Level 2 Technical Award in Land Based Studies (0170-001/501)

Part of 0170-20

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Guide to the examination

Who is this document for?

This document has been produced for centres who offer **City & Guilds Level 2 Award in Land Based Studies.** It gives all of the essential details of the qualification's external assessment (exam) arrangements and has been produced to support the preparation of candidates to take the exam/s.

The document comprises four sections:

1. **Details of the exam**. This section gives details of the structure, length and timing of the exam.
2. **Content assessed by the exam.** This section gives a summary of the content that will be covered in each exam and information of how marks are allocated to the content.
3. **Guidance.** This section gives guidance on the language of the exam, the types of questions included and examples of these, and links to further resources to support teaching and exam preparation.
4. **Further information.** This section lists other sources of information about this qualification and City & Guilds Technical Qualifications.

1. Details of the exam

External assessment

City & Guilds Technical qualifications have been developed to meet national policy changes designed to raise the rigour and robustness of vocational qualifications. These changes are being made to ensure our qualifications can meet the needs of employers and Higher Education. One of these changes is for the qualifications to have an increased emphasis on external assessment This is why you will see an external exam in each of our Technical qualifications.

An external assessment is an assessment that is set and/or marked by the awarding organisation (ie externally). All City and Guilds Technical qualifications include an externally set and marked exam. This must be taken at the same time by all candidates who are registered on a particular qualification. We produce an exam timetable each year. This specifies the date and time of the exam so you can plan your delivery, revision and room bookings/PC allocation in plenty of time.

The purpose of this exam is to provide assurance that all candidates achieving the qualification have gained sufficient knowledge and understanding from their programme of study and that they can independently recall and draw their knowledge and understanding together in an integrated way. Whilst this may not be new to you, it is essential that your learners are well prepared and that they have time to revise, reflect and prepare for these exams. We have produced a Teaching, Learning, and Assessment guide that is you should refer to alongside the present document *(Teaching, Learning and Assessment Guide).* If a learner does not pass the exam at their first attempt, there is only one opportunity to resit the exam, so preparation is essential.

Exam requirements of this qualification

The exam is graded and a candidate must achieve at least a Pass grade in order to be to be awarded the qualification. (In addition to the exam, a synoptic assignment must also be completed and passed. You can find full details of the synoptic assignment in the *Qualification Handbook* and the *Synoptic Assessment Guide* -please see the links at the end of this document).

When does the exam take place?

This is exam is offered either on-demand online through City & Guilds' computer-based testing platform or as paper-based on **two** fixed dates.

The on-demand online test can be taken at any time during the academic year.

Paper-based dated exams are offered on **two** fixed dates in February/March and May/June. The exact dates are published at the start of the academic year in the *Assessments and Exam Timetable* *http://www.cityandguilds.com/delivering-our-qualifications/exams-and-admin*.
At the start of the programme of study, centres should know when the exam will be taking place and allocate teaching time accordingly in order to effectively plan teaching and exam preparation.

Section 2 of this document gives a summary of the content that needs to be covered in order to prepare learners for the exam and full details of this are given in the Qualification Handbook.

Form of exam

The exam for this qualification can be taken either on paper (0170-501) or online (0170-001).

Can candidates resit the exam?

Candidates may resit the exam once only. If a candidate fails the exam both on the first attempt and when resitting it, that candidate has failed the qualification and cannot achieve it in that academic year.

How the exam is structured

Each exam has a total of 60 marks available and is made up of:

- approximately 10-12 short answer questions;
- 1 extended response question.

Multiple choice and short answer questions are used to confirm **breadth of knowledge and understanding**.

The extended response question is to allow candidates to demonstrate **higher level and integrated understanding** through written discussion, analysis and evaluation. This question also ensures the exam can differentiate between those learners who are 'just able' and those who are higher achieving.

More details about and examples of question types are given in Section 3 of this document.

Assessment Objectives

The exams are based on the following set of assessment objectives (AOs). These are designed to allow the candidate's responses to be assessed across the following three categories of performance:

- **Recollection** of knowledge.
- **Understanding** of concepts, theories and processes.
- **Integrated application** of knowledge and understanding.

In full, the assessment objectives covered by the exam for this qualification are:

Assessment objective ***The candidate..***	**Mark allocation (approx %)**
AO1 **Recalls knowledge** from across the breadth of the qualification	23%
AO2 2 **Demonstrates understanding** of concepts, theories and processes from a range of learning outcomes.	57%
AO4 **Applies knowledge, understanding and skills** from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	20%

Booking and taking the exam

All assessments for City & Guilds Technical Exams must be booked through Walled Garden. There is a deadline for booking exams, synoptic assessments and any other centre marked assessments, please refer to the time line to check these dates.

The exam must be taken under the supervision of an invigilator who is responsible for ensuring that it is conducted under controlled conditions. Full details of the conditions under which the exam must be taken can be found in the Joint Council for Qualifications (JCQ) document, *Instructions for Conducting Examinations (ICE)*.

Special consideration

Candidates who are unable to sit the exam owing to temporary injury, illness or other indisposition at the scheduled time may qualify for special consideration. This is a post-examination adjustment that can, in certain circumstances, be made to a candidate's final grade. The Joint Council for Qualifications' guide to the special consideration process can be found at www.jcq.org.uk.

To make a request for special consideration, please contact: policy@cityandguilds.com

Access arrangements

Access arrangements are arrangements that allow candidates with particular requirements, disabilities or temporary illness to take assessments, where appropriate, using their normal way of working. The Joint Council for Qualifications document, *Access Arrangements and Reasonable Adjustments* gives full details and can be downloaded here.

For further information and to apply for access arrangements please see:

Access arrangements - When and how applications need to be made to City & Guilds

Applying for access arrangements on the Walled Garden

2. Content assessed by the exam

The exam assesses:

- **Unit 201: Exploring the use of land**
- **Unit 202: Application of science in the land-based sector**
- **Unit 203: Application of technology in the land-based sector**

Each exam assesses a sample of the content of these units. This means that a single exam will **not** cover 100% of the unit content. The full range of content will be assessed over a number of examination series. Details of the coverage of a particular exam paper will **not** be released in advance of the exam itself. Centres should **not** make assumptions about what will be assessed by a particular exam based on what has been covered on previous occasions. In order to be fully prepared for the exam, learners **must** be ready to answer questions on **any** of the content outlined below.

The table below provides an overview of how the qualification's Learning Outcomes are covered by each exam and the number of **marks** available per Learning Outcome (ie **not** the number of *questions* per Learning Outcome). In preparing candidates for the exam, we recommend that centres take note of the number of marks allocated to Learning Outcomes and to assign teaching and preparation time accordingly.

In preparing candidates for the exam, centres should refer to the Qualification Handbook which gives full details of each Learning Outcome.

The following is a summary of only that qualification content which is assessed by the exam and **not** a summary of the full content of the qualification.

Unit	Learning outcome	Topics	Number of marks
201 Exploring the use of land	L01 Understand different uses of land and associated industries	1.1 Land use and management 1.2 Factors affecting land use and management 1.3 Land based and associated industries	14
	LO2 Understand how land-use has changed	2.1 Chronological review of land-use 2.2 Challenges and conflicts	
202 Application of science in the land-based sector	LO1 Understand the structure and function of plants	1.1 Plant cells and the structure of monocotyledons and dicotyledons 1.2 Process of plant growth to maturity	24

	LO2 Use scientific principles for successful propagation of plants and crops	2.1 Nutritional requirements of plants 2.2 Care for selected plants 2.3 Pest and diseases in plants	
	LO3 Understand requirements of nutrition and growth for animals	3.1 Structure and function of ruminant and non-ruminant digestive and excretory systems 3.2 Functions and sources of nutrients 3.3 Plan diets for selected animals according to life stage and nutritional needs	
	LO4 Use scientific principles to monitor the health and wellbeing of animals	4.1 Safe handling of animals and keep routine records 4.2 Signs of normal and abnormal health in animals 4.3 Common diseases, signs, prevention and treatment	
203 Application of technology in the land-based sector	LO1 Understand the role technology plays in the management of the Land Based Industries	1.1 Roles for technology 1.2 Management of technology for the land based industries	10
	LO2 Understand the range of technology used within land based industries	2.1 Range of technology and design features	
	LO3 Understand how science and innovation has influenced technology development	3.1 Innovation 3.2 Scientific principles	
		Total marks for sections:	48 marks
		Integration across units*:	12 marks
		Total marks for exam:	**60 marks**

** Integration across units.* These marks relate to Assessment Objective 4). These marks are awarded to differentiate between levels of performance by candidates taking the exam. The marks are given for how well a candidate has applied their knowledge, understanding and skills from across the units that make up the qualification in an integrated way to meet the requirements of the exam questions.

3. Guidance

Vocabulary of the exam: use of 'command' verbs

The exam questions are written using 'command' verbs. These are used to communicate to the candidate the type of answer required. Candidates should be familiarised with these as part of their exam preparation.

The following guidance has been produced on the main command verbs used in City & Guilds Technicals exams.

A more detailed version of this table, which also includes the command verbs used in the assignments is published in *City & Guilds Technical Qualifications Teaching, Learning and Assessment* guide.

Command verb	Explanation and guidance
Analyse	Study or examine a complex issue, subject, event, etc in detail to explain and interpret, elements, causes, characteristics etc
Calculate	Work out the answer to a problem using mathematical operations
Compare (…and contrast) (or ***describe*** the similarities/differences)	Consider and describe the similarities (and differences) between two or more features, systems, ideas, etc
Define	Give the meaning of, technical vocabulary, terms, etc.
Describe	Give a detailed written account of a system, feature, etc **(..the effect of…on…)** the impact, change that has resulted from a cause, event, etc **(..the process..)** give the steps, stages, etc
Differentiate between	Establish and relate the characteristic differences between two or more things, concepts, etc
Discuss	Talk/write about a topic in detail, considering the different issues, ideas, opinions related to it
Distinguish between	Recognise and describe the characteristic differences between two things, or make one thing seem different from another
Evaluate	Analyse and describe the success, quality, benefits, value, etc (of an end product, outcome, etc)
Explain	Make (a situation, idea, process, etc) clear or easier to understand by giving details, **(..how..)** Give the stages or steps, etc in a process, including relationships, connections, etc between these and causes and effects.
Give example(s) illustrate/	Use examples or images to support, clarify or demonstrate, an explanation, argument, theory, etc

Give a rationale	Provide a reason/reasons/basis for actions, decisions, beliefs, etc
Identify	Recognise a feature, usually from a document, image, etc and state what it is
Justify	Give reasons for, make a case for, account for, etc decisions, actions, conclusions, etc, in order to demonstrate why they suitable for or correct or meet the particular circumstances, context
Label	Add names or descriptions, indicating their positions, on an image, drawing, diagram, etc
List	Give as many answers, examples, etc as the question indicates (candidates are not required to write in full sentences)
Name	Give the (technical) name of something
Propose	Present a plan, strategy, etc (for consideration, discussion, acceptance, action, etc).
Select	choose the best, most suitable, etc, by making careful decisions
State	Give the answer, clearly and definitely
Summarise	Give a brief statement of the main points (of something)

Question types

The following explains, and gives examples of, types of questions used in City & Guilds Technical exams. In preparing candidates to take the exam, it is recommended that you familiarise them with the requirements of each question type so that they can be effective and make best use of the time available when sitting the exam.

- An effective candidate will gauge the type and length of response required from the question and the number of marks available (which is given for each question on the exam paper).
- Short answer questions may not require candidates to write in complete sentences. Extended response questions will require a more developed response.
- Candidates should read the exam paper before attempting to answer the questions and should allocate time proportionate to the number of marks available for each question or section.

Question type:	Example question:
Short answer questions (restricted response) These are questions which require candidates to give a brief and concise written response. The number of marks available will correspond to the number of pieces of information/examples and the length of response required by the question.	List the **four** main components of soil. (4 marks) **Answer:** • Minerals (1 mark) • Water (1 Mark) • Organic Matter (1 mark) • Air (1 mark)

Structured Response Questions
These are questions that have more than one part (eg a), b), etc.). The overall question is made up of linked, short answer questions which move the candidate through the topic in a structured way. For example, the question will usually start with a 'recall'/'state'/ 'describe' question followed by an 'explain' to draw out understanding of the topic. They usually have a shared introductory 'stem', and the number of marks may increase through the question.

A successful dairy production unit on a farm is dependent on careful management of the diet of dairy cows and an understanding of how their digestive system works.

a) State the type of digestive system of dairy cows. (1 mark)
b) State two types of stored forage used for dairy cows. (2 marks)
c) Explain how food is digested in cattle. (4 marks)

Answer:
Ruminant digestive system (1 mark)
Two from: (Max 2 marks)

- forage maize
- grass or maize silage
- whole crop cereal silage
- hay
- straw
- other sources of forage acceptable at discretion.

Answers should incorporate 4 key areas of explanation and demonstrate understanding of how the ruminant system works:
ruminants have four stomach chambers (1)
cellulose/fibre broken down by microbes in Rumen (1)
microbes grow and multiply to form microbial protein within the reticulum and omasum (1)
microbial protein then digested in abomasum (1)
microbial protein then absorbed in small intestine thus becoming a source of protein for the animal (1)
Accept any other suitable answer

Extended response questions
Extended response questions are those that require the candidate to write a longer written response using sentences and paragraphs. These usually require candidates to discuss, explain, etc. a topic in some detail. The question is often based on a short case study, scenario or other prompt. The level of detail should be gauged from the question and the number of marks available.

The correct choice and application of fertiliser is important in land based businesses in relation to plant growth and the environment. Discuss how science and the technology used in spreading fertilizer can boost production and efficiency while reducing risk to the environment. (12 marks).

Answer:
Indicative content:

- Organic fertiliser vs chemical (inorganic) fertiliser – Organic is slower release as it breaks down, not easily leached, unknown initial nutrient value; Chemical fertiliser – known nutrient value, instant release of nutrients, easily leached for soil, can lead to build up of toxins in soil, potential for eutrophication. Liquid fertilizers.
- Manual hand spreaders, tractor mounted spreaders, organic manure spreaders, rotary or broadcast spreading of fertiliser, pneumatic boom spreader, hydroponic systems.
- Scale of equipment – larger equipment covering more area in a short period of time.
- Technology – RTK units and use of GPS for precision application of fertiliser – less waste, reduced risk of over fertilisation causing eutrophication/harm to environment, maximising use of land.
- Use of fertiliser to increases rate of plant growth and crop yield related to competitiveness in market.
- Pre testing of soils to determine amount of fertiliser required.

Band 1: 1 – 4 marks

Basic discussion with minimal range of technology use and limited relevance to impact on crop growth relating to production levels. To access the higher marks in the band, the response will make minimal links to science and the environment with attempts to make recommendations or conclusions.

Example answer

Technology is better for speeding up growth. It's a lot easier than doing it yourself but there are risks to technology for example they are sometimes not reliable because they can break at times and that can slow down the growth and producing more plants. GPS and RTK Units means that farmers now use computers to make application very accurate.

All of this helps farmers to get better quality crops to get the best price, keep their profits up and be competitive when supermarkets are working hard to get the farmer's produce as

cheaply as possible because it is very competitive for farmers.

Band 2: 5 – 8 marks

Range of technology discussed with clear links made to impact on plant growth and production, including efficiency of costs and some reference to environmental sustainability. To access the higher marks in the band, the response will be justified and balanced with relevant examples, recommendations or conclusions that are mostly supported.

Example answer

Science and technology used in spreading fertilizer can boost production and efficiency whilst reducing risk to the environment because the technology could be like a computer, a tractor, these things will stop the environment of becoming at risk it stops the pollution but if you did it by hand you would be causing risk to the environment, like the fertilizer would go in the air and make pollution. Fertilizer can boost production because it would be a lot quicker by using the equipment and technology rather than taking ages in the process of doing it by hand so you would attract more people because of how much you are producing and how fast you are. This would help with the food crops because, they are most important to humans and animals. It may cost a lot for the equipment and technology which would give the farmer more money with technology. The fertiliser is used which could have a lot of chemicals inside of it or it could be non-chemical.

Band 3: 9 – 12 marks

Detailed description and comparison of appropriate technology available for use with clear relevant links to even application of fertiliser and crop yield; reference to cost effectiveness of technology and reduction of waste; reduction of risk of over fertilisation and related impact on the environment; sound recommendations made across technology types, which are justified. To access the higher marks in the band, the response will be well balanced with recommendations made that are fully justified and conclusions that are fully supported.

Example answer

Farms are getting bigger and it is difficult to do it by hand. Tractors and fertiliser spreaders mean that the farmer can apply fertiliser to larger areas of crops quicker and at the correct time to match what the crop needs. There is a large range of equipment available. Manual hand spreaders for horticultural applications (eg lawns), tractor mounted spreaders, organic manure spreaders, rotary or broadcasting machinery (trailed or mounted), pneumatic boom spreader, liquid sprayers and hydroponics. There are rotary or broadcasting styles of equipment available. Also, application is very accurate which means no wastage, eutrophication and/or no pollution from excess fertiliser entering waterways. Using machinery and accurate application can help to cut costs and increase profits. Bigger equipment can be used so the field areas are covered quicker and that means the application can be made more timely (avoiding bad weather) and farms can get bigger and use less labour. Additionally, RTK Units and GPS Systems have made it much easier for farmer to be incredibly accurate when they apply chemical/inorganic fertilisers which are expensive and have the potential to pollute if over applied.

It is important to realise there is choice in types of fertiliser. Farmers can use either chemical/inorganic fertilisers or organic materials. An example of organic fertilisers may be those products produced on the farm (such as cow muck). Using some organic materials means you reduce costs but possibly reduce production as the muck is not so concentrated and consistent for the crop. Other organic fertilisers used such as compost produced from garden waste can be more consistent as it is mixed and prepared by companies or larger businesses who take in waste from small gardening businesses and then professionally prepare it for sale.

The science of crop growth and fertiliser application is important because it helps farmers to understand how a crop grows and what it needs to grow at its best and maximise yield. It also means the farmer to can make full use of the new technology that is coming along to help. The top farmers regularly test their soils (pH and nutrients etc) to then be able to work out how much and what type of fertiliser they should apply. It will also help them decide which is the best equipment for the work.

Fertilisers are very important to farmers because they help the crops to grow quicker and bigger and farmers get more grain and yield from the crops. There are different types of fertiliser. Organic or Chemical. Organic fertilisers are more natural which means they are better for the soil and work over a longer time. However chemical fertilisers can be either solid or liquid and act more quickly. They can be toxic to the soil if left for a long time. Organic fertilisers such as cow muck can be very variable in quality and nutrient content which does not help to give an even crop. Chemical fertilisers are more predictable and using proper equipment the amount put on the field can be varied to meet the crops and soil's need.

There is a large range of equipment available to apply the different types of fertiliser from hand spreaders for small areas to tractor mounted for larger fields. Hydroponics is a new system which horticultural businesses use to put fertiliser direct to the crop through the water supplied in a sealed system which is very good for stopping pollution but is expensive to run. It is best for intensive high value crops.

Examination technique

Candidates with a good understanding of the subject being assessed can often lose marks in exams because they lack experience or confidence in exams or awareness of how to maximise the time available to get the most out of the exam. Here is some suggested guidance for areas that could be covered in advance to help learners improve exam performance.

Before the exam

Although candidates cannot plan the answers they will give in advance, exams for Technical qualifications do follow a common structure and format. In advance of taking the exam, candidates should:

- be familiar with the structure of the exam (ie number and type of questions).
- be aware of the amount of time they have in total to complete the exam.
- have a plan, based on the exam start and finish time for how long to spend on each question/section of the exam.
- be aware of how many marks are available for each question, how much they should expect to write for each question and allow most time for those questions which have the most marks available.

At the start of the exam session

At the start of the exam, candidates:

- should carefully read through the instructions before answering any questions.
- may find it helpful, where possible, to mark or highlight key information such as command words and number of marks available on the question paper.

- identify questions which require an extended written answer and those questions where all or part of the question may be answered by giving bullets, lists etc rather than full sentences.

Answering the questions

Candidates do not have to answer exam questions in any particular order. They may find it helpful to consider, for example:

- tackling first those questions which they find easiest. This should help them get into the 'flow' of the exam and help confidence by building up marks quickly and at the start of the exam.
- tackling the extended answer question at an early stage of the exam to make sure they spend sufficient time on it and do not run out of time at the end of the exam.

Candidates should avoid wasting time by repeating the question either in full or in part in their answer.

Candidates should **always** attempt every question, even questions where they may be less confident about the answer they are giving. Candidates should be discouraged however, from spending too long on any answer they are less sure about and providing answers that are longer and give more detail than should be necessary in the hope of picking up marks. This may mean they have less time to answer questions that they are better prepared to answer.

Extended answer questions

Before writing out in full their answer to extended questions, candidates may find it helpful to identify the key requirements of the question and jot down a brief plan or outline of how they will answer it. This will help clarify their thinking and make sure that they don't get 'bogged down' or provide too much detail for one part of the question at the expense of others.

Towards the end of the exam

Candidates should always set aside time at the end of the exam to read back through and review what they have written in order to make sure this is legible, makes sense and answers the question in full.

If a candidate finds they are running out of time to finish an answer towards the end of the exam, they should attempt to complete the answer in abbreviated or note form. Provided the content is clear and relevant, examiners will consider such answers and award marks where merited.

Further guidance on preparing candidates to take the exam is given in the City & Guilds publication, Technical Qualifications, Teaching, Learning and Assessment which can be downloaded free of charge from City & Guilds website.

4. Further information

For further information to support delivery and exam preparation for this qualification, centres should see:

City & Guilds

Qualification homepage: http://www.cityandguilds.com/qualifications-and-apprenticeships/land-based-services/agriculture/0170-technical-award-in-land-based-studies#tab=information
which includes:

- Qualification handbook
- Synoptic Assignment
- Sample assessments

Technical Qualifications, Resources and Support: cityandguilds.com/techbac/technical-qualifications/resources-and-support

Joint Council for Qualifications

Instructions for Conducting Examinations: www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations