, processes and operations involved in harvesting forest and woodland crops.

- Harvesting systems: thinning, clearfell, manual, mechanised.
- Extraction systems: forwarding, skidding, skyline, horse logging, low-ground-pressure vehicles.
- Harvesting and extraction considerations:
  - felling licences and UK Forestry Standard (UKFS) compliance
  - ground watercourse protection
  - assessment of area, including ground conditions, access, size and volume of crop and machinery, priority habitats and protected species.

Learning aim B: Undertake activities to plan and establish forest and woodland trees

In carrying out activities relating to planning the establishment, maintenance and management of forest and woodland trees, learners must select and apply learning from across the mandatory content of the qualification, building on the synoptic assessment undertaken in *Unit 9: Tree-felling Activities.*

B1 Site clearance and plant preparation

- Methods, processes, and equipment used in clearing sites:
  o knapsack and vehicle-mounted chemical spraying
  o burning
  o cutting, including reciprocal cutter, flailing, tractor-mounted rotavator.
- Delivery and storage of plants:
  o checks of plants and materials against specification
  o procedures for reporting defects
  o plant handling methods, e.g. planting bags
  o storage methods, e.g. heeling-in, straw clamps, sheeting.

B2 Ground preparation

- Methods of cultivation, e.g. screef, dollop, plough, rotavation, hand cultivation.
- Equipment, e.g. manual, tractor-mounted.
- Drainage systems, e.g. field drains, ditches, culverts, road and track drainage profiles.

B3 Setting out and planting

- Planting plans and specifications, including selection and distribution of planting material showing consideration of plant species, planting density, row spacing, fencing requirements, post-planting protection.
- Handling techniques: planting stock types, e.g. forest transplants, whips, feathered trees, bare root and cell grown.
- Selection of appropriate tools and equipment, e.g. tape measure, spades, stakes, line.
- Planting methods, including notch, e.g. 'V', 'L', 'T' and pit planting.
- Maintenance of tools and equipment.

Learning aim C: Undertake activities to maintain and manage forest or woodland areas

C1 Protection of forests and woodland

Methods, processes and resources used in managing the protection of forests and woodlands.

- Management of competing vegetation, e.g. woody, herbaceous and grass, through use of manual, mechanical or chemical weeding.
- Management of pests, including population control, e.g. trapping, shooting, spraying.
- Management of diseases, including plant health surveys and plant sampling, chemical control, removal and disposal of diseased plant material.
- Protection and management of pollution and environmental damage, e.g. fuel/oil spills, soil compaction, protection of habitats, archaeological sites, surface run-off/flooding.
- Protection and management from fire, including fire-break rides, fire-breaks, access control.

C2 Silviculture management

Management methods and maintenance techniques used in forests and woodlands.

- Use of forest/woodland management plans, e.g. for funding, efficient use of resources, maximising production and plant health.
- Survey procedures for individual and stands of trees, e.g. health monitoring, timber volumes.
- Brushing, beating up and brashing, including pruning, formative pruning, thinning.
- Waste management.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Examine common silviculture systems in relation to different forest or woodland objectives		**A.D1** Evaluate the effectiveness of silviculture systems, and tree-establishment and extraction methods, for forests and woodlands with different management objectives.
A.P1 Explain the relationship between silviculture systems and forest and woodland management objectives. **A.P2** Explain methods for establishing and extracting tree crops.	**A.M1** Analyse the relationship between silviculture systems and forest and woodland management objectives. **A.M2** Compare methods for establishing and extracting tree crops for different purposes.	
Learning aim B: Undertake activities to plan and establish forest and woodland trees		**B.D2** Carry out proficient forest and woodland planting activities based on own comprehensive planting plan. **C.D3** Carry out proficient forest and woodland silviculture maintenance and management activities, evidencing reasoning for selection and effectiveness of processes involved.
B.P3 Produce a simple planting plan to meet specific planting objectives. **B.P4** Carry out simple ground preparation and planting activities, setting out and tree planting.	**B.M3** Carry out complex forest and woodland ground preparation and planting activities, based on own detailed planting plan.	
Learning aim C: Undertake activities to maintain and manage forest or woodland areas		
C.P5 Carry out simple forest and woodland silviculture maintenance and management activities. **C.P6** Explain processes involved in own forest and woodland silviculture maintenance and management activities.	**C.M4** Carry out efficient forest and woodland silviculture maintenance and management activities, evidencing reasons for selection of processes involved.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.M2, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M3, C.M4, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- forestry tools, equipment and machinery
- plant material
- locations to plan, prepare, plant, maintain and manage woodland or forest areas.

Essential information for assessment decisions

This unit is a synoptic assessment unit and draws on skills and knowledge from other units in the qualification. For example, learners will correctly identify tree- and other plant species, and use and maintain tools, equipment and machinery based on assessments in the associated units.

Learning aim A

Learners research and discuss a range of silviculture systems in view of the forest or woodland objectives.

For distinction standard, learners will provide a detailed discussion of different silviculture systems in terms of specified objectives. They will thoroughly consider the methods and approaches in different systems, exploring their effectiveness in realising the intended outcomes, giving fully reasoned rationales that are factually correct, comprehensively considered and which contain valid conclusions.

For merit standard, learners will discuss silviculture systems in terms of specified objectives. They will demonstrate their understanding of how the intended outcomes of the silviculture system, including economic such as timber production, recreational and habitat/conservation management are influenced by the processes within them, including the planting, tending, harvesting, extraction and regeneration. Learners will make logical connections between the processes involved and the consequent outcomes, providing some judgements in relation to the effectiveness of the systems.

For pass standard, learners will discuss silviculture systems and demonstrate some understanding as to how different systems can relate to different management objectives. Learners will consider how the planting, tending, harvesting, extraction and regeneration processes associated with different silviculture systems can influence intended management outcomes. Learners' discussions will be generally accurate but may be undeveloped.

Learning aims B and C

In completing the assessment for learning aims B and C, learners must individually carry out planting activities, detailed in their own planting plan, and undertake forest and woodland management activities, giving a rationale for selected tasks and processes. They are required to independently select, apply and demonstrate appropriate knowledge and skills from across the mandatory content of the qualification, and should build on and make connections between their tree management in this unit, and the assessment tasks related to tree management activities completed in *Unit 9: Tree-felling Activities*. Tutors should ensure that the management activities carried out by learners provide sufficient scope for them to complete the assessment fully.

For distinction standard, learners will produce planting plans that account for a wide range of variable factors, including topography, soil type, intended purpose and variation in species selection, including stock type. The plan will provide practical and insightful solutions to any issues arising from these variables.

Learners will prepare the ground for planting and set out and perform a range of planting activities according to the planting plan. They will set out with precision, adapting their techniques appropriately to different stock types, using a variety of clearly considered planting techniques appropriate to the situation. Their planting activities will include the clearing and preparation of the ground using a range of different methods and equipment, skilfully undertaken for a variety of tasks.

Learners will demonstrate a comprehensive understanding of woodland management plans and their uses, including those for less familiar or complex situations, which require them to draw on their synthesised knowledge and understanding from across the learning aims.

In carrying out silviculture maintenance and management tasks, learners will demonstrate a wide variety of techniques to protect forests and woodlands, working competently, accurately and efficiently across a range of complex situations. Learners will demonstrate that they can skilfully adapt techniques and processes in response to different or unexpected contexts, managing time and resources effectively. Learners will consistently and accurately apply their knowledge and skills from the assessment completed in *Unit 9: Tree-felling Activities*, by fully considering the potential risks arising from the proposed management activities and planning for their mitigation.

In their rationale, learners will give considered, valid and logical reasons for their selection of methods, processes, tools and equipment to manage competing vegetation, pests, disease, pollution, environmental damage and protection from fire. The rationale will consider the effectiveness of planned actions and take account of changes or adaptions to approaches in the field, giving fully reasoned justifications for their choices and suggesting areas for improvement where appropriate.

For merit standard, learners will demonstrate their ability to produce a planting plan that takes account of a range of different variables, including topography, soil type, intended purpose and variation in species selection, including stock type.

They will prepare the ground for planting and set out and then carry out a range of planting activities according to the planting plan. Their planting activities will include the clearing and preparation of the ground using different methods and equipment. They will set out accurately and efficiently, and will work with different stock types using a variety of planting techniques appropriate to the situation.

Learners will demonstrate a sound understanding of woodland management plans and their uses, including those for less familiar situations. They will carry out silviculture maintenance and management, demonstrating a variety of techniques to protect forest and woodland areas, working competently, accurately and safely. Learners will demonstrate that they can effectively adapt techniques and processes to suit different contexts, managing time and resources effectively. Learners' management activities will demonstrate a clear and mostly relevant application of their knowledge and skills from the assessment completed in *Unit 9: Tree-felling Activities*, by considering the potential risks arising from the proposed management activities.

In their rationale, learners will give valid reasons for their selection of methods, processes, tools and equipment to manage competing vegetation, pests, disease, pollution, environmental damage and protection from fire. They will review the effectiveness of the processes, tools and equipment used, suggesting areas for improvement.

For pass standard, learners' planting plans will demonstrate their ability to consider a limited number of variables, such as topography, soil type, intended purpose and variation in species selection, including stock type.

They will prepare the ground for planting, and set out and carry out planting activities according to the planting plan. Learners will demonstrate their ability to clear and prepare the ground using appropriate but limited methods and equipment. They will set out and work with different stock types, using a limited range of appropriate planting techniques.

Learners will demonstrate some understanding of woodland management plans and their uses. In carrying out silviculture maintenance and management, learners will demonstrate the appropriate use of some common techniques to protect forest and woodland areas. They will carry out a range of basic management tasks, which may include surveying, beating up, brushing and brashing, and removal of waste. Learners will work correctly and safely throughout to meet intended outcomes. Learners' management activities will show a limited application of their knowledge and skills from the assessment completed in *Unit 9: Tree Felling and Chainsaw Safety* through consideration of their safe practice and management approaches.

In their rationale, learners will give appropriate but undeveloped reasoning for their selection of methods, processes, tools and equipment to manage competing vegetation, pests, disease, pollution, environmental damage and protection from fire.

Links to other units

This unit should be completed towards the end of the programme. In order to complete the synoptic assessment task in this unit, learners should select and apply the relevant knowledge and skills from other areas of the mandatory content. Learners should build on their knowledge of site inspections and cross-cutting with chainsaws from *Unit 9: Tree-felling Activities*, selecting and applying appropriate knowledge and skills, including those relating to working practices from *Unit 1: Professional Working Responsibilities*; knowledge of tree growth from *Unit 2: Plant and Soil Science*; issues facing the forestry sector *from Unit 3: Contemporary Issues in the Land-based Sectors*; the supervision of others taking part in management activities from *Unit 5: Estate Skills*; the selection, planting and aftercare of trees from *Unit 6: Identification, Planting and Care of Trees*; maintenance methods and assessments from *Unit 7: Tree and Shrub Pruning and Maintenance*; the management of tree health from *Unit 8: Tree Pests and Diseases*; safe working practice and maintenance of machinery from *Unit 10: Forestry and Arboricultural Machinery Operations*; and the production of marketable timber products from *Unit 14: Timber Conversion and Utilisation*.

Additionally, learners will have completed *Unit 4: Work Experience in the Land-based Sectors* and will be able to apply their experience of and insight into real working practices in the sector.

Employer involvement

This unit would benefit from employer involvement in the form of:
- masterclasses or technical workshops
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local forestry organisation staff as mentors.

Unit 17: Forest Recreation

Level: **3**
Unit type: **Internal**
Guided learning hours: **60**

Unit in brief

Learners develop the necessary skills to plan the management and promotion of forestry recreation activities.

Unit introduction

How do you balance the needs of forestry management with public enjoyment of forests and woodlands? Millions of people visit forests and woodlands in England, Wales and Scotland every year, making a significant contribution to the UK economy. Understanding how to integrate the aims and objectives of good forestry management with the provision of recreational activities is essential for promoting sustainable forestry development.

In this unit, you will explore forestry and recreational activities, along with how effective management of these activities impacts on the overall strategies for maintaining and managing forested and woodland areas. You will learn how to select and plan appropriate activities, taking into account the effects of visitors and the activities on the local environment and population. You will find out about the essential processes involved in promoting, managing and monitoring the success of countryside recreational activities.

This unit will be helpful if you want to progress directly to employment in a role such as that of forestry worker. The unit will also help you to progress to higher education courses, for example a degree or HND in forestry management.

Learning aims

In this unit you will:

A Investigate forestry features and recreational use to manage the environmental impact of recreational activities

B Explore the management of forestry recreational activities to support effective practices

C Plan activities to manage forestry recreation.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Investigate forestry features and recreational use to manage the environmental impact of recreational activities	**A1** Physical characteristics **A2** Recreational activities **A3** Impact of recreational activities	A report on the recreational activities in a given area.
B Explore the management of forestry recreational activities to support effective practices	**B1** Management practices in forestry recreation **B2** Considerations for effective activity provision **B3** Measures of success in forestry recreation	Case-study review of the management of two forestry recreational activities.
C Plan activities to manage forestry recreation	**C1** Suitability of sites for recreational activities **C2** Regulation and legislation **C3** Promotion of activities	Plan and accompanying rationale for managing forestry recreational activities.

Content

Learning aim A: Investigate forestry features and recreational use to manage the environmental impact of recreational activities

A1 Physical characteristics

Advantages, disadvantages and features of forestry and surrounding areas, and how they affect its use for particular types of recreation.

- Geographical location to include designation of sites, e.g. National Parks, Sites of Special Scientific Interest (SSSIs), Areas of Outstanding Natural Beauty (AONBs).
- Soil types and distribution.
- Slopes.
- Topography.
- Water bodies and courses, e.g. lakes, rivers, streams.
- Access and rights of way, e.g. roads, tracks, paths.
- Proximity to centres of population and urban development.
- Existing forestry use, e.g. timber production.
- Use of graphs and data to provide information about physical characteristics.

A2 Recreational activities

Characteristics, requirements, potential scale, and human and physical resources required for forestry recreational activities.

- Permanent and temporary installations, e.g. walking trails, seasonal events.
- Nature-based activities e.g. birdwatching, conservation work.
- Adventure activities, e.g. high-ropes courses, survival skills.
- Sporting activities, e.g. mountain biking, horse riding, paintballing.
- Land ownership and provision of recreational facilities, e.g. Forestry Commission, National Trust.
- Location and accessibility of areas and activities:
  - signage for tourist attractions
  - consideration of conservation interests
  - customers with special requirements, including language or culture, age, gender, families, adjustments for disabilities.
- Visitor types and demographics, e.g. organised groups, individuals and families, school groups.
- Visitor frequency, e.g. regular, school holidays, seasonal factors.
- Availability and expertise of staff for guided activities.

A3 Impact of recreational activities

Positive and negative impact of visitors on natural resources, infrastructure and the local area.

- Economic impact:
  - development of local tourist industry, including job creation
  - increased income for local area, e.g. restaurants, hotels and shops
  - work of conservation organisations.
- Social impact:
  - impact of seasonal employment
  - effects of increased traffic and visitor numbers at peak visiting times, e.g. roadways, sewerage, cleanliness of facilities
  - visitor behaviour, e.g. contributions to local issues, antisocial behaviour such as uncontrolled dogs
  - visual impact of tourist attractions and accommodation.

- Environmental impact:
  o care and maintenance of environment
  o construction and development of activities and supporting facilities,
    e.g. parking, shops, visitor centres
  o habitat destruction
  o pollution
  o erosion of pathways
  o change to environmental aesthetics.

Learning aim B: Explore the management of forestry recreational activities to support effective practices

B1 Management practices in forestry recreation

Processes and requirements for managing forestry recreation activities as appropriate to organisation size, aims and resources.

- Planning processes:
  o working as part of a team, e.g. team roles, responsibilities, interaction
  o project timescales and deadlines
  o contingency planning.
- Booking processes:
  o points of contact and information for potential visitors
  o payment options
  o recording of visitor information.
- Physical resources:
  o venues and equipment
  o organisation of transport, refreshments, toilet facilities.
- Human resources, e.g. instructors, stewards, customer service representatives.
- Recording and monitoring systems and processes:
  o activity timings
  o staff deployment and timesheets
  o complaints handling.
- Provision of signage and information for visitors.

B2 Considerations for effective activity provision

Opportunities, challenges and potential solutions affecting management and delivery of forestry recreational activities.

- Design:
  o existing and potential uses of forestry and woodland areas
  o aesthetic and conservation interests, e.g. ecologically-sound buildings,
    impact of development on woodland ecosystems
  o visitor facilities, e.g. parking areas, picnic spots, toilets, refreshments.
- Financial considerations:
  o costs associated with providing activities and maintaining facilities
  o potential gross and net income.
- Logistics:
  o equipment and materials for activities
  o ratio of staff to participants.
- Risk assessments and safety checks of premises and equipment:
  o personal protective equipment (PPE) for maintenance tasks and participation in
    recreation activities.

B3 Measures of success in forestry recreation

Collection and use of information and data to review the planning and delivery of forestry recreational activities against predetermined success measures, according to organisation type, size and aims.

- Businesses and other organisations that may deliver forestry recreational activities:
  o sole traders and partnerships
  o charities and clubs
  o council and government.
- Principles of SWOT (strengths, weaknesses, opportunities, threats) analysis for organisations delivering activities.
- Customer satisfaction and matching customer need and expectation with provision, e.g. customer surveys, feedback sheets, online feedback.
- Effective deployment of staff.
- Contribution to local economy.
- Financial profit, reinvestment and potential for development.
- Management of natural resources, e.g. monitoring of habitats.
- Effectiveness of planning processes and impact on delivery.

Learning aim C: Plan activities to manage forestry recreation

C1 Suitability of sites for forestry recreation

Factors affecting the selection of forestry recreational activities and locations.

- Demand and competition for forestry recreational activities
- Logistical and safety considerations:
  o permissions and restrictions on woodland use
  o requirement for, and availability of, equipment and instructors
  o accessibility, transport links and signage.
- Financial considerations:
  o cost of using site, e.g. ownership and access
  o costs of providing facilities and activities
  o minimum participation levels to make activity financially viable.

C2 Regulation and legislation

Impact of legislation and regulation on managing forestry recreation activities as appropriate to planned activities.

- Current guidance and legislation, e.g. The Countryside Code, Countryside and Rights of Way Act 2000, Equality Act 2010, National Heritage Act 2002, National Parks and Access to the Countryside Act 1949, Occupiers Liability Acts 1957 and 1984.
- Responsibilities of employers, to include compliance with the Health and Safety at Work etc. Act 1974, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995, Data Protection Act 1998.
- Local planning restrictions and requirements, e.g. licensing, planning permission for signage, traffic management.
- Safety procedures, to include:
  o production of risk assessments
  o licensing requirements of adventure activities
  o safety checks of premises and equipment
  o public and employers' liability insurance.

C3 Promotion of activities

Methods, use and effectiveness of promoting forestry recreational activities.

- Paper-based promotional material, to include leaflets, posters, business cards, advertising.
- Use of technology, to include websites, social media, promotional videos.
- Rural and tourism business networking organisations.
- Event presence, e.g. open days, promotion stands.
- Creation of and access to a databases of potential users for direct marketing.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate forestry features and recreational use to manage the environmental impact of recreational activities		
A.P1 Explain links between forestry characteristics and recreational activities. **A.P2** Explain the impact of using forestry environments for recreational activities.	**A.M1** Analyse the factors affecting forestry recreation.	**A.D1** Evaluate the use of the forestry environments for recreational activities.
Learning aim B: Explore the management of forestry recreational activities to support effective practices		
B.P3 Explain success measures for two forestry recreational activities. **B.P4** Explain areas of strength and weakness in the management of two forestry recreational activities.	**B.M2** Analyse the management of two forestry recreational activities.	**B.D2** Evaluate the factors affecting the success of two forestry recreational activities.
Learning aim C: Plan activities to manage forestry recreation		
C.P5 Demonstrate planning for simple elements of organising forestry recreational activities. **C.P6** Explain the planning and promotion for a forestry recreational activity.	**C.M3** Demonstrate planning for complex elements of organising forestry recreational activities. **C.M4** Analyse the impact of planning and promotion on the success of a forestry recreational activity.	**C.D3** Plan and promote complex forestry recreational activities, evidencing reasoned decision-making processes.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of three summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aim: B (B.P3, B.P4, B.M2, B.D2)

Learning aim: C (C.P5, C.P6, C.M3, C.M4, C.D3)

Further information for teachers and assessors

Resource requirements

There are no special resources needed for this unit.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will give a comprehensive account of the impact of a wide range of relevant factors on a given area of forestry, such as the activities that are available, types of visitors likely to access the activities and likelihood of participation. They will make well-reasoned and balanced judgements on a number of different available and potential activity types, showing both breadth and depth of understanding and considering the advantages and disadvantages to the environment, visitors and local economy. Learners' evidence will be structured logically and effectively, with supporting evidence integrated well.

For merit standard, learners will consider and report on a given forestry area in a detailed manner, carefully examining each factor that affects its use for recreational activities. This will include clear consideration of the features of the area suitable for the provision of the available activities, as well as the challenges that might be faced. Learners' evidence will be generally well structured, showing breadth and some depth of understanding and demonstrate a good level of written communication.

For pass standard, learners will give a limited account of the characteristics of the forestry area, linking the characteristics with the activities on offer and the type of visitors who make use of them. They will show realistic but undeveloped understanding of the factors that affect the use of forest environments for recreation but may demonstrate limited use of supporting evidence.

Learning aim B

For distinction standard, learners will give a comprehensive, convincing account of the strengths and challenges facing at least two organisations in the management of a minimum of two different activities. They will address each of the success measures outlined in the unit content and make accurate reference to the degree of relevance each has to the business or organisation. They will scrutinise the degree to which the activities have been delivered successfully, suggesting potential steps to improve the viability of the activities and natural resource management. Learners will comment on the feasibility of these suggestions, with final recommendations put forward that could usefully be put in place. Learners may support their evaluation with reference to practices demonstrated by providers other than those who are the main focus of the report.

For merit standard, learners will give a clear, considered account of a minimum of two organisations managing a minimum of two forestry recreational activities. This could include factors such as the type and size of organisation, location of activities and site accessibility. They will carefully examine the management strategies presented for planning and promoting activities. When considering how successful the activities have been, learners will consider the environmental impact of delivering the activities, showing breadth and some depth of understanding. Learners will present generally coherent and logically-structured work.

For pass standard, learners will use the success measures referenced in the unit content to explore, with some relevance, how far the management of a minimum of two activities by two different organisations can be considered as successful. They will identify the areas of strength that have been demonstrated by each organisation, along with the areas that require improvement, expanding superficially on the reasons why they have identified these points. Learners will demonstrate realistic but undeveloped awareness of a minimum of two types of forestry recreational activity, such as nature, sport and adventure activities. The activities reviewed do not need direct comparisons.

Learning aim C

For distinction standard, learners will produce logically developed, comprehensive plans for activities that have at least the same level of complexity as those identified at merit standard. They will fully consider the logistics and organisation required to carry out the activity/activities effectively. This is likely to include 'mock-ups' of promotional material. Learners will put forward convincing arguments to support the approaches they used and justify the decisions they made, demonstrating an excellent, in-depth understanding of the requirements for each stage of planning and promotion.

For merit standard, learners will plan for complex activities, in terms of managing large numbers of visitors and multiple activities, or managing activities that are inherently more complex, such as those requiring more rigorous attention to regulation and legislation issues. They will clearly specify the practical planning that must be carried out to comply with necessary regulation and legislation. Learners will provide clear and generally relevant reasoning as to why planning and promotion is integral to the success of the activity, demonstrating a clear, detailed understanding of the key principles involved.

For pass standard, learners will produce workable plans for a minimum of two straightforward activities, such as those where low numbers of visitors take part in one or more low-risk activities. They will make mainly appropriate observations about the suitability of the site, requirements for staffing, equipment and safety, and the need for insurance. Learners will consider the consequences of failure to comply with regulations and legislation but this will be limited in scope and depth. They will demonstrate realistic but limited understanding of the relationships between careful planning and promotion of the activities, smooth delivery and a positive customer experience.

Links to other units

This unit links to:

- Unit 1: Professional Working Responsibilities
- Unit 3: Contemporary Issues in Land-based Sectors
- Unit 4: Work Experience in the Land-based Sectors
- Unit 15: Woodland Management
- Unit 18: Wildlife Ecology and Conservation Management.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses or technical workshops
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local forestry organisation staff as mentors.

Unit 18: Wildlife Ecology and Conservation Management

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners study the methods and skills needed to investigate habitats and to carry out wildlife habitat improvements and wildlife rehabilitation.

Unit introduction

Wildlife responds to changes in its habitat. Good animal management will be able to assess those changes, plan habitat improvements and carry them out for the benefit of the wildlife. Sometimes it may be necessary to rehabilitate wildlife. This unit will give you the practical skills you need to carry out a range of wildlife habitat and rehabilitation tasks.

You will learn how to survey and assess habitats in relation to wildlife needs, develop and follow a plan for improvements, and monitor the outcomes. You will also learn to assess wildlife for rehabilitation – for example following loss of habitat through development – and create and follow a plan to reintroduce the wildlife to a suitable habitat.

Whether you move into employment or to further study, the skills you develop in this unit will be invaluable. The study of wildlife and habitat is essential for good animal management. It is an integral part of a wide variety of careers, including conservation and environmental monitoring and planning.

Learning aims

In this unit you will:

A Understand the characteristics of ecosystems for wildlife habitat planning and rehabilitation

B Carry out field studies into wildlife populations and their habitats for the purpose of planning for wildlife management

C Undertake practical wildlife and conservation management to affect biodiversity.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Understand the characteristics of ecosystems for wildlife habitat planning and rehabilitation	**A1** Distribution of ecosystems **A2** Relationships in ecosystems **A3** Human interactions with ecosystems	A portfolio of evidence, such as maps, diagrams, flow charts and reports from investigative fieldwork.
B Carry out field studies into wildlife populations and their habitats for the purpose of planning for wildlife management	**B1** Habitat surveys for wildlife management **B2** Monitoring wildlife populations **B3** Planning for wildlife habitat management and rehabilitation	A survey report, using survey, monitoring and other research information to develop animal- and habitat-specific plans to manage a wildlife population, including maps, task lists, cost–benefit analysis and schedules. Evidence that demonstrates management tasks for habitat change and rehabilitation, which could be a photo log, signed witness statements and/or observation record(s).
C Undertake practical wildlife and conservation management to affect biodiversity	**C1** Interpretation of habitat management and wildlife rehabilitation plans **C2** Carrying out practical habitat management and wildlife rehabilitation **C3** Monitoring the outcomes of practical habitat management and wildlife rehabilitation	

Content

Learning aim A: Understand the characteristics of ecosystems for wildlife habitat planning and rehabilitation

A1 Distribution of ecosystems

- Geographical distribution of ecosystems:
  - scale of ecosystems, including biome, habitat, microhabitats and ecological niches
  - standard methods of mapping and classification, e.g. Phase 1 survey methodology and nomenclature.
- Factors affecting the distribution of ecosystems:
  - abiotic factors that influence the distribution of ecosystems at a range of scales, including global (e.g. atmospheric energy flows and climate zones), regional (e.g. distance from the sea and altitude), local (e.g. aspect and soil type) and micro (e.g. shade and slope)
  - biotic factors, including the modifying influence of plant, animal and human activity.
- Characteristics of major land biomes and habitats:
  - world biomes, to include the five major types: aquatic, desert, forest, grassland and tundra
  - UK habitats, to include coastal, lowland grassland and heathland, freshwater and lowland wetlands, upland, woodland
  - characteristics, to include altitude, latitude, distance from the sea, rainfall, wind speed and direction, temperature, aspect, soil type, fauna and flora.

A2 Relationships in ecosystems

- Energy flows in ecosystems:
  - the flow of energy through an ecosystem, including energy loss, e.g. through respiration and excretion
  - trophic levels, food chains and pyramids
  - natural cycles, including carbon, nitrogen, oxygen, phosphorus and water.
- Wildlife in ecosystems:
  - relationships between animals and other species (including plants), to include predator/prey, symbiosis and parasitism
  - interactions in ecosystems to provide for animal needs, e.g. food, shelter, protection, migration, reproduction and competition.

A3 Human interactions with ecosystems

- Human impacts on ecosystems:
  - impact of human activities, including positive, negative, historical, present and future, e.g. Neolithic woodland clearance, creation of the Forestry Commission, the Common Agricultural Policy
  - main threats to ecosystems at global, national and local scales, e.g. climate change, depletion of fish stocks and ash dieback.
- Protection and conservation strategies:
  - the use of planning and other environmental legislation
  - funding for habitat stewardship
  - the role of charitable and volunteer organisations
  - rehabilitation of wildlife and its impact on biodiversity, including licensing of rehabilitation
  - the range of conservation strategies, e.g. catch and release, captive breeding, maintaining genetic diversity, habitat management.

Learning aim B: Carry out field studies into wildlife populations and their habitats for the purpose of planning for wildlife management

B1 Habitat surveys for wildlife management

Methods and considerations required to carry out habitat surveys:

- planning a survey, choice of survey area, equipment
- sampling techniques, e.g. random, systematic, stratified
- health and safety considerations, e.g. lone working, working near water and use of personal protection equipment (PPE), e.g. in dense undergrowth
- survey techniques, e.g. quadrat, transect, kick methodologies
- recording of results, e.g. tally charts and mapping, including field use of ICT.

B2 Monitoring wildlife populations

Methods and considerations required to carry out the monitoring of wildlife populations:

- planning animal monitoring or population surveys, e.g. equipment, scheduling, methodology
- direct methods, including catch and release, estimation techniques, e.g. of bird populations
- legislation, including health and safety, licensing of live capture programmes
- indirect, non-invasive methods, including tracks and signs, use of tracking tunnels, moving transects, e.g. butterfly walks
- recording and reporting of data.

B3 Planning for wildlife habitat management and rehabilitation

Developing a rehabilitation or habitat plan for targeted wildlife species:

- using survey data to develop a species and habitat plan with measurable outcomes
- task allocation and schedules, taking into account, e.g. seasonality of operations
- tools, materials and equipment used for practical tasks, including suitable general tools (e.g. billhooks, bowsaws) and species-specific tools (e.g. nesting boxes)
- health and safety considerations, including compliance with relevant legislation
- use of monitoring programmes to evaluate outcomes, e.g. species counts, marking, clay pads
- assessing the viability of rehabilitating specific wildlife in terms of survival and recovery
- developing a species-specific rehabilitation plan to include standard release factors that influence a successful outcome
- the development of monitoring strategies that will enable the success of rehabilitation to be evaluated.

Learning aim C: Undertake practical wildlife and conservation management to affect biodiversity

C1 Interpretation of habitat management and wildlife rehabilitation plans

Implementing habitat and rehabilitation plans:

- translating plans into tasks
- scheduling, taking account of seasonality
- job specifications
- identification of tools, materials and equipment
- ordering materials
- risk assessments
- identification of relevant legislation, codes of practice and licensing
- identifying skill sets, e.g. suitably qualified chainsaw operators.

C2 Carrying out practical habitat management and wildlife rehabilitation

Safe completion of planned tasks required to manage project, including:

- task allocation
- time management
- correct selection, transport, use, maintenance and storage of tools, materials and equipment
- working safely, assessing risks
- compliance with relevant legislation, codes of practice and planning guidelines
- minimising environmental damage and disturbance.

C3 Monitoring the outcomes of practical habitat management and wildlife rehabilitation

Determining the impact of practical habitat management and rehabilitation:

- reporting the outcomes of practical habitat management and rehabilitation
- measuring actual outcomes against predicted outcomes, e.g. increase or decrease in target species or survivability
- use of monitoring programmes to track outcomes, e.g. use of dormouse boxes to track population change
- analysis of strengths and weaknesses
- opportunities for improvement, e.g. extending the area of habitat improvement.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the characteristics of ecosystems for wildlife habitat planning and rehabilitation		**A.D1** Evaluate human impacts on wildlife ecosystems and the range of responses to mitigate or enhance those impacts.
A.P1 Explain the distribution of ecosystems. **A.P2** Explain different relationships within ecosystems.	**A.M1** Analyse the relationships between named UK animal species and their interactions with their habitats.	
Learning aim B: Carry out field studies into wildlife populations and their habitats for the purpose of planning for wildlife management		
B.P3 Perform wildlife habitat surveys and monitor wildlife populations. **B.P4** Prepare a clear located habitat management or rehabilitation plan for a named UK animal, using the findings of habitat and animal population surveys.	**B.M2** Analyse survey and monitoring data to produce, for a named UK animal species, a located habitat management or rehabilitation plan.	**BC.D2** Justify a specific habitat or rehabilitation plan using survey and monitoring data. **BC.D3** Evaluate the impact of the rehabilitation plan and tasks carried out on biodiversity and the wildlife habitat.
Learning aim C: Undertake practical wildlife and conservation management to affect biodiversity		
C.P5 Demonstrate the proficient completion of habitat management tasks in accordance with an agreed plan. **C.P6** Demonstrate, under supervision, wildlife rehabilitation in accordance with an agreed plan.	**C.M3** Demonstrate appropriate techniques for habitat management and wildlife rehabilitation, adapting techniques for changing circumstances.	

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, BC.D2, BC.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:
- a range of habitats suitable for detailed survey work
- wildlife animal species suitable for population studies
- a licensed animal rehabilitation programme.

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will show a depth of understanding by evaluating how human impacts on ecosystems can be both positive and negative. They will apply knowledge to less familiar situations and include impacts at a variety of scales and from different historical periods. Their evaluation will be based on properly referenced case studies and will include original fieldwork. Learners will be able to demonstrate the complexity of human impacts and include both intentional and unintentional outcomes. They will show through their analysis that cost–benefit factors can influence outcomes.

Learners will show that they understand that planned outcomes are often difficult to predict and that the scientific basis for decision making can be ambivalent, for example when examining badger culls.

Learners will justify their conclusions by linking impacts to the change or breakdown of specific relationships through human intervention, rather than by explaining them in general terms.

For merit standard, learners will demonstrate their understanding of specific named habitats and species. Learners will show clearly the relationships between different species, including both the nature of the relationship and the energy flow demonstrated. They will make reasoned, analytical judgements, showing that they understand how the habitat provides for the needs of the animal, and applying their knowledge to less familiar situations. For example, honeysuckle is the preferred nesting material for the dormouse and it also provides nectar.

For pass standard, learners will recall knowledge to explain basic world biomes and UK habitats. They will include the ways in which biotic and abiotic factors control the distribution of habitats, and demonstrate awareness that these factors can operate on the very smallest scales. Learners will include specific examples, referring to well-defined situations in order to demonstrate understanding. They will relate natural cycles to specific plant and animal species and to named habitat examples.

Learners will demonstrate their understanding of the different relationships in ecosystems – including energy flows, wildlife and the impact of humans – exploring well-defined situations and structuring their knowledge in order to reach suitable conclusions.

Learning aims B and C

For distinction standard, learners will be able to articulate arguments concisely and professionally in order to justify their habitat management or wildlife rehabilitation plan. They will be able to relate their plan to measurable outcomes and should describe a monitoring plan to use detailed analysis and research in order to justify recommendations made in the plan. Their rationale should be based on relevant primary data, supported with additional, referenced research.

Learners will confidently show that their plan will address specific relationships between the target species and its environment. For example, planting hazel coppice will provide mid-layer transport pathways, overhead cover from predators and a valuable food source for the dormouse.

Learners will draw on knowledge from across the learning aims to reflect on the success of their plan and the tasks they have undertaken. They will use detailed analysis to make objective judgements on both the process and product of the tasks. Learners will predict the impact their tasks will have on the wildlife environment and, specifically, the relationships between the target species and its environment. They will also show awareness of the difficulty of making definitive predictions.

Learners will demonstrate awareness that the tasks they have undertaken may have negative impacts on the target species and other relationships in the environment; for example, rehabilitation of a predator species may alter the equilibrium of the environment. Improvements identified should include better ways of working, as well as improved outcomes.

For merit standard, learners will make reasoned, analytical judgements on the outcomes of their surveys and produce a located plan for habitat improvements or rehabilitation based on their analysis. The plan should detail the tasks required, as well as identifying appropriate solutions and explaining how these tasks will impact on one or more named target animal species.

Learners will select appropriate solutions in order to react to changing circumstances during the completion of tasks, identifying these solutions from practical exploration. Where tasks need to be modified, learners will be able to modify techniques to ensure that the agreed outcomes will still be realised.

For pass standard, learners will select and competently demonstrate a range of appropriate survey techniques, targeting specific animal species and their habitats. They will carry out survey techniques correctly and safely. The surveys must be species specific, for example surveying the amount of honeysuckle used as bedding by the dormouse. Learners should be similarly competent in investigating wildlife populations, although it is unlikely that this will be carried out through licensed catch and release methods unless undertaken as part of an authorised programme. More appropriate will be the use of direct observation, for example population counts, good identification of tracks and signs, tracking tunnels and other less invasive methods. Recording of data will be comprehensive and accurate, and findings will be presented in an appropriate format, including, for example, graphs, tables and maps.

Learners will select and demonstrate competent practical skills for both habitat improvement and wildlife rehabilitation. They will show that they can work safely and efficiently, and with due regard for other people, animal welfare and the environment. The correct and safe selection, transport and use of tools, materials and equipment is essential.

For rehabilitation, learners will act under supervision to ensure good animal welfare. For all of the practical tasks, learners will be expected to show that they can minimise environmental impacts.

Links to other units

This unit links to *Unit 4: Work Experience in the Land-based Sectors*.

Employer involvement

This unit would benefit from employer involvement in the form of:

- masterclasses
- technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- opportunities for observation during work experience
- support from local land-based organisation staff as mentors.

Unit 19: Developing a Land-based Enterprise

Level: **3**

Unit type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop the skills needed to prepare a business plan for a viable land-based enterprise, based on their own market research and financial feasibility study.

Unit introduction

Understanding the operation of any business is vital if it is to be successful. Employees need to have knowledge of the business environment and marketplace as well as good business management skills. The land-based sector is predominately made up of small and medium-sized businesses, and this provides many opportunities to set up your own business.

In this unit, you will learn about the features and resources, including human, physical and financial, and the processes that businesses operating in the land-based sector need. You will undertake a financial viability study, preparing cash flows, an income statement and a statement of financial position. You will undertake market research to identify a viable enterprise, leading to the production and presentation of a viable business start-up plan for a chosen land-based enterprise.

These activities will prepare you for employment in the land-based sector in roles such as unit manager, or for self-employment in the sector. This unit will also enable you to progress to higher education courses such as a degree in land-based business management or relevant vocational degrees such as horticulture or countryside management.

Learning aims

In this unit you will:

A Examine the features, resource requirements and processes of businesses operating in the land-based sector

B Carry out market research to identify a financially viable land-based enterprise

C Develop a business start-up plan for a viable land-based enterprise.

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Examine the features, resource requirements and processes of businesses operating in the land-based sector	**A1** Features of land-based businesses **A2** Resource requirements of land-based businesses **A3** Land-based business processes and procedures	A report that investigates the key features, resource requirements and processes of a profit and a not-for-profit business operating in the land-based sector.
B Carry out market research to identify a financially viable land-based enterprise	**B1** Market research and analysis **B2** Financial feasibility of a land-based enterprise	A business start-up plan for a chosen enterprise for presentation to potential stakeholders, supported by market research and a financial viability analysis.
C Develop a business start-up plan for a viable land-based enterprise	**C1** Features of a business start-up plan **C2** Presenting and evaluating the business plan	

Content

Learning aim A: Examine the features, resource requirements and processes of businesses operating in the land-based sector

A1 Features of land-based businesses

- Ownership and liability, to include sole trader, partnership, private and public limited company, franchises, public sector businesses, not-for-profit.
- Objectives associated with business type, e.g. supply of products or services, not-for-profit, profit making.
- Scope of business activities, to include local, national, international.
- Link between land-based and associated industries in the supply chain, e.g. production and manufacturing, leisure.
- Reasons for success and how they differ depending on ability to meet demand, use of technology, type of business, innovative products or systems.
- Importance of land-based industries to regional and local economies, including social and environmental impact, e.g. bringing employment, gross domestic product (GDP), changes in biodiversity, sustainability.

A2 Resource requirements of land-based businesses

- Physical resources, to include land, machinery, equipment, materials.
- Human resources, including skills and knowledge requirements, staff, structure.
- Financial resources, including internal (retained profit) and external sources (loans, hire purchase, grants).
- Educational resources, such as professional trade associations and trade bodies, government organisations, e.g. Department for Environment, Food and Rural Affairs (Defra), research organisations.

A3 Land-based business processes and procedures

Importance, legal aspects and management efficiency.

- Sourcing materials and services, e.g. timing, purchasing, ordering procedures, credit control, record keeping.
- Planning the production of products or services, e.g. forecasting supply and demand, methods of production (job, batch, lean, flow).
- Sales and marketing, e.g. pricing strategies, costs, internal and external communication, promotional activities (direct marketing, advertising).
- Legislative recording requirements, e.g. health and safety, Control of Substances Hazardous to Health (COSHH) Regulations 2002, food safety, plant and animal passports.
- Details and purpose of relevant registration schemes, e.g. Red Tractor Assurance, quality management schemes, land registry, Registration of Land-based Operatives (ROLO), Forest Stewardship Council (FSC).
- Monitoring business operations to improve performance, e.g. gross margin, production levels, financial efficiency, against targets, advantages, disadvantages.

Learning aim B: Carry out market research to identify a financially viable land-based enterprise

B1 Market research and analysis

Understanding the marketplace, customers and competitors.

- Target market, e.g. types of customer, age, location.
- Primary and secondary research, e.g. questionnaires, surveys, interviews.
- Analysis of the business environment, including Porter's five forces, PESTLE (political, economic, social, technological, legal, environmental) and SWOT (strengths, weaknesses, opportunities, threats).
- Competitor analysis, to include indirect and direct competitors, local, national, international, market share, reputation, pricing, customers.
- Barriers to setting up, e.g. viability, cash flow, finance, legislation, resources.

B2 Financial feasibility of a land-based enterprise

Financial feasibility study – assessment of financial aspects of starting up an enterprise.

- Amount of finance needed, including set-up costs, fixed and variable costs.
- Sources of capital, e.g. investors, own, grants, loans.
- Calculation of break-even forecast and margin of safety.
- Calculation of return on capital employed, net profit margins, current ratio.
- Preparation of financial accounts, to include:
  - income statement
  - statements of financial position
  - cash flow forecasts.

Learning aim C: Develop a business start-up plan for a viable land-based enterprise

C1 Features of a business start-up plan

Key areas that need to be included in a business plan.

- Nature of the enterprise, e.g. sales, service.
- Business aims and objectives, e.g. profit, survival, growth, long and short term.
- Legal structure and operation.
- Resource requirements.
- Promotion, including methods and costs.
- Financial forecasts, including opening and closing statement of financial position, capital to show investment needed, cash flow forecast.
- Summary of market analysis and competition.
- Measures of success, e.g. financial and non-financial key performance indicators.
- Risks and contingency plans.

C2 Presenting and evaluating the business plan

- Documentation, to include financial forecasts, summary of business, business plan.
- Presentation of the business plan to potential investors, e.g. stakeholders, bank, formal, informal, face to face, via submission of documentation.
- Evaluating the business plan, e.g. appropriate method of presentation, clearly set out, feedback from the potential investor, sufficient preparation, level of detail included, coverage of key areas, enable potential investor or stakeholder to make decisions based on the information.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Examine the features, resource requirements and processes of businesses operating in the land-based sector		
A.P1 Explain the features and resource requirements of two contrasting businesses in the land-based sector. **A.P2** Explain the business processes and procedures for two contrasting businesses in the land-based sector.	**A.M1** Analyse the impact of business features, resource requirements, features and processes on the operation of two contrasting businesses in the land-based sector.	**A.D1** Evaluate the impact of key business features, resource requirements and processes on the performance of two contrasting businesses in the land-based sector.
Learning aim B: Carry out market research to identify a financially viable land-based enterprise		**B.D2** Evaluate own market research and financial feasibility study, drawing out valid conclusions to produce a comprehensive business start-up plan for a chosen land-based enterprise.
B.P3 Carry out market research to identify a land-based business enterprise. **B.P4** Carry out a financial feasibility study for a land-based enterprise.	**B.M2** Analyse the results of own market research and financial feasibility study to develop a business start-up plan for a chosen land-based enterprise.	
Learning aim C: Develop a business start-up plan for a viable land-based enterprise		
C.P5 Produce a basic business start-up plan for a chosen land-based enterprise, based on own research. **C.P6** Explain the business start-up plan to relevant stakeholders.	**C.M3** Produce a detailed business start-up plan for a chosen land-based enterprise, based on own research to present to relevant stakeholders.	**C.D3** Evaluate own business start-up plan, justifying conclusions.

Essential information for assignments

The recommended structure of assessment is shown in the unit summary along with suitable forms of evidence. *Section 6* gives information on setting assignments and there is further information on our website.

There is a maximum number of two summative assignments for this unit. The relationship of the learning aims and criteria is:

Learning aim: A (A.P1, A.P2, A.M1, A.D1)

Learning aims: B and C (B.P3, B.P4, C.P5, C.P6, B.M2, C.M3, B.D2, C.D3)

Further information for teachers and assessors

Resource requirements

For this unit, learners must have access to:

- two business types, non-profit and profit, which will allow learners to gain information (one could be learners' work placement)
- business planning tools or information/support such as that provided by banks etc.

Essential information for assessment decisions

Learning aim A

The two business examples used must be in the land-based sector but could be from different industries in the sector, i.e. a charity in the animal sector and Dairy Crest in the agricultural sector.

For distinction standard, learners will show depth of understanding by evaluating how resource requirements, key business features, processes and procedures impact on the performance of two businesses operating in the land-based sector, with one being a for-profit business and the other a not-for-profit business. Learners will support their evaluation with well-chosen examples from their two businesses. They will review how decisions made in the supply chain impact on business performance and show, through their evaluation, the advantages and disadvantages of the processes and procedures used in the businesses, and how these processes impact on and improve business performance. Learners will justify their conclusions by linking the impact to key features, processes and procedures, and resource requirements, rather than just explaining these in general terms.

For merit standard, learners will demonstrate their understanding of how resource requirements, key business features, processes and procedures affect the effectiveness of two businesses operating in the land-based sector, selecting some examples to support their understanding. They will review the links between different land-based businesses in the supply chain and their relationship to each other. Learners will make reasoned, analytical judgements in relation to a number of advantages and disadvantages of the different processes and procedures used in the businesses, and how these processes can improve business performance, for example the advantage of sourcing raw materials locally reduces transport costs and time to market, improving business costs and readiness of products.

For pass standard, learners will recall knowledge to explain the key business features, resource requirements, processes and procedures required to operate a for-profit and a not-for-profit business in the land-based sector. Learners will explain the importance of links between different land-based businesses in the supply chain and how these relate to each other. They will use relevant research to show the resource requirements and the importance of these in operating a business effectively, using specific examples. Learners will demonstrate an understanding of the processes and procedures used in the businesses, and how these relate to business performance, for example registration with a quality assurance scheme gives customers confidence in the product and the company they are buying from, resulting in return purchasing.

Learning aims B and C

Learners should prepare their own business plan. Presentation of the business plan can take the form of a formal presentation, an informal meeting or discussion or submission of the written documentation, as appropriate.

For distinction standard, learners will use concise and professional arguments when reviewing their own research and financial feasibility study, giving reasons for all elements. They will demonstrate clearly how their market research and financial feasibility study will underpin the development of a comprehensive business start-up plan and support this with carefully chosen examples, such as their financial forecasts to show the predicted success of the chosen business. Based on their evaluation, they will give clear and detailed reasons for their conclusions.

Learners will present their business start-up plan individually, demonstrating a high standard of technical ability, attention to detail, and use of the correct business terminology and communication style. They will evaluate this plan, taking into account feedback, their preparation, method of presentation and level of detail. They need to demonstrate their understanding by justifying any conclusions made within their evaluation and recommendations.

For merit standard, learners will make reasoned, analytical judgements about their financial feasibility study and market research and how they relate to the development of the business start-up plan, supporting this with examples. They will produce their business start-up plan based on their own research that includes the type of business, its aims and objectives, resource requirements, methods of promotion, risks and contingency plans and financial forecasts. Learners will individually present this plan in a professional way, demonstrating attention to detail, use of appropriate business terminology and preparation before the final presentation. There will be some analysis of the feedback from the potential investors or stakeholders.

For pass standard, learners will undertake some market research using primary and secondary research, supported by an analysis of the market and potential competitors in identifying a suitable business. They will also identify the potential sources of finance and costs, and prepare a cash flow forecast and income statement that relate to their business start-up, supporting these with examples. Learners will individually prepare a basic business start-up plan from their research, including the outline of the business, its aims and objectives, methods of promotion, a cash flow forecast, and profit and loss statement. They will present this plan, showing some knowledge and understanding of business terminology and answering questions from the potential investors or stakeholders.

Links to other units

This unit links to *Unit 4: Work Experience in the Land-based Sectors.*

Employer involvement

This unit would benefit from employer involvement in the form of:
- masterclasses from industry
- technical workshops involving staff from local land-based organisations
- contribution of ideas to unit assignment/project materials
- observation during work experience
- support from local land-based organisation staff as mentors.

4 Planning your programme

How do I choose the right BTEC National qualification for my learners?

BTEC Nationals come in a range of sizes, each with a specific purpose. You will need to assess learners very carefully to ensure that they start on the right size of qualification to fit into their 16–19 study programme, and that they take the right pathways or optional units that allow them to progress to the next stage.

Some learners may want to take a number of complementary qualifications or keep their progression options open. These learners may be suited to taking a BTEC National Certificate or Extended Certificate. Learners who then decide to continue with a fuller vocational programme can transfer to a BTEC National Diploma or Extended Diploma, for example for their second year.

Some learners are sure of the sector they want to work in and are aiming for progression into that sector via higher education. These learners should be directed to the two-year BTEC National Extended Diploma as the most suitable qualification.

As a centre, you may want to teach learners who are taking different qualifications together. You may also wish to transfer learners between programmes to meet changes in their progression needs. You should check the qualification structures and unit combinations carefully as there is no exact match among the different sizes. You may find that learners need to complete more than the minimum number of units when transferring.

When learners are recruited, you need to give them accurate information on the title and focus of the qualification for which they are studying.

Is there a learner entry requirement?

As a centre it is your responsibility to ensure that learners who are recruited have a reasonable expectation of success on the programme. There are no formal entry requirements but we expect learners to have qualifications at or equivalent to Level 2.

Learners are most likely to succeed if they have:

- five GCSEs at good grades and/or
- BTEC qualification(s) at Level 2
- achievement in English and mathematics through GCSE or Functional Skills.

Learners may demonstrate ability to succeed in various ways. For example, learners may have relevant work experience or specific aptitude shown through diagnostic tests or non-education experience.

What is involved in becoming an approved centre?

All centres must be approved before they can offer these qualifications – so that they are ready to assess learners and so that we can provide the support that it is needed. Further information is given in *Section 8*.

What level of sector knowledge is needed to teach these qualifications?

We do not set any requirements for teachers but expect that centres will assess the overall skills and knowledge of the teaching team to ensure that they are relevant and up to date. This will give learners a rich programme to prepare them for employment in the sector. As part of the requirements of the programme are to involve employers in delivery this should support centres in ensuring that they are following up to date practices when delivering the programme.

What resources are required to deliver these qualifications?

As part of your centre approval you will need to show that the necessary material resources and work spaces are available to deliver BTEC Nationals. For some units, specific resources are required. This is indicated in the units.

How can myBTEC help with planning for these qualifications?

myBTEC is an online toolkit that supports the delivery, assessment and quality assurance of BTECs in centres. It supports teachers with activities, such as choosing a valid combination of units, creating assignment briefs and creating assessment plans. For further information see *Section 10*.

Which modes of delivery can be used for these qualifications?

You are free to deliver BTEC Nationals using any form of delivery that meets the needs of your learners. We recommend making use of a wide variety of modes, including direct instruction in classrooms or work environments, investigative and practical work, group and peer work, private study and e-learning.

What are the requirements for meaningful employer involvement?

Requirements

This BTEC National Extended Diploma in Forestry and Arboriculture has been designed as a Tech Level qualification. As an approved centre you are required to ensure that during their study, every learner has access to meaningful activity involving employers. Involvement should be with employers from the forestry and arboriculture sector and should form a significant part of the delivery or assessment of the qualification. Each centre's approach to employer involvement will be monitored in two ways. It will be monitored at centre level in the first term each year as part of the annual quality management review process that addresses centre strategy for delivery, assessment and quality assurance, when we will ask you to show evidence of how employer involvement is provided for all learners. You will need to show evidence in order to gain reporting clearance for certification. It will be monitored also at programme level as part of the standards verification process to confirm that plans for employer involvement meet the requirements of the specification. These approaches are designed to ensure additional activities can be scheduled where necessary so learners are not disadvantaged (see *Section 8 Quality assurance*).

We know that the vast majority of programmes already have established links with employers. In order to give you maximum flexibility in creating and strengthening employer involvement, we have not specified a particular level of input from employers. However, meaningful employer involvement, as defined below, should contribute significantly to at least **three** units of which one must be a mandatory unit. For this qualification, learners are expected to undertake 300 hours of work experience.

This mandatory unit specifies where delivery and/or assessment will be linked to employers.

- Unit 4: Work Experience in the Land-based Sectors.

Also, there are suggestions in many of the units about how employers could become involved in delivery and/or assessment. These suggestions are not exhaustive and there will be other possibilities at local level.

Employer involvement in these units is subject to verification as part of the standards verification process (see *Section 8*).

Definition

Activities that are eligible to be counted as meaningful engagement are:

- structured work experience or work placements that develop skills and knowledge relevant to the qualification
- projects or assessments set with input from industry practitioners
- masterclasses or guest lectures from industry practitioners
- 'expert witness' reports from practitioners that contribute to the assessment of a learner's work.

There may be other ways in which learners can benefit from contact with employers or prepare for employment, such as listening to careers talks or working in simulated environments. While they provide benefits to learners they do not count as meaningful engagement.

Support

It is important that you give learners opportunities that are high quality and directly relevant to their study. We will support you in this through guidance materials and by giving you examples of best practice.

What support is available?

We provide a wealth of support materials, including curriculum plans, delivery guides, authorised assignment briefs, additional papers for external assessments and examples of marked learner work.

You will be allocated a Standards Verifier early on in the planning stage to support you with planning your assessments. There will be extensive training programmes as well as support from our Subject Advisor team.

For further details see *Section 10*.

How will my learners become more employable through these qualifications?

BTEC Nationals are mapped to relevant occupational standards (see *Appendix 1*).

In the mandatory content and the selected optional units that focus on technical preparation learners will be acquiring the key knowledge and skills that employers need. Also, employability skills such as team working and entrepreneurialism, and completing realistic tasks, have been built into the design of the learning aims and content. This gives you the opportunity to use relevant contexts, scenarios and materials to enable learners to develop a portfolio of evidence that demonstrates the breadth of their skills and knowledge in a way that equips them for employment.

5 Assessment structure and external assessment

Introduction

BTEC Nationals are assessed using a combination of *internal assessments*, which are set and marked by teachers, and *external assessments* which are set and marked by Pearson:

- mandatory units have a combination of internal and external assessments
- all optional units are internally assessed.

We have taken great care to ensure that the assessment method chosen is appropriate to the content of the unit and in line with requirements from employers and higher education.

In developing an overall plan for delivery and assessment for the programme, you will need to consider the order in which you deliver units, whether delivery is over short or long periods and when assessment can take place. Some units are defined as synoptic units (see *Section 2*). Normally, a synoptic assessment is one that a learner would take later in a programme and in which they will be expected to apply learning from a range of units. Synoptic units may be internally or externally assessed. Where a unit is externally assessed you should refer to the sample assessment materials (SAMs) to identify where there is an expectation that learners draw on their wider learning. For internally-assessed units, you must plan the assignments so that learners can demonstrate learning from across their programme. A unit may be synoptic in one qualification and not another because of the relationship it has to the rest of the qualification.

We have addressed the need to ensure that the time allocated to final assessment of internal and external units is reasonable so that there is sufficient time for teaching and learning, formative assessment and development of transferable skills.

In administering internal and external assessment, the centre needs to be aware of the specific procedures and policies that apply, for example to registration, entries and results. An overview with signposting to relevant documents is given in *Section 7*.

Internal assessment

Our approach to internal assessment for these qualifications will be broadly familiar to experienced centres. It offers flexibility in how and when you assess learners, provided that you meet assessment and quality assurance requirements. You will need to take account of the requirements of the unit format, which we explain in *Section 3*, and the requirements for delivering assessment given in *Section 6*.

External assessment

A summary of the external assessment for this qualification is given in *Section 2*. You should check this information carefully, together with the unit specification and the sample assessment materials, so that you can timetable learning and assessment periods appropriately.

Learners must be prepared for external assessment by the time they undertake it. In preparing learners for assessment you will want to take account of required learning time, the relationship with other external assessments and opportunities for retaking. You should ensure that learners are not entered for unreasonable amounts of external assessment in one session. Learners may resit an external assessment to obtain a higher grade of near pass or above. If a learner has more than one attempt, then the best result will be used for qualification grading, up to the permitted maximum. It is unlikely that learners will need to or benefit from taking all assessment twice so you are advised to plan appropriately. Some assessments are synoptic and learners are likely to perform best if these assessments are taken towards the end of the programme.

Key features of external assessment in forestry and arboriculture

In forestry and arboriculture, after consultation with stakeholders, we have developed the following.

- *Unit 1: Professional Working Responsibilities* – learners complete written tasks examining their knowledge and skills in the areas of professional working practice, personal welfare, and responsibilities for themselves, others and the environment. The unit provides crucial knowledge and skills for wide-ranging roles found in the forestry and arboriculture sector.
- *Unit 2: Plant and Soil Science* – learners complete a written examination demonstrating their knowledge of plant structures, systemic processes, and nutrition and soil composition and management. The unit provides fundamental knowledge of the processes for healthy plant growth, which is important for wide-ranging roles in forestry and arboriculture, relating to the establishment and management of trees.
- *Unit 3: Contemporary Issues in the Land-based Sectors* – learners complete written tasks, consolidating their research into contemporary issues in the land-based sectors. The unit provides essential skills to interrogate sources of information on issues facing those working in the sectors and to draw critical conclusions on the validity and importance of the information.

Units

The externally-assessed units have a specific format which we explain in *Section 3*. The content of units will be sampled across external assessments over time, through appropriate papers and tasks. The ways in which learners are assessed are shown through the assessment outcomes and grading descriptors. External assessments are marked and awarded using the grade descriptors. The grades available are Distinction (D), Merit (M), Pass (P) and Near Pass (N). The Near Pass (N) grade gives learners credit below a Pass, where they have demonstrated evidence of positive performance which is worth more than an unclassified result but not yet at the Pass standard.

Sample assessment materials

Each externally-assessed unit has a set of sample assessment materials (SAMs) that accompanies this specification. The SAMs are there to give you an example of what the external assessment will look like in terms of the feel and level of demand of the assessment. In the case of units containing synoptic assessment, the SAMs will also show where learners are expected to select and apply from across the programme.

The SAMs show the range of possible question types that may appear in the actual assessments. They give you a good indication of how the assessments will be structured. While SAMs can be used for practice with learners as with any assessment, the content covered and specific details of the questions asked will change in each assessment.

A copy of each of these assessments can be downloaded from our website. To allow your learners further opportunities for practice, an additional sample of each of the Pearson-set units will be available before the first sitting of the assessment.

6 Internal assessment

This section gives an overview of the key features of internal assessment and how you, as an approved centre, can offer it effectively. The full requirements and operational information are given in the *Pearson Quality Assurance Handbook*. All members of the assessment team need to refer to this document.

For BTEC Nationals it is important that you can meet the expectations of stakeholders and the needs of learners by providing a programme that is practical and applied. Centres can tailor programmes to meet local needs and use links with local employers and the wider vocational sector.

When internal assessment is operated effectively it is challenging, engaging, practical and up to date. It must also be fair to all learners and meet national standards.

Principles of internal assessment

Assessment through assignments

For internally-assessed units, the format of assessment is an assignment taken after the content of the unit, or part of the unit if several assignments are used, has been delivered. An assignment may take a variety of forms, including practical and written types. An assignment is a distinct activity completed independently by learners that is separate from teaching, practice, exploration and other activities that learners complete with direction from, and formative assessment by, teachers.

An assignment is issued to learners as an assignment brief with a defined start date, a completion date and clear requirements for the evidence that they need to provide. There may be specific observed practical components during the assignment period. Assignments can be divided into tasks and may require several forms of evidence. A valid assignment will enable a clear and formal assessment outcome based on the assessment criteria.

Assessment decisions through applying unit-based criteria

Assessment decisions for BTEC Nationals are based on the specific criteria given in each unit and set at each grade level. To ensure that standards are consistent in the qualification and across the suite as a whole, the criteria for each unit have been defined according to a framework. The way in which individual units are written provides a balance of assessment of understanding, practical skills and vocational attributes appropriate to the purpose of qualifications.

The assessment criteria for a unit are hierarchical and holistic. For example, if an M criterion requires the learner to show 'analysis' and the related P criterion requires the learner to 'explain', then to satisfy the M criterion a learner will need to cover both 'explain' and 'analyse'. The unit assessment grid shows the relationships among the criteria so that assessors can apply all the criteria to the learner's evidence at the same time. In *Appendix 2* we have set out a definition of terms that assessors need to understand.

Assessors must show how they have reached their decisions using the criteria in the assessment records. When a learner has completed all the assessment for a unit then the assessment team will give a grade for the unit. This is given simply according to the highest level for which the learner is judged to have met all the criteria. Therefore:

- to achieve a Distinction, a learner must have satisfied all the Distinction criteria (and therefore the Pass and Merit criteria); these define outstanding performance across the unit as a whole
- to achieve a Merit, a learner must have satisfied all the Merit criteria (and therefore the Pass criteria) through high performance in each learning aim
- to achieve a Pass, a learner must have satisfied all the Pass criteria for the learning aims, showing coverage of the unit content and therefore attainment at Level 3 of the national framework.

The award of a Pass is a defined level of performance and cannot be given solely on the basis of a learner completing assignments. Learners who do not satisfy the Pass criteria should be reported as Unclassified.

The assessment team

It is important that there is an effective team for internal assessment. There are three key roles involved in implementing assessment processes in your centre, each with different interrelated responsibilities, the roles are listed below. Full information is given in the *Pearson Quality Assurance Handbook*.

- The Lead Internal Verifier (the Lead IV) has overall responsibility for the programme, its assessment and internal verification to meet our requirements, record keeping and liaison with the Standards Verifier. The Lead IV registers with Pearson annually. The Lead IV acts as an assessor, supports the rest of the assessment team, makes sure that they have the information they need about our assessment requirements and organises training, making use of our guidance and support materials.

- Internal Verifiers (IVs) oversee all assessment activity in consultation with the Lead IV. They check that assignments and assessment decisions are valid and that they meet our requirements. IVs will be standardised by working with the Lead IV. Normally, IVs are also assessors but they do not verify their own assessments.

- Assessors set or use assignments to assess learners to national standards. Before taking any assessment decisions, assessors participate in standardisation activities led by the Lead IV. They work with the Lead IV and IVs to ensure that the assessment is planned and carried out in line with our requirements.

Effective organisation

Internal assessment needs to be well organised so that the progress of learners can be tracked and so that we can monitor that assessment is being carried out in line with national standards. We support you through, for example, providing training materials and sample documentation. Our online myBTEC service can help support you in planning and record keeping.

Further information on using myBTEC can be found in *Section 10* and on our website.

It is particularly important that you manage the overall assignment programme and deadlines to make sure that learners are able to complete assignments on time.

Learner preparation

To ensure that you provide effective assessment for your learners, you need to make sure that they understand their responsibilities for assessment and the centre's arrangements.

From induction onwards, you will want to ensure that learners are motivated to work consistently and independently to achieve the requirements of the qualifications. Learners need to understand how assignments are used, the importance of meeting assignment deadlines and that all the work submitted for assessment must be their own.

You will need to give learners a guide that explains how assignments are used for assessment, how assignments relate to the teaching programme and how learners should use and reference source materials, including what would constitute plagiarism. The guide should also set out your approach to operating assessment, such as how learners must submit work and request extensions.

Setting effective assignments

Setting the number and structure of assignments

In setting your assignments, you need to work with the structure of assignments shown in the *Essential information for assignments* section of a unit. This shows the structure of the learning aims and criteria that you must follow and the recommended number of assignments that you should use. For some units we provide authorised assignment briefs. For all the units we give you suggestions on how to create suitable assignments. You can find these materials along with this specification on our website. In designing your own assignment briefs you should bear in mind the following points.

- The number of assignments for a unit must not exceed the number shown in *Essential information for assignments*. However, you may choose to combine assignments, for example to create a single assignment for the whole unit.

- You may also choose to combine all or parts of different units into single assignments, provided that all units and all their associated learning aims are fully addressed in the programme overall. If you choose to take this approach, you need to make sure that learners are fully prepared so that they can provide all the required evidence for assessment and that you are able to track achievement in the records.

- A learning aim must always be assessed as a whole and must not be split into two or more tasks.

- The assignment must be targeted to the learning aims but the learning aims and their associated criteria are not tasks in themselves. Criteria are expressed in terms of the outcome shown in the evidence.

- For units containing synoptic assessment, the planned assignments must allow learners to select and apply their learning using appropriate self-management of tasks.

- You do not have to follow the order of the learning aims of a unit in setting assignments but later learning aims often require learners to apply the content of earlier learning aims and they may require learners to draw their learning together.

- Assignments must be structured to allow learners to demonstrate the full range of achievement at all grade levels. Learners need to be treated fairly by being given the opportunity to achieve a higher grade if they have the ability.

- As assignments provide a final assessment, they will draw on the specified range of teaching content for the learning aims. The specified content is compulsory. The evidence for assessment need not cover every aspect of the teaching content as learners will normally be given particular examples, case studies or contexts in their assignments. For example, if a learner is carrying out one practical performance, or an investigation of one organisation, then they will address all the relevant range of content that applies in that instance.

Providing an assignment brief

A good assignment brief is one that, through providing challenging and realistic tasks, motivates learners to provide appropriate evidence of what they have.

An assignment brief should have:

- a vocational scenario, this could be a simple situation or a full, detailed set of vocational requirements that motivates the learner to apply their learning through the assignment
- clear instructions to the learner about what they are required to do, normally set out through a series of tasks
- an audience or purpose for which the evidence is being provided
- an explanation of how the assignment relates to the unit(s) being assessed.

Forms of evidence

BTEC Nationals have always allowed for a variety of forms of evidence to be used, provided that they are suited to the type of learning aim being assessed. For many units, the practical demonstration of skills is necessary and for others, learners will need to carry out their own research and analysis. The units give you information on what would be suitable forms of evidence to give learners the opportunity to apply a range of employability or transferable skills. Centres may choose to use different suitable forms for evidence to those proposed. Overall, learners should be assessed using varied forms of evidence.

Full definitions of types of assessment are given in *Appendix 2*. These are some of the main types of assessment:

- written reports
- projects
- time-constrained practical assessments with observation records and supporting evidence
- recordings of performance
- sketchbooks, working logbooks, reflective journals
- presentations with assessor questioning.

The form(s) of evidence selected must:

- allow the learner to provide all the evidence required for the learning aim(s) and the associated assessment criteria at all grade levels
- allow the learner to produce evidence that is their own independent work
- allow a verifier to independently reassess the learner to check the assessor's decisions.

For example, when you are using performance evidence, you need to think about how supporting evidence can be captured through recordings, photographs or task sheets.

Centres need to take particular care that learners are enabled to produce independent work. For example, if learners are asked to use real examples, then best practice would be to encourage them to use their own or to give the group a number of examples that can be used in varied combinations.

Making valid assessment decisions

Authenticity of learner work

Once an assessment has begun, learners must not be given feedback on progress towards fulfilling the targeted criteria.

An assessor must assess only learner work that is authentic, i.e. learners' own independent work. Learners must authenticate the evidence that they provide for assessment through signing a declaration stating that it is their own work.

Assessors must ensure that evidence is authentic to a learner through setting valid assignments and supervising them during the assessment period. Assessors must take care not to provide direct input, instructions or specific feedback that may compromise authenticity.

Assessors must complete a declaration that:

- the evidence submitted for this assignment is the learner's own
- the learner has clearly referenced any sources used in the work
- they understand that false declaration is a form of malpractice.

Centres can use Pearson templates or their own templates to document authentication.

During assessment, an assessor may suspect that some or all of the evidence from a learner is not authentic. The assessor must then take appropriate action using the centre's policies for malpractice. Further information is given in *Section 7*.

Making assessment decisions using criteria

Assessors make judgements using the criteria. The evidence from a learner can be judged using all the relevant criteria at the same time. The assessor needs to make a judgement against each criterion that evidence is present and sufficiently comprehensive. For example, the inclusion of a concluding section may be insufficient to satisfy a criterion requiring 'evaluation'.

Assessors should use the following information and support in reaching assessment decisions:

- the *Essential information for assessment decisions* section in each unit gives examples and definitions related to terms used in the criteria
- the explanation of key terms in *Appendix 2*
- examples of assessed work provided by Pearson
- your Lead IV and assessment team's collective experience, supported by the standardisation materials we provide.

Pass and Merit criteria relate to individual learning aims. The Distinction criteria as a whole relate to outstanding performance across the unit. Therefore, criteria may relate to more than one learning aim (for example A.D1) or to several learning aims (for example DE.D3). Distinction criteria make sure that learners have shown that they can perform consistently at an outstanding level across the unit and/or that they are able to draw learning together across learning aims.

Dealing with late completion of assignments

Learners must have a clear understanding of the centre policy on completing assignments by the deadlines that you give them. Learners may be given authorised extensions for legitimate reasons, such as illness at the time of submission, in line with your centre policies.

For assessment to be fair, it is important that learners are all assessed in the same way and that some learners are not advantaged by having additional time or the opportunity to learn from others. Therefore, learners who do not complete assignments by your planned deadline or the authorised extension deadline may not have the opportunity to subsequently resubmit.

If you accept a late completion by a learner, then the assignment should be assessed normally when it is submitted using the relevant assessment criteria.

Issuing assessment decisions and feedback

Once the assessment team has completed the assessment process for an assignment, the outcome is a formal assessment decision. This is recorded formally and reported to learners.

The information given to the learner:

- must show the formal decision and how it has been reached, indicating how or where criteria have been met
- may show why attainment against criteria has not been demonstrated
- must not provide feedback on how to improve evidence
- must be validated by an IV before it is given to the learner.

Resubmission of improved evidence

An assignment provides the final assessment for the relevant learning aims and is normally a final assessment decision, except where the Lead IV approves one opportunity to resubmit improved evidence based on the completed assignment brief.

The Lead IV has the responsibility to make sure that resubmission is operated fairly. This means:

- checking that a learner can be reasonably expected to perform better through a second submission, for example that the learner has not performed as expected
- making sure that giving a further opportunity can be done in such a way that it does not give an unfair advantage over other learners, for example through the opportunity to take account of feedback given to other learners
- checking that the assessor considers that the learner will be able to provide improved evidence without further guidance and that the original evidence submitted remains valid.

Once an assessment decision has been given to the learner, the resubmission opportunity must have a deadline within 15 working days in the same academic year.

A resubmission opportunity must not be provided where learners:

- have not completed the assignment by the deadline without the centre's agreement
- have submitted work that is not authentic.

Retake of internal assessment

A learner who has not achieved the level of performance required to pass the relevant learning aims after resubmission of an assignment may be offered a single retake opportunity using a new assignment. The retake may only be achieved at a Pass.

The Lead Internal Verifier must only authorise a retake of an assignment in exceptional circumstances where they believe it is necessary, appropriate and fair to do so. For further information on offering a retake opportunity, you should refer to the *BTEC Centre Guide to Internal Assessment*. We provide information on writing assignments for retakes on our website (www.btec.co.uk/keydocuments).

Planning and record keeping

For internal processes to be effective, an assessment team needs to be well organised and keep effective records. The centre will also work closely with us so that we can quality assure that national standards are being satisfied. This process gives stakeholders confidence in the assessment approach.

The Lead IV must have an assessment plan, produced as a spreadsheet or using myBTEC. When producing a plan, the assessment team may wish to consider:

- the time required for training and standardisation of the assessment team
- the time available to undertake teaching and carry out assessment, taking account of when learners may complete external assessments and when quality assurance will take place
- the completion dates for different assignments
- who is acting as IV for each assignment and the date by which the assignment needs to be verified
- setting an approach to sampling assessor decisions though internal verification that covers all assignments, assessors and a range of learners
- how to manage the assessment and verification of learners' work so that they can be given formal decisions promptly
- how resubmission opportunities can be scheduled.

The Lead IV will also maintain records of assessment undertaken. The key records are:

- verification of assignment briefs
- learner authentication declarations
- assessor decisions on assignments, with feedback given to learners
- verification of assessment decisions.

Examples of records and further information are given in the *Pearson Quality Assurance Handbook*.

7 Administrative arrangements

Introduction

This section focuses on the administrative requirements for delivering a BTEC qualification. It will be of value to Quality Nominees, Lead IVs, Programme Leaders and Examinations Officers.

Learner registration and entry

Shortly after learners start the programme of learning, you need to make sure that they are registered for the qualification and that appropriate arrangements are made for internal and external assessment. You need to refer to the *Information Manual* for information on making registrations for the qualification and entries for external assessments.

Learners can be formally assessed only for a qualification on which they are registered. If learners' intended qualifications change, for example if a learner decides to choose a different pathway specialism, then the centre must transfer the learner appropriately.

Access to assessment

Both internal and external assessments need to be administered carefully to ensure that all learners are treated fairly, and that results and certification are issued on time to allow learners to progress to chosen progression opportunities.

Our equality policy requires that all learners should have equal opportunity to access our qualifications and assessments, and that our qualifications are awarded in a way that is fair to every learner. We are committed to making sure that:

- learners with a protected characteristic are not, when they are undertaking one of our qualifications, disadvantaged in comparison to learners who do not share that characteristic
- all learners achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Further information on access arrangements can be found in the Joint Council for Qualifications (JCQ) document *Access Arrangements, Reasonable Adjustments and Special Consideration for General and Vocational Qualifications*.

Administrative arrangements for internal assessment

Records

You are required to retain records of assessment for each learner. Records should include assessments taken, decisions reached and any adjustments or appeals. Further information can be found in the *Information Manual.* We may ask to audit your records so they must be retained as specified.

Reasonable adjustments to assessment

A reasonable adjustment is one that is made before a learner takes an assessment to ensure that they have fair access to demonstrate the requirements of the assessments. You are able to make adjustments to internal assessments to take account of the needs of individual learners. In most cases this can be achieved through a defined time extension or by adjusting the format of evidence. We can advise you if you are uncertain as to whether an adjustment is fair and reasonable. You need to plan for time to make adjustments if necessary.

Further details on how to make adjustments for learners with protected characteristics are given on our website in the document *Supplementary guidance for reasonable adjustment and special consideration in vocational internally-assessed units*.

Special consideration

Special consideration is given after an assessment has taken place for learners who have been affected by adverse circumstances, such as illness. You must operate special consideration in line with our policy (see previous paragraph). You can provide special consideration related to the period of time given for evidence to be provided or for the format of the assessment if it is equally valid. You may not substitute alternative forms of evidence to that required in a unit, or omit the application of any assessment criteria to judge attainment. Pearson can consider applications for special consideration in line with the policy.

Appeals against assessment

Your centre must have a policy for dealing with appeals from learners. These appeals may relate to assessment decisions being incorrect or assessment not being conducted fairly. The first step in such a policy could be a consideration of the evidence by a Lead IV or other member of the programme team. The assessment plan should allow time for potential appeals after assessment decisions have been given to learners. If there is an appeal by a learner, you must document the appeal and its resolution. Learners have a final right of appeal to Pearson but only if the procedures that you have put in place have not been followed. Further details are given in our policy *Enquiries and appeals about Pearson Vocational Qualifications*.

Administrative arrangements for external assessment

Entries and resits

For information on the timing of assessment and entries, please refer to the annual examinations timetable on our website.

Access arrangements requests

Access arrangements are agreed with Pearson before an assessment. They allow students with special educational needs, disabilities or temporary injuries to:

- access the assessment
- show what they know and can do without changing the demands of the assessment.

Access arrangements should always be processed at the time of registration. Learners will then know what type of arrangements are available in place for them.

Granting reasonable adjustments

For external assessment, a reasonable adjustment is one that we agree to make for an individual learner. A reasonable adjustment is defined for the individual learner and informed by the list of available access arrangements.

Whether an adjustment will be considered reasonable will depend on a number of factors, to include:

- the needs of the learner with the disability
- the effectiveness of the adjustment
- the cost of the adjustment; and
- the likely impact of the adjustment on the learner with the disability and other learners.

Adjustment may be judged unreasonable and not approved if it involves unreasonable costs, timeframes or affects the integrity of the assessment.

Special consideration requests

Special consideration is an adjustment made to a learner's mark or grade after an external assessment to reflect temporary injury, illness or other indisposition at the time of the assessment. An adjustment is made only if the impact on the learner is such that it is reasonably likely to have had a material effect on that learner being able to demonstrate attainment in the assessment.

Centres are required to notify us promptly of any learners that they believe have been adversely affected and request that we give special consideration. Further information can be found in the special requirements section on our website.

Conducting external assessments

Centres must make arrangement for the secure delivery of external assessments. External assessments for BTEC qualifications include examinations, set tasks and performance.

Each external assessment has a defined degree of control under which it must take place. Some external assessments may have more than one part and each part may have a different degree of control. We define degrees of control as follows.

High control

This is the completion of assessment in formal invigilated examination conditions.

Medium control

This is completion of assessment, usually over a longer period of time, which may include a period of controlled conditions. The controlled conditions may allow learners to access resources, prepared notes or the internet to help them complete the task.

Low control

These are activities completed without direct supervision. They may include research, preparation of materials and practice. The materials produced by learners under low control will not be directly assessed.

Further information on responsibilities for conducting external assessment is given in the document *Instructions for Conducting External Assessments*, available on our website.

Dealing with malpractice in assessment

Malpractice means acts that undermine the integrity and validity of assessment, the certification of qualifications, and/or that may damage the authority of those responsible for delivering the assessment and certification.

Pearson does not tolerate actions (or attempted actions) of malpractice by learners, centre staff or centres in connection with Pearson qualifications. Pearson may impose penalties and/or sanctions on learners, centre staff or centres where incidents (or attempted incidents) of malpractice have been proven.

Malpractice may arise or be suspected in relation to any unit or type of assessment within the qualification. For further details regarding malpractice and advice on preventing malpractice by learners, please see Pearson's *Centre Guidance: Dealing with Malpractice*, available on our website.

The procedures we ask you to adopt vary between units that are internally-assessed and those that are externally assessed.

Internally-assessed units

Centres are required to take steps to prevent malpractice and to investigate instances of suspected malpractice. Learners must be given information that explains what malpractice is for internal assessment and how suspected incidents will be dealt with by the centre. The *Centre Guidance: Dealing with Malpractice* document gives full information on the actions we expect you to take.

Pearson may conduct investigations if we believe that a centre is failing to conduct internal assessment according to our policies. The above document gives further information, examples and details the penalties and sanctions that may be imposed.

In the interests of learners and centre staff, centres need to respond effectively and openly to all requests relating to an investigation into an incident of suspected malpractice.

Externally-assessed units

External assessment means all aspects of units that are designated as external in this specification, including preparation for tasks and performance. For these assessments, centres must follow the JCQ procedures set out in the latest version of *JCQ Suspected Malpractice in Examinations and Assessments Policies and Procedures* (www.jcq.org.uk).

In the interests of learners and centre staff, centres need to respond effectively and openly to all requests relating to an investigation into an incident of suspected malpractice.

Learner malpractice

Heads of Centres are required to report incidents of any suspected learner malpractice that occur during Pearson external assessments. We ask that centres do so by completing a *JCQ Form M1* (available at www.jcq.org.uk/exams-office/malpractice) and emailing it and any accompanying documents (signed statements from the learner, invigilator, copies of evidence, etc.) to the Investigations Team at candidatemalpractice@pearson.com. The responsibility for determining appropriate sanctions or penalties to be imposed on learners lies with Pearson.

Learners must be informed at the earliest opportunity of the specific allegation and the centre's malpractice policy, including the right of appeal. Learners found guilty of malpractice may be disqualified from the qualification for which they have been entered with Pearson.

Teacher/centre malpractice

Heads of Centres are required to inform Pearson's Investigations Team of any incident of suspected malpractice by centre staff, before any investigation is undertaken. Heads of centres are requested to inform the Investigations Team by submitting a *JCQ Form M2(a)* (available at www.jcq.org.uk/exams-office/malpractice) with supporting documentation to pqsmalpractice@pearson.com. Where Pearson receives allegations of malpractice from other sources (for example Pearson staff or anonymous informants), the Investigations Team will conduct the investigation directly or may ask the head of centre to assist.

Incidents of maladministration (accidental errors in the delivery of Pearson qualifications that may affect the assessment of learners) should also be reported to the Investigations Team using the same method.

Heads of Centres/Principals/Chief Executive Officers or their nominees are required to inform learners and centre staff suspected of malpractice of their responsibilities and rights; see Section 6.15 of the *JCQ Suspected Malpractice in Examinations and Assessments Policies and Procedures* document.

Pearson reserves the right in cases of suspected malpractice to withhold the issuing of results and/or certificates while an investigation is in progress. Depending on the outcome of the investigation results and/or certificates may be released or withheld.

You should be aware that Pearson may need to suspend certification when undertaking investigations, audits and quality assurances processes. You will be notified within a reasonable period of time if this occurs.

Sanctions and appeals

Where malpractice is proven we may impose sanctions or penalties.

Where learner malpractice is evidenced, penalties may be imposed such as:

- mark reduction for external assessments
- disqualification from the qualification
- being barred from registration for Pearson qualifications for a period of time.

If we are concerned about your centre's quality procedures we may impose sanctions such as:

- working with you to create an improvement action plan
- requiring staff members to receive further training
- placing temporary blocks on your certificates
- placing temporary blocks on registration of learners
- debarring staff members or the centre from delivering Pearson qualifications
- suspending or withdrawing centre approval status.

The centre will be notified if any of these apply.

Pearson has established procedures for centres that are considering appeals against penalties and sanctions arising from malpractice. Appeals against a decision made by Pearson will normally be accepted only from heads of centres (on behalf of learners and/or members of staff) and from individual members (in respect of a decision taken against them personally). Further information on appeals can be found in our *Enquiries and Appeals* policy, which is on our website. In the initial stage of any aspect of malpractice, please notify the Investigations Team by email via pqsmalpractice@pearson.com who will inform you of the next steps.

Certification and results

Once a learner has completed all the required components for a qualification, even if final results for external assessments have not been issued, then the centre can claim certification for the learner, provided that quality assurance has been successfully completed. For the relevant procedures please refer to our *Information Manual*. You can use the information provided on qualification grading to check overall qualification grades.

Results issue

After the external assessment session, learner results will be issued to centres. The result will be in the form of a grade. You should be prepared to discuss performance with learners, making use of the information we provide and post-results services.

Post-assessment services

Once results for external assessments are issued, you may find that the learner has failed to achieve the qualification or to attain an anticipated grade. It is possible to transfer or reopen registration in some circumstances. The *Information Manual* gives further information.

Changes to qualification requests

Where a learner who has taken a qualification wants to resit an externally-assessed unit to improve their qualification grade, you firstly need to decline their overall qualification grade. You may decline the grade before the certificate is issued. For a learner receiving their results in August, you should decline the grade by the end of September if the learner intends to resit an external assessment.

Additional documents to support centre administration

As an approved centre you must ensure that all staff delivering, assessing and administering the qualifications have access to this documentation. These documents are reviewed annually and are reissued if updates are required.

- *Pearson Quality Assurance Handbook*: this sets out how we will carry out quality assurance of standards and how you need to work with us to achieve successful outcomes.
- *Information Manual*: this gives procedures for registering learners for qualifications, transferring registrations, entering for external assessments and claiming certificates.
- *Lead Examiners' Reports*: these are produced after each series for each external assessment and give feedback on the overall performance of learners in response to tasks or questions set.
- *Instructions for the Conduct of External Assessments*: this explains our requirements for the effective administration of external assessments, such as invigilation and submission of materials.
- *Regulatory policies*: our regulatory policies are integral to our approach and explain how we meet internal and regulatory requirements. We review the regulated policies annually to ensure that they remain fit for purpose. Policies related to this qualification include:
  - adjustments for candidates with disabilities and learning difficulties, access arrangements and reasonable adjustments for general and vocational qualifications
  - age of learners
  - centre guidance for dealing with malpractice
  - recognition of prior learning and process.

This list is not exhaustive and a full list of our regulatory policies can be found on our website.

8 Quality assurance

Centre and qualification approval

As part of the approval process, your centre must make sure that the resource requirements listed below are in place before offering the qualification.

- Centres must have appropriate physical resources (for example equipment, IT, learning materials, teaching rooms) to support the delivery and assessment of the qualification.
- Staff involved in the assessment process must have relevant expertise and/or occupational experience.
- There must be systems in place to ensure continuing professional development for staff delivering the qualification.
- Centres must have in place appropriate health and safety policies relating to the use of equipment by learners.
- Centres must deliver the qualification in accordance with current equality legislation.
- Centres should refer to the teacher guidance section in individual units to check for any specific resources required.

Continuing quality assurance and standards verification

On an annual basis, we produce the *Pearson Quality Assurance Handbook*. It contains detailed guidance on the quality processes required to underpin planning for delivery including appropriate employer involvement, and for robust assessment and internal verification.

The key principles of quality assurance are that:

- a centre delivering BTEC programmes must be an approved centre, and must have approval for the programmes or groups of programmes that it is delivering
- 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, through online standardisation, 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, for the 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. We will make sure that each centre follows best practice and employs appropriate technology to support quality-assurance processes, where practicable. We work to support centres and seek to make sure that our quality-assurance processes do not place undue bureaucratic processes on centres. We monitor and support centres in the effective operation of assessment and quality assurance.

The methods we use to do this for BTEC Level 3 include:

- making sure that all centres complete appropriate declarations at the time of approval
- undertaking approval visits to centres
- making sure that centres have effective teams of assessors and verifiers who are trained to undertake assessment
- assessment sampling and verification, through requested samples of assessments, completed assessed learner work and associated documentation
- an overarching review and assessment of a centre's strategy for delivering and quality assuring its BTEC programmes, for example making sure that synoptic units are placed appropriately in the order of delivery of the programme.

Centres that do not fully address and maintain rigorous approaches to delivering, assessing and quality assurance cannot seek certification for individual programmes or for all BTEC Level 3 programmes. An approved centre must make certification claims only when authorised by us and strictly in accordance with requirements for reporting.

Centres that do not comply with remedial action plans may have their approval to deliver qualifications removed.

9 Understanding the qualification grade

Awarding and reporting for the qualification

This section explains the rules that we apply in awarding a qualification and in providing an overall qualification grade for each learner. It shows how all the qualifications in this sector are graded.

The awarding and certification of these qualifications will comply with regulatory requirements.

Eligibility for an award

In order to be awarded a qualification, a learner must complete all units, achieve a near pass (N) or above in all external units and a pass or above in all mandatory units unless otherwise specified. Refer to the structure in *Section 2*.

To achieve any qualification grade, learners must:

- complete and **have an outcome** (D, M, P, N or U) for all units within a valid combination
- achieve the **required units at pass or above** shown in *Section 2*, and for the Diploma achieve a minimum of 600 GLH and Extended Diploma achieve a minimum 900 GLH at pass or above (or N or above in external units)
- achieve the **minimum number of points** at a grade threshold.

It is the responsibility of a centre to ensure that a correct unit combination is adhered to. Learners who do not achieve the required minimum grade (N or P) in units shown in the structure will not achieve a qualification.

Learners who do not achieve sufficient points for a qualification or who do not achieve all the required units may be eligible to achieve a smaller qualification in the same suite provided they have completed and achieved the correct combination of units and met the appropriate qualification grade points threshold.

Calculation of the qualification grade

The final grade awarded for a qualification represents an aggregation of a learner's performance across the qualification. As the qualification grade is an aggregate of the total performance, there is some element of compensation in that a higher performance in some units may be balanced by a lower outcome in others.

In the event that a learner achieves more than the required number of optional units, the mandatory units along with the optional units with the highest grades will be used to calculate the overall result, subject to the eligibility requirements for that particular qualification title.

BTEC Nationals are Level 3 qualifications and are awarded at the grade ranges shown in the table below.

Qualification	Available grade range
Certificate, Extended Certificate, Foundation Diploma	P to D*
Diploma	PP to D*D*
Extended Diploma	PPP to D*D*D*

The *Calculation of qualification grade* table, shown further on in this section, shows the minimum thresholds for calculating these grades. The table will be kept under review over the lifetime of the qualification. The most up to date table will be issued on our website.

Pearson will monitor the qualification standard and reserves the right to make appropriate adjustments.

Learners who do not meet the minimum requirements for a qualification grade to be awarded will be recorded as Unclassified (U) and will not be certificated. They may receive a Notification of Performance for individual units. The *Information Manual* gives full information.

Points available for internal units

The table below shows the number of **points** available for internal units. For each internal unit, points are allocated depending on the grade awarded.

	Unit size		
	60 GLH	**90 GLH**	**120 GLH**
U	0	0	0
Pass	6	9	12
Merit	10	15	20
Distinction	16	24	32

Points available for external units

Raw marks from the external units will be awarded **points** based on performance in the assessment. The table below shows the **minimum number of points** available for each grade in the external units.

	Unit size	
	90 GLH	**120 GLH**
U	0	0
Near Pass	6	8
Pass	9	12
Merit	15	20
Distinction	24	32

Pearson will automatically calculate the points for each external unit once the external assessment has been marked and grade boundaries have been set. For more details about how we set grade boundaries in the external assessment please go to our website.

Claiming the qualification grade

Subject to eligibility, Pearson will automatically calculate the qualification grade for your learners when the internal unit grades are submitted and the qualification claim is made. Learners will be awarded qualification grades for achieving the sufficient number of points within the ranges shown in the relevant *Calculation of Qualification Grade* table for the cohort.

Calculation of qualification grade

Applicable for registration from 1 September 2019.

Foundation Diploma		Extended Diploma	
540 GLH		**1080 GLH**	
Grade	**Points threshold**	**Grade**	**Points threshold**
U	0	U	0
P	54	PPP	108
		MPP	124
		MMP	140
M	78	MMM	156
		DMM	176
		DDM	196
D	108	DDD	216
		D*DD	234
		D*D*D	252
D*	138	D*D*D*	270

The table is subject to review over the lifetime of the qualification. The most up-to-date version will be issued on our website.

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Arboriculture)

Example 1: Achievement of an Extended Diploma with a PPP grade

	GLH	Type (Int/Ext)	Grade	Unit points	
Unit 1	120	Ext	Pass	12	← The learner has achieved N or higher in Units 1, 2 and 3, and P or higher in Units 6, 9 and 13.
Unit 2	120	Ext	Pass	12	
Unit 3	120	Ext	Pass	12	
Unit 4	60	Int	Merit	10	
Unit 5	60	Int	Pass	6	
Unit 6	60	Int	Pass	6	
Unit 7	60	Int	Merit	10	
Unit 8	60	Int	U	0	
Unit 9	60	Int	Pass	6	
Unit 10	60	Int	Merit	10	
Unit 11	60	Int	Pass	6	
Unit 12	60	Int	Pass	6	
Unit 13	60	Int	Pass	6	←
Unit 14	60	Int	Pass	6	
Unit 15	60	Int	Pass	6	
Totals	**1080**		**PPP**	**114**	

The learner has sufficient points for a PPP grade.

Example 2: Achievement of an Extended Diploma with a DDD grade

	GLH	Type (Int/Ext)	Grade	Unit points
Unit 1	120	Ext	Near Pass	8
Unit 2	120	Ext	Merit	20
Unit 3	120	Ext	Distinction	32
Unit 4	60	Int	Merit	10
Unit 5	60	Int	Distinction	16
Unit 6	60	Int	Distinction	16
Unit 7	60	Int	Distinction	16
Unit 8	60	Int	Distinction	16
Unit 9	60	Int	Distinction	16
Unit 10	60	Int	Merit	10
Unit 11	60	Int	Merit	10
Unit 12	60	Int	Distinction	16
Unit 13	60	Int	Distinction	16
Unit 14	60	Int	Pass	6
Unit 15	60	Int	Distinction	16
Totals	**1080**		**DDD**	**224**

The learner has sufficient points for a DDD grade.

Example 3: An Unclassified result for an Extended Diploma

	GLH	Type (Int/Ext)	Grade	Unit points
Unit 1	120	Ext	Merit	20
Unit 2	120	Ext	Merit	10
Unit 3	120	Ext	Pass	12
Unit 4	60	Int	Distinction	16
Unit 5	60	Int	Pass	6
Unit 6	60	Int	Merit	10
Unit 7	60	Int	Distinction	16
Unit 8	60	Int	Merit	10
Unit 9	60	Int	Pass	6
Unit 10	60	Int	Merit	10
Unit 11	60	Int	Unclassified	0
Unit 12	60	Int	Unclassified	0
Unit 13	60	Int	Merit	10
Unit 14	60	Int	Unclassified	0
Unit 15	60	Int	Unclassified	0
Totals	**1080**		**U**	**126**

The learner has 240 GLH at U.

The learner has sufficient points for an MPP grade and has achieved N or higher in Units 1, 2 and 3, and P or higher in Units 6, 9 and 13, but has not met the minimum requirement for 900 GLH at Pass or above.

Pearson BTEC Level 3 National Extended Diploma in Forestry and Arboriculture (Forestry)

Example 1: Achievement of an Extended Diploma with a PPP grade

	GLH	Type (Int/Ext)	Grade	Unit points	
Unit 1	120	Ext	Pass	12	◄ The learner has achieved N or higher in Units 1, 2 and 3, and P or higher in Units 6, 9 and 16.
Unit 2	120	Ext	Pass	12	
Unit 3	120	Ext	Pass	12	
Unit 4	60	Int	Merit	10	
Unit 5	60	Int	Pass	6	
Unit 6	60	Int	Pass	6	
Unit 7	60	Int	Merit	10	
Unit 8	60	Int	Unclassified	0	
Unit 9	60	Int	Pass	6	
Unit 10	60	Int	Merit	10	
Unit 14	60	Int	Pass	6	
Unit 15	60	Int	Pass	6	
Unit 16	60	Int	Merit	10	◄
Unit 17	60	Int	Pass	6	
Unit 18	60	Int	Pass	6	
Totals	**1080**		**PPP**	**118**	

The learner has sufficient points for a PPP grade.

Example 2: Achievement of an Extended Diploma with a DDD grade

	GLH	Type (Int/Ext)	Grade	Unit points
Unit 1	120	Ext	Merit	20
Unit 2	120	Ext	Near Pass	8
Unit 3	120	Ext	Distinction	32
Unit 4	60	Int	Merit	10
Unit 5	60	Int	Distinction	16
Unit 6	60	Int	Distinction	16
Unit 7	60	Int	Distinction	16
Unit 8	60	Int	Distinction	16
Unit 9	60	Int	Distinction	16
Unit 10	60	Int	Merit	10
Unit 14	60	Int	Merit	10
Unit 15	60	Int	Distinction	16
Unit 16	60	Int	Distinction	16
Unit 17	60	Int	Pass	6
Unit 18	60	Int	Distinction	16
Totals	**1080**		**DDD**	**224**

The learner has sufficient points for a DDD grade.

Example 3: An Unclassified result for an Extended Diploma

	GLH	Type (Int/Ext)	Grade	Unit points
Unit 1	120	Ext	Merit	20
Unit 2	120	Ext	Merit	10
Unit 3	120	Ext	Pass	12
Unit 4	60	Int	Distinction	16
Unit 5	60	Int	Pass	6
Unit 6	60	Int	Merit	10
Unit 7	60	Int	Distinction	16
Unit 8	60	Int	Merit	10
Unit 9	60	Int	Pass	6
Unit 10	60	Int	Merit	10
Unit 14	60	Int	Unclassified	0
Unit 15	60	Int	Unclassified	0
Unit 16	60	Int	Merit	10
Unit 17	60	Int	Unclassified	0
Unit 18	60	Int	Unclassified	0
Totals	**1080**		**U**	**126**

The learner has 240 GLH at U.

The learner has sufficient points for an MPP grade and has achieved N or higher in Units 1, 2 and 3, and P or higher in Units 6, 9 and 16, but has not met the minimum requirement for 900 GLH at Pass or above.

10 Resources and support

Our aim is to give you a wealth of resources and support to enable you to deliver BTEC National qualifications with confidence. On our website you will find a list of resources to support teaching and learning, and professional development.

Support for setting up your course and preparing to teach

Specification

This **specification** (for teaching from September 2019) includes details on the administration of qualifications and information on all the units for the qualification.

Delivery Guide

This free guide gives you important advice on how to choose the right course for your learners and how to ensure you are fully prepared to deliver the course. It explains the key features of BTEC Nationals (for example employer involvement and employability skills). It also covers guidance on assessment (internal and external) and quality assurance. The guide tells you where you can find further support and gives detailed unit-by-unit delivery guidance. It includes teaching tips and ideas, assessment preparation and suggestions for further resources.

Schemes of work

Free sample schemes of work are provided for each mandatory unit. These are available in Word™ format for ease of customisation.

Curriculum models

These show how the BTECs in the suite fit into a 16–19 study programme, depending on their size and purpose. The models also show where other parts of the programme, such as work experience, maths and English, tutorial time and wider study, fit alongside the programme.

Study skills activities

A range of case studies and activities is provided; they are designed to help learners develop the study skills they need to successfully complete their BTEC course. The case studies and activities are provided in Word™ format for easy customisation.

myBTEC

myBTEC is a free, online toolkit that lets you plan and manage your BTEC provision from one place. It supports the delivery, assessment and quality assurance of BTECs in centres and supports teachers with the following activities:

- checking that a programme is using a valid combination of units
- creating and verifying assignment briefs (including access to a bank of authorised assignment briefs that can be customised)
- creating assessment plans and recording assessment decisions
- tracking the progress of every learner throughout their programme.

To find out more about myBTEC, visit the myBTEC page on the support services section of our website. We will add the new BTEC National specifications to myBTEC as soon as possible.

Support for teaching and learning

Pearson Learning Services provides a range of engaging resources to support BTEC Nationals, including introductory guides to the Next Generation BTEC National approach to learning.

Teaching and learning resources are also available from a number of other publishers. Details of Pearson's own resources and of all endorsed resources can be found on our website.

Support for assessment

Sample assessment materials for externally-assessed units

Sample assessments are available for the Pearson-set units. One copy of each of these assessments can be downloaded from the website/available in print. For each suite, an additional sample for one of the Pearson-set units is also available, allowing your learners further opportunities for practice.

Further sample assessments will be made available through our website on an ongoing basis.

Sample assessment materials for internally-assessed units

We do not prescribe the assessments for the internally-assessed units. Rather, we allow you to set your own, according to your learners' preferences and to link with your local employment profile.

We do provide a service in the form of Authorised Assignment Briefs, which are approved by Pearson Standards Verifiers. They are available via our website or free on myBTEC.

Sample marked learner work

To support you in understanding the expectation of the standard at each grade, examples of marked learner work at PM/MD grades are linked to the Authorised Assignment Briefs.

Training and support from Pearson

People to talk to

There are many people who are available to support you and provide advice and guidance on delivery of your BTEC Nationals. These include:

- Subject Advisors – available for all sectors. They understand all Pearson qualifications in their sector and so can answer sector-specific queries on planning, teaching, learning and assessment
- Standards Verifiers – they can support you with preparing your assignments, ensuring that your assessment plan is set up correctly, and support you in preparing learner work and providing quality assurance through sampling
- Curriculum Development Managers (CDMs) – they are regionally based and have a full overview of the BTEC qualifications and of the support and resources that Pearson provides. CDMs often run network events
- Customer Services – the 'Support for You' section of our website gives the different ways in which you can contact us for general queries. For specific queries, our service operators can direct you to the relevant person or department.

Training and professional development

Pearson provides a range of training and professional development events to support the introduction, delivery, assessment and administration of BTEC National qualifications. These sector-specific events, developed and delivered by specialists, are available both face to face and online.

'Getting Ready to Teach'

These events are designed to get teachers ready for delivery of the BTEC Nationals. They include an overview of the qualifications' structures, planning and preparation for internal and external assessment, and quality assurance.

Teaching and learning

Beyond the 'Getting Ready to Teach' professional development events, there are opportunities for teachers to attend sector- and role-specific events. These events are designed to connect practice to theory; they provide teacher support and networking opportunities with delivery, learning and assessment methodology.

Details of our training and professional development programme can be found on our website.

Appendix 1 Links to industry standards

BTEC Nationals have been developed in consultation with industry and appropriate sector bodies to ensure that the qualification content and approach to assessment aligns closely to the needs of employers. Where they exist, and are appropriate, National Occupational Standards (NOS) and professional body standards have been used to establish unit content.

In the forestry and arboriculture sector, the following approaches have been used.

- The mandatory content has been mapped to NOS to reflect the essential skills and knowledge needed for entry to employment.

Appendix 2 Glossary of terms used for internally-assessed units

This is a summary of the key terms used to define the requirements in the units.
This is a summary of the key terms used to define the requirements in the units.

Term	Definition
Analyse	Learners present the outcome of methodical and detailed examination, either: • breaking down a theme, topic or situation in order to interpret and study the interrelationships between the parts; and/or • of information or data to interpret and study key trends and interrelationships. Analysis can be through performance, practice, written or, less commonly, verbal presentation.
Apply	Learners complete practical tasks drawing on knowledge of concepts and processes.
Assess	Learners present a careful consideration of varied factors or events that apply to a specific situation, or identify those which are the most important or relevant and arrive at a conclusion.
Carry out	Learners demonstrate skills through practical activities, in line with certain requirements. Learners do this in order to complete an identified activity or to demonstrate personal achievement for an audience.
Compare	Learners identify the main factors relating to two or more items/situations or aspects of a subject that is extended to explain the similarities, differences, advantages and disadvantages. This is used to show depth of knowledge through selection and isolation of characteristics.
Demonstrate	Learners' work, performance or practice evidences the ability to carry out and apply knowledge, understanding and/or skills in a practical situation.
Develop	Learners acquire and apply skills and understanding through practical activities that involve the use of concepts, processes or techniques to expand or progress something.
Discuss	Learners consider different aspects of: • a theme or topic • how they interrelate; and • the extent to which they are important. A conclusion is not required.

Term	Definition
Evaluate	Learners' work draws on varied information, themes or concepts to consider aspects such as: • strengths or weaknesses • advantages or disadvantages • alternative actions • relevance or significance. Learners' enquiries should lead to a supported judgement showing relationship to its context. This will often be in a conclusion. Evidence of explanations could be through visual explanations with annotations, as well as written work, presentation, performance or practice.
Examine	Learners select and apply knowledge to less familiar contexts.
Explain	Learners' work shows clear detail and gives reasons and/or evidence to support an opinion, view or argument. It could show how conclusions are drawn (arrived at). Learners show that they comprehend the origins, functions and objectives of a subject, and its suitability for purpose.
Explore	Learners apply their skills and/or knowledge in contexts involving practical research or investigation.
Investigate	Learners' application of knowledge is based on personal research and development.
Justify	Learners give reasons or evidence to: • support an opinion • prove something right or reasonable.
Perform	Learners demonstrate a range of skills required to complete a given activity.
Plan	Learners create a way of doing a task or series of tasks to achieve specific requirements or objectives, showing progress from start to finish.
Produce	Learners' knowledge, understanding and/or skills are applied to develop a particular type of evidence, for example a proposal, plan, product, service or report.
Reflect	Learners consider their own performance and/or skills and development in relation to a specific scenario or scenarios and/or wider context(s). This may include feedback from others. There is often a requirement for learners to identify strengths and areas for improvement, along with a personal development or action plan.

Term	Definition
Review	Learners make a formal assessment of work produced. The assessment allows learners to appraise existing information or prior events, and reconsider information with the intention of making changes, if necessary.
Select	Learners choose the best or most suitable option, whether this is of materials, techniques, equipment or processes. The options and choices should be based on specific criteria.
Understand	Learners demonstrate knowledge related to defined situations.
Undertake	Learners demonstrate skills through practical activities, often referring to given processes or techniques.

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