

BTEC Level 2 Technical Diploma in **AGRICULTURE**



SPECIFICATION

First teaching: September 2018 | First certification: Summer 2019

ISSUE 2



Pearson BTEC Level 2 Technical Diploma in Agriculture

Specification

First teaching September 2018

Issue 2

Edexcel, BTEC and LCCI qualifications

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This specification is Issue 2. Key changes are listed in the summary table on the page after next of the document. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson website: qualifications.pearson.com

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Welcome

With a track record built over 30 years of learner success, BTEC qualifications are widely recognised and respected. They provide progression to the workplace, either directly or via study at higher levels. Proof comes from YouGov research, which shows that 62 per cent of large companies have recruited employees with BTEC qualifications.

Why are BTECs so successful?

BTECs embody a fundamentally learner-centred approach to the curriculum, with a flexible, unit-based structure. In these new BTEC Level 2 Technicals, the focus is on the development of technical, practical and transferable work-related skills, and sector-specific knowledge. The development of these skills is key for learners to progress to work or to an Apprenticeship.

When creating the BTEC Level 2 Technicals, we worked with employers to ensure that the qualifications meet their needs. Employers are looking for recruits with the appropriate technical knowledge, and technical and transferable skills essential for employment.

The BTEC Level 2 Technicals meet these requirements through:

- a range of occupationally-related qualifications, each with a clear purpose, so that there is a qualification to suit each learner's plan for career progression
- up-to-date content that is closely aligned with employers' needs for a skilled future workforce
- assessments chosen to help learners progress to the next stage. This means that all assessments are set by the centre to meet local needs. This ensures that there is a core of skills and understanding common to all learners.

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

A word to learners...

BTEC Level 2 Technicals will demand a lot of practical work from you. You will need to:

- complete a range of units
- be organised
- take some assessments that Pearson will set and mark
- take other assessments that will demonstrate your technical and practical skills
- 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 go on to work or to an Apprenticeship – success in your BTEC Level 2 Technical qualification will help you to progress to the next stage in your life.

Good luck, and we hope you enjoy your course.

Collaborative development

Learners completing their BTEC Level 2 Technicals will be aiming to go on to employment or to an Apprenticeship. It was essential, therefore, that we developed these qualifications in close collaboration with experts from professional bodies and businesses, and with the providers who will be delivering the qualifications. We are grateful to all the further education lecturers, tutors, 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 further education providers that have worked with us include the Royal Association of British Dairy Farmers (RABDF).

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

Summary of Pearson BTEC Level 2 Technical Diploma in Agriculture specification Issue 2 changes

Summary of changes made between the previous issue and this current issue	Page number
<i>Unit 1: Introduction to Working in Land-based Industries</i> and <i>Unit 2: Introduction to Plant and Soil Science</i> have been changed from being externally-assessed to being internally-assessed.	Pages 13-39
The wording in <i>Section 7 Teacher/centre malpractice</i> has been updated to clarify suspension of certification in certain circumstances.	Pages 141, 142
The wording under <i>Section 9 Understanding the qualification grade</i> has been updated to clarify current practice in ensuring maintenance and consistency of qualification standards.	Page 146

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Pearson BTEC Level 2 Technicals

Introduction

BTEC Level 2 Technicals are intermediate qualifications for post-16 learners who want to specialise in a specific occupation, occupational area or technical role. They prepare learners for work or an Apprenticeship by giving them the opportunity to develop sector-specific knowledge, technical and practical skills, and to apply these skills in work-related environments. The qualifications also provide progression to Level 3 Tech Level qualifications.

Developed in close conjunction with leading employers, BTEC Level 2 Technicals develop transferable workplace skills, such as good communication and the ability to work in a team, which employers have identified as essential for gaining employment in the sector and for progression once the learner is working.

At the core of these qualifications is the concept of preparing young people for the working world. Through practical activities and occupationally-fit-for-purpose assessments, learners will gain the skills and behaviours needed for sustainable employment.

BTEC Level 2 Technicals are designed to be used flexibly, depending on their size and scope:

- as part of a full-time 16–19 study programme, alongside mathematics and English GCSEs and/or Functional Skills, work placement and enrichment activities
- as the technical qualification within an Apprenticeship or off-the-job training for those already in work
- as a roll-on, roll-off programme for those entering an Apprenticeship or employment.

These qualifications are not eligible for performance tables in England.

This specification contains the information you need to deliver the Pearson BTEC Level 2 Technical Diploma in Agriculture (QN 603/1907/0). The specification signposts you to additional handbooks and policies. It includes all the units for this qualification.

1 Pearson BTEC Level 2 Technical Diploma in Agriculture

Purpose

Who is the qualification for?

This qualification is for you if you want to start a career working in agriculture. It is designed for post-16 students and can be taken as part of a wider study programme. It is an ideal qualification if you are intending to progress directly to employment within the agricultural sector, or to an agricultural Apprenticeship.

What does the qualification cover?

This qualification has been developed in consultation with employers within the agricultural sector to ensure it enables you to learn the skills and behaviours that will give you the best opportunity to be successful when applying for work.

There are **five mandatory units** plus you will choose **two from four optional units** that relate directly to the skills, knowledge and behaviours expected by employers in the agricultural sector. The areas you cover include:

- Unit 1: Introduction to Working in Land-based Industries
- Unit 2: Introduction to Plant and Soil Science
- Unit 3: Agriculture Work Placement
- Unit 4: Machinery Operations in Agriculture
- Unit 9: Farming and Agricultural Estate Maintenance.

Learners are required to add to two from four optional units:

- Unit 5: Livestock Health
- Unit 6: Livestock Husbandry
- Unit 7: Crop Production
- Unit 8: Forage and Grass Crop Production.

You will enhance your broader skills in literacy and numeracy, which will be invaluable in supporting progression in other areas. In addition, you will develop transferable technical and practical skills in communication (working with colleagues, customers and clients), and research and project work (giving you an opportunity to demonstrate your reflective practice by suggesting alternative approaches to a problem).

What could this qualification lead to?

Achieving this qualification will give you an advantage when applying for a job in the agricultural sector. The types of role you will be supported to progress to include:

- farm assistant
- livestock and/or crops operative.

When studied as part of a full study programme, this qualification also gives you a sound basis to progress further in the agricultural sector to a Level 3 qualification such as a Pearson BTEC Level 3 National Diploma in Agriculture.

About the agriculture sector

The agricultural sector has around 150,000 businesses and 660,000 employees. It is a diverse industry with a wide range of progression and job opportunities, which vary from managing livestock, such as dairy cows, cattle for beef, sheep for wool and lamb, pigs and poultry, to managing crops such as wheat, oats, peas, oilseed rape and grass for livestock. There is now a greater demand for reliable, responsible and motivated people who can combine technical knowledge with practical skills.

2 Structure

Total Qualification Time (TQT)

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 tutors and assessors in teaching, supervising and invigilating learners.

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

The Pearson BTEC Level 2 Technical Diploma in Agriculture is a qualification that has:

- Total Qualification Time: 565 hours
- Guided Learning: 360 hours.

Centres should take note of these hours in planning their programme but should also use their professional judgement to determine the provision of guided learning and study time across the units.

Qualification structure

Learners are required to complete and achieve all mandatory units and two optional units in the qualification.

Pearson BTEC Level 2 Technical Diploma in Agriculture				
Unit number	Unit title	GLH	Type	How assessed
1	Introduction to Working in Land-based Industries	60	Mandatory	Internal
2	Introduction to Plant and Soil Science	60	Mandatory	Internal
3	Agriculture Work Placement	60	Mandatory	Internal
4	Machinery Operations in Agriculture	60	Mandatory	Internal
5	Livestock Health	30	Optional	Internal
6	Livestock Husbandry	30	Optional	Internal
7	Crop Production	30	Optional	Internal
8	Grass and Forage Crop Production	30	Optional	Internal
9	Farming and Agricultural Estate Maintenance	60	Mandatory	Internal Synoptic

This qualification has 83.3% mandatory content and 16.66% optional content.

These qualifications are not eligible for performance tables in England.

Qualification and unit content

Pearson has developed the content of this qualification in collaboration with employers and representatives from relevant professional bodies and further education providers. In this way, we have ensured that content is up to date and that it includes the knowledge, technical and practical skills and behaviours required to work in the sector and occupational area.

Eighty-three per cent of the content in this qualification is mandatory, which provides a balance of breadth and depth, ensuring that all learners develop the technical and practical skills required in the occupational area. Learners are then given the opportunity to develop a range of transferable skills and attributes expected by employers. It is expected that learners will apply their learning to relevant employment and sector contexts during delivery, and that they will have opportunities to engage meaningfully with employers.

BTECs 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 practical, work-related tasks that encourage the development of appropriate work-related behaviours (the affective domain) and transferable skills. Transferable skills are those such as communication, teamwork, planning and completing tasks to a high standard, all of which are valued in the workplace.

Our approach provides rigour and balance and promotes the ability to apply learning immediately in new contexts.

Some of the units in this 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 this qualification in, subject to confirmation by your Standards Verifier.

Assessment

Assessment is designed to fit the purpose and objective of the qualification. It includes a range of assessment types and styles suited to skills and occupationally-based qualifications at this level.

Internal assessment

Units 1, 2, 3, 4, 5, 6, 7, 8 and 9 are assessed through internal assessment. Internal assessment allows learners to apply technical knowledge and demonstrate mastery of practical and technical skills through realistic tasks and activities. This style of assessment promotes deep learning through ensuring the connection between knowledge and practice.

Internal assessment is through assignments that are subject to external standards verification. We provide suggestions in each unit for setting assignments. This means that you can adapt materials to your local contexts and assess assignments that provide the valid and rigorous final assessment for each unit.

You will make grading decisions based on the requirements and supporting guidance given in the units. Learners must achieve all the internally-assessed units at Pass grade or above to achieve the qualification. For further information on internal assessment, including resubmissions, see *Section 6 Internal assessment*.

Internal synoptic assessment

There is one internally-assessed unit that provides the main synoptic assessment for this qualification. This synoptic assessment is designed to take place towards the end of the programme and draws on the learning throughout. The design of this assessment ensures that there is sufficient stretch and challenge, enabling the assessment of sector-related knowledge and technical and practical skills at the end of the learning period.

The synoptic assessment for this qualification is based on *Unit 9: Farming and Agricultural Estate Maintenance* and takes the form of a practical demonstration of an outdoor maintenance duties project that requires learners to consider and select content that will enable them to apply their knowledge and skills from Units 1, 2, 3, 4, 5, 6, 7 and 8 in an integrated way to a realistic work situation. For Unit 9, learners undertake practical selection, use and storage of tools and equipment to install and repair boundaries, surfaces and/or structures. This draws together underpinning knowledge of maintenance methods and techniques, along with the practical skills of repair and installation in different situations.

Learners approach their mostly outdoor estate maintenance duties project having completed their study of key land-based working practices and essential plant and soil science in *Unit 1: Introduction to Working in Land-based Industries* and *Unit 2: Introduction to Plant and Soil Science*. They will utilise the skills of responding to estate habitat work and use of materials around the estate as developed in *Unit 4: Machinery Operations in Agriculture*, as well as the practical skills needed to work with others around an agricultural estate through their learning from *Unit 5: Livestock Health*, *Unit 6: Livestock Husbandry* and/or *Unit 7: Crop Production*. Learners' completion of real-life working, as required by *Unit 3: Agriculture Work Placement*, means they will use the experience and understanding of working in and around an estate environment.

In delivering the unit, you need to encourage learners to draw on their broader learning so that they are prepared for the assessment.

Language of assessment

Assessment of the internally-assessed units for this qualification will be available in English. All learner work must be in English. A learner taking the qualification may be assessed in British Sign Language where it is permitted for the purpose of reasonable adjustment. For information on reasonable adjustments see *Section 7 Administrative arrangements*.

Grading of the qualification

Achievement in the qualification requires a demonstration of depth of study in each unit, assured acquisition of the practical skills required for employment in the specific sector and successful development of transferable skills.

Units are assessed using a grading scale of Distinction, Merit, Pass and Unclassified. All units in the qualification contribute proportionately to the overall qualification grade.

The qualification is graded using a scale of PP to DD. Please see *Section 9 Understanding the qualification grade* 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.

Employer involvement

Employer involvement in the delivery and/or assessment of technical qualifications provides a clear 'line of sight' to work, enriches learning, raises the credibility of the qualification in the eyes of employers, parents and learners, and furthers collaboration between the learning and skills sector and industry.

You need to ensure that all learners have the opportunity to undertake meaningful activity involving employers during their course.

Examples of 'meaningful activity' include:

- structured work experience or work placements that develop skills and knowledge relevant to the qualification/industry
- project(s), exercise(s) and/or assessment(s)/examination(s) set with input from industry practitioner(s)
- units delivered or co-delivered by an industry practitioner(s); this could take the form of masterclasses or guest lectures
- industry practitioners operating as 'expert witnesses' who contribute to the assessment of a learner's work of practice, operating within a specified assessment framework; this may be a specific project(s), exercise(s) or all assessments for a qualification.

Meaningful employer involvement, as defined above, must be with employers from the land-based sector and should contribute significantly to at least one mandatory unit.

For this qualification, *Unit 3: Agriculture Work Placement* has specified mandatory requirements for employer involvement in delivery and/or assessment. This unit requires learners to spend 75 hours in a real working environment. Learners must have a work placement to facilitate this. Please see the unit for information on the requirements for work placement. Suggested evidence records for the work placement can be found on the Pearson website.

We have also provided suggestions, within the units, on how employers could become involved in the delivery and/or assessment of this qualification.

These are suggestions only and there will be other possibilities at local level. Centres may choose to use other approaches but must ensure that they meet the requirement for meaningful employer involvement as defined above. Centres must have an employer involvement plan in place at the start of the programme. It must detail their approach to employer involvement and how it will add value to the delivery and assessment of the qualification.

Each centre's approach to employer involvement will be monitored in two ways. It will be monitored at centre level as part of the annual quality-management review process and captured as part of the standards verification 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 also be monitored 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 that additional activities can be scheduled where necessary so that learners are not disadvantaged, see *Section 8 Quality assurance*.

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 internal unit in the specification is set out in a similar way.

This section explains how the units work. It is important that all tutors, assessors, internal verifiers and other staff responsible for the programme read and are familiar with the information given in this section.

Internally-assessed units

Section	Explanation
Unit number	The number is in a sequence for the qualification.
Unit title	This is the formal title of the unit and appears on certificates.
Level	All units are at Level 2 on the national framework.
Unit type	This says if the unit is mandatory or optional for the qualification. See <i>Section 2 Qualification structure</i> for details.
Assessment type	This says how the unit is assessed – i.e. whether it is internal or synoptic internal. See <i>Section 2 Qualification structure</i> for details.
GLH	Units have a GLH value of 30 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 developing and demonstrating their skills or where they should be actively researching or reviewing.
Unit summary	This section helps tutors to see at a glance the main content areas against the learning aims and the structure of the assessment. 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 assessment criteria to explain the achievement required to obtain Pass, Merit and Distinction grades.
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. It is important that this is used carefully alongside the assessment criteria.
Assessment activity	This section provides information, suggested scenarios and tasks for summative assessment activities.
Further information for tutors and assessors	This section gives you information to support the delivery and assessment of the unit.
Delivery guidance	This section offers suggestions of ways of delivering the unit. It offers ideas on practical activities in a sector context that can be used to help develop relevant skills and to encourage progress.
Essential 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 <i>Section 10 Resources and support</i> .
Links to other units	This section shows you the main relationships of units to other units. This can help you to structure your programme and make the best use of available materials and resources.
Employer involvement	This section gives you information on the units that can be used to involve learners with employers. This information will help you to identify the kind of involvement that is likely to be successful.

Units

This section contains all the units developed for this qualification.

Unit 1: Introduction to Working in Land-based Industries	13
Unit 2: Introduction to Plant and Soil Science	27
Unit 3: Agriculture Work Placement	41
Unit 4: Machinery Operations in Agriculture	53
Unit 5: Livestock Health	67
Unit 6: Livestock Husbandry	77
Unit 7: Crop Production	89
Unit 8: Grass and Forage Crop Production	101
Unit 9: Farming and Agricultural Estate Maintenance	113

Unit 1: Introduction to Working in Land-based Industries

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal**

Guided learning hours: **60**

Unit in brief

In this unit, learners will develop their knowledge and understanding of factors that influence working practices within land-based industries.

Unit introduction

In this unit, you will learn about key job roles in land-based industries and the exciting activities these include. You will consider how laws and other important guidance ensure that working in land-based industries is safe and puts workers' needs first. You will look at how land-based industries can diversify by offering new products and services to the public and different ways in which land-based industries can increase their sustainability by reducing the impacts they have on the environment.

In this unit, you will learn about the professional behaviour and conduct to use when working in land-based industries and the health and safety legislation that affects the way we work within the land-based industries. In order to work at an operational level within these industries, it is essential you have the knowledge and understanding to apply safe and professional working to different situations.

The land-based industries are based on traditional occupations and in order to succeed in this area you need to be able to diversify to utilise opportunities, while also being considerate to the environment. You will learn about diversification and sustainability to give you the knowledge and understanding required for this and to enable you to work responsibly to protect the environment.

Learning aims

- A** Investigate working in the land-based sector
- B** Carry out safe working in the land-based sector
- C** Demonstrate responsible environmental working practices.

UNIT 1: INTRODUCTION TO WORKING IN LAND-BASED INDUSTRIES

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Investigate working in the land-based sector	A1 Land use A2 Diversification in land-based Industries A3 Key job roles by industry	A written report including case studies Photographic/video evidence of learners carrying out land-based tasks in a safe and environmentally responsible manner, supported by observation records. Learners will also need to include reflections on safe and environmentally responsible working practices.
B Carry out safe working in the land-based sector	B1 Fundamentals of working safely B2 Working safely	
C Demonstrate responsible environmental working practices	C1 Waste Management C2 Sustainability C3 Environmental responsibilities	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/behaviours
<ul style="list-style-type: none">• Identification of land use types• Correct selection and use of tools, equipment, materials and PPE to ensure safe working	<ul style="list-style-type: none">• Health and Safety legislation• Waste management legislation and codes of practice	<ul style="list-style-type: none">• Developing practical and technical skills• Working with others• Problem solving• Self-management and development

Unit content

Knowledge and sector skills

Learning aim A: Investigate working in the land-based sector

A1 Land use

Understand the features and characteristics that influence land use.

- Land-based industries including: agriculture, horticulture, forestry and arboriculture, water supply, mineral extraction.
- The social, ecological and aesthetic use and values of the landscape, including:
 - managing landscapes
 - maintaining countryside character
 - preserving and protecting rural landscapes
 - reducing pollution
 - protecting wildlife
 - reducing flood risk
 - recreation, transport.

A2 Diversification in land-based industries

Purposes, advantages and disadvantages of diversification.

- Opportunities for land-based businesses:
 - sport and leisure, e.g. mountain biking, walking, hiking, climbing, paintballing, off-road vehicles, water sports, angling, golf, shooting, canine and equine activities
 - tourism, e.g. country houses and gardens, camping/glamping, farm parks, retail and food, tea shops, gift shops
 - energy production, e.g. biofuel, wind and solar farms
 - education, e.g. school activity holidays/centres, rural crafts, environmental awareness and
 - conservation strategies.
- Implementation of diversification:
 - planning considerations, e.g. access, impact on local services, aesthetic/environmental impacts
 - sources of funding, e.g. government schemes, commercial partnerships, private investment, charitable grants.

A3 Key job roles by industry

- Understanding the skills, qualifications, key responsibilities required, and career pathways and progression for different types of jobs, within the relevant land-based industry.
 - Agriculture, e.g. stock/herdsperson, farm worker, crop technician, machinery operator
 - Countryside, e.g. park ranger, education officer, estates officer, game keeper, water bailiff
 - Horticulture, e.g. greenkeeper, grounds person, nursery worker, garden centre assistant, gardener, landscaper
 - Forestry and Arboriculture, e.g. arborist, tree surgeon, ground maintenance operative, plant operator, forest craftsman.

Learning aim B: Carry out safe working in the land-based sector**B1 Fundamentals of working safely**

Understand the essential principles of safe working in land-based environments and the extent to which care can be given in emergency scenarios.

- Working safely with machines, chemicals, livestock and equipment:
 - following policies and procedures
 - promoting safe working and healthy conditions
 - assessing risks
 - undertaking safety training.
- Appropriate actions, reporting procedures and legal responsibilities for accident and emergency situations:
 - lines of reporting (supervisor, manager, healthcare professional, emergency services)
 - common accident scenarios and their responses e.g. shock, cuts, bleeding, fracture, burns, poisoning, stings/bites, road traffic accident, severe allergies, tourniquets, splinting, large wounds)
 - initial and follow-up responses to chemical spills or ingestion, fire, disease outbreak, escape of livestock.
- Basic first-aid principles:
 - aims of first aid and how to apply it in different situations e.g. prevent further harm, relieve pain, promote recovery, protect the unconscious
 - legal limitations and implications of first aid
 - key contents of first-aid box e.g. bandages, dressings, surgical tape, cotton wool, towel, scissors, disposable gloves, tweezers; personal first-aid kit with large wound dressing.

B2 Working safely

Procedures and requirements for working safely while carrying out tasks, including relevant responsibilities of employers and employees when working in land-based industries.

- Responsibilities of employers and employees for maintaining health and safety including the role of the Health and Safety Executive.
- Current relevant legislation and codes of practice.
- Using risk assessments.
- Dynamic risk assessment while working.
- Additional risks associated working in the land-based sectors to include:
 - lone working
 - working near water
 - working with animals; animal health and their transport
 - slurry pits
 - farm machinery.
- Purpose, selection, pre-use checks and use of personal protective equipment (PPE) according to task including:
 - eye/face e.g. goggles, safety glasses, visor, full face shield
 - head e.g. full face shield, hard hat
 - ear protection e.g. earplugs, earmuffs
 - hand protection e.g. padded gloves, rubber gloves, heavy duty gloves, chainsaw gloves
 - protective clothing e.g. overalls, reflective safety clothing, chainsaw trousers, chemical resistant coveralls/aprons)

- protective footwear e.g. latex/rubber footwear, steel toe-capped boots, chainsaw boots
- respiratory protection, dust masks
- working at height safety equipment e.g. harnesses and ropes.
- Health and safety signs and symbols relevant to the UK including the UK Health and Safety Executive, International Organization for Standardization (ISO):
 - mandatory e.g. wear protective footwear, protective clothing, eye protection, hand protection, ear protection, head protection, face mask, respirator
 - prohibition e.g. no admittance to unauthorised personnel, not drinking water, do not run, do not enter, no naked flames
 - safe condition e.g. first aid, fire exit, emergency shower, emergency eye wash, emergency stop, disabled refuge point, assembly point
 - fire equipment e.g. fire alarm, fire hydrant, fire hose reel, fire extinguisher
 - warning e.g. general warning, electricity, hot surface.

Learning aim C: Demonstrate responsible environmental working practices

C1 Waste management

The main features, purpose and legislative requirements of waste management including:

- Principles of managing waste and the waste hierarchy and pyramid of recycling, including: disposal, energy from waste, 3 Rs – Reduce, Reuse, Recycle.
- Categories of controlled waste, including solid waste, liquid waste and hazardous waste e.g. asbestos, chemicals, batteries, solvents, pesticides, oils, clinical.
- Methods of dealing with different types of waste, for example use of colour coding or other methods of segregating.
- Recycling opportunities and activities:
 - composting of organic materials
 - irrigating using grey water
 - recycling of used plastic in the industry e.g. bale wrap, crop cover.
- UK Health and Safety Executive hazard pictograms relevant to waste management:
 - toxic material, oxidising material, hazardous to the environment, flammable materials, corrosive, irritant, explosive material, slippery surface.
- Current legislation regarding waste management e.g. use of waste management hierarchy, consideration of waste management options, declaration that waste management hierarchy has been considered including versions by UK country.
- Documents associated with waste management and disposal documents e.g. Duty of Care: Waste Transfer Notes, Hazardous Waste Consignment note, waste exemptions.
- Areas that require special care: Nitrate Vulnerable Zones (NVZs), groundwater Source Protection Zones (SPZs).

C2 Sustainability

Key principles of sustainability, benefits and disadvantages of utilising sustainable practices in land-based businesses.

- The 3 Ps of sustainability: people, planet, profit.
- Understanding 'carbon footprint' and carbon footprint assessment to:
 - reduce fuel consumption
 - conserve energy resources
 - facilitate carbon sequestration.
- Calculate basic carbon footprint/sequestration.

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- Financial, environmental, health and political benefits and disadvantages to adopting sustainable practices.
- Activities and practices that may increase sustainability and/or reduce reliance on natural resources:
 - solar and wind farms
 - production of biofuels
 - short rotation coppice, soil management
 - production forecasting and sustainable yield management in forestry
 - reductions and efficiencies in water, energy use, oil and fossil fuel use
 - organic farming.

C3 Environmental responsibilities

Potential and probable impacts of land use, land-based practices and mitigating actions to protect the environment.

- Intensive farming systems and responsible use of medications and chemicals.
- Forestry including use of exotic species, monoculture.
- Urban and transport network development, use of land for recreation.
- Causes and consequences of loss, fragmentation or removal of habitats:
 - boundary removal
 - introduction and spread of non-native invasive plant and animal species
 - food production
 - reduced biodiversity
 - wetland drainage.
- Advantages and disadvantages of adopting environmentally responsible practices.
- Use of Environmental Impact Assessments.

Transferable skills

Developing practical and technical skills

- Demonstrate techniques/skills/processes.
- Use equipment safely and appropriately.

Self-management and development

- Working in a professional environment.
- Planning own time.
- Reviewing own progress.
- Working under pressure to meet professional deadlines.
- Thinking skills/adaptability.

Working with others

- Listening and working as a team.

Problem solving

- Carrying out practical tasks.
- Identifying and choosing the right equipment.

Assessment criteria

Pass	Merit`	Distinction
Learning aim A: Investigate working in the land-based sector		
A.P1 Identify land use in a given context.	A.M1 Describe factors affecting land use and job roles in a given context.	A.D1 Evaluate land use and job roles in a given context.
A.P2 List job roles in land use in a given context.		
Learning aim B: Demonstrate safe working practices		
B.P3 Carry out safe working practices when carrying out work in a land-based environment.	B.M2 Carry out and explain the reasons for safe working practices in a land-based environment.	B.D2 Carry out and assess the importance of safe working practices in a land-based environment.
Learning aim C: Carry out safe working in the land-based sector		
C.P4 Carry out waste management practices to demonstrate some environmental awareness.	C.M3 Demonstrate and explain the reasons for environmentally responsible and sustainable working practices.	C.D3 Demonstrate and assess the importance of responsible environmental working practices on the environment.
C.P5 Outline sustainable and environmentalty responsible working practices.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- use findings and own observation to comprehensively report on the features, characteristics and values, of different land uses and connected job roles within their chosen sector. Learners will cover a minimum of three specific land uses. They will include informed references to diversification for a minimum of three land-based industries in their chosen sector, citing advantages and disadvantages for each. They will justify the relationships between these land uses, related job roles and associated diversified activities by providing sound reasons and further possibilities for diversification in the land-based industries they are covering.

For merit standard, learners will:

- use findings and own observations to describe the features, characteristics and values, of different land uses and connected job roles within their chosen sector. They will cover a minimum of three specific land uses. Learners will include some references to diversification in a minimum of three land-based industries in their chosen sector. Learners will give some reasons for the relationships between these land uses, related job roles and associated activities.

For pass standard, learners will:

- use findings, own observations and research and provide a summary of the features, characteristics and values, of a minimum of three different land uses including for each an example of one appropriate job and one example of diversification within their chosen sector.

Learning aims B

For distinction standard, learners will:

- carry out three specified tasks safely, fully adhering to relevant safety legislation and procedures. They consistently ensure the health and safety of self and others. They routinely assess the risks before and while they are carrying out the work. They consistently check and use relevant personal protective equipment as the work requires. They determine the importance of safe working practices by justifying why they worked in this way and what would happen with non-adherence to safety.

For merit standard, learners will:

- carry out three specified tasks safely, adhering to relevant legislation and procedures, most of the time. They work in a safe manner to ensure safety of self and others most of the time. They check and use relevant personal protective equipment most of the time. They give reasons for safe working practices.

For pass standard, learners will:

- carry out three specified tasks. They work in a safe manner to ensure safety of self and others but may need prompting in order to do so. They use Personal protective equipment but may need prompting in selecting the relevant equipment.

UNIT 1: INTRODUCTION TO WORKING IN LAND-BASED INDUSTRIES

Learning aims C

For distinction standard, learners will:

- adopt consistent, sustainable and environmentally responsible working practices. They always, dispose of waste safely and correctly, fully abiding to the principles, waste hierarchy and pyramid of recycling of waste management. They show full awareness of environmental responsibility while working, by taking mitigating actions to protect the environment. They determine the importance of environmental responsibility by justifying why they have worked in a certain way as well as the disadvantages to the environment should they not.

For merit standard, learners will:

- adopt sustainable and environmentally responsible working practices. They dispose of waste safely by abiding by the principles, waste hierarchy and pyramid of recycling of waste management most of the time. They show awareness of environmental responsibility most of the time, while working, by taking some actions to protect the environment. They determine the importance of environmental responsibility by justifying why they have worked in a certain way.

For pass standard, learners will:

- carry out the three tasks showing some concern for the sustainability and awareness for the environment. They dispose of waste showing some awareness of the principles, waste hierarchy and pyramid of recycling of waste management. They outline a minimum of three environmental working practices which may not be related to their tasks.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that it meets the assessment requirements of the unit.

Suggested scenario

You are working in a land-based sector and have been asked to identify what the land usage and related jobs are and how this can be diversified for the land to be used more profitably. You have also be asked to carry out three tasks which you need to ensure you do safely. You need to ensure that you consider sustainable and environmental practices while carrying out your work.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

Three different tasks within the land-based sector must be used.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutor introduces the main concepts contained within the unit through a series of presentations, class-based activities and practical work. Case studies should be used and visits or field work could be considered.

The main concepts to be covered are:

- Types of land use. Using photographs, land use maps and field work, learners explore the range of land use and their characteristics.
- The 'value' of landscapes, for example, social, economic, recreational.
- Job roles. Learners consider the job roles associated with types of land use. The job roles may be specific, for example, farm manager, countryside warden or general, for example, animal transport driver, agricultural surveyor. Learners would benefit from guest speakers in this respect.
- Diversification. Learners should consider how land use changes and the factors that influence this change. Diversification in response to economic, social and environmental factors should be considered.
- Sustainability and environmentally responsible practice. Learners should understand the need for promoting and adopting working practice and waste management strategies that are both sustainable and environmentally sound. Reference to global issues, for example, climate change, and local issue, for example, river pollution or flood alleviation, should be made.
- The need for learners to work safely – all the time – is essential and tutors must emphasise that this encompasses a wide range of responsibilities to self, other people, animals and the environment.

Suggested time: about 8 hours.

Activity: Exploring land use

Learners should use maps, research, visits and personal experience to investigate three specific land uses. The land chosen should reflect the learner's own interest and sector, (for example, forestry, horticulture, arboriculture, countryside management). At least one of the land uses chosen should reference diversification. Examples of land use might include:

- Mixed lowland farm
- Forest Park
- Upland sheep farm.

For each land use, learners should provide a case study that explores the characteristics of the land use, the job roles specifically associated with the land use, and examples of sustainable and environmentally responsible practice. For diversification learners could examine specific examples, for the actual use of farm buildings for holiday lets or the potential for diversification.

Suggested time: about 8 hours.

Activity: Working Safely

Learners should be introduced to the need to work safely. Case studies could be used to illustrate the consequences of unsafe working and the high occurrence of incidents in the land-based industries.

The legal framework needs to be examined using examples of sector relevant current legislation together with the need to understand employer and employee responsibilities.

Learners should understand the purpose and use of prepared risk assessments and the need to monitor safe working while undertaking tasks (dynamic risk assessment). Tutors should also consider creating scenarios where immediate first aid is required. These can be reinforced while undertaking practical tasks.

Suggested time: about 8 hours.

Activity: Working with Waste

Learners should, through classroom-based instruction and practical tasks, become familiar with current licensing/regulations relating to waste disposal and that they can undertake practical waste disposal that is fully compliant.

Suggested time: about 8 hours.

Activity: Working Sustainably

Through classroom instruction and practical tasks, learners should understand the need to manage resources and the advantages and disadvantages of adopting sustainable working practices.

Learners should explore, at a variety of scales, methods and technologies that reduce the reliance on natural resources. Examples to illustrate this could include, large offshore wind farms, short rotation coppicing, conversion of methane to bio fuels.

Learners should undertake basic carbon footprint calculations, sequestration potentials

Suggested time: about 8 hours.

Activity: Working Responsibly

Through classroom instruction and practical tasks, learners should understand the need to manage the environment responsibly. Learners could investigate sector specific threats and the measures taken to mitigate environmental loss or damage, developing case studies to illustrate. Learners should explore specific working practices that promote good environmental husbandry, for example:

- Scrub clearance to remove invasive plant species.
- Creation of flood alleviation dams on upland streams.
- Use of GIS (Geographic Information Systems) to target chemical applications on crops.

Suggested time: about 8 hours.

Activity: Practical Activities and Assessment

Tutors should ensure that learners undertake relevant, sector specific practical tasks to demonstrate they can:

- Work safely.
- Manage waste correctly.
- Adopt sustainable practices.
- Maintain good environmental standards.

Tutors could consider other areas of the programme that provide suitable learning and assessment opportunities, for example, work experience, practical units running concurrently.

Suggested time: about 14 hours.

UNIT 1: INTRODUCTION TO WORKING IN LAND-BASED INDUSTRIES**Essential resources**

For this unit, learners will need access to

- Suitable tools, materials and equipment to carry out practical tasks.

Links to other units

This unit draws on the knowledge and skills taught in:

- Unit 3: Countryside Work Placement
- Unit 4: Habitat Maintenance
- Unit 5: Countryside Access and Recreation
- Unit 6: Introduction to Game Management
- Unit 7: Land-based Machinery Operations
- Unit 8: Countryside Estate Maintenance.

Employer involvement

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

- guest speakers
- design/ideas to contribute to unit assignment/case study/project materials
- work experience
- own business materials as exemplars
- support from local business staff as mentors.

Unit 2: Introduction to Plant and Soil Science

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop skills and knowledge to understand the importance of plant and soil science when working in land-based sectors.

Unit introduction

Plants really are amazing; they supply the oxygen we breathe, provide us with food and resources and enhance our beautiful landscapes over many years. Having a clear understanding of how plants grow, what they need to stay healthy and the role soil plays in their success is essential when working in any of the land-based sectors.

In this unit, you will learn just how amazing plants are and what they need to survive. You will explore internal structures of plants from cells to transport systems and external plant structures including stems, roots, leaves and flowers, looking at their functions and characteristics. You will also investigate soil types, texture, structure, pH, nutrients and care.

Whether you decide to gain employment in agriculture, horticulture, countryside, forestry and arboriculture or continue your study on to a level three qualification, understanding plant processes and soil requirements will be a huge advantage to your next steps.

Learning aims

- A** Investigate plant structure, growth and development
- B** Investigate plant life cycles and adaptations to the environment
- C** Investigate soil characteristics and effects on plant health.

UNIT 2: INTRODUCTION TO PLANT AND SOIL SCIENCE

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Investigate plant structure, growth and development	A1 Plant structure A2 Plant processes	The learners will build a portfolio of evidence from working with given plant species and soil from a specified area, supplemented by practical laboratory work and/or producing models of cell structure.
B Investigate plant life cycles and adaptations to the environment	B1 Plant growth and development B2 Plant adaptations and modifications	
C Investigate soil characteristics and effects on plant health	C1 Soil characteristics C2 Soil textures and structure of cells C3 Soil water, PH and nutrients C4 Soil care	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/behaviours
<ul style="list-style-type: none">• Soil and plant testing• Experiment skills• Machinery and tool operation• Health and safety	<ul style="list-style-type: none">• Reliability of data recorded• Plant structures and functions• Soil types, texture and structure	<ul style="list-style-type: none">• Communication• Working with others• Thinking skills/adaptability• Problem solving• Management of information• Self-management and development

Unit content

Knowledge and sector skills

- Working safely – operating machinery and tools with due regard for safety of self and others.

Learning aim A: Investigate plant structure, growth and development

A1 Plant structures

Features of the plant and their location within the plant structure to develop understanding of how plants grow and develop and how the growth patterns can then be manipulated. Internal and external parts of plants, where they can be found, and their functions.

- Cell structures, key features of plant cells and identification of organelles:
 - cell wall, cell membrane, nucleus, vacuole, cytoplasm, mitochondria, chloroplasts
 - reproduction of cells, cell division, process of mitosis and meiosis and where these take place.
- Internal parts of plants, location, functions and characteristics:
 - xylem
 - phloem
 - cambium
 - experiments to determine the role of the vascular bundle.
- External parts of plants, characteristics, function and component parts:
 - roots e.g. root cap, root hairs, primary root, lateral roots, intake of water and minerals, anchorage
 - shoots: tropisms, e.g. geotropism, phototropism
 - stems: structure, growth, strength, nodes, leaf buds
 - leaves: simple, compound, needles, scales, lamina, stoma, guard cells, veins, petiole
 - flowers: types, including: angiosperms, gymnosperms; pollination methods, e.g. wind pollinated, insect pollinated, water pollinated; inflorescence types, e.g. petals, tepals, sepals, male organs: microstrobili, stamen, anther and filament, female organs: ovary, stigma, style, macrostrobili.

A2 Plant processes

Plant processes, the factors that affect and influence their rates, and how each of these affect plant growth and development.

- Photosynthesis:
 - equation for process, (CO_2 to produce glucose and oxygen)
 - how plant canopies optimise the interception of sunlight
 - required factors e.g. water, carbon dioxide and light
 - limiting factors, e.g. light intensity, carbon dioxide concentration and temperature.
- Respiration:
 - equation for process
 - optimum conditions for respiration to take place
 - limiting factors, e.g. waterlogged soils, temperature, carbon dioxide concentration.
- Transportation, role of the vascular bundles that include:
 - xylem – moves water and minerals from roots upwards
 - phloem – moves glucose throughout the plant
 - transpiration – role of stomata in exhaling water evaporation.

UNIT 2: INTRODUCTION TO PLANT AND SOIL SCIENCE

- Diffusion:
 - definition of movement of molecules in and out of cells.
- Osmosis:
 - definition of movement of water through semi-permeable membranes.

Learning aim B: Investigate plant life cycles and adaptations to the environment

B1 Plant growth and development

Discovering how plants, trees and crops grow and reproduce, with reference to their life cycles and key terminology.

- Plant and crop types and life cycles, e.g. ephemeral, annual, biennial, herbaceous perennial, perennial; evergreens and deciduous plants.
- Planting times linked to plant types.
- Plant and crop features relevant to the industry and location, e.g. conifers and forestry:
 - monocotyledon characteristics: roots, foliage, stem and flower
 - dicotyledon characteristics: roots, foliage, stem and flower
 - gymnosperm, roots, foliage, stem and flower.
- Flower and crop structures, roles and processes:
 - parts of the seed: e.g. cones, microstrobile, microsporophylls, megasporophyll, megasporangium, testa, cotyledons, epicotyl, plumule, hypocotyl, radicle.
- Germination testing e.g. percentage germination, seed viability, seed health
 - types of pollination and characteristics: self-pollination, cross-pollination, wind pollination, insect pollination
 - process of fertilisation, seed and fruit production
 - seed dispersal: animals, insects, wind, rain, environmental changes and temperature, reasons for dispersal, dormancy
 - types of germination: epigeal, hypogeal.
- Woody perennials e.g. trees, shrubs and hedgerows features and structures, roles and processes:
 - structure to include: inner/outer bark, cambium, sapwood, heartwood
 - growth processes in branch, trunk, roots, including function of apical meristem, vascular meristem/cambium, xylem/phloem
 - extent and process of root growth
 - tree ring analysis to determine structure and variation in growth rates due to differentiation in species, damage, obstruction and seasonal/climatic differences.
- Asexual and vegetative reproduction:
 - meristems, cell division, formation of roots
 - underground storage organs, e.g. rhizomes, bulbs, corms, tubers, tap roots.

B2 Plant adaptations and modifications

How plants, trees and crops adapt to their environment and modify component parts for survival and growth, to ensure healthy plant growth.

- Optimum conditions for healthy plants, taking into account:
 - Topography: aspect
 - exposure to elements e.g. sun, wind, and rain
 - spacing requirements for plants, trees and crops
 - threats to growth from pests and diseases.
- Role of plant parts in adapting to changes in environment e.g. roots, stem, leaves.

- Environmental conditions affecting adaptations and modifications:
 - arid
 - wetland
 - tropical
 - woodland
 - effects of temperature.
- Plant modifications in different environmental conditions: e.g. roots for climbing or storage, leaves, shoots and stems: succulents, spines, tendrils, thorns for protection and scrambling.

Learning aim C: Investigate soil characteristics and effects on plant health

C1 Soil formation, weathering and erosion

Process of soil formation, soil components and soil erosion.

- Soil formation and weathering:
 - parent rock and minerals – igneous, sedimentary, metamorphic, silica, silicates
 - organic matter, decaying plant material, humus, animal matter, animal life, micro-organisms, water, air.
- Soil pit.
- Components of soil e.g.; air, aggregates; organic matter; water.
- Processes of soil weathering e.g.; physical, chemical and biological processes.
- Soil erosion and movement:
 - water, wind, steep slopes, tillage
 - terracettes, rills and gullies, tilting of fence posts, exposed roots, wind-borne particles.

C2 Texture and structure of soils

Recognising soil type by identifying characteristics of texture and structure and how human and environmental activities can impact on growth and development.

- Soil types e.g. sand, silt, clay, aggregate size.
- Soil texture:
 - proportions of sand, silt, and clay.
- Soil characteristics affected by texture:
 - drainage, particle size, colour, nutrients, how it feels, fertility.
- Soil structure: blocky, angular, platy
 - soil profiles, horizons and organic matter.
- Human and environmental influences on soil structure that affect plant growth and development:
 - identify compaction by machinery, use of penetrometer
 - crop rotation and cultivation techniques, effects of cultivation
 - poor drainage
 - weather conditions
 - low nutrient content
 - surrounding mature trees.

UNIT 2: INTRODUCTION TO PLANT AND SOIL SCIENCE

C3 Soil water, pH and nutrients

The importance of water in soil, water-holding capacity and its availability to plants and crops, including interpretation of visual evidence and experiments.

- Water availability in soils: percolation, infiltration, water content:
 - saturation point – gravitational water
 - field capacity – capillary water
 - permanent wilting point – hygroscopic water
 - removal of soil water: drainage, ditch and pond clearance
 - visual signs of water accumulation in field.
- Soil pH:
 - importance of soil pH on plant health and root growth
 - the soil pH scale and how to test soil pH, e.g. test kits, soil probe, laboratory analysis
 - reliability and validity of pH testing
 - effects of varying pH levels e.g. stunted growth, distorted foliage and discoloured foliage
 - how to manage and control levels of pH.
- Soil nutrients:
 - the roles of major plant nutrients: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulphur (S)
 - micro plant nutrients: boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), zinc (Zn)
 - interpreting nutritional information e.g.; fertiliser bags, soil analysis results
 - recognising and managing nutrient deficiencies of major and secondary plant nutrients.

C4 Soil care

The importance of soil care and management to improve soil texture, structure and plant health.

- Management of soil erosion:
 - monitor growth and development of plants in the field.
- Benefits of crop rotation e.g. improving soil erosion, use of cover crops, companion plants, mulching.
- Methods of reducing compaction
 - establishing shelter belts, planting hedgerows.
- Improvement of soil texture and structure:
 - mulching
 - incorporation of organic material e.g. straw
 - breaking-up of a compaction
 - cultivation methods.
- Management of soil nutrients with fertiliser:
 - how and why fertilisers are used in soil care.
- Interpreting nutritional information e.g.; fertiliser bags, soil analysis results.
- Types of fertiliser e.g. straights, compounds liquid, suspensions, prills, granules, slow release, and availability to plants:
 - organic fertilisers e.g. compost and leaf mulch, green manure and farmyard manures
 - inorganic (synthetic) fertilisers e.g. nitrogen, phosphorus, potassium, iron, sulphate of ammonia, sulphate of potash, iron sulphate NH_4NO_3 , Muriate of Potash, Triple Super Phosphate.

- Soil mapping to determine fertiliser application rates.
- Common soil problems and how these are managed:
 - poor drainage and waterlogging
 - drought
 - nutrient deficiency.

Transferable skills

Preparing for work

- Research skills – locating relevant information and presenting in a suitable manner
- Working in a team – sharing responsibilities, gathering and sharing information.

Developing practical and technical skills

- Managing information – gathering detail for a purpose and recording accordingly, health and safety regulations.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate plant structure, growth and development		
A.P1 Identify the cell structures of specified plants.	A.M1 Explain how plant cell structures, and internal and external characteristics of plants influence processing for nutrition and respiration.	A.D1 Analyse how plant cell structures, internal and external characteristics influence how plants meet their nutrition and respiratory requirements.
A.P2 Outline the internal and external characteristics and components of specified plants.		
A.P3 Outline the processes plants use, to meet nutritional and respiratory requirements.		
Learning aim B: Investigate plant life cycles and adaptations to the environment		
B.P4 Explore the growth and development of specified plants.	B.M2 Explain the growth and development of specified healthy plants and how plants adapt to their environments.	B.D2 Assess how growth and development of healthy plants are dependent on environmental factors.
B.P5 Outline how specified plants adapt to environmental conditions.		
Learning aim C: Investigate soil characteristics and effects on plant health		
C.P6 Carry out tests to determine given soil characteristics, water availability, PH and nutrients.	C.M3 Explain the effects that soil characteristics have on specified plants' health and this can be improved.	C.D3 Evaluate the relationship between soil characteristics and care and health of a specified plant.
C.P7 Outline how to improve soil texture and structure for a specified plants' health.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- provide thorough, clearly labelled, annotated and accurate diagrams of cell structures and internal and external parts of plants, including flowers. They discuss all the plant processes for nutrition and respiration comprehensively, explaining in detail how and where these take place. Learners discuss at least two limiting factors of the processes and make suggestions on how to overcome these. They provide accurate details on how plants transport nutrients and water. Learners consistently use correct biological names. They show clear links between the processes and the cell structures and internal and external parts of plants.

For merit standard, learners will:

- provide annotated labelled diagrams of cell structures and, internal and external parts of plants, including flowers. They explain most of the plant processes and how and where these take place. Learners give detail on at least two limiting factors of the processes. They explain how plants transport nutrition and water. Learners use correct biological names most of the time. They show some links between the processes and the cell structures and internal and external parts of plants.

For pass standard, learners will:

- present outline labelled diagrams of cell structures and, internal and external parts of plants, including flowers. They summarise the plant processes and how and where these take place but may only cover two processes. Learners provide at least one limiting factor of the processes. They summarise how plants transport nutrition and water. They use limited biological names but may not always be relevant to the structure or part of the plant. Learners may make some links between the processes and the cell structures and internal and external parts of plants but these may not always be clear.

Learning aim B

For distinction standard, learners will:

- provide accurate comprehensive detail on the plant type and how its life style affects planting times. They explain germination by providing either an accurate fully annotated illustration or accurate details on the development and growth processes for specified plants/trees/crops. Learners clearly distinguish between the development and growth processes showing full understanding of the differences between the two, by providing valid and accurate examples. They explain in detail all the optimum conditions for the development of healthy specified plants/crops/trees. They provide clear examples of environmental conditions affecting the plant/crop/tree growth, clearly explaining why it is important to choose the correct conditions for the particular plant/crop/tree. They provide relevant examples of how plants adapt to environments by modifying themselves e.g. thorns, scrambling.

For merit standard, learners will:

- provide mostly accurate details on the plant type and how its life style affects planting times. They describe germination by providing either an annotated illustration or details on the development and growth processes for specified plants/trees/crops most of the time. Learners distinguish between the development and growth processes, showing some understanding of the differences between the two by using examples. They describe at least two the optimum conditions for the development of healthy specified plants/crops/trees. They provide some examples of environmental conditions affecting the plant/crop/tree growth. They give at least two reasons why it is important to choose the correct conditions for the particular plant/crop/tree. They provide at least two examples of how plants adapt to environments by modifying themselves e.g. thorns, scrambling.

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For pass standard, learners will:

- explore a species of plant/crop/tree and outline the plant type and when the most conducive planting times are. They outline the germination process by providing either a basic annotated illustration or a summary on the development and growth processes for specified plants/trees/crops. Learners show some understanding of the differences between the development and growth processes. They outline a minimum of two optimum conditions for the development healthy specified plants/crops/trees. They provide at least one example of an environmental condition affecting the plant/crop/tree growth. They provide at least one example of how plants adapt to environments by modifying themselves e.g. thorns, scrambling.

Learning aim C

For distinction standard, learners will:

- accurately determine all the characteristics of the soil. They will describe the texture and structure, water availability/absorbency, PH and nutrients, by providing accurate examples of each. Learners will make valid recommendations for soil improvement to accommodate the given plant/crops/trees health, providing valid and well thought out ideas. This could be in the context of maintaining soil fertility optimising the yield of a crop or reducing the fertility of any area to establish a community of flowers to enhance biodiversity.

For merit standard, learners will:

- determine most of the characteristics of soil from the tests they conduct. They will describe the texture and structure, water availability/absorbency, PH and nutrients, by providing examples for most of them. Learners will show that they understand how the soil accommodates the given plant/crops/trees health by providing some examples. They make some recommendations on how the soil can be improved.

For pass standard, learners will:

- carry out simple tests to determine soil texture, structure, including checking for compaction, and pH for a given site. They will provide a list of the findings for at least three characteristics e.g. soil type, components, texture and structure, drainage, water availability, PH and nutrient value. They will be able to state why they are carrying out or recommending the actions undertaken.
- provide at least two ways that soil texture, structure and plant health could be improved.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

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The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that they meet the assessment requirements of the unit.

Suggested scenario

You are working on a farm which also has a small horticultural nursery as well as an established woodland. The farm would like to develop the range of crops they are growing as well as introduce some new species to the woodland. You need to gather a portfolio of evidence on plant growth and development and carry out practical assessments to understand the soil type. Your work will include developing an understanding the structure of plants and how each part functions to ensure good plant growth. You will need to collect the soil and complete a series of soil tests to determine the soils characteristics. You would then make recommendations on how to improve the soil for better plant health.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

Use of different species and soil within the portfolio.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Covered by lectures, tutor led discussions and presentations to explain what the unit content contains, how it will be delivered and assessed. Assessment of prior knowledge to ascertain a start point for all learners. An induction to laboratory procedures may be necessary as will covering the health and safety aspect of this unit including handling of soils.

Suggested time: about 4 hours.

Activity: Plant practical sessions

Tutor led visits/practical activities to identify a range of plants and crops. This can take place in the field, nursery or woodland depending on the resources available. Group discussions on the types of plants seen and their growth patterns. Learners will carry out germination testing to support theory; learners can research nutritional disorders of plants as well as see examples that occur in plants and crops growing in the fields. Learners will use knowledge gained from other units to develop awareness of when and where crops and plants should be grown.

Suggested time: about 15 hours.

Activity: Plant experiments

Tutor led experiments to develop knowledge on cell structure, plant processes e.g. photosynthesis, respiration and transpiration. Learners can create a slide of a plant cell and look at this under the microscope and draw the findings. Recording and reflecting on evidence to contribute to assessment.

Suggested time: about 10 hours.

Activity: Soil practical sessions

Learners will access an area which can be cultivated offering the chance to see the benefits of cultivation on different soil types. Carry out cultivation operations to improve soils using a range of hand-held tools or machinery to identify the changes made to the soil structure. Observe visual signs of compaction through use of a penetrometer and record findings. Tutor led visit to observe drainage being carried out to prevent water stress.

Suggested time: about 15 hours.

Activity: Soil experiments

Tutor led laboratory / in field practical sessions to conduct soil tests working in small groups to carry out pH of soil. They can carry out a visual appraisal of soil type, texture and structure through a tutor led practical.

Suggested time: about 8 hours.

Essential resources

For this unit, learners will need access to

- A range of plants, woody perennials and crops.
- Simple laboratory equipment suitable to test soil, and plants.

Links to other units

This unit draws on the knowledge and skills taught in:

- Unit 4: Machinery Operations in Agriculture
- Unit 7: Crop Production.

This unit has strong links to:

- Unit 1: Introduction to working in land-based industries
- Unit 3: Agriculture Work Placement.

Employer involvement

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

- guest speakers
- practical sessions
- visits to local science laboratories to observe soil/ plant testing
- design/ideas to contribute to unit assignment/case study/project materials
- work experience
- own business materials as exemplars
- support from local business staff as mentors.

Unit 3: Agriculture Work Placement

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop the skills and behaviours required for successful working in the agricultural sector.

Unit introduction

Do you think you can work well in the agricultural sector? Work placement gives a unique insight into working life and is extremely important in helping you to work out the exact area in which you might want to work – as well as in what job role. Added to that, it also gives you the opportunity to learn and try out new skills in communication and teamwork, all of which will enhance your curriculum vitae (CV).

In this unit, you will learn new skills and experience, hands-on, what it is like to apply this learning to the agricultural sector. You will have the time to develop these skills, enabling you to perform confidently and to a high standard, and apply them in a working environment. You will look for, and take part in, a work placement which is, ideally, in an agricultural industry that appeals to you. Talking to, listening to and watching those in the industry is the best way of truly learning about the work involved and what is required of an employee.

This unit will give you the fundamental work skills needed to apply for and gain employment as an agricultural worker. The unit includes 75 hours of real-life work experience.

Learning aims

In this unit you will:

- A** Investigate and apply for an agriculture work placement
- B** Demonstrate work skills relevant to an agriculture work placement
- C** Review own agriculture work placement.

UNIT 3: AGRICULTURE WORK PLACEMENT

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Investigate and apply for an agriculture work placement	A1 Investigating a work placement A2 Applying for a work placement	A portfolio of work-related research and completed application documents evidenced by observation records or video evidence.
B Demonstrate work skills relevant to an agriculture work placement	B1 Professional behaviours B2 Communication skills B3 Safe working around the farm	A work placement report supported by: <ul style="list-style-type: none"> • observation records/ witness statements • video and/or photographic evidence of all practical activities • reported evidence of appropriate work skills and hours.
C Review own agriculture work placement	C1 Review work placement C2 Self-development and areas for improvement	Written evidence of review, reflection and self-development/areas for improvement.
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/ behaviours
<ul style="list-style-type: none"> • Job searching • Work research/application processes • Workplace behaviour/techniques • Work skills 	<ul style="list-style-type: none"> • Effective teamwork • Effective communication • Self-development 	<ul style="list-style-type: none"> • Communication • Problem solving • Self-management and development • Thinking skills/adaptability • Working with others

Unit content

Knowledge and sector skills

Learning aim A: Investigate and apply for an agriculture work placement

A1 Investigating a work placement

- Work search resources, e.g. industry magazines, newspapers, internet job sites, social media, local advertisements.
- Documents:
 - job advertisement
 - job/role description
 - essential and desirable personal requirements
 - using these documents in an appropriate way.
- Identifying the skills required to work in the sector, e.g. interpersonal skills, communication, technical knowledge, practical skills.

A2 Applying for a work placement

- Different methods of applying, e.g. application forms, CVs, covering letters, online applications, telephone enquiries, applying in person.
- How and where to find work application information, e.g. from human resource (HR) departments, company/organisation websites, job websites, local and national information sources, media, employment agencies.
- Job research: paying attention to all details of the job application so that nothing relevant is left out, ordering different types of information in a logical manner in the application document, checking whether or not to include supporting documents, e.g. work permits, certificates, personal identification, using personal statements to create a positive impression of skills and interests.

Learning aim B: Demonstrate work skills relevant to an agriculture work placement

B1 Professional behaviours

- Working environment skills: appropriate attendance, appropriate personal presentation, positive attitude (appropriate demeanour, use of own initiative).
- Time management, including arriving at work on time, completing tasks in allocated time, e.g. feeding livestock, checking crop growth or reporting to supervisors.
- Administrative skills, e.g. maintaining records, using email/phone, using workplace documents, using electronic equipment.
- Problem solving, e.g. finding alternative solution to problems, using technology to work more efficiently.
- Working with others, e.g. team briefing, completing maintenance and practical tasks, handling, communicating and implementing changes.
- Appreciation of others' needs and points of view, respecting equality laws/social diversity in the workplace.

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B2 Communication skills

- Interpersonal skills, including appropriate speaking and listening skills.
- Use of appropriate and professional language.
- Use of initiative/asking for advice if unsure.
- Ability to receive and follow instructions.
- Interacting with visitors and staff appropriately.
- Communicating tasks completed.

B3 Safe working around the farm

- Ensuring safe working by following protocols and any other work placement policies and procedures.
- Working within legal/good practice frameworks, e.g. Health and Safety at Work etc. Act 1974, Control of Substances Hazardous to Health (COSHH) Regulations 2002 etc.
- Use of personal protective equipment (PPE).
- Safe handling procedures.
- Safe working with tools and equipment.
- Risk assessment.

Learning aim C: Review own agriculture work placement**C1 Review work placement**

- SWOT (strengths, weaknesses, opportunities and threats) relating to work placement.
- Identifying what went well and what did not go so well, including time taken to complete tasks, interaction with supervisors/managers, how well tasks were completed, factors taken into account to maintain animal welfare.
- Using feedback from employers when evaluating performance.

C2 Self-development and areas for improvement

- Self-development:
 - identifying own training and development needs, e.g. skills audit
 - meeting/discussion with supervisor
 - review and reflection.
- Areas for improvement: based on own reflection, assessment (and feedback from others, if appropriate), e.g. get feedback and suggestions from all team members before deciding on solution to problem in the team task.

Transferable skills

Communication

- Verbal, written and face-to-face communication with colleagues and tutors.
- Applying for placements in appropriate formats.
- Reviewing own performance.
- Reading feedback from employers.
- Speaking to customers/clients.

Problem solving

- Solving customers' problems.
- Carrying out practical tasks.
- Identifying and choosing the right equipment.

Self-management and development

- Reviewing own performance after a placement.
- Identifying areas for improvement.
- Creating personal action plans for development.

Thinking skills/adaptability

- Working out how to tackle job advertisements.
- Using information and relating own skills.
- Identifying own skills and areas for improvement.

Working with others

- Working with individuals or teams while on work placement.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Investigate and apply for an agriculture work placement		
A.P1 Demonstrate appropriate investigation for a work placement.	A.M1 Demonstrate effective use of search and application documents for a work placement.	A.D1 Justify work placement search and application activities carried out, recommending improvements.
A.P2 Use appropriate application skills for a work placement.		
Learning aim B: Demonstrate work skills relevant to an agriculture work placement		
B.P3 Demonstrate adequate use of communication skills and practices during the work placement.	B.M2 Demonstrate appropriate use of work skills and practices, working effectively with others during the work placement.	B.D2 Demonstrate confident use of work skills and practices, working confidently with others to achieve effective outcomes during the work placement.
B.P4 Demonstrate adequate behaviours during the work placement.		
Learning aim C: Review own agriculture work placement		
C.P5 Describe own tasks and activities carried out during own work placement.	C.M3 Describe own performance during tasks and activities carried out, using relevant examples to demonstrate strengths and areas for improvement.	C.D3 Explain own performance, using examples to identify strengths, areas for improvement and appropriate training and self-development needs in response to feedback from others.
C.P6 Identify own strengths and areas for improvement during a work placement.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- show understanding of their own limitations during a work application process and of how their work application skills could be improved moving forward
- provide evidence of their suitability for the work placement in question.

For merit standard, learners will:

- use work application skills to provide an appropriate and developed CV and letter of application for a suitable work placement.

For pass standard, learners will:

(Note: application for, as opposed to securing, a work placement is the focus of assessment for pass.)

- use work searching skills to locate two appropriate work advertisements and job descriptions
- use work searching skills to find one potential agriculture work placement
- use skills to apply for a relevant work placement
- provide a CV and completed application form for a work placement
- demonstrate acceptable use of spelling, grammar and word sense.

Learning aims B and C

It is a requirement that all learners complete 75 hours of valid work placement in an external setting. This must be in addition to the 60 guided learning hours required for delivery of this unit. Work placement need not be limited to one provider, however work placement in agricultural working environments run by, and/or on the site of, the centre is not appropriate. Suggested evidence records for the work placement can found on the Pearson website.

For distinction standard, learners will:

- provide evidence of consistently appropriate personal presentation and positive attitude during work placement
- provide evidence of excellent time management and problem-solving skills
- require little, if any, intervention by supervisor(s)
- demonstrate effective working with others in the work placement and full appreciation of others and other points of view
- demonstrate consistently effective safe working
- show clear awareness of strengths and areas for improvement and development, with reference to examples of working practice and behaviour
- show clear understanding of how feedback from others can shape self-development needs constructively.

For merit standard, learners will:

- provide evidence of appropriate personal presentation and positive attitude during work placement
- provide evidence of appropriate time management and problem-solving skills
- require some intervention by supervisor(s)
- demonstrate appropriate working with others in the work placement and some appreciation of others and other points of view
- demonstrate effective safe working

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- show awareness of strengths and areas for improvement, with reference to examples of working practice and behaviour
- provide reflective information on how they could benefit from training and development, justified in relation to their own career aspirations and using feedback from others.

For pass standard, learners will:

- provide evidence of adequate use of professional behaviours, communication skills and safe working skills, as listed in the unit content
- require much intervention from supervisor(s)
- provide information on the tasks and work activities they carried out, their strengths, areas for improvement and how they work in respect of legal rights and responsibilities, as detailed in unit content
- provide evidence of interpersonal and communication skills, time management and teamwork.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

Learners should look for a work placement in a working environment appropriate to agriculture and investigate the steps involved in applying for a placement and how these could be improved. Once on a work placement, each learner will show that they have the appropriate skills and behaviours that an employer would expect. When the placement is completed, learners will review their experience and consider any appropriate training and development they could take advantage of. Learners need to take account of feedback received from others, for example workplace supervisors and tutors.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Poster making; work skills and behaviours for employment in agriculture.

Suggested time: about 4 hours.

Activity: Job applications

Small group work/teamwork on scenario-based projects, searching for, and applying for jobs of interest in the industry sector.

Suggested time: about 8 hours.

Activity: Developing skills

Holding group meetings to develop communication and team working skills, using scenarios such as recruitment within sector businesses.

Suggested time: about 4 hours.

Activity: Developing other working skills and behaviours

Role play developing other working skills and behaviours in varying scenarios.

Suggested time: about 3 hours.

Activity: Reviewing performance

Work placement review of own performance.

Suggested time: about 4 hours.

Essential resources

For this unit, learners must have access to:

- a suitable site(s) for work placement
- appropriate transport to suitable sites (centres may need to organise)
- first-aid facilities and appropriately trained staff (wherever practical activities are undertaken).

Links to other units

This unit has strong links to:

- Unit 1: Introduction to Working in Land-based Industries
- Unit 2: Introduction to Plant and Soil Science
- Unit 4: Machinery Operations in Agriculture
- Unit 5: Livestock Health
- Unit 6: Livestock Husbandry
- Unit 7: Crop Production
- Unit 8: Grass and Forage Crop Production
- Unit 9: Farming and Agricultural Estate Maintenance.

Employer involvement

This unit requires employer involvement in the form of:

- fit-for-purpose work placements.

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

- guest speakers
- own business materials as exemplars, for example use of workplace literature and information sources.

Unit 4: Machinery Operations in Agriculture

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal**

Guided learning hours: **60**

Unit in brief

Learners develop the skills needed to prepare, operate safely and maintain land-based machinery for use in the agricultural sector.

Unit introduction

Within the agricultural sector there are many activities that require the safe and responsible use of machinery so that work is carried out effectively and routine tasks can be completed. Owing to the range of activities that can be undertaken, it is important that anyone working within this sector is aware of operating a range of common machinery safely and responsibly following operational guidelines and instructions.

In this unit, you will explore the range of machinery used for a wide variety of agricultural activities across arable and livestock production. You will develop the skills to identify the correct equipment to be used, to carry out initial preparation and routine maintenance, and to be able to operate machinery safely so that tasks may be completed effectively.

Completion of this unit will develop your skills to meet industry expectations, allowing you to work safely and responsibly with land-based machinery in the agricultural sector. Opportunities include working as a general farm worker, tractor driver, sprayer operator, contractor, trainee herdsman or stockman, or you could progress into further education.

Learning aims

In this unit you will:

- A** Explore machinery that can be used for agricultural activities, its purpose and operation
- B** Prepare and maintain machines for agricultural activities
- C** Carry out safe and responsible machine operation for routine agricultural activities.

UNIT 4: MACHINERY OPERATIONS IN AGRICULTURE

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Explore machinery that can be used for agricultural activities, its purpose and operation	A1 Agricultural machinery A2 Operational methods, engines and mechanics	Written diary of activities supported by video evidence of learners identifying, preparing, maintaining and operating common machinery.
B Prepare and maintain machines for agricultural activities	B1 Prepare machinery B2 Maintenance of machinery	
C Carry out safe and responsible machine operation for routine agricultural activities	C1 Operating machinery C2 Post-activity machinery checks and aftercare	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/behaviours
<ul style="list-style-type: none">• Planning and preparing to use machinery safely• Identifying correct machinery for routine tasks• Operating machinery responsibly and safely• Basic maintenance of routine machinery• Operational checks pre- and post-machinery use	<ul style="list-style-type: none">• Professional practice• Safe practice• Following operational instructions• Farm worker responsibilities• Health and safety• Basic mechanical understanding of machinery	<ul style="list-style-type: none">• Managing information• Preparing for work• Problem solving and communication• Self-management and development

Unit content

Knowledge and sector skills

Learning aim A: Explore machinery that can be used for agricultural activities, its purpose and operation

A1 Agricultural machinery

Learners will develop an understanding of the machines used in the agricultural sector and the underlying principles of operation.

- Agricultural machinery, such as tractors, trailers, power harrows, combines, forklifts, flail mowers, telescopic handlers.
- Agricultural activities, such as hedge laying, grass cutting, ploughing, seeding, spraying, making silage, bailing.
- Use of equipment, to include:
 - understanding operational manuals
 - using operational manuals
 - requirements of different types of equipment per manufacturer/industry guidelines
 - reviewing ground conditions for equipment used, e.g. tractors not being suitable for heavily saturated ground, stability.
- Licensing conditions, to include:
 - requirements of operator, e.g. tractor licence and relevant tickets
 - regulations of hours spent at the wheel of a tractor
 - weight limits of loads.

A2 Operational methods, engines and mechanics

Learners will develop an understanding of the operation of engines and the mechanical components of machinery.

- Combustion engines, such as:
 - compression ignition (CI) and spark ignition (SI) engines
 - two-stroke and four-stroke cycles
 - naturally aspirated and turbo-charged air intake systems
 - diesel, petrol, bio-products, lubricants
 - air and liquid cooling systems
 - emissions legislation
 - cold start systems.
- Electric engines, including batteries and electrical motors.
- Component parts, such as cylinder block and head, flywheel, clutch assemblies, crankshaft, pistons and rings, connecting rod and bearings, valves and springs, gaskets and seals, cooling system components, fuel system components, lubrication oil filters, starter motor, generators.
- Engine use, such as self-propelled units, handheld equipment, static units, drive systems, clutches, shafts, belts and chains, transmission gearbox, compressed air and hydraulics, engine speed, power and torque.

Learning aim B: Prepare and maintain machines for agricultural activities**B1 Prepare machinery**

- Awareness of common hazards, including exhaust fumes, heat, noise, vibrations, stored energy, sparks, and machine stability.
- Personal safety requirements, including PPE footwear and personal clothing protection, barrier cream, gloves, eye protection, ear defenders, chemicals protection (apron) and risk assessments.
- Safe working principles.
- Starting procedures and pre-start checks, such as:
 - tractor/power unit preparation, oil, coolant, diesel, tyres, battery, maintenance schedule, wheel nuts, wheel widths to match machine and drawbar
 - mounting and dismounting procedures
 - cold starting
 - fuelling procedures, keeping tank full overnight, bleeding air from pipes
 - power take-off (PTO) procedures, e.g. guards, speeds, removal of shaft
 - hydraulics, e.g. couplings, hoses, spool valves
 - interpret decals
 - interpret odometer
 - locate main controls, e.g. gauges, levers, buttons for electronics, pedals, dipsticks
 - appropriate speeds.

B2 Maintenance of machinery

- Maintenance tools, such as:
 - selection and safe use of hand tools
 - measuring equipment
 - use of manufacturers' service literature
 - lubrication oils data
 - daily and periodic checks and maintenance schedules.
- Maintenance checks of common machinery, such as:
 - basic checks
 - oil changes
 - tyre pressures and changing tyres
 - fan belt checks
 - battery checks and changes
 - replacing filters
 - complex checks
 - grease clutch
 - check hydraulic pump
 - fuel change
 - bleeding radiators
 - identification of necessary repairs
 - cooling and charging system maintenance
 - waste disposal
 - current regulations and legislation.

Learning aim C: Carry out safe and responsible machine operation for routine agricultural activities**C1 Operating machinery**

- Selecting and using machine(s) for specific activities and, where appropriate, relevant attachments, e.g. trailers, sprayers, seeders, bailers, hedge cutters.
- Following correct procedural and operational guidelines, e.g. switching on the machine correctly, carrying out initial checks, putting in the correct amount of seed, attaching hedge cutter.
- Demonstrating awareness of health and safety, e.g. correct PPE and adherence to safe working practices and operational guidelines.
- Tractor/power unit operation: selection of appropriate gear to match ground/road conditions, transport safely to site, warning signals.
- Considering physical and natural conditions, e.g. weather conditions, different ground conditions, such as clay, sand, peat, and how to adapt.
- Correct safe and responsible operation of driven machinery and handheld machinery.
- Equipment and machinery operation, including:
 - lifting in and out of work
 - use of headlamps
 - carrying out adjustments in work, e.g. forward speed, top link, stabiliser bars, PTO speed, depth control, differential lock.

C2 Post-activity machinery checks and aftercare

Learners will understand the necessary checks following completion of an activity.

- Cleaning machines after use, where appropriate, e.g. power washing the combine after use, removing mud from tyres so as not to dirty the road, removing dirt from equipment (especially fans and filters), lubricating engines, removing any leftover chemicals, e.g. sprayers, inspecting equipment for any damage.
- Storage and parking, e.g. safe storage, security, correct parking of vehicles.
- Completion of records, reporting maintenance requirements following use, e.g. driver/vehicle logs, maintenance schedules.

Transferable skills

Managing information

- Interpreting and understanding industry and manufacturer instructions and guidelines.
- Relating legislation and codes of practice into practical situations.

Preparing for work

- Communicating with others in tasks.
- Planning practical tasks and verbally communicating actions.
- Give reasons for using certain methods and techniques and for decisions made.
- Undertaking practical routine machinery maintenance.
- Developing practical and technical skills.
- Demonstrating methods used to maintain machinery equipment.

Problem solving and communication

- Working as a team.
- Preparing, maintaining and operating equipment/identifying problems with machinery and developing solutions.

Self-management and development

- Working in a professional environment, time management, reviewing own progress, working under pressure and working with limited supervision.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore machinery that can be used for agricultural activities, its purpose and operation		
A.P1 Identify types of machines used to complete routine agricultural activities.	A.M1 Describe the types of machines used for routine agricultural activities and relevant operational methods.	A.D1 Compare and contrast the types of machines and operational methods used to carry out routine agricultural activities.
A.P2 Outline the operation methods of agricultural machines when completing routine agricultural activities.		
Learning aim B: Prepare and maintain machines for agricultural activities		
B.P3 Perform appropriate preparation of machinery used for agricultural activities.	B.M2 Carry out effective preparation and basic maintenance of machinery used for agricultural activities.	B.D2 Confidently and competently carry out the preparation and relevant maintenance of machinery used for agricultural activities.
B.P4 Perform some basic machine maintenance.		
Learning aim C: Carry out safe and responsible machine operation for routine agricultural activities		
C.P5 Demonstrate the safe use of agricultural machinery for routine agricultural activities.	C.M3 Demonstrate effective use of machinery, post-activity checks and aftercare for routine agricultural activities.	C.D3 Demonstrate confident and responsible use of machinery, post-activity checks and aftercare when completing routine agricultural activities.
C.P6 Demonstrate basic post-activity checks and aftercare.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- show comprehensive understanding of the similarities and differences between at least three types of machines, clearly identifying the type of machine with the relevant routine activities and associated operational methods
- make relevant connections between the uses of types of machinery with reference to appropriate agricultural activities, ground stability factors and regulatory requirements
- demonstrate a robust understanding of the operation of engines and mechanical components of machinery used routinely in the industry
- demonstrate depth and breadth in their understanding of engines and mechanics, for example how petrol and diesel engines and electric motors work
- demonstrate comprehensive knowledge and understanding of the relevance of mechanical knowledge
- demonstrate comprehensive and appropriate use of technical language.

For merit standard, learners will:

- show understanding of the differences between at least three types of machines, identifying the type of machine, the routine agricultural activities they can be used for and the associated operational methods
- make connections between types of machinery and the operational conditions that determine the activities being undertaken such as ground, weather and licensing
- demonstrate appropriate understanding of the operation of engines and the mechanical components of machinery used routinely in the industry
- demonstrate an understanding of engines and mechanics, for example how petrol and diesel engines and electric motors work
- demonstrate appropriate knowledge and understanding of the relevance of mechanical knowledge
- use relevant technical language.

For pass standard, learners will:

- show a basic understanding of the difference between at least three types of machines, with reference to routine agricultural activities and associated operational methods
- list some of the operational conditions that determine machine activities such as ground, weather and licensing
- have a basic understanding of the operation of engines and the mechanical components of machinery used routinely in the industry
- show some understanding of engines and mechanics, for example how petrol and diesel engines and electric motors work
- demonstrate some knowledge and understanding of the relevance of mechanical knowledge
- use mostly technical language, with some inaccuracies in terminology choice and use.

Learning aim B

For distinction standard, learners will:

- work with an increased level of independence and with limited supervision to demonstrate a robust performance in the preparation and maintenance of at least three items of relevant up-to-date machinery used for agricultural practices
- demonstrate a strong awareness of common hazards, suggesting measures to reduce the risk of such hazards, as mentioned in the unit content
- carry out detailed and logical preparation tasks, showing breadth and depth in understanding of the importance and accuracy of preparation prior to use
- carry out routine maintenance on at least three items of machinery used for agricultural activities. The maintenance will be logical, well developed and accurate in its execution, requiring limited tutor involvement
- give consistent explanations of the practical process while carrying out routine maintenance, covering safe and correct tool selection and comprehensive maintenance checks, as per the unit content.

For merit standard, learners will:

- work with limited independence and a level of tutor supervision to demonstrate an effective approach to the preparation and maintenance of at least three items of relevant up-to-date machinery used for agricultural practices
- demonstrate an awareness of common hazards and suggest variable measures to reduce the risk of such hazards, as mentioned in the unit content
- carry out logical preparation tasks, showing understanding of the importance and accuracy of preparation prior to use
- carry out routine maintenance on at least three items of machinery relevant to agricultural activities. The maintenance will be logical and accurate but not fully developed in its execution, requiring some tutor involvement
- give appropriate explanations of the practical process while carrying out routine maintenance, covering safe and correct tool selection and reasonably accurate maintenance checks, as per the unit content.

For pass standard, learners will:

- work with a significant level of tutor supervision to demonstrate a basic approach in the preparation and maintenance of at least three items of relevant up-to-date machinery used for agricultural practices
- demonstrate some awareness of common hazards, with limited suggestions of variable measures to reduce the risk of such hazards, as mentioned in the unit content
- carry out preparation tasks, showing limited understanding of the importance and accuracy of preparation prior to use, making some mistakes in procedure
- carry out basic routine maintenance on at least three items of machinery relevant to agricultural activities
- provide some explanations of the practical process while carrying out routine maintenance, covering safe and correct tool selection and mostly accurate maintenance checks, as per the unit content.

Learning aim C

For distinction standard, learners will:

- competently select and use appropriate machines for specific agricultural activities, accurately following correct procedures and adhering to necessary operational guidelines
- demonstrate safe and responsible use of at least three items of machinery when carrying out agricultural activities
- demonstrate a robust understanding of the need to care for machinery following use, giving comprehensive explanations for the cleaning, storage and record completion required for each individual piece of equipment
- cover at least three items of machinery routinely used in agriculture, showing a comprehensive understanding of requirements and confident reasoning for carrying out the aftercare
- use technical language consistently and accurately, demonstrating a consistently high level of practical skill.

For merit standard, learners will:

- select and use machines for specific agricultural activities, following correct procedures and operational guidelines
- demonstrate safe and responsible use of at least three items of machinery when carrying out agricultural activities
- demonstrate an effective understanding of the need to care for machinery following use, giving detailed explanations for the cleaning, storage and record completion required for each individual piece of equipment
- cover at least three items of machinery routinely used in agriculture, showing a reasonable understanding of requirements and limited reasoning for carrying out the aftercare
- use mostly technical language appropriately, demonstrating a good level of practical skills with occasional omissions/inaccuracies.

For pass standard, learners will:

- use machines for specific agricultural activities, following some correct procedures and operational guidelines
- demonstrate, with guidance, safe use of at least three items of machinery when carrying out routine agricultural activities
- demonstrate a basic understanding of the need to care for machinery following use, giving some explanations for the cleaning, storage and record completion required for each individual piece of equipment
- cover at least three items of machinery routinely used in agriculture, showing a limited understanding of requirements but with poorly developed reasoning for carrying out the aftercare
- select mostly appropriate techniques for aftercare, supported by poorly developed reasoning for the choices made
- use limited technical language with some inaccuracies in terminology choice and use, and demonstrate practical skills without a high level of proficiency.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that they meet the assessment requirements of the unit.

Suggested scenario

You are working in the agricultural industry as a farm machine operator. You are required to plan, risk assess, prepare, maintain and operate a minimum of three pieces of machinery for specific agricultural activities.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

Three different pieces of machinery must be used.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutor-led discussion on the different types of machinery relevant to a range of operations within the industry, for example ploughing, harvesting, seeding, and spraying. The different roles in the sector should be addressed, as well as how the roles differ, for example arable farming compared with livestock farming. Learners spend time researching a range of roles and what the responsibilities would be with regard to the use of machinery. The relevant industry requirements could also be included, for example tractor licences. A broad range of possible machinery should be covered across petrol and diesel engines.

Suggested time: about 10 hours.

Activity: Preparing machinery

Tutor-guided sessions on the procedure and practices used to prepare machinery for safe use. The sessions start with some initial theory, which is then followed for the majority of the time with practical input, focusing on the use of different types of petrol and diesel routine machinery. Learners develop and use pre-start checklists and carry out activities to develop skills in groups, assessing actions and decisions made in their preparations.

Suggested time: about 10 hours.

Activity: Using and maintaining machinery

Staff-led demonstrations/input from external speakers from machinery companies focus on machinery maintenance. Learners are shown how each piece of equipment should be used. This could be through practical demonstrations or videos and other educational sources such as observations. Tutor-led discussions take place before each demonstration to identify when it is appropriate/inappropriate to use each piece.

Once learners have been shown how to use each piece of equipment, they will be required to observe the relevant maintenance procedures before carrying out full routine maintenance covering the unit content. Relevant health and safety considerations should be highlighted throughout.

Suggested time: about 20 hours.

Activity: Operation and aftercare of machinery

Learners are given the opportunity to operate relevant agricultural machinery (which will form part of assessments), firstly with support and then operating each piece independently. It is imperative that learners are shown how to use each piece before being given the opportunity to operate it. The machinery can belong to the establishment or this can be undertaken during visits or while on placement. Tutor sessions on aftercare could be integrated into practical operation sessions for consistency.

Suggested time: about 20 hours.

Essential resources

For this unit, learners will need access to:

- a range of agricultural operations/agricultural machinery, including up-to-date vehicles
- a safe environment in which to operate machinery
- mechanical workshops, tools and equipment.

Links to other units

This unit has strong links to:

- Unit 1: Introduction to Working in Land-based Industries
- Unit 3: Agriculture Work Placement
- Unit 7: Crop Production
- Unit 8: Grass and Forage Crop Production
- Unit 9: Farming and Agricultural Estate Maintenance.

Employer involvement

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

- demonstrations for learners of the range of equipment in regular use in the agriculture sector
- work experience
- visits
- support from local business staff as mentors.

Unit 5: Livestock Health

Level: **2**

Unit type: **Optional**

Assessment type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners develop the skills required to maintain good health in a range of livestock, including routine husbandry and preventative care.

Unit introduction

Do you want livestock to be cared for in the best possible way, maintaining high welfare standards and ensuring that they are happy and healthy throughout their lives? Routine husbandry and preventative care are both of great importance when working with livestock and have a heavy influence on the health status of the animals.

In this unit, you will acquire the knowledge, understanding and skills to meet the husbandry requirements of a range of livestock, kept for a range of purposes. You will learn about the signs of good and poor health, the signs and symptoms of common diseases, and the recognition, treatment and prevention of parasites. We have a duty of care to the livestock that we keep throughout their different life stages.

Depending on the purpose for which livestock are being kept, their nutritional needs and care routines vary, and you will learn about this variation. You will learn about the links between health promotion and record keeping, good health and husbandry, and how to carry out health promotion.

Learning aims

In this unit you will:

- A** Monitor signs of good and ill health in livestock
- B** Maintain health and wellbeing in livestock
- C** Carry out measures for health promotion in livestock.

UNIT 5: LIVESTOCK HEALTH

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Monitor signs of good and ill health in livestock	A1 Signs of good and ill health in livestock A2 The presence and impact of parasites on health	A report on livestock health and how to recognise poor health, disease and parasites.
B Maintain health and wellbeing in livestock	B1 How to maintain good health in livestock B2 Routine husbandry methods and variation in needs B3 Nutritional requirements and variation in needs	A portfolio of evidence, including observation reports, witness testimony, photographic evidence/ video evidence of learners maintaining and promoting health and wellbeing in livestock.
C Carry out measures for health promotion in livestock	C1 The different ways to promote health in livestock C2 The importance of the link between health promotion and record keeping	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/behaviours
<ul style="list-style-type: none">• Routine husbandry• Routine health checking• Carrying out preventative care• Keeping healthcare records	<ul style="list-style-type: none">• Signs of good and poor health• Different husbandry methods• Different methods of preventative care• The importance of record keeping	<ul style="list-style-type: none">• Preparing for work• Developing practical and technical skills• Managing information

Unit content

Knowledge and sector skills

Learning aim A: Monitor signs of good and ill health in livestock

A1 Signs of good and ill health in livestock

- Indicators of good health:
 - eyes, nose, ears, mouth
 - skin, fur, feathers, beak, claws, hooves, feet
 - normal behaviour and bodily functions
 - movement and gait
 - normal temperature, pulse and respiration rates, total physical response (TPR).
- Indicators of poor health:
 - discharge and abnormalities in eyes, nose, ears and mouth
 - abnormalities and conditions to skin, fur, feathers, beak, claws, feet
 - loss of appetite
 - abnormal bodily functions, i.e. diarrhoea, constipation, urinary function
 - lameness, abnormal posture, not weight-bearing
 - cuts, abrasions, lumps, bumps or swellings to the body
 - abnormal temperament or behaviour
 - abnormal TPR rates.
- Body condition scoring and how this is used to determine health status:
 - records of weights and their importance
 - actions taken as a result of changes to weight.
- Recognising signs of foot abnormalities.
- Records associated with health checking, including frequencies and actions.

A2 The presence and impact of parasites on health

- Endoparasites:
 - recognising signs of the presence of, life cycles, and the methods of prevention:
 - tapeworm
 - roundworm
 - flukes
 - protozoa.
- Ectoparasites:
 - recognising signs of the presence of, life cycles, and the methods of prevention:
 - blowfly
 - ticks
 - mites
 - lice
 - fleas
 - flies.

Learning aim B: Maintain health and wellbeing in livestock**B1 How to maintain good health in livestock**

- The five animal needs, their importance and how they impact on maintaining good health in livestock.
- The correct methods to carry out health checks, their frequency and importance.
- The links between good husbandry and hygiene, health and wellbeing.
- Routine maintenance of accommodation and pasture management and its impact on health and wellbeing and the prevention of injuries.

B2 Routine husbandry methods and variation in needs

- Maintaining and monitoring the health and wellbeing of livestock:
 - time and frequency
 - recording systems
 - common signs and symptoms of diseases, disorders and parasites
 - monitoring abnormal behaviour
 - the link between health and production yield.

B3 Nutritional requirements and variation in needs

- The nutrients required to sustain life and good health, and from where the nutrients are obtained within the diet.
- Advantages and disadvantages of different feed types.
- How diet changes throughout an animal's life stages, including young, maintenance, production, lactating, pregnant, stud.
- Different feeding regimes, including ad lib, weighed diet, time-constrained and enrichment.
- Forage and concentrate ratios.
- The importance of good hygiene when feeding livestock.
- Storage of feed and forage and recognition of good and poor quality.
- Planning, monitoring and recording of livestock diets.

Learning aim C: Carry out measures for health promotion in livestock**C1 The different ways to promote health in livestock**

- Defining health promotion and health promotion methods:
 - grooming, shearing, dipping
 - foot paring and foot maintenance
 - husbandry changes to address prevailing conditions
 - use of supplements.
- Records associated with health promotion and their importance in effective health promotion.

C2 The importance of the link between health promotion and record keeping

- What preventative treatments are, what we use them for, and how frequently:
 - vaccination
 - wormers
 - ectoparasitic treatments
 - blood testing.
- Records associated with preventative treatments and the significance and legalities of these records for animals entering the food chain and being used for production.

Transferable skills

Preparing for work

- Communicating effectively to ensure that livestock health is not compromised and that health and wellbeing is the priority.

Developing practical and technical skills

- Demonstrating effective health checking and maintenance of livestock health at all times.

Managing information

- Managing, recording and reporting information to ensure that the paper trail supports livestock health.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Monitor signs of good and ill health in livestock		
A.P1 Identify signs of good and poor health in livestock.	A.M1 Explain the impact of parasites on livestock health.	A.D1 Assess the range of parasite and other health indicators that can be utilised to monitor signs of good and poor health in livestock.
A.P2 Describe indicators of the presence of parasites in livestock.		
Learning aim B: Maintain health and wellbeing in livestock		
B.P3 Provide for appropriate nutritional requirements in livestock.	B.M2Demonstrate effective health checking and nutritional provision for livestock in different scenarios.	B.D2 Evaluate methods of maintaining good health and nutrition in livestock.
B.P4 Demonstrate competent health checking in livestock.		
Learning aim C: Carry out measures for health promotion in livestock		
C.P5 Carry out activities to promote health in livestock.	C.M3 Explain the importance of health promotion and preventative treatments in maintaining good health in livestock.	C.D3 Evaluate health-promotion programmes and systems and their effectiveness.
C.P6 Carry out administration of routine preventative treatments in livestock.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- provide in-depth information on how health indicators compare by livestock species, to cover cattle, sheep, pigs and poultry.

For merit standard, learners will:

- provide information on how parasites have affected the health of at least two contrasting livestock species.

For pass standard, learners will:

- cover the signs of good and poor livestock health, as listed in the unit content
- provide information on parasite indicators relevant to a minimum of two examples each from cattle, sheep, pigs and poultry.

Learning aim B

For distinction standard, learners will:

- confidently carry out animal health checks without assistance
- accurately provide comprehensive information on the costs and benefits of different regimes to maintain livestock health and nutrition
- relate this information to animal health assessments being carried out. Good-quality audiovisual materials can also be used when naturally occurring animal health or abnormal health examples are not available at the time of assessment.

For merit standard, learners will:

- carry out animal health checks with some assistance
- provide detailed information that demonstrates an understanding of how feedstuffs meet the nutritional needs of different livestock species
- cover the abnormal/poor health examples listed in the unit content. These should be in the context of different livestock species, to include a minimum of two examples each from cattle, sheep, pigs and poultry. Good-quality audiovisual materials can also be used when naturally occurring animal health or abnormal health examples are not available at the time of assessment.

For pass standard, learners will:

- carry out health checks on different livestock species in real-life situations with assistance. Good-quality audiovisual materials can also be used when naturally occurring animal health or abnormal health examples are not available at the time of assessment.

Learning aim C

For distinction standard, learners will:

- confidently carry out a variety of health promotion activities
- confidently carry out the administration of a range of preventative treatments.

For merit standard, learners will:

- show, using explanations, a good knowledge and understanding of the importance of both health promotion activities and preventative treatments in maintaining good health in livestock.

For pass standard, learners will:

- administer worming and flea treatments to two different animal species
- show evidence of animal welfare throughout the practical element.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that they meet the assessment requirements of the unit.

Suggested scenario

This scenario requires practical activities with a range of livestock.

You are working as a farm assistant and you have been asked to look into the establishment's current health-promotion activities and preventative treatments. You will need to identify if they are suitable and suggest any additions or amendments to healthcare plans.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

You are working as a representative for a pharmaceutical company and are to give a presentation to farmers about the importance of health promotion and preventative treatments in livestock.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Learners carry out health promotion and preventative treatments in livestock and explain the importance of these in maintaining good livestock health.

Suggested time: about 3 hours.

Activity: Signs of good and poor health

Learners identify the signs of good and poor health in livestock, explaining the link between health and husbandry and the impact this can have on health.

Suggested time: about 4 hours.

Activity: Maintain good health in livestock

The tutor demonstrates health checking and gives examples of different ways to plan to maintain livestock health. Learners demonstrate how to conduct good health checking and decide on nutritional requirements, working safely and effectively throughout.

Suggested time: about 6 hours.

Activity: Carry out health promotion in livestock

The tutor demonstrates and explains different methods of promoting good health and preventing ill health in livestock. Learners demonstrate how to promote health through a range of methods and how to give preventative treatments, working safely and effectively throughout.

Suggested time: about 6 hours.

UNIT 5: LIVESTOCK HEALTH**Essential resources**

For this unit, learners will need access to:

- a range of livestock
- a range of tools and equipment for health promotion
- a range of preventative treatments.

Links to other units

This unit has strong links to:

- Unit 1: Introduction to Working in Land-based Industries
- Unit 3: Agriculture Work Placement
- Unit 4: Machinery Operations in Agriculture
- Unit 6: Livestock Husbandry
- Unit 7: Crop Production
- Unit 8: Grass and Forage Crop Production
- Unit 9: Farming and Agricultural Estate Maintenance.

Employer involvement

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

- guest speakers
- work experience
- own business materials as exemplars
- support from local business staff as mentors.

Unit 6: Livestock Husbandry

Level: **2**

Unit type: **Optional**

Assessment type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners develop skills in how to raise, care for and handle a variety of farm livestock successfully, with a focus on promoting high animal welfare standards.

Unit introduction

Farm livestock species refers to animals reared for meat or secondary products, and includes, primarily, poultry, pigs, cattle (beef and dairy), sheep and goats. These animals are often housed in a variety of different production systems and reared in different ways depending on the outcome desired.

The farming sector requires a confident and competent workforce to care for these animals daily, ensuring legislation is followed and welfare standards are maintained at all times.

In this unit, you will develop the practical skills and experiences needed to work with livestock safely and confidently, including working with sometimes large – and sometimes unpredictable – animals. You will learn how to ensure that high standards of animal welfare are maintained in farming environments at all times and the importance that farming stakeholders and the public attach to this.

You will also improve your knowledge and understanding of the purposes of good farm livestock husbandry.

The skills developed in this unit are essential if you are looking for a career in agriculture, particularly if you are looking to progress into a role such as a general farm worker.

Learning aims

In this unit you will:

- A** Understand the current welfare needs of farm livestock
- B** Handle farm livestock to meet current industry and legislative standards
- C** Carry out routine farm livestock husbandry duties.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Understand the current welfare needs of farm livestock	A1 Breeds of native and non-native farm livestock species A2 Requirements when working with livestock	An information booklet.
B Handle farm livestock to meet current industry and legislative standards	B1 Equipment and personal protective equipment (PPE) B2 Practical animal handling and restraint techniques B3 Practical use of handling and restraint equipment	Authenticated video evidence and job sheets for routine tasks, forming a portfolio of evidence.
C Carry out routine farm livestock husbandry duties	C1 Routine accommodation C2 Routine watering and feeding	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/behaviours
<ul style="list-style-type: none">• Health and safety• Handling farm livestock• Carrying out routine farm tasks when working with livestock• Caring for livestock to meet current animal welfare standards• Feeding and watering livestock	<ul style="list-style-type: none">• Characteristics of livestock breeds• Legislative requirements and welfare standards• The five animal needs• Codes of practice when working with livestock• Farm worker responsibilities• Health and safety• Identifying livestock breeds• Identifying livestock feeds	<ul style="list-style-type: none">• Communication• Managing information• Planning for tasks• Self-management and development• Working with others

Unit content

Knowledge and sector skills

Learning aim A: Understand the current welfare needs of farm livestock

A1 Breeds of native and non-native farm livestock species

- Characteristics of cattle, sheep, goats, pigs and poultry.
- Advantages and disadvantages of breeds for production, handling, safety, cost of rearing and margins associated with products.

A2 Requirements when working with livestock

- Current legislative requirements and codes of practice for working with cattle, sheep, goats, pigs and poultry, including the Animal Welfare Act 2010 and the five animal needs.
- Health and safety for stockpersons working with all classes of livestock, including personal protective equipment (PPE), biosecurity, handling and restraining safety, use and disposal of medical supplies.
- Implications of poor animal welfare for farms and individuals.

Learning aim B: Handle farm livestock to meet current industry and legislative standards

B1 Equipment and personal protective equipment (PPE)

- Selection of suitable equipment for handling and restraint, e.g. protective footwear, overalls, gloves, face mask.
- Correct use of equipment and PPE.
- Assessment of risk(s) to handler and animal prior to handling or restraint, safety and welfare.

B2 Practical animal handling and restraint techniques

- Appropriate techniques for cattle, sheep, goats, pigs and poultry.
- Industry best practice and legislative standards for appropriate handling and restraint of livestock.
- Body condition scoring: scores relating to the body condition of livestock species, use of scoring when managing health and planning husbandry of livestock.
- Routine movement of livestock, including from field to field, field to farm, pens/field to trailer.

B3 Practical use of handling and restraint equipment

- Handling systems, cattle races, weigh scales, electric fencing, crushes and yoke units, pens, gates, hurdles, halters and crates.
- Restraint equipment appropriate to species and which meets best practice requirements.

Learning aim C: Carry out routine farm livestock husbandry duties**C1 Routine accommodation**

- Preparing accommodation for cattle, sheep, goats, poultry and pigs, including choice of suitable accommodation, bedding down, mucking out, cleaning of feeding and water equipment, handling and restraint equipment, waste disposal, assessment of adequate ventilation and shelter.

C2 Routine watering and feeding

- Identification of feed types, including straights, blends, compound feed, forage and fodder.
- Provision of clean, fresh water.
- Identifying suitable water and feeding equipment.
- Completing feed records.
- Storage of feeds (regulations and practical considerations), vermin control.
- Preparation and feeding of feed to cattle, sheep, goats, pigs and poultry.
- Hygiene.

Transferable skills**Communication**

- Communicating with others in tasks.
- Planning practical tasks and verbally communicating actions.

Managing information

- Using information on different breeds to make links to those most suitable for rearing.
- Relating legislation and codes of practice into practical situations.

Planning for tasks

- Giving reasons for using certain methods and techniques and for decisions made.

Self-management and development

- Demonstrating methods of restraint, selection of handling equipment, and moving animals.
- Being safe on the farm, working responsibly, understanding animal welfare standards.

Working with others

- Developing practical and technical skills.
- Undertaking practical husbandry of livestock animals.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Understand the current welfare needs of farm livestock		
A.P1 Outline the characteristics of native and non-native breeds of livestock.	A.M1 Describe how breed choice of native or non-native breeds influences animal welfare, with reference to some understanding of current welfare and health and safety standards.	A.D1 Explain detailed characteristics of livestock breeds and the implications these have on rearing, with reference to current welfare and health and safety standards.
A.P2 Outline current legislative requirements for animal welfare and health and safety with farm livestock.		
Learning aim B: Handle farm livestock to meet current industry and legislative standards		
B.P3 Select appropriate PPE and equipment for handling and restraining livestock species.	B.M2 Demonstrate effective uses of handling and restraining of livestock species.	B.D2 Demonstrate confident use of handling and restraining techniques of livestock species.
B.P4 Perform basic, accurate handling and restraint of livestock species.		
Learning aim C: Carry out routine farm livestock husbandry duties		
C.P5 Carry out basic routine accommodation tasks for different livestock species.	C.M3 Carry out effective routine accommodation, feeding and watering for different livestock species.	C.D3 Confidently carry out routine accommodation, feeding and watering for different livestock species.
C.P6 Carry out basic routine feed and water tasks for different livestock species.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- show an in-depth understanding of the difference between native and non-native breeds of common farm livestock, covering two different groups of farm livestock and choosing from cattle, sheep, pigs or poultry
- detail characteristics of each group, referring to specific breeds within each group, and ensuring a balance between native and non-native breeds
- provide a detailed overview of the impact that legislation and industry standards have on rearing animals, with comprehensive, clear and relevant detailed links made to the current welfare and health and safety standards expected in the chosen groups of farm livestock
- show breadth and depth of knowledge of breed characteristics and the impact of breed choice on welfare and legislative and industry standard requirements
- use technical language accurately.

For merit standard, learners will:

- understand the difference between native and non-native breeds of common farm livestock, covering two different groups of farm livestock and choosing from cattle, sheep, pigs or poultry
- give limited characteristics of each group, with some reference to specific breeds within each group
- provide an overview of the impact that legislation and industry standards have on rearing animals, with limited but accurate links made to the current welfare and health and safety standards expected in the chosen groups of farm livestock
- show breadth of knowledge, with limited depth, of breed characteristics and the impact of breed choice on welfare and legislative and industry standard requirements
- be limited in their use of technical language, with some inaccuracies.

For pass standard, learners will:

- know the difference between native and non-native breeds of common farm livestock, covering two different groups of farm livestock and choosing from cattle, sheep, pigs or poultry
- give basic characteristics of each group, with little reference to specific breeds within each
- provide a brief overview of the impact that legislation and industry standards have on rearing animals, with limited and some inaccurate links made to the current welfare and health and safety standards expected in the chosen groups of farm livestock
- show limited breadth and depth of knowledge of breed characteristics and the impact of breed choice on welfare and legislative and industry standard requirements
- demonstrate basic use of technical language, with some inaccuracies and a limited range of technical language.

Learning aim B

For distinction standard, learners will:

- work, with minimal assistance, to demonstrate technically correct methods and techniques in the handling and restraint of at least two different groups of farm livestock, choosing from cattle, sheep, pigs or poultry
- confidently and accurately handle and restrain following the correct protocols, giving robust reasoning for actions taken in handling and restraint, with clear links being made to animal welfare through the use of excellent and appropriate handling and restraint methods and techniques
- utilise correct handling and restraint, using appropriate judgements on how to handle and restrain two different groups of farm livestock, and discussing all aspects relevant to the species, showing a clear level of competency and accuracy
- show breadth and depth in their understanding of handling and restraint techniques
- use technical language accurately.

For merit standard, learners will:

- work, with greater levels of supervision and with some tutor guidance required for safety, to demonstrate technically correct methods and techniques in the handling and restraint of at least two different groups of farm livestock, choosing from cattle, sheep, pigs or poultry
- require some assistance in handling and restraint following correct protocols, giving relevant reasoning for actions taken in handling and restraint, with limited links being made to promotion of animal welfare, through appropriate handling and restraint methods and techniques
- utilise mostly correct handling and restraint techniques, with limited reasoning
- correctly handle and restrain two different groups of farm livestock, discussing some accurate aspects relevant to the species and showing accuracy in handling and restraint techniques
- show breadth, with limited depth, in their understanding of handling and restraint techniques
- be limited in their use of technical language, with some inaccuracies.

For pass standard, learners will:

- work with little independence, requiring tutor assistance to safely demonstrate technically correct methods and techniques in the handling and restraint of at least two different groups of farm livestock, choosing from cattle, sheep, pigs or poultry
- require much supervision in handling and restraint following the correct protocols, giving basic reasoning for actions taken in handling and restraint, with basic links being made to the promotion of animal welfare
- utilise mostly correct handling and restraint techniques, with no reasoning given for choices made
- correctly handle and restrain two different groups of farm livestock, discussing basic aspects relevant to the species, with some inaccuracies
- show limited breadth and depth in their understanding of handling and restraint techniques
- be basic in their use of technical language, with some inaccuracies and using a limited range of technical language.

Learning aim C**For distinction standard**, learners will:

- work, with limited assistance, to complete routine accommodation, feeding and watering tasks for at least two different groups of farm livestock, choosing from cattle, sheep, pigs or poultry
- demonstrate a clear and robust ability to complete routine accommodation tasks listed in the unit content, with technically accurate skills and to a greater level of independence, with a detailed knowledge of the methods and techniques required to carry out routine accommodation tasks, including feeding and watering
- select appropriate resources and carry out all tasks effectively, ensuring the needs of the livestock are met in accordance with legislative requirements
- show breadth and depth in their understanding of routine accommodation, feeding and watering techniques
- use technical language accurately.

For merit standard, learners will:

- work, with some tutor assistance, to complete routine accommodation, feeding and watering tasks for at least two different groups of farm livestock, choosing from cattle, sheep, pigs or poultry
- demonstrate an ability to complete routine accommodation tasks listed in the unit content, with mostly technically accurate skills and with limited independence and knowledge of the methods and techniques required to carry out routine accommodation tasks, including feeding and watering
- select mostly appropriate resources and carry out all tasks, showing some inaccuracies and unclear actions, but ensuring the needs of the livestock are met in accordance with legislative requirements
- show breadth, with limited depth, in their understanding of routine accommodation, feeding and watering techniques
- be limited in the use of technical language, with some inaccuracies.

For pass standard, learners will:

- work, with limited independence and much need for tutor assistance, to complete routine accommodation, feeding and watering tasks for at least two different groups of farm livestock, choosing from cattle, sheep, pigs or poultry
- demonstrate an ability to complete routine accommodation tasks, listed in the unit content, with basic skills and technical inaccuracies, and with a basic knowledge of the methods and techniques required to carry out routine accommodation tasks, including feeding and watering
- select basic resources and carry out all tasks, showing some inaccuracies and unclear actions, but ensuring the needs of the livestock are met in accordance with legislative requirements
- show limited breadth and depth in their understanding of routine accommodation, feeding and watering techniques
- be basic in the use of technical language, with some inaccuracies and using a limited range of technical language.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that they meet the assessment requirements of the unit.

Suggested scenario

You have recently been employed on a mixed livestock farm as a stockperson, working with the farm livestock. Your supervisor has asked you to research different native and non-native breeds of livestock for beef and dairy cattle, pigs, poultry and sheep. You need to produce a detailed table listing the advantages and disadvantages for each breed and the implications for animal welfare and health and safety. Your main role is the routine care of the livestock and their accommodation on a daily basis. These tasks should be carried out in a farm setting. As records are very important on farms, you need to complete weekly job sheets recording your activities: handling and restraint, routine accommodation tasks, and the feeding and watering of two farm livestock species. Use video footage, witness statements and observation records to supplement the detailed job sheets and provide further evidence of your work.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

Use two different livestock species from the unit content.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Learners work on a range of tasks to identify native and non-native breeds of farm livestock. Learners then make links to the suitability of the different breeds for rearing as production animals, discussing the advantages and disadvantages of breeds for production, handling, safety, cost of rearing and the margins associated with products.

Practical visits to breed centres and farms would enrich this part of the unit.

Suggested time: about 6 hours.

Activity: Legislation, codes of practice and animal welfare standards

Learners work on activities to explore the range of legislation and codes of practice, making clear links to the differences between the law and codes of practice. Learners explore the relevant aspects of the legislation and codes of practice that relate directly to working practically with farm livestock, ensuring that responsibilities under law are clear so that they may be adhered to.

Suggested time: about 6 hours.

Activity: Livestock handling, restraint and health checking

Learners are given practical demonstrations and practise sessions by tutors or professionals from the sector in handling livestock appropriately while maintaining welfare.

Learners experience working in a farm setting to develop practical skills in a routine task-based setting. They work with two contrasting livestock species such as beef cattle and pigs, or sheep and poultry.

Learners use standard record forms to document animal health checks and these should be repeated routinely to develop skills in this process, along with body condition scoring where appropriate.

Learners give practical demonstration of the use of handling and restraint equipment for different species of livestock in real-life situations. The routine movement of animals, including from field to field, field to farm, pens/field to trailer, can be completed as part of routine farm tasks over the course of the year.

Suggested time: about 11 hours.

Activity: Routine livestock accommodation tasks

Learners are given practical demonstrations by tutors and professionals from the sector on the correct methods and techniques to be used for accommodation tasks, supported by short classroom sessions. Learners then work in practical groups and rotate routine practical tasks on the farm over the course of the year, completing tasks as appropriate in the agricultural calendar. Learners complete job sheets and record video evidence as final assessments for these routine tasks.

Suggested time: about 11 hours.

Activity: Routine livestock feeds, feeding and watering tasks

Learners are given practical demonstrations by tutors and professionals from the sector on the correct methods and techniques used for feeding and watering tasks, supported by short classroom sessions. Learners then work in small groups to carry out practical routine feeding and watering of livestock on the farm, using a range of equipment, methods and techniques in doing so.

Learners receive practical sessions in feed identification, and receive formative assessments of their progress and ability to accurately identify, select and store feeds for livestock across the species, as listed in the unit content.

Suggested time: about 6 hours.

UNIT 6: LIVESTOCK HUSBANDRY**Essential resources**

For this unit, learners will need access to:

- working livestock farms which utilise handling and restraint equipment
- livestock species, such as cattle, sheep, pigs and poultry.

Links to other units

This unit has strong links to:

- Unit 5: Livestock Health
- Unit 9: Farming and Agricultural Estate Maintenance.

Employer involvement

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

- guest speakers
- design/ideas to contribute to unit assignment/case study/project materials
- visits to see specialist breeds or, for example, rare-breed farms
- work experience
- own business materials as exemplars
- support from local business staff as mentors.

Unit 7: Crop Production

Level: **2**

Unit type: **Optional**

Assessment type: **Internal**

Guided learning hours: 30

Unit in brief

Learners develop skills in crop identification and establishment, maintaining and monitoring the health of crops during the growing season, and the safe use of machinery and equipment.

Unit introduction

Working in agriculture entails being involved in the production and maintenance of different crops – crops which you may see in everyday use such as grass, cereals, root vegetables or a range of alternative products. As a result, the ability to identify and apply crop husbandry practices when establishing and maintaining a range of crops is extremely important and requires specific skills.

In this unit, you will learn how to recognise some of the different crops grown in the UK as well as the products that come from them. You will develop your understanding of crop establishment techniques, crop planting and nutrient supply, and learn how to monitor their growth before looking at how they are stored. You will safely use machinery and equipment to carry out establishment techniques, to maintain crop health and to prepare for the storage of harvested crops.

The skills developed in this unit are essential if you are looking for a career in agriculture, particularly if you are looking to progress into a role such as a general farm worker.

Learning aims

In this unit you will:

- A** Explore the preparation and establishment of crop species
- B** Maintain the growth of crops during the growing season
- C** Prepare for harvesting and storage of crops.

UNIT 7: CROP PRODUCTION

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Explore the preparation and establishment of crop species	A1 The different types of crops A2 Preparation and establishment of crops	A report on the preparation and establishment of different crops.
B Maintain the growth of crops during the growing season	B1 Monitor and maintain the growth and development of crops B2 Plant nutrient requirements	A portfolio of work evidencing learners' explanations and practical skills in monitoring and maintaining the growth of crops, preparing for harvesting and storing crops, including use of relevant machinery and equipment.
C Prepare for harvesting and storage of crops	C1 Prepare and monitor storage areas	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/behaviours
<ul style="list-style-type: none">• Identification of crops• Monitoring the growth of crops• Recognise weeds, pests and diseases• Monitoring stored crops• Use equipment and machinery• Health and safety – safe use of machinery	<ul style="list-style-type: none">• Types of crops and their uses• Methods of establishing crops• Methods of maintaining crops• Nutrient requirements of crops• Methods of storing crops	<ul style="list-style-type: none">• Communication• Working with others• Thinking skills/adaptability• Problem solving

Unit content

Knowledge and sector skills

Learning aim A: Explore the preparation and establishment of crop species

A1 The different types of crops

- Identification of crop plants and products, including:
 - combinable: cereals, oilseeds and pulses
 - forage, e.g. legumes, forage maize
 - grasses, e.g. timothy, rye grass, fescue
 - root crops, e.g. turnips, potatoes, sugar/fodder beet
 - field vegetables, e.g. carrots, onions, cabbage
 - fruit, e.g. strawberries, blueberries
 - alternative crops: energy crops (miscanthus), sunflower, borage, manures (vetch, mustard).
- Uses of different crops and reasons for growing them, e.g. animal feed, human consumption, manures, biofuels.
- Factors affecting choice of crops, including soil type, place in rotation, climate, market, topography.

A2 Preparation and establishment of crops

For a range of crop types, e.g. combinable, roots, pulses, alternative, field vegetables.

- Crop-growing cycles, e.g. autumn and spring sown crops (time of sowing), stages of growth, maturity at harvest.
- Site preparation and seedbed requirements for a range of crops, including consideration of previous crops, crops to be grown, treatments, bed forming, seed rates.
- Establishment methods for a range of crops, e.g. direct drilling, strip tillage, primary and secondary cultivations, seedbed preparation.
- Cultivation equipment, e.g. ploughs, harrows, cultivators.
- Factors for the establishment and growth of crops, including:
 - soil types and structure
 - time of sowing, depth and seed rate, plant spacing
 - topography, weather, rainfall
 - pH of soil and nutrients.
- Soil sampling and pH analysis, e.g. soil analysis, BDH kit, pH test.
- Health and safety, e.g. safe working practices, PPE, risk assessment.

Learning aim B: Maintain the growth of crops during the growing season**B1 Monitor and maintain the growth and development of crops**

For a range of crop types, e.g. combinable, roots, pulses, alternative, vegetables.

- Identify signs of good health in crops, e.g. leaf colour, uniform growth.
- Identify signs of problems and control methods for a range of crops, including:
 - pests, e.g. aphids, pollen beetle, pigeons, rabbits, deer, slugs
 - diseases, e.g. mildew, blight, yellow rust, *septoria*, eyespot
 - weeds at different growth stages, e.g. fat hen, chickweed, cleavers, couch, wild oats, blackgrass
 - waterlogging and its impact on crops.
- Monitor crop growth and development, e.g. stages of growth, weeds, pests and diseases, readiness for harvesting.
- Current relevant legislation and regulation, e.g. environmental issues, waste disposal, operator licences, Nitrate Vulnerable Zones (NVZs), the Control of Substances Hazardous to Health Regulations 2002 (COSHH).

B2 Plant nutrient requirements

For a range of crop types, e.g. combinable, roots, pulses, alternative, vegetables.

- Types of nutrients and sources, including major nutrients, e.g. nitrogen, potassium and potash, and minor nutrients, e.g. copper, manganese, boron.
- Methods of maintaining nutrients, e.g. injection, spreaders, sprayers.
- Nutrient requirements of different crops and timing of application, e.g. seedbed, spring (tillering), grain filling.
- Nutrient deficiencies, e.g. discolouration of plants, lack of establishment.
- Health, safety and legislation, e.g. operator certificates and requirements, COSHH, NVZs.

Learning aim C: Prepare for harvesting and storage of crops**C1 Prepare and monitor storage areas**

- Methods of storing crops, e.g. clamps, grain silos/stores, hardstanding areas.
- Prepare storage areas, e.g. removing old crops, fumigation, cleaning, checking walls, floors.
- Monitor stored crops for:
 - pests and disease, e.g. rodents, birds
 - deterioration, e.g. mould, sprouting
 - moisture content and temperature.
- Maintain crops in store, e.g. temperature control, protection from frost, pest and disease control.
- Relevant legislation, e.g. health and safety, appropriate PPE, waste disposal.

Transferable skills

Communication

- Describing the types of and reasons for growing crops.
- Communicating with peers or colleagues.

Working with others

- Carrying out field operations.

Thinking skills/adaptability

- Developing the skills to establish and monitor crops.
- Following instructions and putting skills into practice.

Problem solving

- Carrying out practical crop monitoring.
- Providing options to resolve problems.
- Selecting the correct machinery or equipment.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore the preparation and establishment of crop species		
A.P1 Describe crops, their uses and products.	A.M1Explain in detail the preparation and establishment requirements for two different crops.	A.D1 Evaluate factors that influence the preparation and establishment of contrasting crops, linking this to the type and use of the crop.
A.P2 Describe the establishment of two different crops.		
Learning aim B: Maintain the growth of crops during the growing season		
B.P3 Identify pests, diseases and weeds related to crops.	B.M2Carry out crop maintenance tasks effectively, assessing their growth and development.	B.D2 Carry out crop maintenance tasks confidently, justifying remedial actions to support their growth and development.
B.P4 Carry out monitoring and maintenance tasks for crops during the growing season to promote growth.		
Learning aim C: Prepare for harvesting and storage of crops		
C.P5 Carry out the safe preparation of storage areas for harvested crops.	C.M3 Carry out the preparation of storage areas and the monitoring of stored crops effectively, explaining the importance of doing so.	C.D3 Carry out the preparation of storage areas and the monitoring of stored crops confidently, justifying remedial actions to maintain the quality of the crops.
C.P6 Monitor stored crops.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- compare and contrast the different uses of crops
- identify ten crops and their products
- provide comprehensive information for two different crops on suitable seedbed requirements, calculating appropriate seed rates, and how site preparation, establishment method, soil type, pH and timing influence crop establishment
- use accurate agricultural terminology throughout.

For merit standard, learners will:

- provide information on how the choice of crop is influenced by its intended use
- identify ten crops and their products
- provide information, for two crops, on suitable seedbed requirements, how the cultivation method, previous cropping, soil type, topography and nutrient requirements influence crop establishment
- use appropriate agricultural terminology throughout.

For pass standard, learners will:

- provide limited information on a minimum of ten commonly grown crops and their intended use
- provide some description of suitable seedbed requirements and the cultivation method for two crops
- provide limited information on factors that can influence the establishment of the crops
- use some relevant agricultural terminology, but there may be some omissions and irrelevancies.

Learning aim B

For distinction standard, learners will:

- identify three pests, three diseases and three weeds, giving in-depth guidance on their management and effect on yield
- monitor crop growth during the growing season, producing a detailed record of findings and identifying the different stages of growth
- recommend and justify appropriate actions to promote the growth of crops, accurately calculating the major nutrient requirement of a crop and recognising the likely deficiency symptoms
- identify how pH affects nutrient availability, and the effect of waterlogging on plant growth
- use machinery and equipment confidently to promote the growth of crops, justifying the choice of machinery used.

For merit standard, learners will:

- identify three pests, three diseases and three weeds, providing guidance on their management and effect on yield
- monitor crops during the growing season
- identify some nutrient requirements, how to calculate nutrient requirements and the optimum soil pH for a crop, but will not be able to relate pH to nutrient availability
- identify nutrient deficiency symptoms, including some minor nutrients, and the symptoms of waterlogging
- use machinery and equipment safely to promote the growth of crops, providing limited justification for the choice of machinery used.

UNIT 7: CROP PRODUCTION

For pass standard, learners will:

- identify three pests, three diseases and three weeds
- monitor crops during the growing season
- show some knowledge of the nutrients required and calculate nutrient requirements, identifying the pH of soil
- provide limited suggestions of actions to promote the growth of crops
- use machinery and equipment safely to carry out straightforward tasks to maintain the growth of crops.

Learning aim C

For distinction standard, learners will:

- select and use machinery, tools and equipment confidently to carry out the preparation of storage areas ready for harvesting operations within the limits of their responsibility, justifying the actions taken
- confidently monitor a minimum of two different stored crops, producing a detailed record of observations and actions taken to maintain the quality of the stored crop, and using initiative within the limits of their responsibility
- compare and contrast storage methods, explaining how to maintain produce in store and the type of monitoring required.

For merit standard, learners will:

- demonstrate the safe use of machinery, tools and equipment to carry out the preparation of storage areas ready for harvesting operations, showing some use of initiative within the limits of their responsibility
- monitor a minimum of two different stored crops, producing a record of observations and actions taken to maintain the quality of the stored crop, using some initiative within the limits of their responsibility
- provide some explanation of the various storage methods, how to maintain produce in store, and the type of monitoring required.

For pass standard, learners will:

- use machinery and equipment safely to carry out routine storage preparations to meet given objectives, showing little initiative
- monitor a minimum of two different stored crops, producing a brief record of findings with no or limited links to the actions to be taken to maintain quality
- demonstrate knowledge of most common storage types, and that stores require monitoring for temperature, moisture, pests and diseases.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that they meet the assessment requirements of the unit.

Suggested scenario

You have been monitoring the condition of two crops in storage and now your manager has asked you to assist in the preparation and establishment of two crops: one could be a cereal crop and one potatoes. He has asked you what factors will influence the establishment of the crop, what should be considered when preparing the seedbed and how to calculate the seed rates.

Once the crop is established you will be expected to monitor the health and development of the crops. This will include carrying out pest, disease and weed presence and control, monitoring the health and growth stages of the crops, identification of the major nutrients and the timing of applications. You will need to choose and use machinery and equipment safely to undertake required maintenance tasks and prepare storage areas ready for receiving this year's harvested crops.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

The same scenario can be used but different crops must be chosen for a retake of the unit.

Assessing the unit through work placement

This unit can be assessed through work placement, particularly the maintenance and monitoring of crops during the growing season and during storage. Therefore, employers must be made aware of this and provide relevant opportunities for this type of work and be able to provide witness testimonies as evidence.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutor-led discussion on the different crops, what they are used for and their products. Real examples or pictures will be required to support the identification. This should be followed up with a farm walk/visit to look at the crops in the field or storage, depending on the time of year. The growing cycle of crops can be introduced, focusing on the main stages such as sowing, growth and harvesting.

Suggested time: about 3 hours.

Activity: Identification and establishment of crops

Tutor-led visits/farm walks so learners can see a range of crops in different stages of their growing cycle and, where possible, they can observe the establishment of a range of different crops, for example potatoes and cereals. Learners test soil for pH, identify soil types and soil profiles. Learners are given a range of crops in different stages of growth to identify.

Learners research the methods of seedbed preparation for a range of crops, the machinery used and the factors that influence the cultivations.

Learners use their knowledge to prepare seedbeds during practical lessons, for example ploughing, harrowing or any other cultivation required, depending on the crop and area.

Suggested time: about 8 hours.

Activity: Monitoring and maintaining crop growth

Tutor-led discussion on the signs that indicate healthy crop growth and development, the signs of problems for a range of crops and the methods for controlling these. This should include the signs of waterlogging and its impact on growth. Any relevant health and safety issues that will impact on the monitoring and maintenance should also be discussed.

Learners should be able to identify different weeds, pests and diseases for a range of crops.

Learners research the growth and development for a range of different crops, for example cereals, legumes and root crops, identifying their signs of readiness for harvesting.

Learners use this knowledge to carry out the monitoring of crops during the growing season, noting the different growth stages and weeds, pests and diseases present.

Suggested time: about 8 hours.

Activity: Crop nutrient requirements

Tutor-led discussion on the sources, types and methods of application of nutrients for a range of crops. Health and safety and relevant legislation should also be discussed. Learners research the signs of nutrient deficiencies and factors that affect this. They should monitor the crops for nutrients (this could be included in part of the overall monitoring of crops in the previous activity).

Learners undertake practical sessions to carry out relevant maintenance tasks, depending on the crops grown on the college farm. A local farm could be used to widen the breadth of skills for learners. These tasks could include calculating fertiliser and nutrient requirements or using relevant machinery and equipment.

Suggested time: about 6 hours.

Activity: Storing and monitoring of stored crops

Tutor-led session on the different storage methods used for different crops, the monitoring that is required and relevant legislation.

Learners complete the preparation of storage areas using the relevant machinery and equipment. Learners research the storage requirements of two crops and the impact on the quality of the crop when the storage area is not prepared correctly.

Learners will demonstrate the monitoring of stored crops over a period of time, preparing a record of their findings. Their record should include notes on pests and disease, deterioration, moisture content and temperature. They should also include notes on actions taken.

Suggested time: about 4 hours.

UNIT 7: CROP PRODUCTION**Essential resources**

For this unit, learners must have access to:

- a range of crops, such as combinables, roots, pulses, alternative, vegetables
- access to local farms to observe other crops not grown on the college farm
- a range of cultivation, planting, fertiliser application and other machinery and equipment required to maintain crop growth
- storage areas for harvested crops.

Links to other units

This unit has strong links to:

- Unit 1: Introduction to Working in Land-based Industries
- Unit 2: Introduction to Plant and Soil Science
- Unit 3: Agriculture Work Placement
- Unit 4: Machinery Operations in Agriculture
- Unit 8: Grass and Forage Crop Production.

Employer involvement

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

- farm visits where learners can experience a range of crops and their monitoring
- guest speakers who could talk about crop walking and monitoring for disease, pest, weeds and nutrient status
- design/ideas to contribute to unit assignment/case study/project materials
- work experience that can give learners the opportunity to develop their skills further in the establishment and maintenance of crops during the growing season and preparation of storage areas.

Unit 8: Grass and Forage Crop Production

Level: **2**

Unit type: **Optional**

Assessment type: **Internal**

Guided learning hours: **30**

Unit in brief

Learners develop skills in grass and forage crop identification, and establishment and maintenance of crops using machinery and equipment safely.

Unit introduction

Grass and forage crops provide livestock with food all year round: a process only made possible through their conservation. It is crucially important that agricultural workers develop the correct skills to grow these crops to ensure the livestock eating them maintain their productivity. They need strong practical skills to work competently and safely to ensure optimum grass and forage crop growth for use with farms and livestock. Grass and forage can also be part of a farm's crop rotation, providing a break from growing other crops.

In this unit, you will learn how to recognise some of the different grass and forage crops grown locally and in the UK as well as the purpose of good grass and forage crop husbandry. You will develop an understanding of how grass and forage crops are established and how to monitor their health and growth, before looking at how they are harvested and stored. You will use machinery and equipment throughout the life cycle of the crops in activities such as preparing seedbeds, harrowing, rolling established grass and maintaining forage for grazing, while learning about the importance of working safely in crop-based environments.

The skills developed in this unit are essential if you are looking for a career in agriculture, particularly if you are looking to progress into a role such as a general farm worker.

Learning aims

In this unit you will:

- A** Explore the preparation and establishment of forage crops
- B** Maintain the growth of forage crops for grazing or conservation
- C** Prepare for harvesting and storage of forage crops.

UNIT 8: GRASS AND FORAGE CROP PRODUCTION

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Explore the preparation and establishment of forage crops	A1 The different types of grass and forage crops A2 Preparation and establishment of forage crops	A report on the preparation and establishment of forage crops.
B Maintain the growth of forage crops for grazing or conservation	B1 Monitor the growth and development of forage crops B2 Maintenance of healthy forage crops during the grazing season	A portfolio of work evidencing learners’ explanations and practical skills in monitoring and maintaining the growth of crops for grazing or conservation, preparing for harvesting and storing crops, including the safe use of relevant machinery and equipment.
C Prepare for harvesting and storage of forage crops	C1 Prepare and monitor storage areas	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/behaviours
<ul style="list-style-type: none">• Identification of grass and forage crops• Monitoring the growth of forage crops• Monitoring stored crops• Use equipment and machinery• Health and safety – safe use of machinery	<ul style="list-style-type: none">• Types of grass and forage crops and their uses• Methods of establishing forage crops• Methods of maintaining forage crops• Methods of storing forage crops	<ul style="list-style-type: none">• Communication• Working with others• Thinking skills/adaptability• Problem solving

Unit content

Knowledge and sector skills

Learning aim A: Explore the preparation and establishment of forage crops

A1 The different types of grass and forage crops

- Forage crops, to include grass as well as other forages, e.g. lucerne, maize, rape, roots.
- Reasons and uses of grass and forage crops: conservation, e.g. hay, silage, haylage, grazing, improving soil structure, break/catch crop.
- Types of grassland, e.g. rough grassland, permanent grassland, temporary pasture.
- Identification of grass seed and plants, including perennial ryegrass, Italian ryegrass, timothy, fescue, and cocksfoot.
- Identification of forage crop seed and plants, including clover, lucerne, maize, brassicas, e.g. kale, forage rape and root crops, e.g. fodder beet, turnips.
- Life cycles of grass and forage crops, including time of sowing, stages of growth, annual grass growth curve, maturity at harvest.

A2 Preparation and establishment of forage crops

- Site preparation and seedbed requirements for forage crops, including:
 - consideration of previous crops, treatments and crop to be grown
 - cultivations and machinery used, e.g. subsoiling, ploughing, disking, harrowing.
- Methods of establishment, e.g. undersowing, drilling, broadcast, slot seeding.
- Factors affecting establishment of forage crops, including:
 - soil types and structure, e.g. clay, sandy, silt, loam
 - time of sowing (season), depth and seed rate
 - topography, weather, drainage, temperature
 - pH of soil and lack of nutrients.
- Health and safety at work, e.g. safe working practices, Nitrate Vulnerable Zones (NVZs).

Learning aim B: Maintain the growth of forage crops for grazing or conservation

B1 Monitor the growth and development of forage crops

- Identification of signs of problems in forage crops, including:
 - pests, e.g. deer, moles, birds, rabbits, slugs, wireworm and leatherjackets
 - diseases, e.g. crown rust in grass, damping off in brassicas
 - common weeds, e.g. creeping thistle, cleavers, docks, chickweed, ragwort, buttercup, nettles
 - nutrient deficiencies, e.g. discolouration of plant.
- Identification of different stages of crop growth, including vegetative phase, first leaf, tillering and reproductive stage, seed head.
- Monitoring of forage crop growth, including sward height, sward and crop deterioration, weeds and pests, readiness for harvesting.

UNIT 8: GRASS AND FORAGE CROP PRODUCTION

B2 Maintenance of healthy forage crops during the grazing season

- Maintenance operations and machinery used, e.g. rolling, harrowing, topping and nutrient application.
- Grazing management, including:
 - avoiding over- and undergrazing, e.g. stocking rates
 - fencing, e.g. permanent, temporary, electric
 - monitoring of grazed crops and livestock, e.g. the quantity and quality of forage crops is appropriate, digestibility value of grass, poaching.
- Suitable grazing patterns for grassland and forage crops, including strip, zero, rotational.
- Plant nutrient requirements, timings and methods of application, e.g. nitrogen, phosphate, potassium.
- Health and safety:
 - risk assessment
 - safe use of equipment and machinery.
- Relevant legislation, e.g. environmental issues, waste disposal, operator licences, NVZs, the Control of Substances Hazardous to Health Regulations 2002 (COSHH).

Learning aim C: Prepare for harvesting and storage of forage crops**C1 Prepare and monitor storage areas**

- Methods of storing grass and forage crops, e.g. clamps, silage towers, hardstanding areas, wrapped bales, barns.
- Prepare silage clamps and standing areas, e.g. removing old silage, cleaning, checking walls, floor, sheeting.
- Monitor conserved grass or forage crops for:
 - pests and disease, e.g. rodents, birds
 - deterioration, e.g. air ingress, mould
 - quantity, e.g. amount in store.
- Assessment of conserved forage, e.g. colour, smell, texture, taste, analysis.
- Relevant legislation, e.g. health and safety, appropriate personal protective equipment (PPE), waste disposal.

Transferable skills**Communication**

- Describing the types of and reasons for growing forage crops.
- Communication with peers or colleagues.

Working with others

- Carrying out field operations.

Thinking skills/adaptability

- Developing the skills to establish and monitor crops.
- Following instructions and putting them into practice.

Problem solving

- Carrying out practical crop assessment.
- Providing options to resolve problems.
- Selecting the correct machinery or equipment.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Explore the preparation and establishment of forage crops		
A.P1 Describe forage crops and their uses.	A.M1 Explain in detail the preparation and establishment requirements for contrasting forage crops.	A.D1 Evaluate factors that influence the preparation and establishment of contrasting forage crops, linking this to the type and use of the crop.
A.P2 Describe the establishment of two different forage crops.		
Learning aim B: Maintain the growth of forage crops for grazing or conservation		
B.P3 Identify pests, diseases and weeds related to forage crops.	B.M2 Carry out forage crop maintenance tasks effectively, assessing their growth and development.	B.D2 Carry out forage crop maintenance tasks confidently, justifying remedial actions to support their growth and development.
B.P4 Carry out monitoring and maintenance tasks for forage crops to promote growth.		
Learning aim C: Prepare for harvesting and storage of forage crops		
C.P5 Carry out the safe preparation of storage areas for harvested forage crops.	C.M3 Carry out the preparation of storage areas and the monitoring of stored crops effectively, explaining the importance of doing so.	C.D3 Carry out the preparation of storage areas and the monitoring of stored crops confidently, justifying remedial actions to maintain the quality of the crops.
C.P6 Monitor stored forage crops.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- compare and contrast the different uses of grass and forage crops
- identify at least three grass and three forage crops in their seed and vegetative stage
- provide comprehensive information on how site preparation, establishment method, life cycle, soil type, topography, timing and pH influence grass and forage crop establishment
- use accurate agricultural terminology throughout.

For merit standard, learners will:

- provide information on how the choice of grass and forage crop is influenced by its intended use
- identify three grass and three forage crops in their seed and vegetative stage
- provide information on how the cultivation method, previous cropping, soil type, topography and nutrient requirements influence crop establishment
- use appropriate agricultural terminology throughout.

For pass standard, learners will:

- identify three grass and three forage crops in their vegetative stage and provide limited information on their uses
- provide some description of the establishment techniques for two contrasting forage crops
- provide limited information on factors that can influence the establishment of the contrasting forage crops
- use some relevant agricultural terminology, but there may be some omissions and irrelevancies.

Learning aim B

For distinction standard, learners will:

- monitor forage crop growth during the growing season, producing a detailed record of findings, and identifying the different stages of growth and appropriate nutrient requirements
- recommend and justify appropriate actions to promote the growth of forage crops
- identify three pests, three diseases and three weeds, giving in-depth guidance on their management
- demonstrate effective grazing management tasks to a high degree of accuracy to meet given objectives, showing initiative within their responsibility
- use machinery and equipment confidently to promote the growth of forage crops, justifying the choice of machinery used.

For merit standard, learners will:

- monitor forage crops during the growing season
- identify some nutrient requirements and the relevant growth stages
- recommend some actions to promote the growth of forage crops
- identify three pests, three diseases and three weeds, providing guidance on their management
- demonstrate grazing management tasks to meet given objectives, showing some use of initiative
- use machinery and equipment safely to promote the growth of forage crops, providing limited justification for the choice of machinery used.

For pass standard, learners will:

- monitor forage crops during the growing season
- show some knowledge of the nutrients required
- provide limited suggestions of actions to promote the growth of forage crops
- identify three pests, three diseases and three weeds, showing some knowledge of the methods used to manage them
- demonstrate grazing management tasks to meet given objectives, showing little use of initiative
- use machinery and equipment safely to carry out straightforward tasks to maintain the growth of forage crops.

Learning aim C

For distinction standard, learners will:

- select and use machinery, tools and equipment confidently to carry out the preparation of storage areas ready for harvesting operations within the limits of their responsibility, providing comprehensive reasoning for the actions taken
- compare and contrast methods of conservation, including how they impact on the quality of the harvested crop
- monitor a minimum of two different stored crops, producing a detailed record of observations and actions taken to maintain the quality of the stored crop, using initiative within the limits of their responsibility.

For merit standard, learners will:

- demonstrate the safe use of machinery, tools and equipment to carry out the preparation of storage areas ready for harvesting operations, showing some use of initiative within the limits of their responsibility
- provide some information on how conservation methods impact on the quality of the harvested crop
- monitor a minimum of two different stored crops, producing a record of observations and actions taken to maintain the quality of the stored crop, using some initiative within the limits of their responsibility.

For pass standard, learners will:

- use machinery and equipment safely to carry out routine storage preparations to meet given objectives, showing little initiative
- demonstrate knowledge of the methods of conservation with limited links to the impact on the quality of the harvested crop
- monitor a minimum of two different stored crops, producing a brief record of findings but with limited or no links to the actions to be taken to maintain quality.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that they meet the assessment requirements of the unit.

Suggested scenario

Your boss has asked you to explore the possible forage crops that could be grown next year on the farm. She wants to know what the preparation and establishment methods for two different crops are, what she can use the crops for, the monitoring and maintenance requirements during the season and how they can be stored. You will be expected to demonstrate identification of the different crops as well as monitoring and maintaining the chosen forage crop during the growing season. You must choose and use machinery and equipment safely to undertake required maintenance tasks and to prepare storage areas prior to harvesting.

Your boss is pleased with the way you have carried out the monitoring of the stored crops on the farm where you work. She now wants you to hand this over and has asked you to show the new agricultural apprentice how to monitor the crops, what they need to look for and to explain the importance of monitoring to stored crops.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

The same scenario can be used but learners must use different forage crops in their examples.

Assessing the unit through work placement

This unit can be assessed through work placement, particularly the maintenance and monitoring of forage crops during the growing season and during storage. Therefore, employers must be made aware of this and provide relevant opportunities for this type of work and be able to provide witness testimonies as evidence.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Tutor-led discussion of the different types of grass and forage crops, what they are used for and the distinctive features used to identify them. Learners discuss the life cycles of forage crops, including main timings such as sowing, promotion of growth and harvesting. This could be followed up with a farm walk to look at the crops in the field. Weeds, pests and diseases in the forage crops should be pointed out as an introduction at this point.

Suggested time: about 3 hours.

Activity: Identify forage crops and their establishment methods

Tutor-led visits to local farms so that learners can see a range of grass and forage crops growing and, where possible, observe establishment of these crops. Soil profiles could be dug so that learners can see different soil types and carry out pH tests. Learners are given a range of forage crops in the seed and plant form to identify.

Learners research the different methods of establishment and machinery used for grass and forage crops and the factors that influence choices.

Learners use their knowledge in seedbed preparation activities during practical lessons, such as ploughing or other seedbed cultivations relevant to the forage crop and local area.

Suggested time: about 8 hours.

Activity: Monitor forage crops

Tutor-led activity to discuss the monitoring of forage crops and what to look for, including signs of nutrient deficiency. Learners' discussions should include the identification and control of weeds, pests and diseases.

Learners research the stages of growth for different forage crops.

Learners use this knowledge to carry out monitoring of forage crops during the growing season, noting the different growth stages and weeds, pests and diseases present.

Suggested time: about 6 hours.

Activity: Maintain forage crops

Learners discuss, in groups, the maintenance requirements of growing forage crops, for example rolling, harrowing, topping and nutrient application and grazing management.

Learners should research any relevant health and safety or legislative requirements that may influence what they do or the way in which they work.

Learners undertake practical sessions to carry out relevant maintenance tasks, depending on the forage crops grown on the college farm. A local farm could be used to widen the breadth of skills for learners. These tasks could include calculating fertiliser and nutrient requirements, using machinery and equipment to apply fertilisers, control weeds, pests or diseases, assessing grazed forage for over- or undergrazing, poaching, moving temporary fencing.

Suggested time: about 8 hours.

UNIT 8: GRASS AND FORAGE CROP PRODUCTION

Activity: Preparing storage areas and monitoring forage crops in storage

Learners complete the preparation of storage areas using the relevant machinery and equipment. Learners research the storage requirements of two crops and the impact on the forage crop of not preparing the area correctly.

Learners demonstrate the monitoring of stored forage crops over a period of time, preparing a record of their findings. Their record should include notes on the quality and quantity of the forage crops, any evidence or sightings of vermin, or any deterioration. They should also include notes on actions taken.

Suggested time: about 4 hours.

Essential resources

For this unit, learners will need access to:

- a range of forage crops, such as grass, maize, root crops, lucerne, kale etc.
- local farms to observe other crops not grown on the college farm
- a range of cultivation, planting, fertiliser application and other machinery and equipment required to maintain forage crop growth
- grazing crops
- storage areas for harvested crops.

Links to other units

This unit has strong links to:

- Unit 1: Introduction to Working in Land-based Industries
- Unit 2: Introduction to Plant and Soil Science
- Unit 3: Agriculture Work Placement
- Unit 4: Machinery Operations in Agriculture
- Unit 7: Crop Production.

Employer involvement

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

- farm visits where learners can experience a range of crops and their monitoring
- guest speakers who can talk about crop walking and monitoring for disease, pest, weeds and nutrient status
- design/ideas to contribute to unit assignment/case study/project materials
- work experience that can give learners the opportunity to develop their skills further in establishment, maintenance and preparation of storage areas.

Unit 9: Farming and Agricultural Estate Maintenance

Level: **2**

Unit type: **Mandatory**

Assessment type: **Internal Synoptic**

Guided learning hours: **60**

Unit in brief

Learners will study how to carry out repairs, maintenance and installation of boundaries, surfaces, structures and services found in the agricultural industries.

Unit introduction

Working in agriculture often involves basic tasks including repairing fences, installing gates, operating and maintaining machinery and providing facilities for nutrition and water for livestock and crops. These are tasks requiring installation and maintenance skills and they are common to many land-based industries.

In this unit, you will learn how to carry out inspections, and select, use and maintain tools, equipment and materials to carry out estate tasks safely and efficiently, centred on livestock and crop farming. You will learn how to work to a standard expected in industry and be able to review your work, identifying improvements. This unit is synoptic which means you must use the skills and knowledge developed from all other units and you will find that the tasks you undertake will link to work you have completed elsewhere on the qualification.

This unit is essential if you want to work in agriculture. It offers a valuable insight into the skills needed to keep agricultural environments in good order.

Learning aims

In this unit you will:

- A** Carry out inspections to plan routine maintenance, repair and installation tasks for livestock and crop farming
- B** Select and prepare materials, tools and equipment for routine maintenance, repair and installation tasks for livestock and crop farming
- C** Undertake routine maintenance, repair and installation tasks for livestock and crop farming.

Unit summary

Learning aim	Key teaching areas	Summary of suggested assessment evidence
A Carry out inspections to plan routine maintenance, repair and installation tasks for livestock and crop farming	A1 Inspecting for repair, maintenance and installation needs A2 Plan repair, maintenance and installation needs	Evidence could include: <ul style="list-style-type: none">• logbooks/blogs• witness/observation records• specifications• reports• maps/plans/sketches/ diagrams.
B Select and prepare materials, tools and equipment for routine maintenance, repair and installation tasks for livestock and crop farming	B1 Selecting and preparing tools, equipment and materials B2 Health and safety	
C Undertake routine maintenance, repair and installation tasks for livestock and crop farming	C1 Carry out maintenance, repair and installation tasks C2 Review maintenance, repair and installation tasks	
Key teaching areas in this unit include:		
Sector skills	Knowledge	Transferable skills/ behaviours
<ul style="list-style-type: none">• Estate inspection to identify tasks• Tools, materials and equipment selection and use for estate tasks• Drawing up and/or working to habitat maintenance specifications• Mixed farming skills• Improving safety	<ul style="list-style-type: none">• Boundaries, surfaces, structures and services• Tools, equipment and materials used for estate tasks• Safe working practices• Interrelationship between agricultural practices	<ul style="list-style-type: none">• Communication• Developing practical and technical skills• Problem solving• Thinking skills/adaptability• Working with others

Unit content

Knowledge and sector skills

Learning aim A: Carry out inspections to plan routine maintenance, repair and installation tasks for livestock and crop farming

Learners will apply knowledge and skills developed in the qualification to assess and record the maintenance and repair needs of a selected area.

A1 Inspecting for repair, maintenance and installation needs

- Conducting surveys/inspections of:
 - field boundaries, e.g. post and rail, electric, stock fencing, rabbit fencing, hedgerows
 - surfaces, e.g. woodchip, concrete, asphalt, grass, aggregate (type 1), livestock matting and soil
 - structures, e.g. stiles, gates, troughs, field shelters, hand-washing facilities, livestock-handling equipment, crop stores
 - services, e.g. mains or temporary gas/oil, water, fuel storage and electric
 - machinery, e.g. tractors, quads, parts of heavy machinery.
- Identifying the causes of damage, wear or poor condition, e.g. vermin, chemicals, livestock, soil erosion, flooding and pollution.
- Identifying maintenance, repair and installation needs.
- Identifying the consequences if maintenance, repair or installation tasks are not carried out.
- Recording findings using appropriate method and format, e.g. field notes, farm plans, maps, sketches, photographs.

A2 Plan repair, maintenance and installation needs

- Identifying tasks including:
 - complex tasks needing multiple operations and a variety of tools, equipment and materials, e.g. installing a bowser-fed water trough with ball valve
 - simple tasks needing few operations and a limited range of tools, equipment and materials, e.g. checking fuel oil levels, checking/testing an electric fence, replacing rails on a post and rail fence, soil testing.
- Draw up specifications to include:
 - location, e.g. on maps, plans, use of GPS (where relevant)
 - timescale, e.g. duration, appropriateness of season
 - description of task including standard required and working tolerances if appropriate
 - tools, materials, equipment needed
 - identified risks and hazards
 - identification of skill set (e.g. particular skills needed for the tasks identified, communication with others, ability to work safely)
 - oversight, e.g. person in charge of task/supervision.

Learning aim B: Select and prepare materials, tools and equipment for routine maintenance, repair and installation tasks for livestock and crop farming

Learners will apply knowledge and skills developed in the qualification to select and prepare appropriate materials, tools and equipment for specific tasks identified in the inspection report.

B1 Selecting and preparing tools, equipment and materials

- Factors influencing selection, e.g. cost, availability, durability, sustainability.
- Consequences of correct/incorrect selection, e.g. poor-quality work, unsafe practice through use of inappropriate tools.
- Factors influencing preparation of tools, equipment and materials, e.g. condition, availability, training.
- Tools, e.g. saws, hammers, billhooks, rakes, spades/shovels, drills, forks, power tools.
- Equipment, e.g. non-contact electrical test equipment, strimmers/brush cutters, wheelbarrows, soil test kits, livestock handling equipment and machinery.
- Materials, e.g. nails, cement/concrete, woodchip, aggregates, straw, timber types, cleaning materials.
- Identifying the skills needed to use tool, equipment, materials', e.g. driving skills, use of pesticides, certificates of competence.

B2 Health and safety

- Learners will need to prepare a risk assessment, before starting, and risk assess during completion, of listed maintenance tasks, applying, from the qualification, their knowledge and understanding of correct health and safety practices.
- Use and preparation of risk assessments to include the identification and assessment of hazards, risks and mitigating action in the following areas:
 - health and safety, e.g. safe use of tools, equipment and materials, animals and chemicals, working with others
 - animal welfare, e.g. reducing animal stress/disturbance, maximising animal welfare to best practice guidelines
 - environmental protection, e.g. protection of habitats, use of fertilisers, animal waste
 - waste disposal, e.g., plastics, discarded materials, oil, recyclables, chemicals and animal medicines, dead livestock
 - safe manual handling, e.g. when lifting or using tools, equipment or materials
 - selection of PPE, both prior to and during work
 - use of Safe Operating Procedures (SOPs) with predetermined specifications to obtain a desired outcome for all machinery.
- Use of standard or generic risk assessments, e.g. when using wood preserver.
- In-work risk assessing, e.g. monitoring safe working practice, dealing with unexpected hazards.

Learning aim C: Undertake routine maintenance, repair and installation tasks for livestock and crop farming

Undertaking estate maintenance, repair and installation; reviewing the process of task completion and task outcomes.

C1 Carry out maintenance, repair and installation tasks

- Transporting tools, equipment, materials:
 - use of carry bags, toolboxes
 - transporting in vehicles, carrying tools and equipment safely
 - consequences of correct/incorrect transport.
- Establishing a safe working area, e.g. clearing scrub, isolating water, removing obstructions, level work surfaces.
- Maintenance, repair or installation, including:
 - boundaries, including:
 - stock fencing, e.g. straining, replacing posts or mesh, remove or confine livestock
 - electric fencing, e.g. selection of appropriate type, setting out, use of stand-offs, testing
 - post and rail fencing, e.g. use of wood preservers, replacement of worn or damaged parts
 - hedgerows, e.g. pruning, pollarding, hedge laying
 - surfaces, e.g. yards, hard standings, farm tracks and roads, field drains/ditches, paddocks and soil quality
 - structures, e.g. silos, polytunnels, cattle races, pens, troughs, barns, sheds, stores
 - identification of services (gas/oil, electric, water/sewerage), including:
 - electrical, e.g. power for electric fences, generators for shearing, isolation of mains supply, basic circuit testing
 - water, e.g. mains or bowser supply to troughs, hydroponic systems, field sprinklers, isolation of water supply
 - gas, e.g. propane cannon (bird scarer), temporary heating, biogas systems, isolation of gas supply.
- Working to a standard, including:
 - working to timescales
 - achieving quality standard
 - working to specification.
- Monitoring progress, risk assessing, problem solving.
- Minimising environmental impacts and maintaining animal welfare.
- Correct waste disposal.
- Maintaining tools, equipment, materials:
 - assessing needs and carrying out maintenance of tools, equipment, materials
 - use of aids to maintenance, e.g. sharpening files/stones/guides, oils, tools required for disassembly/assembly
 - replacing parts, e.g. air filters, drill bits, bow saw blades
 - consequences of correct/incorrect maintenance.
- Storage of tools, equipment and materials:
 - storage for safety and security
 - storing to maintain condition
 - regulations governing storage, e.g. flammable liquids, fertilisers, chemicals
 - consequences of correct/incorrect storage.

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C2 Review maintenance, repair and installation tasks

- Assessing product against specification, e.g. with reference to time taken, quality.
- Reviewing process, e.g. how confidently, efficiently was the task completed.
- Identifying improvements to both product and process, e.g. use of different tools, improving skills, different sequence of operations.

Transferable skills**Developing practical and technical skills**

- To select and use a variety of tools, equipment and materials.

Communication

- Drawing up risk assessments and specifications.
- Communication with colleagues.

Problem solving

- Overcoming obstacles when carrying out tasks.
- In-work risk assessing.

Thinking skills/adaptability

- Carrying out inspections to determine needs.
- Formulating tasks based on maintenance, repair and installation needs.

Working with others

- To complete tasks requiring more than one person.
- Complete tasks with supervision.

Assessment criteria

Pass	Merit	Distinction
Learning aim A: Carry out routine inspections to plan maintenance, repair and installation tasks for livestock and crop farming		
A.P1 Carry out site inspections recording simple maintenance, repair and installation needs for crop and livestock purposes.	A.M1 Carry out accurate site inspections using findings to plan complex maintenance, repair and installation tasks for crop and livestock purposes, producing specifications to an agreed standard.	A.D1 Carry out effective site inspections, recording detailed needs and producing fully justified specifications for complex maintenance, repair and installation tasks for crop and livestock purposes.
A.P2 Plan simple maintenance, repair and installation tasks for crop and livestock purposes.		
Learning aim B: Select and prepare materials, tools and equipment for routine maintenance, repair and installation tasks for livestock and crop farming		
B.P3 Select tools, equipment and materials for specific maintenance, repair and installation tasks for crop and livestock purposes.	B.M2 Confidently select correct tools, equipment, and materials, and produce detailed, accurate risk assessments for specified, complex maintenance, repair and installation tasks for crop and livestock purposes.	B.D2 Fully justify the selected tools, equipment, materials, and risk assessments for specific, complex maintenance, repair and installation tasks for crop and livestock purposes, identifying improvements and explaining consequences of choices.
B.P4 Carry out risk assessments for specific, simple maintenance, repair and installation tasks for crop and livestock purposes.		
Learning aim C: Undertake routine maintenance, repair and installation tasks for livestock and crop farming		
C.P5 Carry out simple maintenance, repair and installation tasks for crop and livestock purposes.	C.M3 Carry out complex maintenance, repair and installation tasks for crop and livestock purposes, competently to industry standards, reviewing process and outcomes with reference to the specification.	C.D3 Confidently and efficiently carry out complex maintenance, repair and installation tasks for crop and livestock purposes, reviewing processes and outcomes with reference to the specification and recommending improvements to inform future practice.
C.P6 Carry out review of completed maintenance, repair and installation tasks.		

Essential information for assessment decisions

Learning aim A

For distinction standard, learners will:

- confidently carry out effective inspections and detailed recording of complex estate maintenance, repair and installation needs. Effective inspections will include the correct identification of needs and the causes of, for example, poor condition, wear or breakage. Findings will be clear and unambiguous
- confidently carry out three tasks. This will include one maintenance task, e.g. lubricate moving parts on a gate or livestock restraining system, basic tractor, seed drill or milking machine; one repair task, e.g. fill in potholes on a track, replace fencing in a field, repair livestock handling system and one installation task, e.g. move an electric fence, install a pest control system in a field or storage area, set up pens for young livestock
- use inspection findings, own observations and research, to plan four specific estate maintenance, repair or installation tasks, producing specifications that are fully justified with valid reasons for their decisions
- demonstrate a broad understanding and application of wider knowledge during inspections giving justified and detailed findings for tasks relevant to livestock and crop farming. Application of work experience and practical tasks carried out in crop and livestock husbandry practical sessions will be evident and well executed
- show detailed approaches to inspecting damages, giving likely reasons for the cause, and identifying consequences for not identifying things correctly.

For merit standard, learners will:

- carry out inspections and recording of complex estate maintenance, repair and installation needs. Learners will confidently assess the needs and produce accurate findings
- carry out three tasks. This will include one maintenance task, e.g. lubricate moving parts on a gate or livestock restraining system, basic tractor, seed drill or milking machine, one repair task, e.g. fill in potholes on a track, replace fencing in a field, repair livestock handling system and one installation task, e.g. move an electric fence, install a pest control system in a field or storage area, set up pens for young livestock
- use inspection findings, own observations and research, to plan four specific estate maintenance, repair or installation tasks that will include: a boundary, a surface and a structure. Planning will include the production of specifications or other instruction sets, agreed with the tutor and detailing the tasks and the standards to be met
- demonstrate some understanding and limited application of wider knowledge during inspections giving findings for tasks relevant to livestock and crop farming
- show limited approaches to inspecting damages, giving reasons for the cause, and identifying some consequences for not identifying things correctly.

Standards will be defined through the specification and include the quality of finished product and time taken. The tasks required will be complex, requiring multiple operations and a variety of tools, equipment or materials.

For pass standard, learners will:

- carry out inspections to identify and record simple, selected maintenance, repair and installation needs with limited wider skills shown
- carry out three tasks; this will include one maintenance task, e.g. lubricate moving parts on a gate or livestock restraining system, basic tractor, seed drill or milking machine, one repair task, e.g. fill in potholes on a track, replace fencing in a field, repair livestock handling system and one installation task, e.g. move an electric fence, install a pest control system in a field or storage area, set up pens for young livestock
- plan simple, selected maintenance, repair and installation tasks requiring few operations and a limited range of tools, equipment or materials, including a boundary, a surface and a structure
- show limited understanding and limited application of wider knowledge during inspections, giving some findings for tasks relevant to livestock and crop farming.

Learners will integrate their skills and understanding of safe working practices and sustainability and diversification objectives when carrying out site inspections from *Unit 1: Introduction to Working in Land-based Industries*; during inspections, understanding the external environment and how it influences crops and soil from *Unit 2: Introduction to Plant and Soil Science*, *Unit 5: Livestock Health* and *Unit 6: Livestock Husbandry* when carrying out maintenance, repair and installation tasks that may affect the welfare and care of livestock.

Learning aim B

For distinction standard, learners will:

- produce detailed risk assessments and confidently select correct tools, equipment and materials for four specified, complex estate maintenance, repair or installation tasks. Learners will fully justify their selections giving valid reasons and identifying appropriate improvements. Learners will be able to explain how correct and incorrect risk assessments and selection of tools, equipment and materials can affect the progress and outcome of tasks
- confidently apply factors in tools, equipment and material selection to at least two different tasks where different outcomes are required
- demonstrate risk assessment with the ability to identify risks and hazards and deal with them appropriately. They will show a confident understanding of individual, group and animal health and safety concerns while working, using Safe Operating Procedures (SOPs) with predetermined specifications to obtain a desired outcome for all machinery and risk assessments.

For merit standard, learners will:

- produce detailed, accurate risk assessments and confidently select correct tools, equipment and materials for four specified, complex estate maintenance, repair or installation tasks, including a boundary, a surface, a structure
- apply factors in tools, equipment and material selection to at least two different tasks with different outcomes required
- demonstrate risk assessment with the ability to identify risks and hazards and deal with them appropriately. They will show an understanding of individual, group, crop and animal health and safety concerns while working, using Safe Operating Procedures (SOPs) with predetermined specifications to obtain a desired outcome for all machinery and risk assessments.

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For pass standard, learners will:

- select tools, materials and equipment for four simple, selected maintenance, repair and installation tasks, including a boundary, a surface, a structure
- produce risk assessments for four simple, selected maintenance, repair and installation tasks. Learners will identify critical hazards and correctly risk assess them
- show limited skills in applying factors in tools, equipment and material selection to at least two different tasks with different outcomes required
- demonstrate risk assessment with the ability to identify risks and hazards and deal with them appropriately. They will show a basic understanding of individual, group, crop and animal health and safety concerns while working, using Safe Operating Procedures (SOPs) with predetermined specifications to obtain a desired outcome for all machinery and risk assessments.

Learners will integrate their understanding of safe working practices and risk assessment and their use in maintenance, repair and installation tasks from *Unit 1: Introduction to Working in Land-based Industries*; demonstrate work skills around a farm estate from *Unit 3: Agriculture Work Placement* and the use of equipment and machinery from *Unit 4: Machinery Operations in Agriculture*, *Unit 5: Livestock Health* and *Unit 6: Livestock Husbandry* when carrying out maintenance, repair and installation tasks that may affect the welfare and care of livestock.

Learning aim C

For distinction standard, learners will:

- carry out three complex estate tasks. This will include one maintenance task, for example lubricate moving parts on a gate or livestock restraining system, basic tractor, seed drill or milking machine; one repair task, for example fill in potholes on a track, replace fencing in a field, repair livestock handling system and one installation task, for example move an electric fence, install a pest control system in a field or storage area, set up pens for young livestock. Learners will demonstrate their ability to work to an agreed specification working confidently and efficiently to industry standards. The tasks must be varied with different outcomes and requiring different tools, materials, equipment and methods
- review task progress and outcomes of estate maintenance, repair or installation tasks they have undertaken, giving well-reasoned explanations. Learners will identify improvements to both the process of task completion and task outcomes and explain how the identified improvements could affect future practice.

For merit standard, learners will:

- carry out three complex estate tasks. This will include one maintenance task, for example lubricate moving parts on a gate or livestock restraining system, basic tractor, seed drill or milking machine, one repair task, for example fill in potholes on a track, replace fencing in a field, repair livestock handling system and one installation task, for example move an electric fence, install a pest control system in a field or storage area, set up pens for young livestock. Learners will demonstrate their ability to work competently to an agreed specification and industry standard. The tasks must be varied with different outcomes and requiring different tools, materials, equipment and methods
- assess the progress and end result of four complex maintenance, repair or installation tasks in relation to the agreed specification.

For pass standard, learners will:

- carry out three simple estate tasks. This will include one maintenance task, for example lubricate moving parts on a gate or livestock restraining system, basic tractor, seed drill or milking machine, one repair task, for example fill in potholes on a track, replace fencing in a field, repair livestock handling system and one installation task, for example move an electric fence, install a pest control system in a field or storage area, set up pens for young livestock. Learners will require little support in the execution of tasks. The tasks must be varied with different outcomes and requiring different tools, materials, equipment and methods
- review the process and end result of simple maintenance, repair or installation tasks describing the quality of work produced and the methodology.

Learners will integrate their skills and understanding of safe working practices during maintenance, repair and installation tasks from *Unit 1: Introduction to Working in Land-based Industries* understanding how the environment influences the maintenance activities of crops and soils from *Unit 2: Introduction to Plant and Soil Science*; the use of equipment and machinery from *Unit 4: Machinery Operations in Agriculture*, *Unit 5: Livestock Health* and *Unit 6: Livestock Husbandry* when carrying out maintenance, repair or installation tasks that may affect the welfare and care of livestock and *Unit 8: Grass and Forage Crop Production* when carrying out maintenance, repair and installation that may affect the moving and storing of agricultural crops.

Assessment activity

The summative assessment activity takes place after learners have completed their formative development. The activity should be practical, be set in a realistic scenario and draw on learning from the unit, including the transferable skills. You will need to give learners a set period of time and number of hours in which to complete the activity. *Section 6* gives information on setting assignments and there is further information on our website. This unit could be assessed within the context of a work placement.

A suggested structure for summative assessment is shown in the *Unit summary* section, along with suitable forms of evidence. This is for illustrative purposes only and can therefore be adapted to meet local needs or to assess across units where suitable opportunities exist. The information in the *Links to other units* section will be helpful in identifying opportunities for assessment across units.

The following scenario could be used to produce the required evidence for this unit. Centres are free to use comparable scenarios or other forms of evidence provided that they meet the assessment requirements of the unit.

Suggested scenario

You are a trainee worker at a large mixed farm with cattle, pigs, sheep, fodder crops and polytunnels growing seasonal fruit and vegetables.

Your task is to carry out inspections and report any maintenance, repair or installation requirements. You will need to plan and carry out tasks to ensure the boundaries, surfaces, structures and basic services function properly.

If a retake is necessary, an alternative example must be used. The following is an example of a retake assessment activity.

Learners will carry out alternative inspections and undertake different tasks.

Further information for tutors and assessors

Delivery guidance

The following are examples of practical activities and workshops that tutors could use when developing sector and transferable skills in the delivery of this unit. Wherever possible, practical activities should be used to help learners develop both personal and sector skills in preparation for the final assessment. These suggestions are not intended as a definitive guide to cover the full GLH of the unit.

Introduction to unit

Learners are introduced to the unit through practical activities that require them to investigate boundaries, surfaces, structures and mains or temporary services the field. This will broaden their experience and, if combined with simple tasks, develop their practical skills.

They should look at a variety of situations where they gain an understanding of the differences between:

- maintain = keep something in good working order, for example lubricate moving parts on a gate, re-strain top wire on a fence
- repair = replace worn, broken parts, for example fill in potholes on a track, replace a gate pintle
- install = move or place something in a new location, for example move an electric fence, place a water butt to collect rainwater from a roof.

The introduction is probably best carried out through tutor-led practical demonstrations.

Tutors will realise that being a synoptic unit, knowledge and skills from other units in the qualification will be essential and they may provide opportunities to deliver or expand on content in this unit. Similarly, this unit will underpin content from other units and may provide opportunities to support them.

Suggested time: about 6 hours.

Activity: Carrying out inspections, recording findings and task analysis

Learners should realise through their initial investigations, the difference between 'needs' and 'tasks'. For example:

1. A gate drags on the ground when opened – it 'needs' to hang properly.
Task = adjust the pintles to ensure it clears the ground when opened.
2. A large tree has fallen across a public bridle path and a stock fence field boundary – the path 'needs' to be safe and the fence 'needs' to be secure.
Task = remove the tree and debris from the path and make good the fence.

During these investigations, learners need to develop their analytical and recording skills using a standard format that might include:

- field investigation of boundaries, surfaces, structures, services
- field discussion and recording of needs, using photographs, sketches, maps, notebooks
- identification of causes of the needs and consequences of leaving them unmet
- classroom discussion of resulting tasks, identifying tools, materials, equipment required
- identifying processes/steps to task completion, sequencing the task
- individual research/homework on, construction methods, tools, equipment, materials.

Suggested time: about 10 hours.

Activity: Planning, specifications and risk assessments

Learners need to understand the use of specifications and risk assessments as part of planning maintenance, repair and installation tasks.

- A specification should be regarded as an essential working document that would allow someone to carry out a task to a required standard, within a given timescale, and with enough information to ensure smooth and orderly task completion.
- Learners should appreciate the need to anticipate hazards through the use of written risk assessments and workplace risk assessing.

This understanding should take place through a combination of the following.

- Practical investigations:
 - these will help learners to understand the need for specifications, to identify hazards and to discuss risk assessment and mitigation or control measures that could be taken.
- Classroom-based knowledge:
 - this should add breadth and depth to learners' practical investigations. Learners should practise drawing up specifications for given tasks. They should be encouraged to develop a risk-assessment culture. Learners would benefit from an exploration of generic risk assessments, which are available online
 - classroom sessions should also underpin the practical aspects of risk assessing, taking into consideration the legislation that controls many practical activities. This could be done through scenario-based presentations and case studies.
- Individual research related to specific maintenance, repair and installation tasks:
 - individual research should focus on good-quality sources that relate to risk assessment and offer further practice in developing specifications.

Suggested time: about 8 hours.

Activity: Selection of tools, equipment and materials

The most useful experience learners can gain is through working through practical maintenance, repair and installation tasks. This should be supported by classroom activities in which they discuss factors that influence selection. Care must be taken to ensure learners gain a variety of experiences that should include:

- using hand tools and power tools
- using machinery, for example tractors
- using equipment, for example portable generators, concrete mixers
- using materials, for example cement, wood chip, polypropylene water pipe (MDPE), timber, wire mesh, nails, screws
- storing, transporting and maintaining tools, equipment and materials
- selection of tools, equipment and materials across livestock and crop farming practices.

Suggested time: about 10 hours.

Activity: Carry out maintenance of crops or livestock housing to maintain health and welfare

Learners should gain practical experience carrying out maintenance, repair and installation tasks. This experience should include:

- interpreting specifications and risk assessments in order to plan tasks
- selecting and transporting tools, equipment and materials
- preparing the work area
- handling and using a variety of tools, equipment and materials
- safe working practices, including lone working and working near water
- in-work risk assessing and problem solving
- minimising environmental impacts
- clearing the work area and the disposal of waste
- maintaining and storing tools, equipment and materials.

The practical tasks should include:

- boundaries, surfaces, structures and mains or temporary services
- tasks that are simple – requiring few operations and limited tools, equipment and machinery
- tasks that are complex – requiring multiple operations and a variety of tools, equipment and machinery.

Ideally, the same task should provide both simple and complex experiences. For example, providing water to a glass house:

- the simple task might be to divert a downspout into a tank to collect water
- the complex task might be to run an MDPE pipe from an existing water supply and install a tap with hose attachment.

Learners should also experience a range of tasks, including maintenance, repair and installation.

Learners should develop the habit of keeping a logbook, blog or other record of the tasks they carry out, and these can be used for formative assessment.

Learners will need to practise reviewing the progress of the work carried out, relating outcomes to intended aims as expressed through the specification for the task. Important concepts include:

- working to a standard; comparison with industry roles could be made, for example trainee, competent employee, professional in the field
- working to quality; this can be measured against instructions or tolerances in the specification, for example:
 - nails driven through must be bent over/filed flat
 - vertical alignments must be + or – 5 degrees
 - posts must be cut to identical lengths above the rail
 - two coats of preserver with no visible variation in application or brush marks.

In reviewing their tasks, learners also need to examine the methodology, including the use of tools, in-work risk assessing, or clearance of the site to find ways of improving the process.

A peer review or the involvement of professionals working in the field would be a good way to evaluate the progress of tasks and outcomes.

Suggested time: about 26 hours (including the time allocated for practical assessments).

UNIT 9: FARMING AND AGRICULTURAL ESTATE MAINTENANCE

Essential resources

For this unit, learners will need access to

- a variety of practical estate maintenance, repair and installation situations
- suitable tools, equipment and materials.

Links to other units

The table below illustrates how knowledge, understanding and skills from units across this qualification provide links to this unit.

Unit	Synoptic links to Unit 9: Farming and Agricultural Estate Maintenance
Unit 1: Introduction to Working in Land-based Industries	<ul style="list-style-type: none"> • Using understanding of safe working practices on a farm estate. • Using understanding of sustainability when working on a farm estate. • Using understanding of diversification when working on a farm estate.
Unit 2: Introduction to Plant and Soil Science	<ul style="list-style-type: none"> • Using understanding of the physical needs and health issues of crops around a farm estate. • Using understanding of how an external environment will influence crops and soil on a farm estate.
Unit 3: Agriculture Work Placement	<ul style="list-style-type: none"> • Using the work skills and behaviours developed in a real working environment. • Working safely around a farm estate.
Unit 4: Machinery Operations in Agriculture	<ul style="list-style-type: none"> • Safely using machinery when working on a farm estate. • Preparing, maintaining and storing machinery safely on a farm estate.
Unit 5: Livestock Health	<ul style="list-style-type: none"> • Using skills to ensure livestock health and welfare needs are met when working with animals on a farm estate. • Using skills to provide day-to-day care of livestock on a farm estate.
Unit 6: Livestock Husbandry	
Unit 7: Crop Production	<ul style="list-style-type: none"> • Establishing and maintaining agricultural crops on a farm estate. • Moving and storing agricultural crops on a farm estate.
Unit 8: Grass and Forage Crop Production	

Employer involvement

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

- guest speakers and practitioners
- work experience, in particular, placements with maintenance teams on large estate/farms/garden centres.

4 Planning your programme

Is there a learner entry requirement?

As a centre, it is your responsibility to ensure that recruited learners 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 1.

Learners are most likely to succeed if they have:

- three or four GCSEs at intermediate grades and/or
- BTEC qualification(s) achieved at least at Level 1
- at least Level 1 equivalent 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 this qualification – so that you are ready to assess learners and so that we can provide the support needed. Further information is given in *Section 7 Administrative arrangements*.

What level of sector knowledge is needed to deliver this qualification?

We do not set any requirements for tutors but expect centres to assess the overall skills and knowledge of the teaching team to ensure that they are relevant and up to date with current industry practice. This will give learners a rich programme to prepare them for progression.

What resources are required to deliver this qualification?

As part of your centre approval, you will need to show that the necessary material resources and workspaces are available to deliver the qualification. For some units, specific resources are required.

What makes good vocational teaching?

The approach to vocational teaching must be led by what is right for the particular sector. Therefore, each unit includes delivery guidance and suggested assessment tasks. Using the delivery guidance and suggested assessment tasks and our additional free delivery guidance and assignment briefs, you can build a course that contextualises learning in real-life and/or employment scenarios. This will naturally draw in the kind of broader attributes valued in the sector, for example teamwork, when repairing installations, as well as the more general skills needed in work that fit well with project-based learning, for example independent learning.

What are the requirements for meaningful employer involvement?

This qualification has been designed as a Technical Certificate qualification and as an approved centre you are required to ensure that during their study, every learner has access to meaningful activity involving employers. See *Section 2 Structure* and *Section 8 Quality assurance* for the requirements for employer involvement.

Support for employer involvement

It is important that you give learners opportunities which are of high quality and which are directly relevant to their study. We will support you in this through our guidance materials and by giving you examples of best practice. See *Section 10 Resources and support* for details of the support available, including the Work Experience Toolkit.

What support is available for delivery and assessment?

We provide a wealth of support materials, including schemes of learning, delivery plans, assignment briefs and examples of marked learner work.

To support you with planning your assessments, you will be allocated a Standards Verifier early in the planning stage. There will be extensive training programmes and support from our Subject Advisor team.

For further details see *Section 10 Resources and support*.

How will my learners become more employable through this qualification?

Learners will be acquiring the key technical and sector knowledge, and practical and technical skills that employers need. Employability skills, such as teamworking and communication, and completing realistic tasks have been built into the design of the learning aims and content. This gives tutors 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

The Pearson BTEC Level 2 Technical Diploma in Agriculture is assessed using *internal assessments* which are set and marked by tutors.

We have taken great care to ensure that the assessment method chosen is appropriate to the content of the unit and is in line with requirements from employers.

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.

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* available on our website. All members of the assessment team need to refer to this document.

For this qualification, 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. You 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

Our approach to internal assessment for this qualification 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 Units*, and the requirements for delivering assessment given in *Section 7 Administrative arrangements*.

Operating internal assessment

The assessment team

It is important that there is an effective team for internal assessment so that all assessment is planned and verified. For this qualification, it is likely that the team will be small but it is still necessary to ensure that the assessment process is followed. Full information is given in the *Pearson Quality Assurance handbook*.

The key roles are:

- the Lead Internal Verifier (Lead IV) for the qualification has responsibility for the planning, record keeping and standard setting for the qualification. The Lead IV registers with Pearson annually and organises training using our support materials
- Internal Verifiers (IVs) check that assignments and assessment decisions are valid and that they meet our requirements. In a small team, all people will normally be assessors and IVs. No one can verify their own actions as an assessor
- assessors set or use assignments to assess learners to national standards.

Planning and record keeping

The Lead IV should make sure that there is a plan for assessment of the internally-assessed units and 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*.

Effective organisation

Internal assessment needs to be well organised so that learners' progress 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 Resources and support* 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 qualification. 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 they 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.

You are encouraged to employ a range of formative assessment approaches before putting learners through to the assignments to formally assess the units. Formative assessment supports teaching and learning, and should be ongoing throughout the learning process. It enables tutors to enhance learning by giving learners constructive feedback so that they can identify their strengths and weaknesses, and to put measures in place to target areas that need work. Formative assessment approaches that incorporate reflective learning and regular skills assessment are important in encouraging self-development and reflective practice, to ensure that learners progress.

Setting assignments

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. This assignment will be separate from the practice and exploration activities that have been used during the learning period, and learners must understand that the assignment is being used to judge the learning aims. 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.

When setting your assignments, you need to work with the information given in the *Essential information for assessment decisions* and the *Assessment activity* sections of the units. You can choose to use the suggested scenarios or to adapt them to take account of local circumstances, provided that assignments are verified.

In designing your own assignment briefs you should bear in mind the following points.

- A learning aim must always be assessed as a whole and must not be split into two or more tasks.
- 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 to do so.
- Learners should be given clear tasks, activities and structures for evidence; the criteria should not be given as tasks.
- You must ensure that assignments for synoptic assessment are designed to enable learners to draw on the specific units identified and demonstrate that they can identify and use effectively an appropriate selection of skills, techniques, concepts, theories and knowledge in an integrated way. Assignments for the synoptic unit will be monitored at programme level as part of the standards verification process to ensure that they encourage learners to select and apply their learning from across the qualification in an integrated way.
- Where there is a requirement for assessment to be conducted in the real work environment (mandatory work placement), assignments must be designed to facilitate this. Where there is no mandatory requirement for workplace assessment but learners will be in work placement or work experience settings as a part of the programme, then it would be worthwhile if these assignments were also designed for completion in the real work environment. You must ensure that the work placement or work experience setting gives learners the opportunity to achieve at all grade levels.

As assignments provide a final assessment, they will draw on the specified range of teaching content for the learning objective. The specified teaching 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 a practical performance, then they must address all the relevant range of content that applies in that instance.

An assignment brief should have:

- a vocational scenario or context that motivates the learner to apply their learning through the assignment
- an audience or purpose for which the evidence is being provided
- clear instructions to the learner about what they are required to do, normally set out through a series of tasks.

Forms of evidence

The units allow for a variety of forms of evidence to be used, provided that they are suited to the type of learning aim and the learner being assessed. For most units, the practical demonstration of skills is necessary. The units give you information on suitable forms of evidence that would give learners the opportunity to apply a range of transferable and sector skills. Centres may choose to use different suitable forms for evidence to those proposed. Overall, learners should be assessed using varied forms of evidence.

The main forms of evidence include:

- observation and recordings of practical tasks or performance in the workplace with supporting evidence
- projects
- recordings of role play, interviews and other types of simulated activity
- oral or written presentations with assessor questioning
- work logbooks and reflective journals.

It is important to note that an observation record is a source of evidence and does not confer an assessment decision. It must be sufficiently detailed to enable others to make a judgement about the quality and sufficiency of the performance and must document clearly the rationale for the assessment decision. Observation records should be accompanied by supporting evidence, which may take the form of videos, audio recordings, photographs, preparation notes, learner logs and other similar types of record.

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
- the learner to produce evidence that is their own independent work
- a verifier to independently reassess the learner to check the assessor's decisions.

Centres need to take particular care in ensuring that learners produce independent work.

Making valid assessment decisions

Assessment decisions through applying unit-based criteria

Assessment decisions for this qualification are based on the specific criteria given in each unit and set at each grade level. The way in which individual units are written provides a balance of assessment of sector-specific knowledge, technical and practical skills, and transferable skills appropriate to the purpose of the qualification.

Pass, Merit and Distinction criteria all relate to individual learning aims. The assessment criteria for a unit are hierarchical and holistic where, in satisfying the M criteria, a learner would also have satisfied the P criteria. The unit assessment grid shows the relationships of the criteria so that assessors can apply all the criteria to the learner's evidence at the same time.

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 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 all 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 all 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 2 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.

Making assessment decisions using criteria

As an assessor, you review authenticated learner work and make judgements on standards using the assessment criteria and the supporting information provided in units and training materials. 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.

Assessors should use the following information and support in reaching assessment decisions:

- the *Essential information for assessment decisions* section in each unit
- your Lead IV and assessment team's collective experience, supported by the standardisation materials we provide.

Once the team has agreed the outcome, a formal assessment decision is recorded and reported to learners. The information given:

- must show the formal decision and indicate where criteria have been met
- may show where attainment against criteria has not been demonstrated
- avoid giving direct, specific instructions on how the learner can improve the evidence to achieve a higher grade.

Authenticity of learner 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.

Once an assessment has begun, learners must not be given feedback that relates specifically to their evidence and how it can be improved, learners must work independently.

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 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 Administrative arrangements*.

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 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 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.

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 did not complete assignments by your planned deadline or an authorised extension deadline, if one was given for specific circumstances, may not have the opportunity to subsequently resubmit. Similarly, learners who submit work that is not their own should not be given an opportunity to resubmit.

The outcome of any resubmission of the assignment by the learner is then recorded as the final decision.

A learner who has not achieved their expected level of performance in the relevant learning aims **after resubmission** of an assignment may be offered a single retake opportunity using a new assignment. The highest grade that may be awarded is a Pass.

The Lead IV must authorise a retake with a new assignment only in exceptional circumstances and where 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* available on our website. We provide information on writing assignments for retakes on our website (please go to www.btec.co.uk/keydocuments).

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 assessment. You need to refer to our *Information Manual* for information on making registrations for the qualification.

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

Internal assessments need to be administered carefully to ensure that all learners are treated fairly and that results and certificates are issued on time to allow learners to progress to chosen progression opportunities.

Our equality policy requires that all learners 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 (as defined by the Equality Act 2010) 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 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 our *Information Manual*. Records must be maintained as specified as we may ask to audit them.

Reasonable adjustments to assessment

To ensure that learners have fair access to demonstrate the requirements of the assessments, a reasonable adjustment is one that is made before a learner takes an assessment. 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 only 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 being conducted unfairly. 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 the document *Enquiries and appeals about Pearson vocational qualifications and end point assessment policy*.

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 our *Centre guide for dealing with malpractice and maladministration in vocational qualifications*, available on our website.

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. Our *Centre guide for dealing with malpractice and maladministration in vocational qualifications* 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.

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:

- 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 or 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 about Pearson vocational qualifications and end point assessment 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 units for a qualification, 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

Qualification results will be issued once a learner has completed all components of the qualification and you have claimed certification. 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.

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 and claiming certificates.
- 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 robust assessment, internal verification and planning of appropriate employer involvement.

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 Technical Certificate and Diploma qualifications 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
- undertaking an overarching review and assessment of a centre's strategy for ensuring sufficient and appropriate engagement with employers at the beginning of delivery of any BTEC programme(s)
- undertaking a review of the employer involvement planned at programme level to ensure its appropriateness at a time when additional activities can be scheduled where necessary
- 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.

Centres that do not fully address and maintain rigorous approaches to delivering, assessing and quality assurance cannot seek certification for individual programmes or for the BTEC Technical Certificate and Diploma qualifications. 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 providing an overall qualification grade for each learner. The final grade awarded for a qualification represents a holistic performance across all of 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 will be balanced by a lower outcome in others.

Eligibility for an award

In order to be awarded the qualification, a learner must complete all units and achieve a Pass or above in all units. See *Section 2 Structure* for full details.

To achieve the qualification grade, learners must:

- achieve and **report a grade** (D, M or P) for all units within a valid combination
- achieve the **minimum number of points** at a grade threshold.

Where there are optional units in a qualification, it is the responsibility of the centre to ensure that a correct unit combination is adhered to. Learners who do not pass all the required units shown in the structure will not achieve the qualification. For example, learners who have not taken enough mandatory or optional units will not achieve that qualification even if they have enough points.

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 (where available), 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.

The qualification is awarded at the grade ranges shown in the table below.

Qualification	Available grade range
Diploma	PP to DD

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. Our *Information Manual* gives full details.

Points available for internally-assessed units

The table below shows the number of **points** available for internally-assessed units. For each internally-assessed unit, points are allocated depending on the grade awarded.

	Unit size	
	30 GLH	60 GLH
U	0	0
Pass	8	16
Merit	12	24
Distinction	16	32

Claiming the qualification grade

Subject to eligibility, we will automatically calculate the qualification grade for your learners when the internally-assessed 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 table

Diploma	
Grade	Points threshold
PP	96
MP	112
MM	128
DM	152
DD	176

The table is subject to review over the lifetime of the qualification.
The most up-to-date version will be issued on our website.

Examples of grade calculations based on table applicable to registrations from September 2018

Example 1: Achievement of a Diploma with a PP grade

Unit	GLH	Type	Grade	Points
1	60	Internal	Pass	16
2	60	Internal	Pass	16
3	60	Internal	Pass	16
4	60	Internal	Pass	16
6	30	Internal	Merit	12
7	30	Internal	Pass	8
9	60	Internal	Pass	16
	360		PP	100

The learner has achieved a Pass or above in enough units.

The learner has sufficient points for a PP grade.

Example 2: Achievement of a Diploma with a DD grade

Unit	GLH	Type	Grade	Points
1	60	Internal	Distinction	32
2	60	Internal	Merit	24
3	60	Internal	Distinction	32
4	60	Internal	Merit	24
7	30	Internal	Distinction	16
8	30	Internal	Distinction	16
9	60	Internal	Distinction	32
	360		DD	176

The learner has sufficient points for a DD grade.

Example 3: Achievement of a Diploma with an Unclassified result

Unit	GLH	Type	Grade	Points
1	60	Internal	Merit	24
2	60	Internal	Merit	24
3	60	Internal	Pass	16
4	60	Internal	Pass	16
5	30	Internal	Unclassified	0
6	30	Internal	Pass	8
9	60	Internal	Distinction	32
	360		U	120

The learner has a U in Unit 5.

The learner has sufficient points for an MP but has not met the requirement for a Pass, or above, in all units.

10 Resources and support

Our aim is to give you support to enable you to deliver Pearson BTEC Level 2 Technicals with confidence. You will find resources to support teaching and learning, assessing, and professional development on our website.

Support for setting up your course and preparing to teach

Schemes of Learning

Our free Schemes of Learning give you suggestions and ideas for how to deliver the units in the qualifications, including opportunities to develop employability skills, tips on embedding mathematics and English, and how to link units through holistic assessments.

Delivery planner

High-level models showing how the course can be delivered over different timescales, for example six months, one year, two years.

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 BTEC qualifications 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 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.

Support for teaching and learning

Work Experience Toolkit

Our free Work Experience Toolkit gives guidance for tutors, assessors, work-based supervisors and learners on how to make the most of work placements and work experience.

Pearson Learning Services provides a range of engaging resources to support BTEC qualifications.

Teaching and learning resources may also be available from a number of other publishers.

Details of Pearson's own resources and of all endorsed resources are on our website.

Support for assessment

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.

We provide assignment briefs approved by Pearson Standards Verifiers.

Sample marked learner work

To support you in understanding the expectation of the standard at each grade, examples of sample marked learner work will be made available on our website.

Training and support from Pearson

People to talk to

There are lots of people who can support you and give you advice and guidance on delivering your Pearson BTEC Level 2 Technicals. They include the following.

- Standards Verifiers – they can support you with preparing your assignments, ensuring that your assessment plan is set up correctly, in preparing learner work and providing quality assurance through sampling.
- 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.
- Curriculum Development Managers (CDMs) – they are regionally based and have a full overview of 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

We provide a range of training and professional development events to support the introduction, delivery, assessment and administration of the Pearson BTEC Level 2 Technicals.

These sector-specific events, developed and delivered by specialists, are available both face to face and online.



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