

City & Guilds Level 2 Technical Certificate in Agriculture (0171-20)

September 2023, Version 1.11

(For delivery from September 2023)

Qualification Handbook

Qualification at a glance

Industry area	Land – Agriculture
City & Guilds qualification number	0171-20
Age group	16-19 (Key Stage 5), 19+
Entry requirements	Centres must ensure that any pre-requisites stated in the <i>What is this qualification about?</i> section are met.
Assessment	<p>To gain this qualification, candidates must successfully achieve the following assessments:</p> <ul style="list-style-type: none"> Two externally set, externally marked exams, sat under examination conditions One externally set, internally marked, externally moderated assignment
Additional requirements to gain this qualification	Employer involvement in the delivery and/or assessment of this qualification is essential for all candidates and will be externally quality assured.
Grading	<p>This qualification is graded Pass/Merit/Distinction/Distinction*</p> <p>For more information on grading, please see Section 7: Grading.</p>
Approvals	These qualifications require full centre and qualification approval
Support materials	<p>Sample assessments</p> <p>Guidance for delivery</p> <p>Guidance on use of marking grids</p>
Registration and certification	Registration and certification of this qualification is through the Walled Garden, and is subject to end dates.
External quality assurance	This qualification is externally quality assured by City & Guilds, and its internally marked synoptic assignments are subject to external moderation. There is no direct claim status available for this qualification.

Title and level	Size (GLH)	TQT	City & Guilds qualification number	Ofqual accreditation number
City & Guilds Level 2 Technical Certificate in Agriculture	360	600	0171-20	603/0067/X

Version and date	Change detail	Section
1.1 May 2017	Updating assessment component numbers	1. Introduction 5. Assessment 7. Grading
1.2 August 2017	Synoptic assessment description contextualised	5. Assessment
	Addition of the examination paper based module number	1. Introduction – Assessment requirements and employer involvement 5. Assessment 5. Assessment – exam Specification 7. Grading – Awarding grades and reporting results
	Removal of AO 6-8 from Synoptic Assignments	5. Assessment – Assessment Objectives
	Addition of Provisional Grade Boundaries for the Synoptic Assignment	7. Grading
	Revised Exam Specification, Exam Duration and AO weightings	5. Assessment – Exam Specification
	Branding changes	Throughout
	Unit 201 aim updated	Unit
1.3 September 2017	Unit 201 title amended	Throughout
1.4 October 2017	Assessment type for unit 201 changed to assignment	1. Introduction 5. Assessment
1.5 December 2017	Amendment to summary of assessment methods and conditions table	5. Assessment
1.6 August 2018	City & Guilds added to the title	Throughout
1.7 September 2018	Amendment to summary of assessment methods and conditions table – Assessment 201	Assessment
1.8 October 2018	Added assessment method for unit 201	1. Introduction – Assessment requirements and employer involvement
	Amended assessment method for unit 201	5. Assessment - Summary of assessment methods and conditions
1.9 August 2019	Unit 207 aim and delivery guidance updated for work experience requirements	207
1.10 May 2023	Amended assessment method for unit 201 Component number for assessment unit changed from 201 to 200	5 Assessment

Version and date	Change detail	Section
	Clarified moderation and external verification processes	6 Moderation and standardisation of assessment
	Updated website links and references	3 Delivering Technicals qualifications - Support materials 8 Administration
1.11 September 2023	Revision to the exam specification for the health and safety test component (200)	5 Exam specification

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1 Introduction

What is this qualification about?

The following purpose is for the **City & Guilds Level 2 Technical Certificate in Agriculture** (603/0067/X)

Area	Description
OVERVIEW	
Who is this qualification for?	<p>This City & Guilds Level 2 Technical Certificate in Agriculture is for you if you are looking to start a career within the agriculture and farming sector. Agriculture and food production is a thriving global industry that is essential to all our lives – without it we wouldn't eat.</p> <p>Farmers themselves are a vital part of the agricultural industry. British farmers produce a massive 63% of the food we eat; this is supported by a large varied industry that employs 3.5 million people in the UK.</p> <p>You may or may not have any previous experience in farming and this qualification could be the gateway to over 200 careers that are available in UK agriculture. Most jobs involve the outdoors in some way and it is a good match for people who like hands on practical work. Whichever area of the industry you choose you are likely to operate machinery of some kind, many of which use cutting-edge technology. Most importantly there are real opportunities to specialise and develop your skills as time goes on.</p> <p>This exciting and ever-changing industry needs talented, flexible people who are ready to take on a challenge. Every day is likely to be different and we need people that can problem solve and take on whatever Mother Nature throws our way.</p> <p>Growing or rearing food on an industrial scale takes a lot of skill and dedication, helped along by technology and science. In fact 70% of the jobs in the agricultural industry involve science, engineering or technology, everything from GPS, to drones and even robots. If you're ambitious, there is real scope to progress in this industry.</p> <p>This qualification is suitable if you are 16 years old, or over. You will gain an understanding of the skills and knowledge that are important when you are working in an agricultural setting, or progressing to further learning and training in this area.</p>

Area	Description
What does this qualification cover?	<p>This qualification covers the skills you will need to progress to further learning and training, or to enter the world of work within the agriculture and farming sector. You will study the following mandatory content:</p> <ul style="list-style-type: none"> • Health and safety for the land-based industries • Agricultural power unit and machinery operation • Crop husbandry • Farm animal production • Farm estate maintenance • Physiology of plants and animals • Working in the agricultural industry <p>There is also a requirement to complete 150 hours of work experience.</p> <p>You will get lots of practice and support to enable you to develop the required skills and knowledge to prepare you for the learning and end assessment.</p> <p>Colleges and training/education centres will work with local employers who will contribute to the knowledge and delivery of training. The different ways in which centres could support your learning, by working with both local and national farming agri-businesses, include:</p> <ul style="list-style-type: none"> • structured work-experience or work-placements within their business • your attendance at classes or lectures given by industry experts • employers input into projects and exercises • employers who act as 'expert witnesses' to contribute to the assessment of your work. <p>This practical based training is ideal preparation for gaining employment in the agricultural industry or further specialist study.</p>

WHAT COULD THIS QUALIFICATION LEAD TO?

Will the qualification lead to employment, and if so, in which job role and at what level?	<p>Achievement of this qualification demonstrates to an employer that you are able to undertake routine tasks as a:</p> <ul style="list-style-type: none"> • general farm worker • tractor operator • agricultural machinery operator • trainee stockperson <p>N.B. These jobs roles are similar in title to some at Level 3, however, they are different because of the</p>
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Area	Description
	routine/straightforward nature of the skills and knowledge at this Level.
Why choose this qualification over similar qualifications?	There are no other College-based qualifications within this suite at this Level.
Will the qualification lead to further learning?	<p>Yes. Once you have successfully completed this qualification, you could go on to study a Level 3 College-based qualification over one year, or two years.</p> <p>Over one year:</p> <ul style="list-style-type: none"> • Level 3 Advanced Technical Certificate in Agriculture • Level 3 Advanced Technical Diploma in Agriculture (540) <p>Over two years:</p> <ul style="list-style-type: none"> • Level 3 Advanced Technical Extended Diploma in Agriculture (720) (Mixed Farming) • Level 3 Advanced Technical Extended Diploma in Agriculture (720) (Farm Mechanisation) • Level 3 Advanced Technical Extended Diploma in Agriculture (1080) (Livestock) • Level 3 Advanced Technical Extended Diploma in Agriculture (1080) (Arable) • Level 3 Advanced Technical Extended Diploma in Agriculture (1080) (Farm Mechanisation) <p>The larger qualifications taken over two years will allow you to specialise in livestock, arable farming or farm mechanisation, which could lead to a greater range of more diverse career opportunities.</p> <p>This qualification could also lead you to an apprenticeship in Agriculture. There are a number of new and exciting apprenticeships currently being developed in the following occupations. Depending upon what you have achieved previously, you could progress to an apprenticeship as a:</p> <ul style="list-style-type: none"> • stockperson • poultry operative • crop technician • poultry manager • packhouse supervisor
WHO SUPPORTS THIS QUALIFICATION?	
Employer/Higher Education Institutions	<p>The National Farmers Union</p> <p>Loudham Estates Ltd</p> <p>Mansell Park Farm Ltd</p> <p>GC Davies & Co</p>

Area	Description
	Upper Booth Farm
	Davies Penralltddu
	Nickerson Seeds

Qualification structure

For the **City & Guilds Level 2 Technical Certificate in Agriculture** the teaching programme must cover the content detailed in the structure below:

City & Guilds Level 2 Technical Certificate in Agriculture		
Unit number	Unit title	GLH
Mandatory		
201	Health and safety for the land-based industries	30
202	Agricultural power units and machinery operation	60
203	Crop husbandry	60
204	Farm animal production	60
205	Farm estate maintenance	60
206	Physiology of plants and animals	30
207	Working in the agricultural industry	60
Total GLH		360

NB – Candidates will be required to complete 150 hours work experience alongside the qualification.

Total qualification time (TQT)

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

Title and level	GLH	TQT
City & Guilds Level 2 Technical Certificate in Agriculture	360	600

Assessment requirements and employer involvement

To achieve the **City & Guilds Level 2 Technical Certificate in Agriculture** candidates must successfully complete **all** mandatory assessment components.

Component number	Title
Mandatory	
022	Level 2 Agriculture - Synoptic assignment
021 or 521	Level 2 Agriculture – Theory exam
200	Level 2 Health and safety for the land-based industries – Theory exam (evolve online)

In addition, candidates **must** complete the mandatory employer involvement requirement for this qualification **before** they can be awarded a qualification grade. For more information, please see guidance in *Section 4: Employer involvement*.

Employer involvement

Component number	Title
Mandatory	
820	Employer involvement

**Number of mandatory assessments per assessment type*

2 Centre requirements

Approval

New centres will need to gain centre approval. Existing centres who wish to offer this qualification must go through City & Guilds' **full** Qualification Approval Process. There is no fast track approval for this qualification. Please refer to the City & Guilds website for further information on the approval process: www.cityandguilds.com

Resource requirements

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

Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following requirements:

- be technically competent in the areas in which they are delivering
- be able to deliver across the breadth and depth of the content of the qualification being taught
- have recent relevant teaching and assessment experience in the specific area they will be teaching, or be working towards this
- demonstrate continuing CPD.

Physical resources

Centres must be able to demonstrate that they have access to the equipment and technical resources required to deliver this qualification and its assessment.

Internal Quality Assurance

Internal quality assurance is key to ensuring accuracy and consistency of tutors and markers. Internal Quality Assurers (IQAs) monitor the work of all tutors involved with a qualification to ensure they are applying standards consistently throughout assessment activities. IQAs must have, and maintain, an appropriate level of technical competence and be qualified to make both marking and quality assurance decisions through a teaching qualification or recent, relevant experience.

Learner entry requirements

Centres must ensure that all learners have the opportunity to gain the qualification through appropriate study and training, and that any prerequisites stated in the *What is this qualification about?* section are met when registering on this qualification.

Age restrictions

This qualification is approved for learners aged 16 – 19, 19+.

3 Delivering technical qualifications

Initial assessment and induction

An initial assessment of each learner should be made before the start of their programme to identify:

- if the learner has any specific learning or training needs,
- support and guidance they may need when working towards their qualification,
- the appropriate type and level of qualification.

We recommend that centres provide an introduction so that learners fully understand the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

Employer involvement

Employer involvement is essential to maximise the value of each learner's experience. Centres are required to involve employers in the delivery of technical qualifications at Key Stage 5 and/or their assessment, for every learner. This must be in place or planned before delivery programmes begin in order to gain qualification approval. See *Section 4: Employer involvement* for more detail.

Work experience

Work experience will provide learners with the opportunity to participate in the world of work and gain practical experience that is relevant to both the qualification and future employment possibilities.

Each learner is expected to complete a 150-hour work experience placement as part of the programme. This work placement should be with an employer that will provide the learner with structured opportunities to develop the skills and knowledge that are relevant to the qualification and should be undertaken in a real business environment relevant to the subject interest of the learner. Work experience may be gained by a number of routes, e.g. as part of an industrial placement whilst within the programme, whilst working on a planned daily or weekly basis on the centre's commercial and/or educational facilities, whilst undertaking voluntary work within the industry, or as a member of a group of learners invited to carry out practical work on a suitable business. The work placement can take place at any time during the learning programme. Centres should be able to provide evidence that the work experience placement has been completed by the learner and this evidence may be reviewed on request by City & Guilds.

The 150 hours work experience is included in the Total Qualification Time.

Support materials

The following resources are available for this qualification:

Description	How to access
Sample assessments	Available 2017 on the qualification pages on the City & Guilds Website: www.cityandguilds.com
Technical Qualifications: Guide to Teaching, Learning and Assessment	Available on the City and Guilds website: 14-19-teaching-learning-assessment-guide-pdf.ashx (cityandguilds.com)
Quality Assurance Guide for Centres: Technical Qualifications and the Extended Project Qualification (EPQ)	Available on the City and Guilds website: technicals-quality-assurance-guide-for-centres-pdf.ashx (cityandguilds.com)

4 Employer involvement

Employer involvement is a formal component of Key Stage 5 Technical qualifications. It does not contribute to the overall qualification grading, but is a mandatory requirement that all learners must meet. As such it is subject to external quality assurance by City & Guilds.

Department for Education (DfE) requirements state:

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 students and furthers collaboration between the learning and skills sector and industry.

[Technical qualifications] must:

- *require all students to undertake meaningful activity involving employers during their study; and*
- *be governed by quality assurance procedures run by the awarding organisation to confirm that education providers have secured employer involvement for every student.*

Extract from: ***Vocational qualifications for 16 to 19 year olds, 2017 and 2018 performance tables: technical guidance for awarding organisations, paragraphs 89-90***

City & Guilds will provide support, guidance and quality assurance of employer involvement.

Qualification approval

To be approved to offer City & Guilds technicals, centres must provide an Employer Involvement planner and tracker showing how every learner will be able to experience meaningful employer involvement, and from where sufficient and suitable employer representatives are expected to be sourced.

Centres must include in their planner a sufficient range of activities throughout the learning programme that provide a range of employer interactions for learners. Centres must also plan contingencies for learners who may be absent for employer involvement activities, so that they are not disadvantaged.

As part of the approval process, City & Guilds will review this planner and tracker. Centres which cannot show sufficient commitment from employers and/or a credible planner and tracker will be given an action for improvement with a realistic timescale for completion. **Approval will not be given** if employer involvement cannot be assured either at the start of the qualification, or through an appropriate plan of action to address this requirement before the learner is certificated.

Monitoring and reporting learner engagement

Employer involvement is a formal component of this qualification and is subject to quality assurance monitoring. Centres must record evidence that demonstrates that each learner has been involved in meaningful employer based activities against the mandatory content before claiming the employer involvement component for learners.

Centres must record the range and type of employer involvement each learner has experienced and submit confirmation that all learners have met the requirements to City & Guilds. If a centre cannot

provide evidence that learners have met the requirements to achieve the component, then the learner will not be able to achieve the overall Technical Qualification.

Types of involvement

Centres should note that to be eligible, employer involvement activities **must** relate to one or more elements of the mandatory content of this qualification.

As the aim of employer involvement is to enrich learning and to give learners a taste of the expectations of employers in the industry area they are studying, centres are encouraged to work creatively with local employers.

Employers can identify the areas of skills and knowledge in their particular industry that they would wish to see emphasised for learners who may apply to work with them in the future. Centres and employers can then establish the type of input, and which employer representative might be able to best support these aims.

To be of most benefit this must add to, rather than replace the centre's programme of learning.

Some examples of meaningful employer involvement are listed below. Employer involvement not related to the mandatory element of the qualification, although valuable in other ways, does not count towards this element of the qualification.

The DfE has provided the following examples of what does and does not count as meaningful employer involvement, as follows^{1,2}:

The following activities meet the requirement for meaningful employer involvement:

- *students undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification³;*
- *students undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s);*
- *students take one or more units delivered or co-delivered by an industry practitioner(s). This could take the form of master classes or guest lectures;*
- *industry practitioners operate as 'expert witnesses' that contribute to the assessment of a student's work or practice, operating within a specified assessment framework. This may be a specific project(s), exercise(s) or examination(s), or all assessments for a qualification.*

In all cases participating industry practitioners and employers must be relevant to the industry sector or occupation/occupational group to which the qualification relates.

The following activities, whilst valuable, do not meet the requirement for meaningful employer involvement:

- *employers' or industry practitioners' input to the initial design and content of a qualification;*
- *employers hosting visits, providing premises, facilities or equipment;*
- *employers or industry practitioners providing talks or contributing to delivery on employability, general careers advice, CV writing, interview training etc.;*
- *student attendance at career fairs, events or other networking opportunities;*
- *simulated or provider-based working environments e.g. hairdressing salons, florists, restaurants, travel agents, small manufacturing units, car servicing facilities;*

¹ As extracted from: Vocational qualifications for 16 to 19 year olds

2017 and 2018 performance tables: technical guidance for awarding organisations

² This list has been informed by a call for examples of good practice in employer involvement in the delivery and assessment of technical qualifications - **Employer involvement in the delivery and assessment of vocational qualifications**

³ **DfE work experience guidance**

- *employers providing students with job references.*

Types of evidence

For each employer involvement activity, centres are required to provide evidence of which learners undertook it, e.g. a candidate attendance register. The types of additional evidence required to support a claim for this component will vary depending on the nature of the involvement. E.g. for a guest lecture it is expected that a synopsis of the lecture and register would be taken which each learner and the guest speaker will have signed; expert witnesses will be identified and will have signed the relevant assessment paperwork for each learner they have been involved in assessing; evidence of contribution from employers to the development of locally set or adapted assignments.

Quality assurance process

As the employer involvement component is a requirement for achieving the KS5 Technical qualifications, it is subject to external quality assurance by City & Guilds at the approval stage and when centres wish to claim certification for learners.

Evidence will be validated by City & Guilds before learners can achieve the employer involvement component. Where employer involvement is not judged to be sufficient, certificates cannot be claimed for learners.

Sufficiency of involvement for each learner

It is expected that the centre will plan a range of activities that provide sufficient opportunities for each learner to interact directly with a range of individuals employed in the related industry. Centres must also provide contingencies for learners who may be absent for part of their teaching, so they are not disadvantaged. Any absence that results in a learner missing arranged activities must be documented. Where learners are unable to undertake all employer involvement activities due to temporary illness, temporary injury or other indisposition, centres should contact City & Guilds for further guidance.

Live involvement

Learners will gain most benefit from direct interaction with employers and/or their staff; however the use of technology (e.g. the use of live webinars) is encouraged to maximise the range of interactions. Where learners are able to interact in real time with employers, including through the use of technology, this will be classed as 'live involvement'.

It is considered good practice to record learning activities, where possible, to allow learners to revisit their experience and to provide a contingency for absent learners. This is not classed as live involvement however, and any involvement of this type for a learner must be identified as contingency.

Timing

A learner who has not met the minimum requirements cannot be awarded the component, and will therefore not achieve the qualification. It is therefore important that centres give consideration to scheduling employer involvement activities, and that enough time is allotted throughout delivery and assessment of the qualification to ensure that requirements are fully met.

5 Assessment

Summary of assessment methods and conditions

Component numbers	Assessment method	Description and conditions
022	Synoptic assignment	<p>The synoptic assignment is externally set, internally marked and externally moderated. The assignment requires candidates to identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories, and knowledge from across the content area. Candidates will be judged against the assessment objectives.</p> <p>Assignments will be released to centres as per dates indicated in the Assessment and Examination timetable published on our website.</p> <p>Centres will be required to maintain the security of all live assessment materials. Assignments will be password protected and released to centres through a secure method.</p> <p>There will be one opportunity within each academic year to sit the assignment. Candidates who fail the assignment will have one re-sit opportunity. The re-sit opportunity will be in the next academic year, and will be the assignment set for that academic year once released to centres. If the re-sit is failed, the candidate will fail the qualification.</p> <p>Please note that for externally set assignments City & Guilds provides guidance and support to centres on the marking and moderation process.</p>
021/ 521	Externally marked exam	<p>The exam is externally set and externally marked and can be taken either online through City & Guilds' computer-based testing platform, (021) or as a paper based test (521).</p> <p>The exam is designed to assess the candidate's depth and breadth of understanding across content in the qualification at the end of the period of learning, using a range of question types and will be sat under invigilated examination conditions. See JCQ requirements for details: http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations</p> <p>The 5 shows the coverage of the exam across the qualification content.</p> <p>Candidates who fail the exam at the first sitting will have one opportunity to re-sit. If the re-sit is failed the candidate will fail the qualification. For exam dates, please refer to the Assessment and Examination timetable.</p>

200	Evolve online on-demand exam	<p>This exam is externally set and externally marked and will be taken online through City & Guilds' computer-based testing platform under invigilated exam conditions. The exam is available on-demand and can be taken at any time in the year.</p> <p>There is no maximum number of retake attempts for this exam, however, learners should be given sufficient time and tutor support before resitting.</p>
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What is synoptic assessment?

Technical qualifications are based around the development of a toolkit of knowledge, understanding and skills that an individual needs in order to have the capability to work in a particular industry or occupational area. Individuals in all technical areas are expected to be able to apply their knowledge, understanding and skills in decision making to solve problems and achieve given outcomes independently and confidently.

City & Guilds technical qualifications require candidates to draw together their learning from across the qualification to solve problems or achieve specific outcomes by explicitly assessing this through the synoptic assignment component.

In this externally set, internally marked and externally moderated assessment the focus is on bringing together, selecting and applying learning from across the qualification rather than demonstrating achievement against units or subsets of the qualification content. The candidate will be given an appropriately levelled, substantial, occupationally relevant problem to solve or outcome to achieve. For example this might be in the form of a briefing from a client, leaving the candidate with the scope to select and carry out the processes required to achieve the client's wishes, as they would in the workplace.

Candidates will be marked against assessment objectives (AOs) such as their breadth and accuracy of knowledge, understanding of concepts, and the quality of their technical skills as well as their ability to use what they have learned in an integrated way to achieve a considered and high quality outcome.

How the assignment is synoptic for this qualification

The typical assignment brief could be to assess and plan the use of land in an agricultural environment, considering factors that will affect its use. This will require the candidate to carry out the operation of land-based power units and associated machinery as well as soil sampling activities. Learners will also complete practical boundary maintenance using a range of tools and equipment in line with standard working practices. Learners may also be required to produce a report or plan on how crops or livestock could be introduced based on a given scenario, with justifications of their suggestions and consideration of wider-land based applications.

Exam for stretch, challenge and integration

The externally marked (021/521) exam draws from across the mandatory content of the qualification, using:

- **Multiple choice questions** to confirm breadth of knowledge and understanding.
- **Multiple choice applied knowledge and understanding questions**, giving candidates the opportunity to demonstrate higher level, integrated understanding through application, analysis and evaluation.

Assessment objectives

The assessments for this qualification are set against a set of assessment objectives (AOs) which are used across all City & Guilds Technicals to promote consistency among qualifications of a similar purpose. They are designed to allow judgement of the candidate to be made across a number of different categories of performance.

Each assessment for the qualification has been allocated a set number of marks against these AOs based on weightings recommended by stakeholders of the qualification. This mark allocation remains the same for all versions of the assessments, ensuring consistency across assessment versions and over time.

The following table explains all AOs in detail, including weightings for the synoptic assignments. In some cases, due to the nature of a qualification's content, it is not appropriate to award marks for some AOs. Where this is the case these have been marked as N/A. Weightings for exams (AOs 1, 2 and 4 only) can be found with the exam specification.

Assessment objective	City & Guilds Level 2 Technical Certificate in Agriculture Typical expected evidence of knowledge, understanding and skills	Approximate weighting (Assignment)
AO1 Recalls knowledge from across the breadth of the qualification.	Reference to legislation, health and safety considerations, industry structure, identification of categories and types of crops, animals, machinery, indicators of health, common diseases of animals, components and controls of power units, nutrient supply and application types for crops, weed/pest/disease identification, feeding and watering equipment, types of boundary maintenance, types of surfaces, boundaries, plant and animal structures and processes, methods of weed pest and disease control.	15%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Reasons for machinery operation processes and procedures, maintenance procedures, pre/post operation machinery checks, importance of reporting, requirements for machinery storage, factors affecting selection of equipment (compatibility, field conditions etc.), factors affecting selection of crops (soil type, crop rotation etc.), uses of crops, reasons and methods of soil sampling, crop establishment methods, growing calendars and cycles, indicators and causes of poor health in crops and animals, requirements for storage, harvesting and storage of crops, factors affecting choice of animal production system (breed, soil type etc.), reasons for using feed methods and administration, application welfare codes, housing/handling and transport requirements to meet of animal needs, selection of tools/methods for boundary maintenance tasks, plant lifecycles and physiology, inheritance and reproduction, factors affecting growth and germination, animal body systems, job opportunities and progression within industry,	20%

Assessment objective	City & Guilds Level 2 Technical Certificate in Agriculture Typical expected evidence of knowledge, understanding and skills	Approximate weighting (Assignment)
	personal quality requirements, application of business skills relating to agriculture	
A03 Demonstrates technical skills from across the breadth of the qualification.	Following health and safety procedure, carry out machinery operation, following maintenance procedures, carrying out pre/post operation machinery checks, recording and reporting following operation, storing and cleaning of machinery, hitching and de-coupling of equipment methods, soil sampling techniques, use of soil sampling tools equipment, analysis of soil sampling results, soil preparation techniques, preparing for use of crop establishment equipment (e.g. calibration), handling and transporting animals, maintaining accommodation (providing bedding, cleaning and feeding etc.), carrying out health and welfare tasks (e.g. weighing, worming etc.), using tools, storing and maintaining tools for boundary maintenance.	30%
A04 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Linking crop choice to animal choice, impacts of environmental factors on production, considerations that impact on profitability, health and safety impacts across working practices, adaptability of machinery for crossover applications, impacts of IT across agricultural systems, consideration of wider impacts of agricultural systems, sustainability, linking science (animal and plant systems, reproduction) to production, adapting to change, developing self in response to experience.	20%
A05 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Using feedback on tasks to evaluate self, and improving performance, practicing skills to complete tasks to a high standard, preparation for tasks including contingency, checking and re-checking of machinery, accuracy/precision and efficiency in tasks (e.g. ploughing in straight lines, accurate calibration of machinery), positive work ethic, and consideration of industry standard speeds/accuracy for task completion.	15%

Exam specification

AO weightings per exam

AO	Component 021/521 weighting (approx. %)
AO1 Recalls knowledge from across the breadth of the qualification.	44
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	40
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	16

The way the exam covers the content of the qualification is laid out in the table below:

Assessment type: Multiple choice, written exam*

Assessment conditions: Invigilated examination conditions

Grading: X/P/M/D

021/ 521 Duration: 1 hour 40 minutes			
Unit	Learning outcomes	Number of marks	%
203 Crop husbandry	1. Know agricultural crop type and uses 4. Know crop nutrient requirements and methods of application	13	26
204 Farm animal production	1. Know agricultural animal types and uses 3. Know requirements for maintaining animal health and welfare	8	16
206 Physiology of plants and animals	1. Understand the basic physiology of plants 2. Understand the basic physiology of animals	12	24
207 Working in the agricultural industry	1. Know the structure and career opportunities within the agricultural industry 3. Know basic business skills required for working in the agricultural industry	9	18
Integration across units	N/A	8	16
		50	100

*These exams are sat under invigilated examination conditions, as defined by the JCQ:
<http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations>

Entry for exams can be made through the City & Guilds Walled Garden.

Assessment type: Multiple-choice exam, delivered online *

Assessment conditions: Invigilated examination conditions

Grading: X/P

Health and Safety for land-based industries – Theory exam (200)			
Duration: 1 hour			
Unit	Learning outcome	Number of marks	%
Health and Safety for land-based industries (201)	1. Understand the impact legislation has on land-based industries	8	31
	2. Understand risk assessment requirements for land-based industries	4	17
	3. Know safe working practices when working in land-based industries	13	51
Total		25	100

*These exams are sat under invigilated examination conditions, as defined by the JCQ:
<http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations>

Entry for exams can be made through the City & Guilds Walled Garden.

6 Moderation and standardisation of assessment

City & Guilds' externally set synoptic assignments for technical qualifications are designed to draw from across the qualifications' content, and to contribute a significant proportion towards the learner's final qualification grade. They are subject to a rigorous external quality assurance process known as external moderation.

Moderation is the process where external quality assurers are standardised to a national standard in order to review centre marking of internally marked assessments. These quality assurers are referred to as 'moderators'. Moderators will review a representative sample of 'candidate work' across the mark range from every centre. Their marks act as a benchmark to inform City & Guilds whether centre marking is in line with City & Guilds' standard.

Where moderation shows that the centre is applying the marking criteria within a reasonable range of mark tolerance, centre marks for the whole cohort will be accepted. Where moderation shows that the centre is either consistently too lenient or consistently too harsh in comparison to the national standard, an appropriate adjustment (up or down) will be made to the marks of the whole cohort, retaining the centre's rank ordering. Due to the nature of the assessment and the marking grid across Assessment Objectives (AOs), it is not expected that the tutors mark and the moderators mark will match exactly.

Where centre application of the marking criteria is inconsistent, an appropriate adjustment for the whole cohort may not be possible on the basis of the sample of candidate work. In these instances, a complete remark of the candidate work may be necessary.

For more detailed information, on the external quality assurance process for synoptic assignments and additional unit assessments please refer to 'Quality Assurance Guide for Centres: Technical Qualifications and the EPQ available to download on the City & Guilds website.

It is vital that centres familiarise themselves with this process, and how it impacts on their delivery plan within the academic year.

Supervision and authentication of internally assessed work

The Head of Centre is responsible for ensuring that internally assessed work is conducted in accordance with City & Guilds' requirements.

City & Guilds requires both tutors and candidates to sign declarations of authenticity. If the tutor is unable to sign the authentication statement for a particular candidate, then the candidate's work cannot be accepted for assessment.

Internal standardisation

For internally marked work² the centre is required to conduct internal standardisation to ensure that all work at the centre has been marked and/or graded to the same standard. It is the Internal Quality

² For any internally assessed optional unit assignments, the same process must be followed where assessors must standardise their interpretation of the assessment and grading criteria.

Assurer's (IQA's) responsibility to ensure that standardisation has taken place, and that the training includes the use of reference and archive materials such as work from previous years as appropriate.

Internal appeal

Centres must have an internal process in place for candidates to appeal the marking of internally marked components, i.e. the synoptic assignment and any optional unit assignments. This must take place before the submission of marks or grades for external quality assurance. The internal process must include candidates being informed of the marks (or grades) the centre has given for internally assessed components, as they will need these to make the decision about whether or not to appeal.

Post-quality assurance procedures

Once the external quality assurance processes have been completed, feedback is provided to the centre on the standard of the internal assessment, highlighting areas of good practice, and potential areas for improvement. This will inform future centre assessment, and standardisation activities, as well as external quality assurance and risk management activity.

Centres retaining evidence

Centres must retain assessment records for each candidate for a minimum of three years. To help prevent plagiarism or unfair advantage in future versions, candidate work may not be returned to candidates. Samples may however be retained by the centre as examples for future standardisation of marking.

7 Grading

Awarding individual assessments

Individual assessments will be graded, by City & Guilds, as pass/merit/distinction where relevant. The grade boundaries for pass and distinction for each assessment will be set through a process of professional judgement by technical experts. Merit will usually be set at the midpoint between pass and distinction. The grade descriptors for pass and distinction, and other relevant information (e.g. archived samples of candidate work and statistical evidence) will be used to determine the mark at which candidate performance in the assessment best aligns with the grade descriptor in the context of the qualification's purpose. Boundaries will be set for each version of each assessment to take into account relative difficulty.

Please note that as the Merit grade will usually be set at the arithmetical midpoint between pass and distinction, there are no descriptors for the Merit grade for the qualification overall.

Grade descriptors

To achieve a pass, a candidate will be able to

- Demonstrate the knowledge and understanding required to work in the occupational area, its principles, practices and legislation.
- Describe some of the main factors impacting on the occupation to show good understanding of how work tasks are shaped by the broader social, environmental and business environment it operates within.
- Use the technical industry specific terminology used in the industry accurately.
- Demonstrate the application of relevant theory and understanding to solve non-routine problems.
- Interpret a brief for complex work related tasks, identifying the key aspects, and showing a secure understanding of the application of concepts to specific work related tasks.
- Carry out planning which shows an ability to identify and analyse the relevant information in the brief and use knowledge and understanding from across the qualification (including complex technical information) to interpret what a fit for purpose outcome would be and develop a plausible plan to achieve it.
- Achieve an outcome which successfully meets the key requirements of the brief.
- Identify and reflect on the most obvious measures of success for the task and evaluate how successful they have been in meeting the intentions of the plan.
- Work safely throughout, independently carrying out tasks and procedures, and having some confidence in attempting the more complex tasks.

To achieve a distinction, a candidate will be able to

- Demonstrate the excellent knowledge and understanding required to work to a high level in the occupational area, its principles, practices and legislation.
- Analyse the impact of different factors on the occupation to show deep understanding of how work tasks are shaped by the broader social, environmental, and business environment it operates within.
- Demonstrate the application of relevant theory and understanding to provide efficient and effective solutions to complex and non-routine problems.
- Analyse the brief in detail, showing confident understanding of concepts and themes from across the qualification content, bringing these together to develop a clear and stretching plan that would credibly achieve an outcome that is highly fit for purpose.

- Achieve an outcome which shows an attention to detail in its planning, development and completion, so that it completely meets or exceeds the expectations of the brief to a high standard.
- Carry out an evaluation in a systematic way, focussing on relevant quality points, identifying areas of development/ improvement as well as assessing the fitness for purpose of the outcome.

Awarding grades and reporting results

The overall qualification grade will be calculated based on aggregation of the candidate's achievement in each of the assessments for the mandatory units, taking into account the assessments' weighting. The **City & Guilds Level 2 Technical Certificate in Agriculture** will be reported on a four grade scale: Pass, Merit, Distinction, Distinction*.

All assessments **must** be achieved at a minimum of Pass for the qualification to be awarded. Candidates who fail to reach the minimum standard for grade Pass for an assessment(s) will not have a qualification grade awarded and will not receive a qualification certificate.

The approximate pass grade boundary for the synoptic assignment(s) in this qualification are:

Synoptic Assignment	Pass Mark (%)
022	40

Please note that each synoptic assignment is subject to an awarding process before final grade boundaries are confirmed.

The health and safety assessment 200 must be passed to achieve the qualification. This assessment is graded pass/fail.

The contribution of assessments towards the overall qualification grade is as follows:

Assessment method	Grade scale	% contribution
Synoptic Assignment (022)	X/P/M/D	60%
Exam (021/ 521)	X/P/M/D	40%

Both synoptic assignments and exams are awarded (see 'Awarding individual assessments', at the start of Section 7, above), and candidates' grades converted to points. The minimum points available for each assessment grade is listed in the table below. A range of points between the Pass, Merit and Distinction boundaries will be accessible to candidates. For example a candidate that achieves a middle to high Pass in an assessment will receive between 8 and 10 points, a candidate that achieves a low to middle Merit in an assessment will receive between 12 and 14 points. The points above the minimum for the grade for each assessment are calculated based on the candidate's score in that assessment.

	Pass	Merit	Distinction
Assignment: 60%	6	12	18

Exam: 40%	6	12	18
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The candidate's points for each assessment are multiplied by the % contribution of the assessment and then aggregated. The minimum points required for each qualification grade are as follows:

Qualification Grade	Points
Distinction*	20.5
Distinction	17
Merit	11
Pass	6

Candidates achieving Distinction* will be the highest achieving of the Distinction candidates.

8 Administration

Approved centres must have effective quality assurance systems to ensure valid and reliable delivery and assessment of qualifications. Quality assurance includes initial centre registration by City & Guilds and the centre's own internal procedures for monitoring quality assurance procedures.

Consistent quality assurance requires City & Guilds and its associated centres to work together closely; our Quality Assurance Model encompasses both internal quality assurance (activities and processes undertaken within centres) and external quality assurance (activities and processes undertaken by City & Guilds).

For this qualification, standards and rigorous quality assurance are maintained by the use of:

- internal quality assurance
- City & Guilds external moderation (synoptic assessments).

In order to carry out the quality assurance role, Internal Quality Assurers (IQAs) must have and maintain an appropriate level of technical competence and have recent relevant assessment experience. For more information on the requirements, refer to *Section 2: Centre requirements* in this handbook.

To meet the quality assurance criteria for this qualification, the centre must ensure that the following procedures are followed:

- suitable training of staff involved in the assessment of the qualification to ensure they understand the process of marking and standardisation
- completion by the person responsible for internal standardisation of the Centre Declaration Sheet to confirm that internal standardisation has taken place
- the completion by candidates and supervisors/tutors of the record form for each candidate's work.

External quality assurance

City & Guilds will undertake external moderation activities to ensure that the quality assurance criteria for this qualification are being met. Centres must ensure that they co-operate with City & Guilds staff and representatives when undertaking these activities.

City & Guilds requires the Head of Centre to

- facilitate any inspection of the centre which is undertaken on behalf of City & Guilds
- make arrangements to receive, check and keep assessment material secure at all times,
- maintain the security of City & Guilds confidential material from receipt to the time when it is no longer confidential and
- keep completed assignment work and examination scripts secure from the time they are collected from the candidates to their dispatch to City & Guilds.

Enquiries about results

The services available for enquiries about results include a review of marking for exam results and review of moderation for synoptic assignments.

For further details on enquiries and appeals process and for the application forms, please visit the **centre document library** on the City & Guilds website at **www.cityandguilds.com**.

Re-sits and shelf-life of assessment results

For the synoptic theory exam and synoptic assignment, candidates who have failed an assessment or wish to re-take it in an attempt to improve their grade, can re-sit assessments **once only**. The best result will count towards the final qualification. See guidance on individual assessment types and re-sit conditions in Section 5.

Factors affecting individual learners

If work is lost, City & Guilds should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form, JCQ/LCW, to inform City & Guilds Customer Services of the circumstances.

Learners who move from one centre to another during the course may require individual attention. Possible courses of action depend on the stage at which the move takes place. Centres should contact City & Guilds at the earliest possible stage for advice about appropriate arrangements in individual cases.

Malpractice

Please refer to the City & Guilds guidance notes *Managing cases of suspected malpractice in examinations and assessments*. This document sets out the procedures to be followed in identifying and reporting malpractice by candidates and/or centre staff and the actions which City & Guilds may subsequently take. The document includes examples of candidate and centre malpractice and explains the responsibilities of centre staff to report actual or suspected malpractice. Centres can access this document on the City & Guilds website.

Examples of candidate malpractice are detailed below (please note that this is not an exhaustive list):

- falsification of assessment evidence or results documentation
- plagiarism of any nature
- collusion with others
- copying from another candidate (including the use of ICT to aid copying), or allowing work to be copied
- deliberate destruction of another's work
- false declaration of authenticity in relation to assessments
- impersonation.

These actions constitute malpractice, for which a penalty (e.g. disqualification from the assessment) will be applied.

Where suspected malpractice is identified by a centre after the candidate has signed the declaration of authentication, the Head of Centre must submit full details of the case to City & Guilds at the earliest opportunity. Please refer to the form in the document *Managing cases of suspected malpractice in examinations and assessments*.

Access arrangements

Access arrangements are adjustments that allow candidates with disabilities, special educational needs and temporary injuries to access the assessment and demonstrate their skills and knowledge

without changing the demands of the assessment. These arrangements must be made before assessment takes place.

It is the responsibility of the centre to ensure at the start of a programme of learning that candidates will be able to access the requirements of the qualification.

Please refer to the *JCQ access arrangements and reasonable adjustments and Access arrangements - when and how applications need to be made to City & Guilds* for more information. Both are available on the **City & Guilds website**.

Special consideration

We can give special consideration to candidates who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given after the examination.

Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the centre. For more information, please consult the current version of the JCQ document, *A guide to the special consideration process*. This document is available on the **City & Guilds website**.

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand the principles, and importance, of health and safety within land-based settings. This unit covers health and safety legalisation which provides the requirements upon which policies and procedures within the industry are based.

Working in land-based roles is exciting and varied but operating in these environments can be dangerous and present potential risks and hazards. As part of this unit learners will look at the legislation that is in place to maintain safety, the requirements for risk assessment and how these impact on working practices.

This unit also introduces learners to the basic requirements of fire prevention, safe manual handling and basic first aid.

Learners should consider the following questions as a starting point to this unit:

- What is the difference between a hazard and a risk?
- What legislation covers health and safety when working in land-based environments?
- How should heavy materials or equipment be moved safely?
- What different types of fire prevention equipment are there?

This unit must be taught alongside **all** technical units within the qualification ensuring learners gain an appreciation of its importance and so that they are equipped with knowledge and understanding to protect themselves and others when working in the industry.

Learning outcomes

In this unit, learners will:

1. Understand the impact legislation has on land-based industries
2. Understand risk assessment requirements for land-based industries
3. Understand safe working practices when working in land-based industries

Learning outcome:

1. Understand the impact legislation has on land-based industries

Topics

1.1 Legislation relevant to land-based industries

1.2 Employer and employee responsibilities

Topic 1.1

Legislation related to the land-based sector, and where it applies.

Legislation:

- Health and Safety at Work Act (HASAW) (1974)
- Provision and Use of Work Equipment Regulations (PUWER) (1998)
- Reporting of Injuries Diseases and Dangerous Occurrences Regulations (RIDDOR) (2013)
- Control of Substances Hazardous to Health (COSHH) Regulations (2002)
- Management of Health and Safety at Work Regulations (1999)
- Personal Protective Equipment Regulations (PPE) (1992)
- Regulatory Reform (Fire Safety) Order (2005)
- Environmental Protection Act

NB - Health and safety relating to specific tasks/practices will be covered within the relevant specific unit.

Topic 1.2

Employer responsibilities under health and safety regulations:

- Providing healthy work environment – washing facilities, toilets, ventilation, heating and lighting, no smoking policy, first aid
- Providing safe work environment - signage, PPE, fire safety, risk assessments, safe equipment
- Training
- Reporting

Employee responsibilities under health and safety legislation:

- Responsibility for own personal health and safety
- Co-operation with employer
- Not interfering with or misusing equipment/provisions (e.g. alarms, signage) provided for health safety and welfare
- Lines of reporting for:
 - accidents
 - faults
 - damage
- Following instructions and safe working practice – e.g. using PPE where provided
- Helping others and sharing good practice

Learning outcome:

2. Understand risk assessment requirements for land-based industries

Topics

2.1 Risk assessment terminology

2.2 Hazards, risks and control measures

Topic 2.1

Definitions of risk assessment terminology:

- Generic risk assessment
- Site specific
- Task specific
- Emergency action plan
- Method statement
- Hazard
- Risk
- Persons at risk e.g. yourself, colleagues, general public
- Control measures

Topic 2.2

The five step process for risk assessments:

- Identifying hazards
- Deciding who might be harmed and how
- Evaluating risks, deciding on precautions
- Recording finding and implementing
- Reviewing as required

Learning outcome:

3. Understand safe working practices when working in land-based industries

Topics

3.1 Manual handling principles

3.2 Basic first aid procedures

3.3 Fire safety principles

Topic 3.1

Principles of and techniques for manual handling, and consequences of not following:

- Legislative requirement
- Safe lifting techniques
- Use of mechanical aids
- Potential implications of poor manual handling – back injury, dropped and damaged goods/equipment
- That it is covered by manual handling risk assessments

Topic 3.2

First aid situations:

- Wounds/severe bleeding
- Burns
- Shock
- Unconsciousness
- Falls from height

Response to first aid situations:

- Procedures to be taken
- How and when to call for assistance
- Reporting requirements
- Own limitations when responding to first aid emergency

Topic 3.3

Principles of fire safety, procedures to follow, and fire safety equipment and their uses:

- Procedures for raising the alarm
- Evacuations and drills
- Types and uses of fire safety equipment:
 - smoke detectors
 - fire alarms
 - fire extinguishers – water, dry powder, foam, CO2
 - fire blankets
 - fire hoses
- Own limitations when responding to potential fire emergency

Guidance for delivery

This unit links closely with all other units and provides the basis of knowledge required to work safely on all tasks in the range of land-based environments. Tutors should guide learners to develop their understanding of principles of health and safety required for working within the industry as learners will need to understand how these are essential for employment within the sector.

This is a knowledge only unit and although the majority of content could be delivered in a classroom environment, it is important that learners can relate this knowledge and understanding to real life working tasks and environments. Reference to this unit should be made when teaching the other practical units that make up this qualification.

It is expected that a range of delivery methods will be used including presentations, classroom discussions and individual study.

Topic 1.1 relates to legislation - there is no requirement for a detailed understanding at this level, but learners must appreciate where there are legislations, what they are and where each applies. Tutors should ensure that they keep up to date with changes and amendments to legislations covered by this unit and include delivery of locally relevant policy and standards where relevant.

Topic 3.2 relates to the procedures that should be followed when dealing with an emergency incident: Stop work, assess the situation, provide first aid, seek assistance, reassess, update risk assessment, record and/or report the incident.

The learning outcome on safe working practices could be supported by visits to, or talks from employers. Representatives from industry could be invited to meet with learners and discuss a typical day in their work setting and best practice in terms of safety procedures and how their daily routine is affected by health and safety procedure and legislation.

This unit is key to the delivery of the practical elements of the units in the qualification. Learners should be encouraged to consider the health and safety considerations before engaging in practical activities for example completing risk assessments before starting jobs.

Level:	2
GLH:	60

What is this unit about?

The purpose of this unit is for learners to use and maintain power units and agricultural machinery. The types of machinery used vary across the industry and area of specialism but can include tractors, telescopic handlers, all-terrain vehicles (ATVs) and utility vehicles (RTV). The use of these types of vehicles is essential to the day to day smooth running of land-based industries, as agricultural machinery is relied upon to carry out a wide range of essential tasks. Agricultural machines can be expensive, complicated and state of the art and must be used with care and consideration during operation and maintenance.

This unit provides learners with the opportunity to drive and operate agricultural machinery, hitch and unhitch attachments and carry out pre and post operational checks that are vital to ensure correct maintenance. Alongside these practical skills learners will look at the types of agricultural machinery available and their key components, as well as the legislation and codes of practice that cover their use.

Learners should consider the following questions as a starting point to this unit:

- What different controls do power units have?
- How can machinery be maintained to ensure smooth running?
- What checks are carried out on power units and agricultural machinery before they are used?
- What codes of practice cover the operation of agricultural machinery?

Learning outcomes

In this unit, learners will:

1. Know power unit components and operational checks
2. Know types of machinery used in agricultural settings
3. Operate power units using basic controls
4. Complete hitching procedures for power units
5. Operate agricultural machinery
6. Maintain and store agricultural machinery

Learning outcome:

1. Know power unit components and operational checks

Topics

1.1 Legislation and regulations

1.2 Power unit components and controls

Topic 1.1

Legislations and codes of practice relating to the safe use and operation of power units. For purposes of assessment, there is no requirement for detail, but learners must appreciate that there is legislation and where each applies.

- Highway code
- Health and safety at work act – including importance of risk assessments
- Provision and Use of Work Equipment Regulations (PUWER)
- Waste management regulations
- Personal Protective Equipment (PPE) regulations
- Manual handling regulations
- Management of health and safety regulations
- Control of Substances Hazardous to Health (COSHH)
- Road Transport Industry Training Board (RTITB)
- Lifting Operations and Lifting Equipment Regulations (LOLER)

Topic 1.2

Functionality of basic power unit components and controls.

Components:

- Wheels/tyres
- Lights
- Mirrors
- Indicators
- Systems – hydraulics, power take off, engine
- Safety devices – load indicators, horns, lights
- Service liquids - Oil, Water, Fuel

Controls:

- Steering
- Indicators
- Hydraulic spool valves
- Accelerator
- Independent brake / handbrake
- Hitch
- Specific electric system controls –e.g. global positioning systems / auto steering systems
- Clutch
- Gears – including ranges within the gears.

Learning outcome:

2. Know types of machinery used in agricultural settings

Topics

2.1 Types of agricultural machinery

2.2 Factors affecting use

Topic 2.1

Categories and types of agricultural machinery and components and their uses:

- Powered – e.g. muck spreader, slurry tanker, power harrow, fertiliser spreader, trail forage harvester, seed drill (pneumatic), sprayer, potato harvester, combine harvester, grading machines (e.g. egg/potato), feed auger, mower, baler, bale wrapper, telescopic handler grab
- Non-powered – e.g. plough, cultivator, trailed equipment

Topic 2.2

Factors affecting the selection and use of agricultural machinery:

- Field conditions - Soil type, terrain, ground conditions, weather, size of field, obstacles
- Working around yards and inside and outside of buildings
- Time in the farming year
- Specific health and safety considerations – legislation, risk assessments
- Compatibility with power unit
- Suitability for task
- Training required
- Operating costs

Learning outcome:

3. Operate power units using basic controls

Topics

3.1 Complete starting and stopping procedures

3.2 Operate power units

3.3 Clean and decontaminate power units

Topic 3.1

Completing pre operation checks for power units:

- Tyres – pressure, wear, damage
- Service liquid levels – Oil (engine/hydraulic) water, fuel, diesel exhaust fluids
- Air cleaner check
- Visual checks for road worthiness and vehicle safety – e.g. lights, horns, checks for damage
- Specific checks as required from risk assessment – e.g. handling oil

Topic 3.2

Operate power units using basic controls:

- Starting/stopping procedures including site specific risk assessment requirements
- Hydraulics/electrical controls
- PTO – 540 and 1000 rpm engagement (where applicable)
- Fluent use of gear ranges and speeds

Control and manoeuvre power units:

- Driving fluently in straight lines and round obstacles
- Reversing / back up to machinery

Learners must take into consideration weather and situational/terrain conditions during operation – e.g. wet, dry, icy, on grass, on concrete, on slopes.

Topic 3.3

Completing post operation checks for power units:

- Cleaning and decontamination
- Refuelling
- Reporting faulty and damaged components
- Storing/parking with consideration for security and safety

Learning outcome:

4. Complete hitching procedures for power units

Topics

4.1 Attach implements to power units

4.2 Detach implements from power units

Topic 4.1

Completing attaching procedures for implements to power units:

- Non powered and powered implements for attachment to power units considering compatibility:
 - three point linkage or front linkage i.e. loader grabs (where applicable)
 - trailed equipment
- Isolating power unit / external use of controls
- Equipment specification
- Adjustments to tractor and implement to ensure ready for safe transport and/or operation
- Requirements as per machine specific risk assessment

Topic 4.2

Completing detaching procedures for implements from power units:

- Disconnect attachment of implement following use
- Select and use jack/stand appropriate to meet machine specification to ensure safe storage

Learning outcome:

5. Operate agricultural machinery

Topics

5.1 Complete checks on agricultural machinery

5.2 Operate agricultural machinery

Topic 5.1

Checks including:

- Service liquid levels – Oil (engine/hydraulic/gear) water, fuel, diesel exhaust fluids
- Visual checks for safety and operational readiness – e.g. checks for damage, safety shut off switches, webs/grids clear and ready to use, guards in place, tyres
- Specific checks as required from risk assessment – e.g. handling oil
- Checks of implement as per specification and manufacture's handbook

Topic 5.2

Operate non-powered, powered and trailed machinery with consideration of:

- Hitching and attaching procedures
- Set up requirements including:
 - Manufacturer's specification / operators manual
 - In field settings (transport /work mode)
 - Efficiency and output of machine when in use
 - Hydraulics/electrical controls
 - PTO – 540 and 1000 rpm engagement
 - Gear ranges and suitability for task
- Power up and down as per machine specification
- Use machinery for appropriate task as per job requirement and specification
- Reporting cases of fault, damage, inefficiency and breakdown where required
- Follow health and safety procedures

Learners must take into consideration weather and situational/terrain conditions during operation – e.g. wet, dry, icy

Topic 5.3

Completing post operation checks:

- Detaching as per machine requirements
- Refuelling
- Reporting faulty and damaged components

Learning outcome:

6. Maintain and store agricultural machinery

Topics

6.1 Maintain agricultural equipment

6.2 Store and clean agricultural equipment

Topic 6.1

Completing maintenance activities on agricultural equipment:

- Oiling
- Greasing
- Fixing broken/damaged/loose parts – e.g. plough point, damaged chain, missing blades, tines, tightening bolts, tensioning belts
- Record and report where replacement of parts is required, when it has been implemented or further intervention is required

Topic 6.2

Clean and store agricultural equipment:

- Cleaning and decontamination
- Storing safely and securely as per machine specification – utilising jacks/stands, chocks
- Adherence to specific health and safety requirements

Guidance for delivery

When operating tractors and machinery consideration of machinery power and specification should be made and related to candidate experience of and stage of course delivery.

The controls and systems covered will need to be as per the specification of the particular make and model available. However learners should know that there are differences in machine specifications and how this might impact on the presentation of components – e.g. location of controls in vehicles may vary. Tutors should ensure consistent reference is made to manufacture's handbook/ instructions/ operators manual for both power unit and implements.

As part of this unit, learners are required to attach implements to power units but are not specifically required to operate the power units with implements attached. Consideration to the type of machine(s) will vary depending on the type of industry i.e. Telescopic handler, ATV, RTV.

Minimum vehicle specification – Agriculture specification tractor of at least 75HP or ATV/RTV telescopic handler.

Reference to relevant legislation and standards should be made, as necessary throughout delivery of the unit, but there is no requirement for a detailed understanding at this level.

Although some of the content may be delivered in a classroom environment, it is important that learners can relate this knowledge and understanding to actual workshop situations, practical tasks and vehicle applications.

It is expected that a range of delivery methods will be used including presentations and internet research. This unit could be supported by a range of industry visits, from farms utilising large scale machinery to machinery manufacturers such as JCB. Additionally on farm practicals where appropriate can be delivered at a range of farming businesses. Learners should be encouraged to investigate the different ranges and models of tractor and machinery available and their application as per land use and employer requirements for the local area.

This unit links to Unit 201 as an overarching module. When working on machinery power units and machine operation, learners will have access to a range of machines and be assessed on their practical ability, in the basic attachment of machines to the setup of machines to the safe operation.

Level:	2
GLH:	60

What is this unit about?

The purpose of this unit is for learners to explore and understand how agricultural crops are grown from seed to maturity and the factors that influence the lifecycle of the plants.

There is a wide variety of agricultural crop production in the UK today. This type of farming is influenced by many factors including environmental considerations such as climate and soil type as well as economic factors such as cost and demand. Learners will look at these influences and how they impact on arable land use and crop production.

The unit covers how plants are cultivated, cared for, kept healthy and harvested. It also covers the potential problems that can arise from pests, disease and weeds. This unit also provides learners with the opportunity to take and analyse soil samples to help ensure crop health and sustainability.

Learners should consider the following questions as a starting point to this unit:

- Why are some locations better than others for crop production?
- How does climate and environment influence the types of crops grown?
- What information can be found by taking soil samples?
- What types of problems can affect crop production?

Learning outcomes

In this unit, learners will:

1. Know agricultural crop types and uses
2. Take representative soil samples for analysis
3. Prepare for crop establishment
4. Know crop nutrient requirements and methods of application
5. Know signs and indicators of crop health
6. Know requirements for the harvesting of crops

Learning outcome:

1. Know agricultural crop type and uses

Topics

1.1 Categories of crops

1.2 Uses of crops

Topic 1.1

Categories and types of crops:

- Combinable crops
 - Cereals – Wheat, Barley, Oats, Rye, Triticale
 - Pulses – Beans, Peas
 - Oil seeds – Oil Seed Rape, Linseed,
- Grasses – Rye Grass (diploid/tetraploid), Timothy, Cocksfoot, Meadow Fescue
- Forage crops – Legumes, Forage Maize, Kale, Clover
- Green manure – Clover, Vetch, Sainfoin, Westerwolds, Mustard
- Root crops – Stubble Turnips, Potatoes, Swedes, Sugar Beet, Fodder Beet
- Field vegetables – Cauliflowers, Carrots, Cabbage, Onions
- Energy crops - Miscanthus, Short Rotation Coppice (SRC) – including Willow and Poplar

Topic 1.2

Uses of different crop types:

- Human consumption
- Animal feed
- Bio fuels

Factors affecting the choice of cropping:

- Soil type – clay, sand, silt, loam, limestone, chalk, peat
- Topography
- Geographical and climate consideration – weather, proximity to population
- Market/demand
- Crop rotation
- Existing infrastructure – buildings, storage, machinery
- Financial considerations

Learning outcome:

2. Take representative soil samples for analysis

Topics

2.1 Use sampling tools and equipment

2.2 Take soil samples

2.3 Analyse soil samples

Topic 2.1

Use soil sampling tools and equipment:

- Soil auger – mechanised or non-mechanised
- Soil analysis kit (BDH kit)
- Soil texture classification chart

Topic 2.2

Follow soil sampling procedures:

- W shape configuration of site
- Take numerous cores from topsoil according to auger depth
- Labelling of samples
- Indicate accurately on plan/map where samples were taken

Topic 2.3

Completing testing and analysis of soil samples:

- Texture
- pH test
- Phosphate
- Potassium

Learning outcome:

3. Prepare for crop establishment

Topics

3.1 Crop establishment methods

3.2 Growing calendars and cycles

3.3 Seed bed preparation

Topic 3.1

Crop establishment methods and machinery for crop types identified in topic 1.1:

- Grasses – seed bed preparation, under sowing, overseeding
- Root crops (including potatoes) – bed formers, de-stoners, deep ridges, precision seed drills
- Combinable crops – seed bed preparation, minimum tillage, plough, power harrow, combination seed drill

Topic 3.2

Growing calendars and cycles for agricultural crops:

- Grasses – time of sowing/establishment, calendar of weed/disease and pest control, maturity at harvest
- Root crops - time of sowing/establishment, calendar of weed/disease and pest control, maturity at harvest
- Combinable crops - time of sowing/establishment, calendar of weed/disease and pest control, stages of growth, maturity at harvest

Topic 3.3

Establish crops from the types identified in topic 3.1 with consideration of:

- Selecting and using equipment as appropriate for crop establishment
- Preparing seed bed
- Planting techniques

Learners must establish at least one crop as topic 3.1.

Learning outcome:

4. Know crop nutrient requirements and methods of application

Topics

4.1 Nutrients

4.2 Supply and application types

4.3 Weed, pest and disease control measures

Topic 4.1

Types of nutrients for agricultural crops:

- Major – nitrogen phosphorus, potassium
- Minor – sulphur, magnesium, manganese, boron, trace elements, copper, selenium

Topic 4.2

Nutrient supply types for agricultural crops:

- Farmyard manure
- Slurry
- Manufactured fertiliser
- Crop residue
- Legume crops

Application types including:

- Manure spreaders
- Slurry tankers
- Slurry injection
- Umbilical cord
- Fertiliser spreaders
- Sprayers

Topic 4.3

Type and uses of agricultural chemicals:

- Fertilisers – Straight, Compound
- Pesticides – herbicides, fungicides, specific pesticides, growth regulators, insecticides

Non-chemical control methods

Cultural, mechanical, biological, rotation, variety choice

Consideration should be made of the safe storage and use of agricultural chemicals and relevant legislations:

- COSHH
- Nitrate vulnerable zone
- Water directive framework 2003
- PPE regulations
- Waste management regulations

Learning outcome:

5. Know signs and indicators of crop health in crops

Topics

5.1 Signs of good health in crops

5.2 Signs of poor health in crops

Topic 5.1

Signs of good health in agricultural crops:

- Leaf colour
- Consistent / uniform growth stages

Topic 5.2

Potential causes of poor health in crops and the signs of their presence:

- Pests - Presence of pests, signs of damage
- Nutrient deficiencies - Discolouration of plant or parts of plant, under development of plant
- Disease – presence of pustules, mould on leaves / plant

Common weeds including grass and broadleaf:

- Annual meadow grass
- Chickweed
- Fat Hen
- Charlock
- Cleavers
- Field pansy
- Wild oats
- Couch
- Yorkshire fog
- Redshank
- Brome
- Blackgrass

Common pests:

- Aphids
- Leather jackets

- Wireworm
- Pollen beetle
- Slugs
- Pigeons
- Rabbits
- Mice
- Rats

Common diseases:

- Mildew
- Eyespot
- Septoria
- Yellow rust
- Phoma
- Chocolate spot
- Blight
- Canker

Learning outcome:

6. Know requirements for the harvesting of crops

Topics

6.1 Harvesting crops

6.2 Handling and storage requirements for crops

Topic 6.1

Considerations and requirements when harvesting agricultural crops:

- Machinery – combines, self-propelled forage harvesters, root harvesting equipment, balers
- Timings/season – crop maturity and crop harvest

Topic 6.2

Handling requirements for agricultural crops:

- Telehandler, buck rake, potato graders, elevators and conveyors

Storage requirements for agricultural crops including:

- Clamps, bales, indoor/outdoor stores, bins, boxes (potatoes), bale wrap, silos.

Guidance for delivery

For topic 1.1 learners must be able to identify visual characteristics of at least one fully grown crop from each of these categories.

For topic 3.2 learners must cover a minimum of one crop per category.

For learning outcome 4 learners could be introduced to legislation in crop protection and nutrition for example AHBD RB209 - <http://www.ahdb.org.uk/projects/CropNutrition.aspx>

For topic 5.2 although learners should know what the common weeds, pests, diseases are, at this level identification and diagnosis is not required.

Although some of the content may be delivered in a classroom environment, it is important that learners can relate their knowledge and understanding to the real life environment. Tutors are encouraged to take learning outside into agricultural settings.

Tutors should encourage learners to investigate the different ranges of arable farming conducted in their area, consider how the local climate/demand etc. has influenced this, and how nearby agricultural industries and employers have responded.

The unit should be supported by a range of industry visits, on farm practicals utilising a range of crops. Industry representatives, farmers and growers, seed specialists for example should be made available to support the delivery of this unit. The links to machinery operation and health and safety is also important to cross reference to this unit and observation of machinery on farm will reinforce the learning outcomes.

This unit has links to the knowledge and skills covered in unit 206. Learners will also build on content from unit 202 machinery operation, when assessing crop establishment techniques as part of this unit.

Level:	2
GLH:	60

What is this unit about?

The purpose of this unit is for learners to understand the requirements for the farming of agricultural animals. There is a great variety of animals and breeds that can be farmed successfully in the UK. As part of this unit learners will look at the requirements for caring for animals on a day to day basis and how this is influenced by the farming year and local environmental considerations.

This unit provides learners with the opportunity to carry out basic stock tasks to maintain the health and wellbeing of animals on a farm throughout their lifecycle and the farming year including housing them, transporting them and checking their health.

The unit also looks at potential problems and diseases that can affect the main range of agricultural animals farmed in the UK today.

Learners should consider the following questions as a starting point to this unit:

- What types of agricultural animals are farmed locally?
- What different breeds of farm livestock are there?
- How can financial considerations influence the types of animals farmed?
- What common diseases can affect agricultural livestock?

Learning outcomes

In this unit, learners will:

1. Know agricultural animal systems, types and uses
2. Understand feeding systems for agricultural animals
3. Know requirements for maintaining animal health and welfare
4. Complete stock tasks on agricultural animals

Learning outcome:

1. Know agricultural animal types and uses

Topics

1.1 Types and uses

1.2 Breeds

1.3 Choosing breeds for system

Topic 1.1

Types and main uses of agricultural animals:

- Cattle - dairy, meat
- Sheep – dairy, meat, wool
- Pigs – meat
- Goats – dairy, meat
- Poultry (chicken, geese, ducks, turkey) – meat, eggs

Matching animal systems to animal type/breed:

- intensive/semi-intensive/extensive
- Indoor/outdoor

Topic 1.2

Breeds of agricultural animals:

- Cattle
 - Dairy - British Friesian, Holstein, Jersey, Guernsey, Ayrshire, Dairy Shorthorn, crossbreeds
 - Beef - Native (Hereford, Welsh Black, Aberdeen Angus, Shorthorn) , Continental (Charolais, Simmental, Limousin, Belgian/British Blue), crossbreeds, composites (Stabiliser)
- Sheep – Commercial (Suffolk, Texel, Charolais, Lleyn, Swaledale, Scottish Blackface, Welsh Mountain) Rare (Romney, Norfolk Horn), crossbreeds (Mule)
- Pigs – Commercial (Landrace, Large White, Duroc, Pietrain, crossbreeds) Rare (Saddleback, Gloucester Old Spot, Tamworth)
- Goats – Dairy (Saanen, Toggenburg, alpine) Meat (Boer)
- Poultry – Commercial/domestic
 - Chicken
 - Geese
 - Ducks
 - Turkey

Topic 1.3

Factors affecting the choice of animal production system:

- Soil type
- Land availability
- Topography
- Geographical and climate consideration – weather, proximity to population
- Market/demand
- Existing infrastructure – buildings, machinery

- Management of waste
- Availability of resources
- Financial considerations

Learning outcome:

2. Understand feeding systems for agricultural animals

Topics

2.1 Feed types and choices

2.2 Feed methods and administration

2.3 Feeding and watering equipment

Topic 2.1

Feed types and choices:

Types -

- Conserved – hay, straw, haylage, grass silage, maize silage, wholecrop cereal silage, lucerne
- Non-conserved – grazed grass, kale, fodder beet, stubble turnips, swedes, beans, peas, cereals, brewers grains, distillers grains, pressed sugar beet pulp
- Blends and compounds – pellets, meals, cake, mixes
- Supplementary - vitamins, minerals, medications, molasses, buffers

Choices -

- Feed suitability for stage of production/age – quantities, content, balance of overall diet
- Performance – daily liveweight gain, food conversion ratio, litres milk/ cow/day, milk quality

Topic 2.2

Methods of feed administration:

- Strip grazing
- Paddock grazing
- Self-feed silage
- Auger systems
- Total Mixed Rations (TMR)
- Ad lib
- Restricted feeding

Topic 2.3

Feeding and watering equipment:

- Preparation - Mill and mixers
- Putting feed out - Feeder wagons, telehandler, bucket/shear grab
 - Computerised feeding systems
 - Troughs

- Ring
- Hoppers
- Storage
 - Silage clamps
 - Ag-bag
 - Big bales
 - Bins
 - Silos
 - Bunkers

Learning outcome:

3. Know requirements for maintaining animal health and welfare

Topics

3.1 Animal welfare

3.2 Indicators of good health

3.3 Indicators of poor health

3.4 Common diseases

Topic 3.1

Welfare needs of animals:

- Suitable diet
- Protected from pain, suffering and disease
- Exhibiting normal behaviour patterns
- Suitable environment
- Housed with/apart from other animals as applicable

Learners should be aware of the relevant DEFRA Codes of Recommendations for the Welfare of Livestock welfare relating to agricultural animals.

Topic 3.2

Indicators of good health:

- Normal temperature and breathing
- Coat/skin condition
- Good posture/ movement and absence of lameness
- Clear, alert, bright eyes
- Production levels consistent– e.g. milk yield, daily LWG
- Feeding/cudding regularly
- Normal dung consistency (i.e. not scouring)

Topic 3.3

Indicators of poor health:

- Extremes of temperature/respiration
- Poor/irregular coat/skin condition – presence of parasites
- Poor posture/ movement, lameness
- Sunken eyes
- Production levels e.g. irregular growth rates/milk yields
- Under feeding

- Irregular waste production levels - Scouring
- Isolation from main group

Topic 3.4

Common diseases/disorders and ailments of agricultural animals:

- Notifiable diseases – TB, Brucellosis, FMD
- Zoonotic diseases – Toxoplasmosis, Ringworm, Leptospirosis, Orf
- Lameness issues – Digital Dermatitis, Foul, Sole Ulcers, Footrot, Scald

Learners must cover at least two different types of agricultural animal and know examples of at least two relevant diseases for each:

- Cattle – e.g. Ringworm, Leptospirosis, Bovine Viral Diarrhoea (BVD), Infection Bovine Rhinotracheitis (IBR), Milk Fever, Mastitis, Grass Staggers, Tuberculosis (TB), ticks, liver fluke, stomach worms, Johnes disease, and Calves – e.g. Scours, Pneumonia, Joint Ill, Coccidiosis, stomach worms
- Sheep – e.g. Orf, Toxoplasmosis, Mastitis, Coccidiosis, Sheep scab, maggots (blow fly), ticks, liver fluke, stomach worms, Contagious Ovine Digital Dermatitis (CODD)
- Poultry – e.g. Salmonella, Newcastle Disease, Coccidiosis, stomach worms
- Pigs – e.g. Rhinitis, Salmonella, Enteritis, Erysipilis, stomach worms
- Goats – e.g. Coccidiosis, liver fluke

Learning outcome:

4. Complete stock tasks for agricultural animals

Topics

4.1 House agricultural animals

4.2 Handle and transport agricultural animals

4.3 Complete welfare tasks for agricultural animals

Topic 4.1

Selecting animal housing with consideration of:

- Stocking density – depending on stage of growth
- Suitability for species
- Ventilation
- Lighting
- Feeding systems
- Security and escape routes

Maintaining animal housing:

- Providing bedding
- Cleaning and disinfecting areas – scraping up
- Maintaining feed and water levels
- Following security and welfare procedures for animal housing

Topic 4.2

Handling and transporting agricultural animals with consideration of:

- Altering environmental conditions in preparation for handling and transporting – e.g. lighting, ground surfaces
- Ensuring safety and security of self and animal e.g. PPE, gating preparation before movement
- Using correct restraint and handling methods :
 - Manual
 - Equipment – e.g. halter, race, crush, turnover crate
- Selecting using transportation equipment as per requirements of the animal's needs – e.g. trailer size, crate
- Ensuring animal welfare throughout with consideration of legislation, codes of practice

Topic 4.3

Completing animal health and welfare tasks:

- Following biosecurity measures for disease prevention
- Footbath
- Body condition scoring
- Visual inspection/check of health
- Ear tagging
- Weighing
- Worming – pour on, bolus/drench
- Recording and reporting animal health and welfare concerns

Guidance for delivery

For topic 3.4 although learners should know the common health issues of agricultural animals there is no requirement to diagnose them or identify their signs and symptoms. At this level learners should know what the issues are and be able to match the issue to the animal.

Although some of the content may be delivered in a classroom environment, it is important that learners can relate their knowledge and understanding to the real life environment. Tutors are encouraged to take learning outside into agricultural settings.

Tutors should encourage learners to investigate the different ranges of pastoral farming conducted in their area, consider how the local climate/demand etc. has influenced this and how nearby agricultural industries and employers have responded.

This unit will be supported by a range of livestock enterprises. The link to local farms and businesses to undertake a range of practicals utilising a range of livestock species will be delivered. In addition the support from feed companies, mills and feed formulation companies, vets, animal health companies would also enhance the learning experience and support this unit.

This unit has links to the knowledge and skills covered in unit 206 'Physiology of plants and animals'.

Level:	2
GLH:	60

What is this unit about?

The purpose of this unit is for learners to develop the skills used to maintain elements of the farm and estate environment including boundaries and structures. Keeping a farm estate well maintained contributes to its smooth day to day running as well as ensuring the wellbeing and safety of both livestock and farm workers.

Learners will cover how to use a range of tools that are used as part of regular maintenance activities, including how to use them safely and keep them in good working order. The unit covers different types of maintenance work including working on boundaries such as walls and hedges, as well as basic painting, plumbing and drainage responsibilities.

This unit provides learners with the opportunity to work practically with equipment to fix things that are broken, problem solve and make a real difference to how the environment of a farm estate looks and operates.

Learners should consider the following questions as a starting point to this unit:

- What types of boundaries need maintenance on farms?
- What kind of tools are required for basic estate maintenance?
- How are tools maintained following use?
- What steps should be followed when fixing a wooden gate?

Learning outcomes

In this unit, learners will:

1. Use and maintain agricultural hand tools
2. Complete agricultural boundary and drainage maintenance
3. Complete basic agricultural structure maintenance activities

Learning outcome:

1. Use and maintain agricultural hand tools

Topics

1.1 Using tools

1.2 Maintaining and storing tools

Topic 1.1

Using hand tools for agricultural estate maintenance:

- Spades
- Forks
- Fencing/wire strainers
- Post knockers
- Slash hooks
- Clippers
- Hammers
- Fencing pliers
- Trowels
- Spirit levels
- Measuring equipment – tapes
- Saws
- Drainage rods
- Knapsack sprayer

Topic 1.2

Maintaining and storing tools:

- Reporting damaged or broken tools
- Clean tools following use
- Store safely and securely

Learning outcome:

2. Complete agricultural boundary and drainage maintenance

Topics

2.1 Types of boundary maintenance

2.2 Completing boundary maintenance

Topic 2.1

Types of agricultural boundaries maintenance:

- Hedge – planting, trimming, hedge laying
- Stone walls/brickwork – building/rebuilding
- Fencing – fixing/fitting posts and wire/rails
- Fitting and repairing gates
- Maintaining ditches – clearing and creating, ensuring drainage
- Weed control on boundaries

Topic 2.2

Completing maintenance with consideration of:

- Tool selection and use – fitness for purpose
- Assessing requirements of repair/maintenance – planning
- Material selection, quantity and use
- Order and sequence of work
- Adherence to legislation and specific health and safety requirements of the task
- Leaving the working area safe, secure, clean and tidy

Learning outcome:

3. Complete basic agricultural structure maintenance activities

Topics

3.1 Types of agricultural structure and surface maintenance

3.2 Completing agricultural structure maintenance

Topic 3.1

Types of agricultural structure maintenance:

- Brick/Stonework/Blockwork:
 - Building straight masonry walls (brick or stone)
 - Building right angled walls (brick or stone)
 - Laying slabs/concrete
- Woodwork:
 - Repairing wooden structures
 - Fixing wooden components to each other e.g. manufacture of a trough
 - Cutting wood to size
- Painting:
 - metal e.g. gates, stanchions
 - wood e.g. applying treatments, fencing panels
 - stone e.g. brickwork and walls
- Plumbing:
 - Fixing broken pipes
 - Diagnosing blockages

Topic 3.2

Completing agricultural structure maintenance with consideration of:

- Tool selection and use – fitness for purpose
- Material selection and use
- Order and sequence of work
- Adherence to legislation and specific health and safety requirements of the task
- Leaving the working area safe, secure, clean and tidy

Guidance for delivery

Tutors should ensure that the tools available for use fit the range of practical tasks candidates will undertake as part of outcomes two and three. Due to the practical nature of the unit, including this use of tools and equipment, tutors should highlight the importance of working safely throughout and link back to the underpinning knowledge from unit 201 'Health and safety for the land-based industries'.

Learners should be given the opportunity to work on each of the structural maintenance tasks outlined in outcome three – the nature of the tasks should be related to relevant, real life activities. For example fixing wooden components to each other could relate to fixing a gate, maintaining a wooden structure or building a feeding trough.

The unit could be supported by talks from or visits to local employers to review the challenges and types of estate maintenance work that is conducted day to day and seasonally.

The learning outcomes for this unit would benefit from on farm practicals undertaking project work e.g., fencing, hedge laying and boundary maintenance. There are further potential links to working with employers on case studies and project work – researching costings, the use of suppliers and external companies, comparing contractors with on-farm costs to complete certain aspects of job tasks etc.

This unit incorporates a wide variety of tasks associated with the farm estate including the practical installation and maintenance of fencing, construction work such as brick, concrete and wood, hedge laying and drainage. Therefore there are key links to the health and safety unit 20, where learners will assess the risks associated with each task and establish the health and safety precautions and control measures before and during each task.

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to investigate the physiology of plants and animals found in agricultural settings. When working in agricultural settings it is important to understand how plants and animals 'work', to ensure they are kept healthy and are given the environment and conditions they need to grow and reproduce. Understanding the science behind the main animal and plant processes is key to running a successful and productive farm.

Learners will look at the structure of plant and animal cells, the systems that make them function, their respective lifecycles and how they get energy for growth. This unit also provides learners with a basic understanding of simple genetics and how particular characteristics of crops and animals are bred and passed on to ensure consistent and successful production.

Learners should consider the following questions as a starting point to this unit:

- What does a plant cell look like?
- Where do plants get energy for growth from?
- How do cattle digest their food?
- What are the stages of animal reproduction?

Learning outcomes

In this unit, learners will:

1. Understand the basic physiology of plants
2. Understand the basic physiology of animals

Learning outcome:

1. Understand the basic physiology of plants

Topics

1.1 Plant cell structures and processes

1.2 Plant lifecycles

1.3 Plant physiology

Topic 1.1

Main plant cell structures:

- Cell wall
- Cell membrane
- Nucleus
- Mitochondria
- Vacuole
- Chloroplasts

Definitions of key plant cell processes:

- Carbon cycle
- Photosynthesis
- Respiration
- Translocation
- Transpiration
- Osmosis
- Diffusion

Topic 1.2

Plant growth types:

- Monocotyledons (Monocots) – grasses and cereals
- Dicotyledons (Dicots) – broad leaf weeds, oil seed rape

Life cycles of plants:

- Annual
- Biennial
- Perennial
- Ephemeral

Topic 1.3

Structure and purpose of plant physiology:

- Stems
- Leaves
- Flowers
- Seeds
- Root systems

Factors that influence growth and germination:

- Moisture
- Temperature

- Oxygen
- Nutrients
- Light levels
- Pest and disease infestation

Learning outcome:

2. Understand the basic physiology of animals

Topics

2.1 Animal cells and body systems

2.2 Inheritance and reproduction

2.3 Digestion and nutrition

Topic 2.1

Animal cells and body systems:

- Cell structures – cell membrane, cytoplasm, nucleus, mitochondria
- Specialised cells - blood, nerve, egg, sperm
- Organs and organ systems -
 - Circulatory – heart, veins, arteries
 - Respiratory – lungs, trachea, diaphragm
 - Digestive – oesophagus, stomach, intestines, liver, pancreas
 - Nervous – brain, nerves, spinal cord,
 - Reproductive – ovaries, testes, uterus, penis, vagina, cloaca

Topic 2.2

Key concepts in genetic inheritance:

- Terms – DNA, Chromosomes, Genes
- Combination of genetic information from both parent animals
- Impact on choice of stock
- Selective breeding for positive traits
- Dominant and recessive genetic information

Stages of the breeding cycle:

- Production age of animal / maturation
- Oestrous
- Gestation / incubation
- Parturition / hatching
- Lactation
- Dry period

Topic 2.3

Nutritional requirements of animals:

- Protein – for growth and repair
- Carbohydrates – for energy

- Lipids/fats – for energy and warmth
- Vitamins/Minerals – for body system maintenance
- Water – for body system maintenance

Features of digestive systems of animals:

- Stages – Ingestion, digestion, absorption, egestion
- Pigs and poultry - Monogastric (single stomached) – use of enzymes, adsorption of nutrients
- Cattle, sheep and goats - Ruminant (four chambered - reticulum, rumen, omasum, abomasum) - fermentation process, volatile fatty acids produced, nutrients absorbed into body

Guidance for delivery

This is a knowledge based unit so the majority of the content could be delivered in a classroom environment. However it is important that learners can relate their knowledge and understanding to real life environments. Tutors are encouraged, where possible, to take learning outside into agricultural settings and to link the science covered here to the crop and animal husbandry units.

Tutors should encourage learners to investigate the different ranges of pastoral and arable farming conducted in their area and consider how breeding programs are implemented in local settings.

As this is a knowledge only unit, tutors should emphasise the relevance and application of this content to agricultural settings. It is expected that a range of delivery methods will be used including presentations, internet research and, where applicable, visiting speakers. The outcomes for this unit will incorporate a range of visits to livestock and arable farms. Plant physiology will look at the growing of various crops, cereals, roots, forage crops linking the crop calendar to specific agronomy tasks and timings of fertilisers and sprays to crop growth stages.

In this unit learners develop a theoretical understanding of the physiology of plants and animals which is explored and practically applied in the learning from units 203 and unit 204.

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to explore the agricultural industries and opportunities within it. Working within agriculture is hard work and hands-on, but can also be exciting and varied, with many different career and job opportunities. From the very beginning of being employed within the sector there is the opportunity to work practically and directly impact the success of crop and animal production.

Learners will gain an understanding of the breadth of services delivered in the industry, the requirements expected of them and the prospects of working within these types of role.

Learners will cover how technology and IT are used within agricultural roles in the industry today, as well as some of the key financial concepts that impact on agricultural business success such as profitability and the importance of meeting production targets.

Learners should consider the following questions as a starting point to this unit:

- What organisational bodies support the agricultural industry?
- What types of further study and learning are there in agriculture?
- What are the benefits of working in the agricultural industry?
- What job opportunities are there within arable and pastoral farming?

As part of the unit requirements, learners must achieve 150 hours of work experience within the industry. This requirement is subject to external quality assurance through sampling of learner evidence, which must be provided by centres upon request by City & Guilds.

Learning outcomes

In this unit, learners will:

1. Know the structure and career opportunities within the agricultural industry
2. Understand personal attributes required for success in the agricultural industry
3. Know basic business skills required for working in the agricultural industry

Learning outcome:

1. Know the structure and career opportunities within the agricultural industry

Topics

1.1 Structure of the agricultural industry

1.2 Working opportunities in the agricultural industry

Topic 1.1

Structure of the agricultural industry:

- Types of agricultural business:
 - Share farming
 - Contract farming
 - Tenants
 - Owner occupiers
 - Partnerships
 - Sole traders
 - Private limited companies
 - Public limited companies
 - Allied trades
 - Charities/not for profit organisations
- Types of workers:
 - Permanent
 - Temporary
 - Casual
 - Seasonal
 - Apprentices
 - Contractors
- Organisational and legislative bodies:
 - Farm Assurance
 - National Farmers' Union (NFU)
 - Agriculture and Horticulture Development Board (AHDB)
 - Department for Environment Food & Rural Affairs (DEFRA)
 - The Environment Agency (EA)
 - The Rural Payments Agency (RPA)

Topic 1.2

Job roles and potential career opportunities for progression within the industry:

- Entry level roles:
 - General farm worker
 - Tractor operator/machinery operator
 - Trainee stockman
 - Livestock assistant
- Middle level roles:
 - Assistant farm manager
 - Supervisor
 - Stockman

- Herd manager
- Senior machinery technician
- Management and higher level roles:
 - Director
 - Farm manager
 - Head of estate
- Salary expectations
- Educational / entry requirements / progression
- Allied trade opportunities:
 - Training
 - Education
 - Sales/supply
 - Nutrition
 - Breeding
 - Agronomy
 - Laboratory opportunities

Learning outcome:

2. Understand personal attributes required for success in the agricultural industry

Topics

2.1 Personal qualities and work ethics required in the agricultural industry

2.2 Methods of self-development

Topic 2.1

Factors that contribute to generating a positive work ethic required for success in the agricultural industry and the benefits of displaying them:

- Good time management and planning
- Demonstrating initiative
- Teamwork
- Positive and open communication
- Working safely and carefully
- Knowing and working within the limits of personal responsibility

Topic 2.2

Methods of personal self-development which can improve employability within the agricultural industry:

- Mentoring
- Self-reflection / recording personal development
- Networking and research – discussion groups, farm visits, job searches
- Positive use of social media for self-promotion
- CPD
- Work experience
- CV development
- Interview experience and techniques

Learning outcome:

3. Know basic business skills required for working in the agricultural industry

Topics

3.1 Uses of IT in agriculture

3.2 Finance for agriculture

3.3 Uses of technology in agricultural activities

Topic 3.1

IT activities that support agricultural settings:

- Electronic record keeping – staff/suppliers/manufacturers (spreadsheets, databases)
- Electronic recording of data systems
- Invoicing
- Online stock ordering/re-ordering
- Stock control

Importance of record keeping in agricultural businesses with consideration of:

- Movement of animals – tagging, passports
- Importance of data accuracy
- Legislative requirements

Topic 3.2

Basic financial concepts and how they apply to the agricultural industry:

- Key Performance Indicators (KPIs)
- Profit and loss – including pricing mechanisms and farm costings
- Crop and animal yields
- Effects of local market/competition
- Supply and demand

Learners should cover how market structures, customer requirements, routes to market and marketing in general can impact on costs and profits.

Topic 3.3

Uses of technology in agricultural activities:

- Automated ordering systems – stock control
- GPS systems in tractors and agricultural machinery
- Activity monitors in livestock e.g. to identify heats
- Mobile apps – e.g. CCTV
- Drones
- Mechanisation/robotics
- Data collection e.g. EID for livestock

Guidance for delivery

For topic 1.1 tutors should ensure that they keep up to date with changes and amendments to current titling of organisational bodies and include delivery of locally relevant examples where possible.

Learners should be encouraged to investigate career and job opportunities that are available in the local area. This unit would be well supported by visits to, or talks from employers from a variety of the areas covered in the unit content. Representatives from industry should be invited to meet with learners and discuss a typical day in their work setting, including reference to personal values, behaviours and how they work in partnership with other roles. There could also be an opportunity to bring in ex-students to discuss their progression.

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

Any Act or legislation that is sector specific should be adhered to.

Learners must complete 150 hours work experience. Centres should be mindful of their responsibilities for ensuring that work placements have appropriate supervision, insurance and health and safety policies in place and that learners have access to appropriate support whilst on placement. This requirement is subject to external quality assurance through sampling of learner evidence, which must be provided by centres upon request by City & Guilds.

Provided it meets the requirements detailed in the Qualification Handbook and the Employer Involvement Centre Guidance, this work experience can also count as the meaningful employer involvement component that all learners are also required to undertake. In these instances, centres must record work experience activities on the Employer Involvement Planner and Tracker and retain records confirming each learner's attendance at these placements. These must be made available to City & Guilds if required, as part of our standard quality assurance monitoring.

The knowledge, skills and understanding in this unit could be supported through employer engagement by visits and talks by local employers to explain what the sector looks like, typical dealership structures, job opportunities and requirements of employers. Guest speakers could be invited to speak from companies such as NFU, specific allied trades, e.g. Nutritionists, agronomy companies.

This unit provides a good holistic overview of the requirements and structure of the sector as it touches on learning from all other units and the developing knowledge of a wide range of employment opportunities within the agricultural industry.

Appendix 1 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on www.cityandguilds.com.

City & Guilds Centre Manual

This document provides guidance for organisations wishing to become City & Guilds approved centres, as well as information for approved centres delivering City & Guilds qualifications. It covers the centre and qualification approval process as well as providing guidance on delivery, assessment and quality assurance for approved centres.

It also details the City & Guilds requirements for ongoing centre and qualification approval, and provides examples of best practice for centres. Specifically, the document includes sections on:

- the centre and qualification approval process
- assessment, internal quality assurance and examination roles at the centre
- registration and certification of candidates
- non-compliance and malpractice
- complaints and appeals
- equal opportunities
- data protection
- management systems
- maintaining records
- internal quality assurance
- external quality assurance.

Our Quality Assurance Requirements

This document explains the requirements for the delivery, assessment and awarding of our qualifications. All centres working with City & Guilds must adopt and implement these requirements across all of their qualification provision. Specifically, this document:

- specifies the quality assurance and control requirements that apply to all centres
- sets out the basis for securing high standards, for all our qualifications and/or assessments
- details the impact on centres of non-compliance

The **centre homepage** section of the City & Guilds website also contains useful information on

- **Walled Garden:** how to register and certificate candidates on line
- **Events:** dates and information on the latest Centre events
- **Online assessment:** how to register for e-assessments.

Useful contacts

UK learners General qualification information	E: learnersupport@cityandguilds.com
International learners General qualification information	E: intcg@cityandguilds.com
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	E: centresupport@cityandguilds.com
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	E: singlesubjects@cityandguilds.com
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	E: intops@cityandguilds.com
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	E: walledgarden@cityandguilds.com
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: business@cityandguilds.com

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If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **feedbackandcomplaints@cityandguilds.com**

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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