Level 3 Advanced Technical Certificate in Agriculture (0171-30)

May 2019 Version 3.1

Qualification Handbook

Qualification at a glance

Industry area	Agriculture
City & Guilds qualification number	0171-30
Age group	16-19 (Key Stage 5), 19+
Entry requirements	Centres must ensure that any pre-requisites stated in the *What is this qualification about?* section are met.
Assessment	To gain this qualification, candidates must successfully achieve the following assessments: • Two externally set, externally moderated assignment • One externally set, externally marked exams, sat under examination conditions • Portfolio of evidence
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	This qualification is graded Pass/Merit/Distinction/Distinction* For more information on grading, please see Section 7: Grading.
Approvals	This qualification requires full centre and qualification approval
Support materials	Sample assessments Guidance for delivery Guidance on use of marking grids
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 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
Level 3 Advanced Technical Certificate in Agriculture	360	600	0171-30	601/7448/1

Version and date	Change detail	Section
1.1 May 2016	Small typographical errors	Throughout
	TQT added for qualifications Assessment component titles amended	1. Introduction
	Employer involvement guidance updated throughout	4. Employer involvement
	Summary of assessment methods and conditions	5. Assessment
	Moderation and standardisation of assessment updated throughout	6. Moderation and standardisation of assessment
	Awarding individual assessments Awarding grades and reporting results	7. Grading
	Enquiries about results Re-sits and shelf-life of assessment results Malpractice Access arrangements and special consideration	8. Administration
1.2 February 2017	301 assessment methodology updated	1. Introduction 5. Assessment
	Assessment component numbers updated	1. Introduction 5. Assessment
2.0 June 2017	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 and the readjusted approximate weightings	5. Assessment – Assessment Objectives
	Addition of Provisional Grade Boundaries for the Synoptic Assignment	7. Grading
	Revised Exam Specification and AO weightings	5. Assessment – Exam Specification
	Branding Changes	Throughout
2.1 November 2018	Assessment method for unit 301 amended	1. Introduction 5. Assessment

3.1	Wording changed regarding retakes	5. Assessment – Summary of assessment methods and conditions 8. Administration – Re-sits and shelf-life of assessment results

Contents

1 Introduction

The following purpose is for the **Level 3 Advanced Technical Certificate in Agriculture.**

Area	Description
OVERVIEW	
Who is this qualification for?	This qualification is for you if you are 16 years or older and want to work in agriculture. It provides you with the core practical skills and knowledge which will equip you to seek employment or further learning and training within the agricultural industry.
What does this qualification cover?	This qualification enables you to gain the core skills and knowledge required for working in a farming environment. Sound practical skills are really important for working in agriculture as you will be required to work with animals, crops and machinery. You will learn safe working practices, how to operate a range of agricultural machinery and estate maintenance skills such as fencing. You will also learn about crop production, plant and soil science and livestock husbandry. Centres and providers work with local employers who will contribute to the knowledge and delivery of training. Employers will provide demonstrations and talks on the industry and where possible work placements will also be provided by the employers. This practically based training is ideal preparation for gaining employment in the agricultural industry or specialist further study.
WHAT COULD THIS QUALIFICATION LEAD TO?	
Will the qualification lead to employment, and if so, in which job role and at what level?	You might progress into work as a: • General farm worker • Agricultural technician • Apprentice in a farm business
Why choose this qualification over similar qualifications?	This qualification is typically delivered alongside other qualifications such as GCSEs, AS or A Levels. It provides an introduction to the core skills and knowledge required to enter employment in the agricultural industry and opens first steps to a career in working in farming. Working in agriculture requires hard physical work, long hours and dedication and these core skills could set you off on your career. City & Guilds offers four sizes of Level 3 qualification in Agriculture: Certificate, Diploma (540), Extended Diploma (720) and Extended Diploma (1080). You would take the Certificate if you want an introductory qualification to develop some of the core skills and knowledge

	required by employers in the agricultural industry. The Certificate is likely to be taken alongside other programmes such as GCSEs or AS Levels over a one-year course of study. You would take the Diploma (540) if you want a qualification to develop some of the skills and knowledge that can lead to specific roles required by employers in the agricultural industry. The Diploma is likely to be taken alongside other programmes such as GCSEs or AS Levels over a one-year course of study. You would take the Extended Diploma (720) if you want to specialise, to develop most of the skills and knowledge required by employers in the agricultural industry. The Extended Diploma (720) is likely to be taken as part of a full-time two year programme of study, or alongside other qualifications such as AS or A Levels over a longer period of time. You would take the Extended Diploma (1080) if you want to specialise and develop the skills and knowledge required by employers in the agricultural industry. The Extended Diploma (1080) is likely to be taken as a full-time programme of study over two years. By taking this large qualification, you will be exposed to, and have the opportunity to gain experience in, the wider agricultural sector. This will enable you to progress to a diverse range of employment opportunities, as you will have gained hands-on experience over 2 years, which employers really value.
Will the qualification lead to further learning?	You may wish to progress onto an Advanced Apprenticeship in Agriculture, which allows you to combine working on a farm with typically attending one day a week at college or with a training provider. You may wish to progress onto further learning within a Higher Education Institution. You could take a course such as an Agriculture Foundation Degree.

WHO SUPPORTS THIS QUALIFICATION?	
Employer/Higher Education Institutions	The National Farmers Union The British Growers Association Upper Booth Farm

Qualification structure

For the **Level 3 Advanced Technical Certificate in Agriculture** the teaching programme must cover the content detailed in the structure below:

Unit number	Unit title	GLH
Mandatory		
301	Principles of health and safety	30
302	Undertake and review work related experience in the Land-based Industries	30
303	Land-based industry machinery operations	60
304	Agriculture crop production	60
305	Plant and soil science	60
306	Undertake estate skills	60
307	Livestock husbandry	60

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
Level 3 Advanced Technical Certificate in Agriculture	360	600

Assessment and employer involvement

To achieve the **Level 3 Advanced Technical Certificate in Agriculture** candidates must successfully complete **all** the mandatory assessment components

Component number	Title
Mandatory	
001	Level 3 Agriculture - Synoptic assignment (1)*
002 or 502	Level 3 Agriculture - Theory exam (1)*
301	Level 3 Principles of health and safety - Theory exam
302	Level 3 Undertake and review work related experience in the land-based industries - Portfolio

In addition, candidates **must** achieve 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	
830	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 assessments.

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.

Support materials

The following resources are available for this qualification:

Description	How to access
Sample assessments Guidance for delivery Guidance on use of marking grids	Available 2016 on the qualification pages on the City & Guilds Website: **www.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 sufficient 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 qualification[3];
- 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 eg hairdressing salons, florists, restaurants, travel agents, small manufacturing units, car servicing facilities;
- 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

[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**

support a claim for this component will vary depending on the nature of the involvement. Eg 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 (eg 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
001	Synoptic assignment	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. Assignments will be released to centres as per dates indicated in the Assessment and Examination timetable published on our website. Where seasonality is a factor in the timing of the assignment the assignment will be released early to ensure that candidates can take the assignment to fit in with the seasonal requirements. 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. 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. Please note that for externally set assignments City & Guilds provides guidance and support to centres on the marking and moderation process.
002/502	Externally marked exam	The exam is **externally set and externally marked**, and will be taken either online through City & Guilds' computer-based testing platform (002) or as a paper based test (502). 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** The exam specification shows the coverage of the exam across the qualification content. Candidates who fail the exam at the first sitting will have a maximum of two opportunities to retake. If the candidate fails the

		exam three times then they will fail the qualification. (Note: the third and final retake opportunity applies to Level 3 only.) For exam dates, please refer to the Assessment and Examination timetable.
301	Internally marked theory exam	This theory exam is **externally set, internally marked and externally moderated.** It is designed to assess the candidate's depth and breadth of understanding from across the unit content area and will be sat under supervised conditions. This assessment is available on our website. The assessment can be taken at any point during the academic year, but evidence must be submitted on to the Moderation Portal by the deadline in Assessment and Examination timetable, published on our website. Centres will be required to maintain the security of all live assessment materials. Assessments will be password protected and released to centres through a secure method. There is no re-sit limit for this assessment. If a learner fails, they can re-sit a different version. Assessors should allow seven days before reassessment.
302	Portfolio	This unit will be assessed by a portfolio of evidence, externally moderated by City & Guilds.

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. These are detailed on page 18.

How the assignment is synoptic for this qualification

The typical assignment brief could be to plan the takeover of a farm, introducing both livestock and arable enterprises.

This will require the candidate to draw on their knowledge and understand of both livestock and arable enterprises to enable them to plan the use of farm land to ensure sound husbandry will be used, wildlife is enhanced and the land maintained. Candidates decisions will be supported through their understanding of the value of Agriculture to the UK economy, the use of soil maps and research to successfully produce cropping plans, their understanding of the different crops and livestock and how best they are nurtured. Candidates will also demonstrate practical farm actives.

External exam for stretch, challenge and integration

The external assessment will draw from across the mandatory content of the qualification, using a range of shorter questions to confirm breadth of knowledge and understanding. Extended response questions are included, giving candidates the opportunity to demonstrate higher level understanding and integration through discussion, analysis and evaluation, and ensuring the assessment can differentiate between 'just able' and higher achieving candidates.

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 approximate 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	Level 3 Advanced Technical Certificate in Agriculture Typical expected evidence of knowledge, understanding and skills	Approximate weighting
AO1 Recalls knowledge from across the breadth of the qualification.	Use of terminology, health and safety considerations, welfare codes, environmental impact, recognising animal behaviour, signs of animal health, legislation, routine tasks	15%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Planting specifications, weed, pest and disease control, rates and timings of fertilisers, interpreting data, application of legislation and codes of practices, storage conditions, harvest losses, physical and financial records, importance to the economy, quality management, market requirements.	20%
AO3 Demonstrates technical skills from across the breadth of the qualification.	Livestock husbandry tasks, estate skills and machinery operations.	25%
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Applying and linking knowledge, understanding and practical skills to a particular situation, justifying decisions/ approaches taken, contingencies, reflection and evaluation.	25%
AO5 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Meeting specific requirements of the task; care of equipment; time management	15%

Exam specifications

AO weightings per exam

Assessment Objective	Test 002/502 weighting (approx. %)
AO1 Recalls knowledge from across the breadth of the qualification.	25
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	55
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	20

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

Assessment type: Examiner marked, written exam
Assessment conditions: Invigilated examination conditions
Grading: X/P/M/D

002/502	Duration: 2 hours		
Unit	**Outcome**	**Number of marks**	**%**
303	Land based industry machinery operations	4	7
304	Agricultural crop production	8	13
305	Plant and soil science	21	35
307	Livestock husbandry	15	25
N/A	Integration across the units	12	20
	Total	**60**	**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 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. This process is outlined below. For more detailed information, please refer to 'Marking and moderation - Technicals centre guidance' 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 work[4] the centre is required to conduct internal standardisation to ensure that all work at the centre has been marked to the same standard. It is the Internal Quality 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.

Provision for reworking evidence after submission for marking by the tutor

It is expected that in many cases a candidate who is struggling with a specific piece of work may themselves choose to restart and rectify the situation during their normal allocated time, and before it gets to the stage of it being handed in for final marking by the tutor.

In exceptional circumstances however, where a candidate has completed the assignment in the required timescales, and has handed it in for marking by the tutor but is judged to have significantly underperformed, may be allowed to rework or supplement their original evidence for remarking prior to submission for moderation. For this to be allowed, the centre must be confident that the candidate will be able to improve their performance without additional feedback from their tutor and within the required timescales ie the candidate has shown they can perform sufficiently better previously in formative assessments.

The reworked and/or supplemented original evidence must be remarked by the tutor in advance of the original moderation deadline and the moderator informed of any candidates who have been allowed to resubmit evidence.

The process must be managed through the IQA. The justification for allowing a resubmission should be recorded and made available on request. The use of this provision will be monitored by City & Guilds.

[4] 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.

Internal appeal

Centres must have an internal process in place for candidates to appeal the marking of internally marked components, ie the synoptic assignment and any optional unit assignments. This must take place before the submission of marks for moderation. 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.

Centres cannot appeal the outcome of moderation for individual candidates, only the moderation process itself. A request for a review of the moderation process should be made to **appeals@cityandguilds.com**.

Moderation

Moderation is the process where external markers are standardised to a national standard in order to review centre marking of internally marked assessments. These markers are referred to as 'moderators'. Moderators will mark a representative sample of centre marked, candidate work 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 correctly, 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 will be made to the marks of the whole cohort, retaining the centre's rank ordering.

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. This may be carried out by the centre based on feedback provided by the moderator, or carried out by the moderator directly.

Moderation applies to all internally marked assignments. Following standardisation and marking, the centre submits all marks and candidate work to City & Guilds via the moderation platform. The deadline for submission of evidence will be available on Walled Garden. See the Marking and moderation - Technicals Centre Guidance document for full details of the requirements and process.

In most cases candidate work will be submitted directly to the moderator for moderation. This includes written work, photographic and pictorial evidence, or video and audio evidence. For some qualifications there will be a requirement for moderators to visit centres to observe practical assessments being undertaken. This will be for qualifications where the assessment of essential learner skills can only be demonstrated through live observation. The purpose of these visits is to ensure that the centre is assessing the practical skills to the required standards, and to provide the moderators with additional evidence to be used during moderation. These visits will be planned in advance with the centre for all relevant qualifications.

Post-moderation procedures

Once the moderation process has been completed, the confirmed marks for the cohort are provided to the centre along with feedback from the moderator on the standard of marking at the centre, highlighting areas of good practice, and potential areas for improvement. This will inform future marking and internal standardisation activities.

City & Guilds will then carry out awarding, the process by which grade boundaries are set with reference to the candidate evidence available on the platform.

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 (eg 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 **Level 3 Advanced 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 (ies) for the synoptic assignment(s) in this qualification are:

Synoptic Assignment	Approximate Pass Mark (%)
001	40

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

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

Assessment method	Grade scale	% contribution
Synoptic Assignment (001)	X/P/M/D	60%
Exam (002/502)	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 (001): 60%	6	12	18
Exam (002/502): 40%	6	12	18

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.

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 secure 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 internally marked assessments.

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

Re-sits and shelf-life of assessment results

Re-sits and shelf-life of assessment results Candidates who have failed an exam or wish to re-take it in an attempt to improve their grade, can do so **twice**. The best result will count towards the final qualification. See guidance on individual assessment types 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 (eg 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. Please refer to the form in the document managing cases of suspected malpractice in examinations and assessments.

Access arrangements and special consideration

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: **http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments**

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: **http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments**

Unit 301 Principles of health and safety

UAN:	A/507/4634
Level:	3
GLH:	30

What is this unit about?

This unit aims to provide learners with an understanding of the principles of health and safety and identify how these can be applied in practice within land-based or related industries. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

Learners will be able to recognise common health and safety practices and processes which they will encounter within the workplace. The land-based sector has one of the worst fatal accident records of any major industrial sector and a lack of basic training and/or competency is often a contributory factor. There is a need for new entrants to these industries to gain essential health and safety knowledge in order to minimise harm to themselves and to improve attitudes and behaviour in the workplace. In addition, the learners have the opportunity to consider factors which are specific to their workplace. 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 be able to

1. Understand health and safety legislation
2. Understand the risk assessment process
3. Understand first aid requirements
4. Understand principles of safe manual handling
5. Understand the use of fire extinguishers

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand health and safety legislation

Topics

1.1 Impact of good and bad practice upon individuals and businesses
1.2 Key legislation relating to health, safety and welfare
1.3 Statutory duties of employers, employees and the self-employed
1.4 Consequences of not complying with statutory duties
1.5 How individuals can contribute to establishing a good health and safety culture

Topic 1.1

Learners will know direct and indirect consequences of poor standards of workplace health and safety practice on both businesses and individuals, to include

Financial eg:

- Prosecution fines and legal fees
- Compensation claims
- Repairs/replacement of equipment
- Recruit and train new staff
- Increased insurance premiums

Emotional eg:

- Guilt and grief
- Stress

Reputation eg:

- Loss of reputation
- Bad publicity

Employees eg:

- Reduced staff morale and productivity
- Increased staff turnover and sickness

Social eg:

- Loss of independence
- Reduced social activity

Topic 1.2

Learners will know key legislation relating to health, safety and welfare within the workplace, for example, Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999. Learners will understand the importance of accident and incident reporting in accordance with the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013. Learners will understand the legal status and practical implications of approved codes of practice and industry specific best practice guidance.

Topic 1.3

Learners will know the statutory duties of employers, employees and the self-employed, to include

Employers

- Provide a safe working environment
- Provide safe equipment and systems of work.
- Provide information, instruction, training and supervision.
- Arrange for the safe storage, transport and use of articles and substances.
- Provide adequate welfare facilities.

Employees

- Take reasonable care of their own health and safety.
- Take reasonable care of other people who may be affected by what they do or don't do at work.
- Cooperate with their employer on health and safety.
- Not interfere with or misuse anything provided for their health, safety or welfare

Topic 1.4

Learners will know the powers of health and safety enforcement officers (eg inspection, investigation and guidance) and identify the range of enforcement actions and penalties that may be imposed (eg prohibition and improvement notices, intervention fee and prosecutions).

Topic 1.5

Learners will understand how individuals can contribute to establishing a good health and safety culture within their workplace, for example:

- Prompt reporting of defective safety equipment or other matters of concern
- Always use control measures and personal protective equipment (PPE) as instructed
- Help others to work safely by sharing knowledge and good practice
- Set a good example to others by always working safely
- Follow instructions and safe working procedures

Learning outcome:

2. Understand the risk assessment process

Topics

2.1 Principles of risk assessment
2.2 Workplace hazards
2.3 Risk assessment

Learning Outcome 2 provides learners with the knowledge on the requirements and importance of carrying out risk assessments. Learners will be expected to carry out risk assessments in practice when performing their industry specific activities as required.

Topic 2.1

Learners will understand the legal requirement to carry out suitable and sufficient risk assessments. They will understand the responsibilities of the employer, self-employed and employee within the risk assessment process and identify when expert advice and guidance may be required (eg lack of experience or knowledge).

Topic 2.2

Learners will know common hazards associated with a workplace which could result in serious harm to themselves or others (eg visitors, colleagues, members of the public).

Topic 2.3
Learners will understand how to undertake a detailed risk assessment within the context of their workplace, following the Health and Safety Executive 'Five Steps to Risk Assessment', to include

- Identification of the hazards
- Identification of who might be harmed and how they might be harmed
- Evaluation of the risks and decide how the level of risk may be controlled
- Recording and implementation of the results, as well as communication to others who may be affected
- Reviewing risk assessments and suggesting when risk assessments should be reviewed

Learners will also know the hierarchy of risk control:

- Elimination
- Substitution
- Safe working procedures
- Training, instruction and supervision
- Personal and respiratory protective equipment (PPE/RPE)

Learning outcome:

3. Understand first aid requirements

Topics

3.1 Planning for emergencies and first aid provision in the workplace
3.2 Procedures when encountering an accident or medical emergency
3.3 First aid for common emergencies

In this outcome learners will explore the importance of planning to and subsequently how to manage common first aid emergencies which may arise in the workplace, with emphasis upon their workplace. Learners should be aware of the aims of first aid (i.e., preserve life, prevent injuries worsening and promote recovery) Evidence towards this outcome could come from a current first aid training qualification (i.e., appointed persons or first aid at work).

Topic 3.1
Learners will understand the importance of emergency planning, especially for lone or isolated working, and the responsibilities of a first aider. Learners will also know the minimum requirements for first aid at work and identify supplementary arrangements which may be appropriate for their workplace.

Topic 3.2
Learners will know the procedures to follow when encountering an accident or medical emergency. Learners will know how to check the incident site to minimize risk to themselves, assess the situation, and how and when to contact the emergency services and identify prioritisation of activities (eg, 'DRABC').

Topic 3.3
Learners will know how to manage the following common situations as well as other significant situations appropriate to their workplace:

- Wounds and burns

- Choking
- Severe bleeding
- Shock
- Concussion
- Unconscious casualties
- Falls from height
- Suspected broken limbs and dislocations
- Heart attacks

Learners will know how to recognise their own limitations and explain how to monitor the condition of the casualty and prevent an injury from worsening.

Learning outcome:

4. Understand principles of safe manual handling principles

Topics

4.1 Principles of safe manual handling

4.2 Safe manual handling of common items

In this outcome learners will need to investigate the principles of risk assessment relevant to manual handling in order to plan for and safely move a range of common items associated with their workplace. Learners should have access to a range of common mechanical aids and these should be used as appropriate.

Topic 4.1

Learners will understand how manual handling at work should be minimised and identify appropriate alternatives and mechanical aids. They will know the common causes of injuries associated with poor manual handling within the workplace.

Topic 4.2

Learners will understand how to safely move a range of common items within their workplace. They will know appropriate mechanical aids for a range of common manual handling activities within their workplace.

Learning outcome:

5. Understand the use of fire extinguishers

Topics

Topic 5.1 Use of fire extinguishers

Topic 4.1

Learners will know the types, use and colours of portable fire extinguishers, to include

- Water
- Dry powder
- Foam
- CO2

Learners will know how to recognise their own limitations in managing fires in the workplace.

Guidance for delivery

On completion of this unit, the learner will have developed an understanding of some of the key underlying principles and practices of health and safety to help prepare them to enter the workplace. It will be important that delivery relates to example situations that are vocationally relevant to the learners.

Visiting speakers eg paramedics, health and safety consultants or inspectors could enhance the relevance of the subject to learners.

Suggested learning resources

Books

Anon. 2013. *Farmwise - Your Essential Guide to Health and Safety in Agriculture*. Health and Safety Executive ISBN 0717665097

Chadder P. and Duncan M. 2014. *Health & Safety at Work Essentials. 8th Edition*. Lawpack Publishing Ltd. ISBN 1910143006

Stranks, J. 2010. *Health and Safety at Work: An Essential Guide for Managers. 9th Edition*. Kogan Page. ISBN 0749461195

Websites

- Health and Safety Executive (HSE) http:// www.hse.gov.uk
- The Royal Society for the Prevention of Accidents (ROSPA) http://www.rospa.com/

Unit 302 Undertake and review work related experience in the land based industries

UAN:	F/507/4635
Level:	3
GLH:	30

What is this unit about?

The aim of this unit is to give learners the skills needed to identify, participate in and review work experience in the environmental and land based sector. The unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

Learning outcomes

In this unit, learners will be able to

1. Determine employment opportunities in the environmental and land based industries
2. Prepare for a work-based experience in the environmental and land based industry
3. Understand the importance of effective interpersonal skills in the workplace
4. Review a work-based experience in the environmental and land based sector.

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Determine employment opportunities in the environmental and land based industries

Topics

1.1 Career and progression opportunities within an environmental and land based industry

In this outcome, learners will explore the different job roles and responsibilities, and the job titles commonly associated with them in their specialist sector. This background understanding is likely to require some formal classroom teaching. Learners should be encouraged to explore the range of employment opportunities and career paths within their specialist sector. Learners will then consider the skills and qualifications that are required for appropriate jobs for themselves and should be encouraged to think about skills and qualifications that they may need to acquire to achieve their employment and careers ambitions. This should help them to identify suitable work experience.

Topic 1.1

Learners will know the job roles relevant to the land based sector, to include managerial, supervisory, team worker, trainee, volunteer, common job titles within the relevant sector, main duties and responsibilities

Learners will also know the skills, qualifications and experience needed to fulfil duties and responsibilities of appropriate jobs, to include job specific, vocational and personal

Learning outcome:

2. Prepare for a work-based experience in the environmental and land based industry

Topics

2.1 Appropriate work-based experience and the application process

2.2 Interview skills

This outcome involves learners going through the process of applying for work experience. They will need to locate suitable job adverts or work experience opportunities, but can be supported by centres suggesting suitable placements. When applying for work experience learners should produce, as a minimum, a detailed curriculum vitae and letter of application using a computer. It will be beneficial for learners to attend a real or simulated interview, and reflect on their performance outlining how they could improve their effectiveness.

Topic 2.1

Learners will find a suitable job opportunity based on existing skills, experience, qualifications, development of skills and experience to achieve future employment goals. They will use a range of sources of information about work opportunities eg trade magazines, websites. Learners will complete an application form (if applicable), curriculum vitae and letter of application.

Topic 2.2

Learners will know how to prepare for an interview, eg: Research the business and job role, suitable dress and personal presentation, information to find out and suitable questions to ask.

Learners will also know how to behave in an interview:
eg attend punctually and dressed appropriately, answering questions, completion of other tests (eg practical, aptitude), and reflection on interview performance

Learning outcome:

3. Understand the importance of effective interpersonal skills in the workplace

Topics

3.1 The importance of effective interpersonal skills in the workplace

It would be appropriate for employers to be invited to outline to learners their expectations in the workplace.

Topic 3.1

Learners will understand the importance of effective interpersonal skills in the workplace when dealing with customers and colleagues, to include

- effective communication (eg addressing others face to face, appropriate telephone manner, effective written communication, use of social media)
- courtesy and helpfulness
- appropriate dress and body language
- product knowledge
- use of technical terms

Learning outcome:

4. Review a work-based experience in the environmental and land based sector

Topics

4.1 Present evidence of activities and achievements during a work-based experience
4.2 Review a work-based experience, identifying strengths and areas for improvement
4.3 Evaluate future career aspirations

In this outcome, learners will use evidence from their work experience to present a report (eg written or visual), on their work experience business, job role, learning and achievements. They will then review the effectiveness of the workplace, making realistic and justified suggestions for improvement. Review of their own workplace performance and achievements should include all of the content identified, with reference to relevant evidence, eg reports, progress reviews, and the extent to which their aims, objectives/targets have been achieved. Learners should consider further training and experience that will help them to achieve their career ambitions.

Topic 4.1

Learners will present evidence of activities and achievements during a work-based experience to include, as appropriate: name of work experience provider, nature of the organisation (type of business, products or services, customers), organisation structure chart, main duties and responsibilities, regular daily working routine, evidence of safe working practices (eg PPE, risk assessments)

Topic 4.2

Learners will review their work-based experience, identifying strengths and areas for improvement, to include work rate, work quality and effectiveness, punctuality, attendance, reliability, dress and personal presentation, working relationships with others work experience aims, objectives and

targets

Topic 4.3

Learners will evaluate career aspirations, to include advantages and disadvantages of identified pathways, suitability to personal interests, skills and qualifications.

Guidance for delivery

Learners on vocational courses should have experience of the type of work that they hope to do, and of the expectations of potential future employers.
Ideally this unit should be undertaken in a real business environment relevant to the subject interest of the learner, but actual work experience may be gained by a number of routes, eg 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, as previous relevant and current work experience in the industry or as a member of a group of learners invited to carry out practical work on a suitable business.

Throughout the unit, the emphasis should be on safe working. It is expected that learners will be aware of safe working practices and familiar with accepted practices and behaviours within the context in which they are working.

Learners should complete a minimum of 150 hours of work experience to achieve this unit. If work experience is in the industry, centres should be mindful of their responsibilities for ensuring that work placements have appropriate supervision, insurance and health and safety policies in place.

It is recommended that a summary report is completed by the employer at the end of the work placement.

Unit 303 Land based industry machinery operations

UAN:	J/507/4636
Level:	3
GLH:	60

What is this unit about?

This unit aims to provide learners with an understanding of the principles of land based machinery operations and how these can be applied in practice. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

The learners will study the purpose and operation of land based machines including machine operating and working principles. They will explore routine maintenance and appropriate Personal Protective Equipment. They will also develop knowledge of the legal requirements and industry best practice guidance for land based machinery. They will learn how to safely operate and maintain machinery and consider the different conditions in which machinery might need to operate.

Learning outcomes

In this unit, learners will be able to:

1. Understand the purpose and operation of land based industry machinery
2. Prepare land based industry machinery for work
3. Operate land based industry machinery

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the purpose and operation of land based industry machinery

Topics:

1.1 Current legislation and industry guidance for land based industry machinery operation

1.2 Purpose and operation of land based machines

In Outcome 1 learners must understand the significance of current legislation and industry best practice guidance to the machinery they operate. Learners must also demonstrate understanding of the construction and working principles of a selection of machines commonly used in their specific land based industry, and knowledge of their work and performance parameters.

Topic 1.1

Learners will understand the significance of current legislation and industry best practice guidance to the machinery they operate. To include

- Legislation: eg Provision and Use of Work Equipment Regulations 1998 (PUWER), Health and Safety at Work Act 1974, Management of Health and Safety at Work Regulations 1999, Control of Substances Hazardous to Health Regulations 2002 (COSHH), Manual Handling Operations Regulations 1992, Personal Protective Equipment (PPE) at Work Regulations 1992, Environmental Protection Act 1990, Wildlife and Countryside Act 1981, Control of Noise at Work Regulations 2005, Control of Vibration at Work Regulations 2005, Lifting Operations and Lifting Equipment Regulations 1998
- Industry best practice guidance

Topic 1.2

Learners will understand the purpose, operating and working principles and limitations of land based industry machinery. For example:

- Purpose built, trailed, tractor mounted, self-propelled or pedestrian ,
- Power source (eg electric, battery, spark ignition, compression ignition, PTO and hydraulic)
- Drive and transmission systems
- Cutting mechanisms
- Cutting/loading capacity or range
- Input and output ranges and levels
- Terrain suitability
- Safety features

Learning outcome:

2. Prepare land based industry machinery for work

Topics:

2.1 Machinery preparation

2.2 Carry out pre-use checks

2.3 Identify common faults and suggest appropriate remedial action

2.4 Check and report on safety requirements

In Outcome 2 learners will demonstrate the ability to prepare machines for work. Machines will be specific to learners' area of study. It is essential that manufacturers' recommendations, user's manuals and machinery handbooks are available to the learner. It is expected that leaners do this for three different machines.

Topic 2.1
Learners will prepare selected land based industry machinery for work in accordance with the manufacturers' recommendations, user's manual or machinery handbook.

Topic 2.2
Learners will carry out pre-use checks for selected land based industry machinery in accordance with the manufacturers' recommendations, user's manual or machinery handbook.

Topic 2.3
Learners will identify common faults and suggest appropriate remedial action to the machinery available to them. Common faults may include

- Incorrect, polluted or lack of fuel
- blocked filters (air, fuel, oils)
- poor oil pressure
- damaged sprockets and fouled drive systems
- damaged or blunt blades
- fouled or incorrectly set gap of spark plugs
- starter recoil tension
- blocked mechanisms

Topic 2.4
Learner will be able to check and report on the safety requirements for selected land based industry machinery in accordance with the manufacturers' recommendations, user's manual or machinery handbook.

Learning outcome:

3. Operate land based industry machinery

Topics:

3.1 Carry out risk assessments
3.2 Ways to minimise possible environmental impacts of using selected land based industry machinery
3.3 Operate land based industry machinery
3.4 Carry out post operating procedures

In outcome 3 learners will be required to operate land based industry machinery. It is anticipated that the delivery of this outcome will be through supervised practical training and the learners will be able to consolidate operational skills within realistic working environments. As a minimum, it is expected that the learner will be able to operate three powered machines appropriate to their area of study in a realistic industrial environment where possible. The learner should be given appropriate time in order to develop operational skills before assessment. The learner is not required to transport machinery, but should be aware of transport requirements.

Topic 3.1
Learners will carry out risk assessments for the machines they are to operate in accordance with The Management of Health and Safety at Work Regulations 1999

Topic 3.2

Learners will know how to minimise possible environmental impacts of land based industry machinery, eg

- Oil and fuel spillage and storage
- Emissions
- Soil stability and erosion
- Protected species
- Waste disposal
- Watercourses

Topic 3.3

Learners will demonstrate safe and efficient operation of specialist land based industry machinery, to include as appropriate:

- Risk assessment
- Adherence to industry safety guidance and operator's manual,
- Safe start and stop,
- Monitoring of machine performance and output
- Effective communications
- Clearance of blockages,
- Conversion between work and transport positions
- Economic operation
- Safe and efficient operation,

Topic 3.4

Learners will carry out post operating procedures appropriate to machinery operated. To include

- Cleaning
- Inspecting for and reporting of damage or defects
- Lubrication
- Storage

Guidance for delivery

This unit is designed to give learners knowledge, understanding and practical skills to enable them to recognise and understand the working principles of land based industry machinery typically used in their area of study.

Learners will be able to demonstrate pre use checks and fault finding of a range of selected machines. They will be able to prepare machines for work and operate them safely and efficiently. An emphasis will be put on the use of manufacturers' recommended procedures, health and safety issues and safe working practices.

Learners must show awareness and consideration of hazards and risks at all times, particularly during operational situations where levels of risk may vary at any given time.

Where possible, tasks should be undertaken in a real working environment. Following operations, learners will demonstrate simple inspection and maintenance and pre storage tasks to minimise degeneration of the machine, and to ensure it is in a useable condition for subsequent operations.

Suggested learning resources

Books

Arboricultural Association. 2005. *Arboricultural Association Health and Safety Package*. Cheltenham: Arboricultural Association. ISBN 0900978406.

Ireland, D. 2004. *Winching Operations in Forestry: Tree Takedown and Vehicle Debogging*. Norwich: Stationary Office Books. ISBN 085538638X.

Hathaway, L. 1994. *Tractors Fundamentals of Machine Operation.* Davenport: John Deere Publishing. ISBN 0866912126.

Kestel, B. 2009. *Chainsaw Operator's Manual: The Safe Use of Chainsaws.* Australia: Landlinks Press. ISBN 0643090282.

Southorn, N. 1999. *Tractor Operation and Maintenance*. Sydney: Inkata Press. ISBN 0750689145.

Williams, M. 2000. *Tractor Power.* Ipswich: Farming Press. ISBN 0852365144.

Journals and magazines

Arboricultural Association newsletter

Forestry and British Timber

Arboriculture and Forestry Advisory Group (AFAG) Safety Guides

Forest Industry Safety Accord (FISA) Safety Guides

Websites

- The Arboricultural Association http://www.trees.org.uk
- The Forest Industry Safety Accord http://www.ukfisa.com
- The Forestry Commission http://www.gorestry.gov.uk
- The Health and Safety Executive http:/www.hse.gov.uk

Unit 304 Agricultural crop production

UAN:	H/507/6846
Level:	3
GLH:	60

What is this unit about?

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

The aim of this unit is to develop learners' understanding of factors affecting the profitability of crop production as well as the practical skills required to establish and monitor crop growth.

Learning outcomes:

In this unit, learners will be able to

1. know how to establish crops for given markets
2. plan the nutrition of crops
3. understand control measures for weeds, pests and diseases
4. understand harvest and storage losses and production costs

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Crops

Cereals, oilseeds, grass, peas, beans, alternative crops.

Learning outcome:

1. Know how to establish crops for given markets

Topics

1.1 Crops and their life cycles
1.2 End uses and key market requirements
1.3 Planting specifications
1.4 Crop rotation

Topic 1.1

Learners will know different crops and their lifecycles in order to recognise seeds and their growth in field at all stages, including annual, biennial, perennial and ephemeral.

Topic 1.2

Learners will know end uses and market requirements, including

- named varieties for different uses (milling, malting, bio-fuel and seed)
- the various end uses for the crops (milling, malting, seed, bio-fuel, feed)
- quality standards (Hagberg falling number, protein, impurities, moisture content, appearance)
- crop assurance schemes.

Topic 1.3

Learners will know planting specifications, including

Timing of drilling, crop seedbed, expected yield, soil type, seed rate, depth, row width and spacing, plant population, and thousand grain weight (TGW).

Topic 1.4

Learners will know crop rotations and the reasons for them, including restorative and exhaustive crops, continuous cropping, break cropping, and catch cropping. They will also know crops for given soil types, eg clay, sand, loam, silt.

Learning outcome:

2. Plan the nutrition of crops

Topics

2.1 Interpretation of soil analysis data
2.2 Fertiliser programmes
2.3 Function of nutrients, deficiency/excess symptoms
2.4 Legislative and environmental guidelines

Topic 2.1

Learners will interpret soil analysis data: SMN, SNS, Index system, field procedures, precision farming methods, variable rate application.

Topic 2.2

Learners will plan a fertiliser programme for a named crop, including

Major and minor nutrients (nitrogen, phosphate, potassium, sulphur, manganese), timing of applications (drilling, spring split applications), lime, manure applications, RB209 or suitable software MANNER/PLANET, avoidance of waste/pollution.

Topic 2.3

Learners will understand the function of nutrients. Learners will recognise deficiency symptoms and will identify how to overcome them, including

Function of key major and minor nutrients, excess and deficiency symptoms, disease association, pH.

Topic 2.4

The following is a comprehensive list of the legislation, regulation and good practice that applies to planning the nutrition of crops. For purposes of assessment, there is no requirement for detail, but learners must appreciate that it exists and where each applies

- Environmental Protection Act 1990
- Cross Compliance Nitrates Directive 1991
- Water Framework Directive 2003
- Local Environmental Risk Assessment Procedures (LERAPs)
- Nitrate Vulnerable Zones (NVZs) and timing
- Entry Level Scheme rules
- Protecting our Water, Soil and Air (A DEFRA publication)

Learning outcome:

3. Understand control measures for weeds, pests and diseases

Topics

3.1 Weeds, pests and diseases
3.2 Importance of weed, pest and disease control
3.3 Weed, pest and disease biology
3.4 Cultural and chemical control

Topic 3.1
Learners will understand
- seed, soil, stem and leaf diseases
- major weeds and their importance
- pests and the damage they cause
- beneficial insects.

Topic 3.2
Learners will understand the damage caused by weeds, pests and diseases in terms of:
- yield
- profit
- subsequent crops
- harvesting
- storage
- marketing
- environment

Topic 3.3
Learners will understand
- fungal, viral and bacterial diseases
- spread of weeds pests and diseases
- life cycles
- resistance

in order to discuss aspects of the biology of weeds, pests and diseases that are relevant to their spread and control.

Topic 3.4
Learners will understand methods of controlling weeds, pests and disease, in order to evaluate them. These include
- cultural control, including rotations, varieties, cultivations, seed, seed rates, rogueing, fertiliser use, biological, beneficial insects
- chemical control, including herbicides, insecticides, fungicides, molluscicides, Plant Growth Regulators (PGRs), seed dressings
- thresholds and timing.

Learning outcome:

4. Understand harvest and storage losses and production costs

Topics

4.1 Yield and quality losses during harvest
4.2 Storage conditions for crops
4.3 Production costs for crops

Topic 4.1
Learners will understand
- timing and crop maturity
- field settings to minimise damage and losses

- effects of disease and weather
- typical yields

Topic 4.2
Learners will understand
- store preparation
- crop moisture during storage
- temperature, pest and disease problems
- market requirements

Topic 4.3
Learners will understand
- variable costs (seeds, fertilisers, sprays)
- fixed costs (machinery, depreciation, labour, fuel)
- contractors' costs
- gross margin data
- market prices.

Guidance for delivery

This unit will involve practical delivery, theory sessions, and visits to suitable locations; it will also have links to industrial experience placements. The unit will imitate industry practice, with the learner being involved in all the operations of farm crop production. Tutors need to offer the learner as wide a selection of learning opportunities as possible. This will involve lectures, regular crop walks, farm practical work experience, talks, visits (eg local machinery dealers), and use of an agronomist if possible. In addition, the tutor needs to ensure that all relevant crops are included: cereals, grass, oil-seed rape, peas, beans, and alternatives (concentrating more on the crops typical to their locality). Other crops may be used at the tutor's discretion, according to locality. Learners will need access to farm recording data and relevant previous crop history.

Crop walks both in taught time and learners' own time are to be maximised. Health and safety must be regularly enforced especially with regard to machinery and chemicals.

Learning outcome 1 will need to be delivered at the start of the unit. In the autumn, learners may well have been working and involved in autumn cultivations and seedbed preparation. Crop walks at this time of year will primarily involve observing cultivations and seedbeds for specific crops in the range. Alternatively, spring-sown crops would equally lend themselves to observation for the purposes of this learning outcome.

Learning outcome 2 will need to be delivered to coincide with crop growth, which will likely be all year round, especially in the case of cereals. Crop walks and visits to local arable farms can be used to cover this outcome. Tutors could ensure that the learner has access to a farm's fertiliser programme for selected crops. An introduction to a farm agronomist would also be useful prior to the main fertilising season.
Learners will need to have access to soil analysis data, as well as fertiliser software such as MANNER or PLANET and/or the RB209 book. They may also be involved in soil sampling.

Learning outcome 3 will need to refer to at least two crops and be delivered throughout their growing season. Crop walks and visits to local arable farms can be used to cover this outcome. An introduction to a farm agronomist would also be useful prior to the main spraying season.

Learning outcome 4 will need to look at previous crop history, since learners will not be in college during the summer to monitor and gather current crop harvesting, storage and marketing information. The learner will need access to farm information and current market prices, such as those in the regular farming press or on the internet. Learners should be given the opportunity to view different storage and drying systems.

Suggested learning resources

Books

Arable plants – a field guide Published by: Princeton University Press, 2004 ISBN 978-1903657027	Wilson, P. & King, M.
Resource management: soil Published by: Farming Press, 2001 ISBN 978-0852365595	Davies, D.; Finney, B; & Eagle D.
Lockhart & Wiseman's Crop Husbandry including grassland 9th edition Published by: Woodhead publishing, 2014 ISBN 978-1782423713	Finch, H.; Samuel, A.; & Lane, G.
Organic cereals and pulses Published by: Chalcombe publications, 2002 ISBN 978-0948617478	Younie, D. & Taylor, B.
Farm Machinery Published by: Old Pond Publishing, 2005 ISBN 978-1903366684	Bell, B.
Culpin's Farm Machinery Published by: Hesperides Press, 2008 ISBN 978-1443703017	Culpin, C. & Bloxham P.
Farm Management Pocketbook, 45th edition Published by: Agro Business Consultants Ltd, 2015 ISBN 978-0957693913	Nix, J.
Drying and storing combinable crops Published by: Farming Press, 1989 ISBN 978-0852361931	McLean, K.
Oilseed rape Published by: Farming Press, 1985 ISBN 978-0852361559	Ward, J. & Basford, W.
The Agricultural Notebook, 20th edition Published by: Wiley-Blackwell, 2003 ISBN 978-0632058297	Soffe, R.

Protecting our Water, Soil and Air — DEFRA
Published by: The Stationery Office Books, 2009
ISBN 978-0112432845

Fertiliser Manual RB209, 8th edition — DEFRA
Published by: The Stationery Office Books, 2010
ISBN 978-0112432869

UK Pesticide guide 2015, 28th edition — Lainsbury, M.
Published by: CABI Publishing, 2015
ISBN 978-1780645773

The Agricultural Budgeting and Costing Book, 79th Edition — ABC
Published by: Agro Business Consultants, 2014
ASIN: B00EGO3HQK

Publications

- Crops
- Farm Contractor
- Farmers Guardian
- Farmers Weekly
- Farm Business

Websites

- Farmers Weekly Interactive — http://www.fwi.co.uk
- Home Grown Cereals Authority — http://www.cereals.ahdb.org.uk
- UK website for Syngenta Crop Protection — http://www.newfarmcrops.co.uk
- National Institute of Agricultural Botany — http://www.niab.com
- Department for Environment, Food and Rural Affairs — http://www.defra.gov.uk
- Welsh Assembly Government — http://www.wales.gov.uk
- Scottish Executive Environment and Rural Affairs Department — http://www.scotland.gov.uk
- Department of Agriculture and Rural Affairs (Northern Ireland) — http://www.dardni.gov.uk
- Combine World — http://www.combineworld.co.uk

Unit 305 Plant and soil science

UAN:	L/507/4637
Level:	3
GLH:	60

What is this unit about?

This unit aims to provide learners with an understanding of the principles of plant and soil science and how these can be applied in practice within land-based or related industries. This unit is primarily aimed at learners within a centre-based setting looking to progress into the sector or further education and training.

Learners will be able to develop an understanding of soil characteristics and their relationship to crop growth and development. They will investigate how plants grow and develop, through a knowledge of their structure and physiology. In addition, the learners have the opportunity to consider factors which influence production of commercial crops and other plants, which provides a basis for plant and soil management techniques.

Learning outcomes

In this unit, learners will be able to

1. Understand the function of plant structures
2. Understand the main processes of plant physiology, growth and development
3. Understand how soils affect plant growth and development

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Understand the function of plant structures

Topics

1.1 Internal and external structures of plants

1.2 Function of plant structures

Topic 1.1

Learners will understand the major internal and external structures of plants

- Major internal structures: cell structure (cytoplasm, organelles), parenchyma, collenchyma, sclerenchyma, xylem tissue, phloem tissue, cambium, epidermis, guard cells, and stomata
- Major external structures: roots, shoots, stem, leaves, buds, flowers, fruit and seeds
- Specialised cells, tissues and organs: eg pericycle, endodermis, lenticels, cotyledons, stolons, rhizomes, bulbs, corms, root and stem tubers

Topic 1.2

Learners will understand the function of the major plant structures (eg photosynthesis, reproduction, support, transport, anchorage, absorption, storage, defence, attraction, gaseous exchange, respiration, division)

Learning outcome:

2. Understand the main processes of plant physiology, growth and development

Topics

2.1 Processes of plant physiology

2.2 Life cycle of selected plants

2.3 Growth and development of plants

In this outcome learners will explore the major processes of plant physiology and identify factors affecting growth and development of plants. Learners will also need an awareness of how knowledge of plant physiology can be applied within land-based management scenarios.

Topic 2.1

Learners will understand the major processes of plant physiology

- Photosynthesis: process and equation for photosynthesis, chloroplasts, function of chlorophyll, functionality of guard cells and stomata, factors influencing the rate of photosynthesis (light, chlorophyll, temperature, carbon dioxide, water, leaf colour)
- Respiration: definition of aerobic and anaerobic respiration, equation for aerobic respiration, structure and function of mitochondria, diffusion, compensation point, factors influencing the rate of respiration (temperature, water availability, seasonal growth)
- Uptake, transport and loss of water and nutrients: osmosis, diffusion, plasmolysis, turgor, translocation, transpiration, factors influencing transpiration (eg temperature, humidity, air movement, water supply, light, stomata).

Topic 2.2

Learners will understand the life cycle of plants:

- life cycle types: ephemeral, annual, biennial, perennial
- germination: process and stages, types of germination (eg epigeal, hypogeal),
- types of reproduction (sexual reproduction eg flower structures, pollination and fertilisation, seed production, dispersal), (asexual reproduction eg vegetative propagation, parthenogenesis)

Topic 2.3

Learners will understand the growth and development of plants, to include cell division, cell expansion, cell differentiation, apical meristems, lateral meristems, formation of roots, shoots, leaves and buds

Learning outcome:

3. Understand how soils affect plant growth and development

Topics

3.1 Soil types and soil formation
3.2 Investigate characteristics of soil types
3.3 How soils affect plant growth and development
3.4 Cultural techniques that affect soil characteristics

In this outcome learners will need to investigate a range of soil types and carry out supervised basic soil experiments to investigate different soil characteristics. These could include investigating the proportion of sand, silt and clay through suspending in water, investigating the water holding capacity of different soil types, and determining soil pH. The learners' understanding of the effects of soil characteristics on plant growth and development could be supported by some controlled experiments, where learners grow plants in different soil types.

Delivery could be enhanced by visits to see different types of plants growing in different soil types. Visiting expert speakers' input would be useful, as they would describe practical aspects of managing soil structure and plant nutrition.

Topic 3.1

Learners will identify a range of soil types to include loams, clays, silts, sands, organic soils, and understand how soil is formed.

Topic 3.2

Learners will investigate the characteristics of a range of soil types and profiles to include

- soil profiles and different horizons
- properties of soil particles and texture (clay, silt and sand),
- soil structure (i.e. crumb structure, aggregate sizes)
- water holding capacity
- aeration
- stability
- organic matter
- pH
- soil life: decomposers, mycorrhizae.

Topic 3.3

Learners will understand how soil properties and characteristics can affect plant growth and development, to include

- rooting depth and plant stability
- pH and organic matter
- availability or lack of macronutrients and micronutrients
- effects of organic and inorganic fertiliser application
- nutrient retention to include cation exchange capacity
- drainage/water logging
- compaction/poor aeration
- effects of high or low soil water content
- effects on ability to prepare soil for planting

Topic 3.4

Learners will understand how cultural techniques affect soil structure, to include:

- Soil amelioration (eg green manure, addition of lime, organic matter, hydrogels, mycorrhizae, textural amendment)
- Soil cultivation (eg sub-soiling, ploughing, single and double digging, rotavating, minimal cultivation, zero cultivation)
- Soil protection and prevention of damage (eg capping, erosion, cultivation pans, surface and subsurface compaction

Guidance for delivery

On completion of this unit, the learner will have developed an understanding of how plants grow and develop, through knowledge of their structure and physiology. It will be important that delivery relates to plants that are vocationally relevant to the learners. Laboratory and field based practicals will be essential to help learners to explore soil characteristics, plant physiology and structure, and a series of visits to growing plants could help learners better understand plant growth and development. Learners are required to study a range of plants for this unit, although they should be able to focus upon plant types that are most relevant to their vocational area of study. Learners will also need to have access to a range of soils, as well as appropriate equipment and resources to undertake soil sampling and investigate soil profiles.

Visiting speakers could enhance relevance of the subject to learners Development of areas within a college environment where learners are able to modify and manipulate plant environments may enhance understanding of the complexities of plants and their life cycles.

Suggested learning resources

Books

Adams C.R. and Early M. 2011. *Principles of Horticulture. 6th Edition*. Routledge. ISBN 0080969577

Allaby, M. 2012. *A Dictionary of Plant Science. 3rd Edition*. OUP Oxford. ISBN 0199600570

Ashman M. and Puri, G. 2008. *Essential Soil Science: A clear and concise introduction to soil science.* Wiley-Blackwell ISBN 0632048859.

Beck C.B. 2010. *An Introduction to Plant Structure and Development: Plant Anatomy for the Twenty-First Century. 2nd Edition*. Cambridge University Press. ISBN 0521518059

Brady N.C. and Weil R.R. 2014. Nature and Properties of Soils. 14th Edition. Pearson Education. ISBN 9332519102.

Cutler D.F., Botha T. and Stevenson D.W. 2008. *Plant Anatomy: An Applied Approach.* John Wiley & Sons. ISBN 1405126795

Buchanan B.B., Gruissem W. and Jones, R. 2015. *Biochemistry and Molecular Biology of Plants. 2nd Edition.* Wiley-Blackwell. ISBN 0470714212

Evert R.F and Eichhorn S.E. 2012. Raven *Biology of Plants.* 8th Edition. WH Freeman & Co Ltd. ISBN 1464113513.

Lack, A. and Evans, D. 2005. *Instant Notes in Plant Biology.* 2nd Edition. Taylor and Francis. ISBN 0415356431

Mauseth, J.D. 2014. *Botany: An Introduction to Plant Biology. 5th Edition.* Jones & Bartlett Publishers. ISBN 1284068854

Reiss, M, Monger, G. 2000. *Advanced Biology.* Cheltenham: Nelson Thornes. ISBN 0174387326

Roberts, M. and Ingram N. 2001. *Biology*. *2nd Revised Edition* Nelson Thornes. ISBN 0748762388.

Smith A., Coupland G., Dolan L., Harberd N., Jones J., Martin C., Sablowski R. and Amey A. 2009. *Plant Biology*. Garland Science. ISBN 0815340257

Taiz, L., Zeiger, E. 2010. Plant Physiology. 5th Edition. Hampshire: Sinauer Associates. ISBN 0878935657

Wayne R. 2009. *Plant Cell Biology*. Academic Press. ISBN 0123747783

White R.E. 2005. *Principles and Practice of Soil Science: The Soil as a Natural Resource*. 4th Edition. Wiley-Blackwell. ISBN 0632064552.

Journals and magazines

Arborist News
Essential Arb
Forestry Journal
Journal of Arboriculture
Quarterly Journal of Forestry
The Arb Magazine
Field mycology

Websites

- Biotechnology and Biological Sciences Research Council http://www.bbsrc.ac.uk
- British Society of Soil Science http://www.soils.org.uk/
- DEFRA http:// www.defra.gov.uk
- Environment Agency http:// www.environment-agency.gov.uk
- Health and safety Executive http:// www.hse.gov.uk
- Science and Plants for Schools http://www.saps.org.uk/
- The Arboricultural Association http://www.trees.org.uk/
- The Forestry Commission http://www.forestry.gov.uk

Unit 306 Undertake estate skills

UAN:	K/507/4645
Level:	3
GLH:	60

What is this unit about?

The purpose of this unit is to introduce learners to common estate skills and knowledge and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or into further/higher education.

The learner will look at constructing, repairing and maintaining boundaries, structures and surfaces. They will build their experience and confidence in developing practical skills in a range of situations. The learner will be able to contextualise practical management work to a particular habitat that lies within their primary area of learning.

Learning outcomes

In this unit, learners will be able to

1. Construct, repair or maintain boundaries
2. Construct, repair or maintain structures
3. Construct, repair or maintain surfaces
4. Carry out practical habitat management work

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome:

1. Construct, repair or maintain boundaries

Topics

1.1 Prepare for work on boundaries
1.2 Select equipment and materials
1.3 Construct, repair or maintain boundaries

In this outcome learners will develop the practical skills needed to construct, repair or maintain at least **two** different boundaries.

Boundaries, eg

- hedge, bank, ditch,
- fence (post and rail, post and wire, electric, netting)
- wall (stone, brick)

Topic 1.1

Learners will plan the task, clear debris and prepare the site, ensure livestock and public safety, consider factors associated with the location (eg power supply, waste disposal, equipment and materials storage).

Topic 1.2:

Learners will select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 1.3:

Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards

Learning outcome:

2. Construct, repair or maintain structures

Topics

2.1 Prepare for work on structures
2.2 Select equipment and materials
2.3 Construct, repair or maintain structures

In this outcome, learners will construct, repair or maintain at least **two** different structures. These may typically be constructed from wood, metal, stone or brick. Learners are not expected to be able to fully construct substantial structures such as animal or machinery housing, however, it is anticipated that delivery could include repair and maintenance of such larger structures as would be found in an estate setting

Structures eg

Gate, stile, horse jump, bird box, table, bench, door, raised bed, composting area or swim platform.

Large structures requiring repair or maintenance may include animal house or pen, machinery or feed store, garden furniture, shed and pergola.

Topic 2.1
Learners will plan the activity, clear debris and prepare the site, ensure livestock and public safety, consider location factors (power supply, waste disposal, equipment and materials storage).

Topic 2.2:
Learners will select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 2.3:
Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards.

Learning outcome:

3. Construct, repair or maintain surfaces

Topics

3.1 Prepare for work on surfaces
3.2 Select equipment and materials
3.3 Construct, repair or maintain surfaces

In this outcome learners are required to construct, repair or maintain **one** surface (eg path, road and hard standing) which could be either solid (eg decking, concrete and paving), or loose (eg gravel, wood chippings and sand). Where appropriate, learners should be aware of timeliness considerations, for example preparing concrete at the right time for construction.

Topic 3.1
Learners will plan the task, clear debris and prepare the site, ensure livestock and public safety, consider factors associated with the location (eg power supply, waste disposal, equipment and materials storage).

Topic 3.2:
Learners will identify and select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 3.3:
Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards

Learning outcome:

4. Carry out practical habitat management work

Topics

4.1 Prepare for habitat management work
4.2 Select equipment and materials
4.3 Carry out practical habitat management work

In this outcome learners are required to undertake practical habitat management work (eg mowing,

renovation, tree and shrub planting, clearing unwanted vegetation, coppicing, pruning, thinning, pond, stream and ditch clearance, and control of invasive species). Where appropriate, learners should be aware of time considerations, for example preparing concrete at the right time for construction.

Topic 4.1

Learners will plan the task, clear debris and prepare the site, ensure livestock and public safety, consider factors associated with the location (eg power supply, waste disposal, equipment and materials storage).

Topic 4.2

Learners will identify and select materials and equipment relevant to the task, taking into account health and safety, sustainable practice and cost implications.

Topic 4.3

Learners will undertake the task safely (eg implementation of risk assessment and appropriate Personal Protective Equipment (PPE)) and to the required standards.

Guidance for delivery

This unit has a very practical focus, and aims to enable learners to develop estate skills which can be applied to a range of situations and circumstances. The unit has been written such that naturally occurring and locally relevant opportunities can be used in selecting sites, structures and surfaces to construct, repair or maintain.

As learners will be engaged in practical activity there should be an emphasis on safe working practices, including the use of appropriate personal protective equipment (PPE), and appropriate risk assessments should be undertaken. At Level 3 it is expected that learners will take an active part in completing risk assessments, so that this becomes an integral part of all practical activity. Learners should also be made aware of the impact on the environment, and sustainability concepts should also be demonstrated where possible.

Learners should have the opportunity to undertake estate skills activity in a land-based setting wherever possible to maximise the vocational relevance. It will be most beneficial if the structures, boundaries and surface selected are for a clear purpose above and beyond delivery of this unit. It is recognised that there will not be opportunities to carry out construction, repair *and* maintenance in each of the categories, but it would be appropriate for the skills of construction, repair and maintenance to each be developed in one aspect of the unit.

It is anticipated that most delivery of this unit will take place in a practical setting, with supervised practice of skills. Delivery will also include some classroom based activity in ensuring learners have a good understanding of planning, materials selection and preparation, and underpinning knowledge.

Suggested learning resources

Books

Agate E (Ed), Brooks A and Adcock S (1999) *Dry Stone Walling: A Practical Handbook*. The Conservation Volunteers.

Agate E (2001) *Fencing: A Practical Handbook*. The Conservation Volunteers.

Agate E (2001) *Footpaths: A Practical Handbook*. The Conservation Volunteers.

Agate E and Brooks A (1998) *Hedging: A Practical Handbook*. The Conservation Volunteers.

Agate E (Ed) (2001) *Tree Planting and Aftercare: A Practical Handbook*. The Conservation Volunteers.

Agate E (2000) *Tool Care: A Maintenance and Workshop Manual*. The Conservation Volunteers.

Agate E (2001) *Waterways &Wetlands: A Practical Handbook*. The Conservation Volunteers.

Agate E (Ed) (2002) *Woodlands: A Practical Handbook*. The Conservation Volunteers.

Maclean M (2006) *Hedges and Hedgelaying – A Guide to Planting, Management and Conservation*. The Crowood Press.

Roberts, M. (1997) *Poultry House Construction*. Gold Cockerel Books

Roberts, M. (1999) *The Smallholder's DIY*. Gold Cockerel Books

Roberts, M. (2005*) Farm and Smallholder Fencing: A Practical Guide to Permanent and Electric Livestock Fencing on the Farm and Smallholding*. Gold Cockerel Books

Stokes A (1999) *Health and Safety Overview for Practical Conservation Project: A Guide to Good Practice for Conservation Groups and Land Managers*. The Conservation Volunteers.

Websites

- The Conservation Volunteers www.tcv.org.uk
- Department for Environment, Food and Rural Affairs www.defra.gov.uk
- Health and Safety Executive www.hse.gov.uk
- The Wildlife Trusts www.wildlifetrusts.org
- Forestry Commission www.forestry.gov.uk

Unit 307 Livestock husbandry

UAN:	T/507/6849
Level:	3
GLH:	60

What is this unit about?

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

The learner will study the range of beef, dairy, pig and sheep husbandry systems, the principles of production animal health and breeding and practical skills and regulation involved in the planning and management of modern livestock production systems.

Learning outcomes:

In this unit, learners will be able to

1. carry out beef husbandry activities
2. carry out dairy husbandry activities
3. carry out pig husbandry activities
4. carry out sheep husbandry activities

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

It is not anticipated that learners will develop practical skills to carry out the full range of husbandry activities across the full range of farm animals. Delivery should be planned to enable them to gain an overview of these, but then to take part in a range of six husbandry tasks or activities for at least two categories of farm livestock (where appropriate).

Learning outcome:

1. Carry out beef husbandry activities

Topics

1.1 UK Beef Industry
1.2 beef production systems
1.3 husbandry tasks on beef cattle

Topic 1.1

Learners will understand the UK beef industry in terms of: trends, breeds, consumption vs production, marketing.

Topic 1.2

Learners will understand beef production systems:

- suitability of breed and sex for production system
- Grass fed, cereal fed, 18 month grass/cereal and 24 month grass/silage fed, suckled beef production.

Topic 1.3

Learners will understand and carry out husbandry tasks:

- restrain calf
- signs of health
- temperature
- ear tagging
- disbudding
- dosing
- weighing and handling
- selection for slaughter.

Learning outcome:

2. Carry out dairy husbandry activities

Topics

2.1 UK Dairy Industry
2.2 The dairy cow's year
2.3 Husbandry tasks relating to dairy cattle

Topic 2.1

Learners will understand the UK dairy industry in terms of: trends, breeds, consumption vs production, marketing

Topic 2.2

Learners will understand the dairy cow's year:

- calving index
- replacements
- lactation
- feeding
- housing.

Topic 2.3

Learners will understand and carry out husbandry tasks relating to dairy cattle:

- signs of heat
- milking
- parlour cleaning
- sterile milk sample
- condition score
- use of dairy cow records
- mastitis identification
- preparation for artificial insemination
- grazing techniques
- calving .

Learning outcome:

3. Carry out pig husbandry activities

Topics

3.1 UK pig Industry
3.2 Pig production systems
3.3 Husbandry tasks relating to pigs

Topic 3.1

Learners will understand the UK pig industry in terms of: trends, breeds, consumption vs production, marketing.

Topic 3.2

Learners will understand pig production systems

- farrowing to weaning
- weaning to service
- pregnant sow
- boar
- gilt

- weaned pig
- finishing pig.

Topic 3.3
Learners will understand and carry out husbandry tasks relating to pigs:

- handle pigs of all ages
- move pigs of all ages
- teething, tailing
- iron injection
- earmark
- signs of health
- temperature taking
- heat detection
- prepare pig for farrowing
- select pig for slaughter.

Learning outcome:

4. Carry out sheep husbandry activities

Topics

4.1 UK Sheep Industry
4.2 Sheep production systems
4.3 Husbandry tasks relating to sheep

Topic 4.1

Learners will understand the UK sheep industry in terms of:

- Trends
- Breeds
- consumption vs production
- marketing.

Topic 4.2
Learners will understand sheep production systems:

- preparation for tupping
- mating season
- mid-pregnancy
- preparation for lambing
- lambing
- grass lamb systems
- store lamb finishing
- shearing.

Topic 4.3
Learners will understand and carry out husbandry tasks relating to sheep:

- move sheep
- use 5 point plan to deal with lameness
- recognise breeds
- age by dentition
- ear tagging
- signs of health
- catch
- restrain
- move turn
- oral drenching
- injection
- dagging
- select lambs for slaughter
- tail lambs
- castrate lambs
- harness a ram
- set up hand piece
- condition score ewes.

Guidance for delivery

This unit will introduce learners to the major types of agricultural livestock production in the UK, and equip them with some practical husbandry skills. As learners will be engaged in practical activities, safe working practices should be emphasised, including the use of appropriate personal protective equipment (PPE). Appropriate risk assessments should be undertaken and at Level 3 it is expected that learners will take an active part in completing risk assessments, so that this becomes an integral part of all practical activity. Learners will also know the importance of animal welfare, and sustainability concepts should be demonstrated to them where possible.

Each learning outcome calls for a combination of practical and theoretical study. Theory and practical classes on the college farm can achieve this. Additional resources may need to be outsourced from local farms cooperating with the centre.

For each Learning outcome, learners need to gain an overview of all the major production systems for either beef cattle, dairy cattle, sheep or pigs. It would be helpful if delivery includes visits to a number of different production systems. Where this is not feasible due to production systems not being available in the local area, learning should be supported by high quality and up-to-date audiovisual resources.

Learners will understand the major husbandry requirements of production systems and develop the skills to undertake these husbandry tasks and requirements in practice. Learners will need supervised access to a range of production systems to enable them to practice their skills. This could be linked to appropriate work placements. It is important that the health and safety of learners and the welfare of animals are emphasised during both theoretical and practical learning

Suggested learning resources

Books

Allen, D. 1990. Planned Beef Production and Marketing. (Blackwell Science, ISBN 0632026111
Croston, D and Pollott, G. 1993. Planned Sheep Production. (Blackwell Science, ISBN 0632035765
Gillespie, J. 2000. Modern Livestock and Poultry Production. Delmar,
ISBN 0766816079

Soffe, R and McConnell, P. 2003. The Agricultural Notebook. Blackwell Science, ISBN 0632058293
Speedy, A. 1980. Sheep Production: Science into Practice. (Longman Higher Education, ISBN 0582455820

Websites

- http://www.defra.gov.uk Department for Environment, Food and Rural Affairs
- http://www.wales.gov.uk Welsh Assembly Government
- http://www.scotland.gov.uk Scottish Executive Environment and Rural Affairs Department
- http://www.dardni.gov.uk Department of Agriculture and Rural Affairs (Northern Ireland)
- http://www.fawc.org.uk Farm Animal Welfare Council
- http://www.mdc.org.uk Milk Development Council
- http://www.mlc.org.uk Meat and Livestock Commission
- http://www.beefandlamb.ahdb.org.uk Beef and lamb levy board
- www.redtractor.org.uk

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	**E: business@cityandguilds.com**

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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