

Scheme of Work

Cambridge IGCSE™
Agriculture 0600

Cambridge O Level
Agriculture 5038

For examination from 2020



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Contents

Introduction	4
1 General agriculture	7
2 Soil	9
3 Principals of plant growth.....	14
4 Crop production	18
5 Crop protection	20
6 Livestock anatomy and physiology	23
7 Livestock production and health	25
8 Pasture management.....	28
9 Livestock and crop breeding	30
10 Farm structures and tools	32

Introduction

This scheme of work has been designed to support you in your teaching and lesson planning. Making full use of this scheme of work will help you to improve both your teaching and your learners' potential. It is important to have a scheme of work in place in order for you to guarantee that the syllabus is covered fully. You can choose what approach to take and you know the nature of your institution and the levels of ability of your learners. What follows is just one possible approach you could take and you should always check the syllabus for the content of your course.

Suggestions for independent study (**I**) and formative assessment (**F**) are also included. Opportunities for differentiation are indicated as **Extension activities**; there is the potential for differentiation by resource, grouping, expected level of outcome, and degree of support by teacher, throughout the scheme of work. Timings for activities and feedback are left to the judgment of the teacher, according to the level of the learners and size of the class. Length of time allocated to a task is another possible area for differentiation.

Guided learning hours

Guided learning hours give an indication of the amount of contact time you need to have with your learners to deliver a course. Our syllabuses are designed around 130 hours for Cambridge IGCSE and O Level courses. The number of hours may vary depending on local practice and your learners' previous experience of the subject. The table below give some guidance about how many hours we recommend you spend on each topic area. It is suggested that the topics be taught to fit in with the growing seasons and production cycles of the plants and livestock being used as practical examples. The teaching times suggested below take account of the opportunities for practical activities presented by the particular subject content.

Topic	Suggested teaching time (hours / % of the course)
1 General agriculture	It is recommended that this should take about 10 hours/ 8.5% of the course.
2 Soil	It is recommended that this should take about 15 hours/ 11% of the course.
3 Principals of plant growth	It is recommended that this should take about 15 hours/ 11% of the course.
4 Crop production	It is recommended that this should take about 15 hours/ 11% of the course.
5 Crop protection	It is recommended that this should take about 10 hours/ 8.5% of the course.
6 Livestock anatomy and physiology	It is recommended that this should take about 13 hours/ 10% of the course.
7 Livestock production and health	It is recommended that this should take about 15 hours/ 11% of the course.
8 Pasture management	It is recommended that this should take about 10 hours/ 8.5% of the course.

Topic	Suggested teaching time (hours / % of the course)
9 Livestock and crop breeding	It is recommended that this should take about 12 hours/ 9.5% of the course.
10 Farm structures and tools	It is recommended that this should take about 15 hours/ 11% of the course.

Resources

This scheme of work includes website links providing direct access to internet resources. Cambridge is not responsible for the accuracy or content of information contained in these websites. Additionally, the scheme of work includes links to a set of resources developed by teachers and included with this document. These have been produced from the perspective of teaching agriculture in the United Kingdom, so it is expected that they will be adapted for use in your own particular circumstances, where agriculture and the challenges it faces may be significantly different. The resources have been produced in a plain design to allow you to easily alter them for your own teaching programme should you wish to use them. Other suggested resources are listed on the School Support Hub at www.cambridgeinternational.org/support. These have not been through the Cambridge quality process, but have been found suitable for use with various parts of the syllabus by teachers.

Throughout this scheme of work, we have referred to Cambridge IGCSE Agriculture 0600 past papers. The 0600 syllabus runs parallel to the 5038 syllabus content and assessment criteria. Cambridge IGCSE and Cambridge O Level syllabuses are at the same level. In addition to reading the syllabus, teachers should refer to the updated specimen assessment materials.

Tools to support remote teaching and learning – Click [here](#) to find out about and explore the various online tools available for teachers and learners.

School Support Hub

The School Support Hub www.cambridgeinternational.org/support is a secure online resource bank and community forum for Cambridge teachers, where you can download specimen and past question papers, mark schemes and other teaching and learning resources. We also offer online and face-to-face training; details of forthcoming training opportunities are posted online. This scheme of work is available as PDF and an editable version in Microsoft Word format; both are available on the School Support Hub at www.cambridgeinternational.org/support. If you are unable to use Microsoft Word you can download Open Office free of charge from www.openoffice.org

Websites

This scheme of work includes website links providing direct access to internet resources. Cambridge Assessment International Education is not responsible for the accuracy or content of information contained in these sites. The inclusion of a link to an external website should not be understood to be an endorsement of that website or the site's owners (or their products/services).

The website pages referenced in this scheme of work were selected when the scheme of work was produced. Other aspects of the sites were not checked and only the particular resources are recommended.

How to get the most out of this scheme of work – integrating syllabus content, skills and teaching strategies

We have written this scheme of work for the Cambridge Agriculture syllabus and it provides some ideas and suggestions of how to cover the content of the syllabus. We have designed the following features to help guide you through your course.

Learning objectives help your learners by making it clear the knowledge they are trying to build. Pass these on to your learners by expressing them as 'We are learning to / about...'.

Suggested teaching activities give you lots of ideas about how you can present learners with new information without teacher talk or videos. Try more active methods which get your learners motivated and practising new skills.

Extension activities provide your more able learners with further challenge beyond the basic content of the course. Innovation and independent learning are the basis of these activities.

Formative assessment (F) is on-going assessment which informs you about the progress of your learners. Don't forget to leave time to review what your learners have learnt, you could try question and answer, tests, quizzes, 'mind maps', or 'concept maps'. These kinds of activities can be found in the scheme of work.

Past papers, specimen papers and mark schemes are available for you to download at:
www.cambridgeinternational.org/support

Using these resources with your learners allows you to check their progress and give them confidence and understanding.

Independent study (I) gives your learners the opportunity to develop their own ideas and understanding without direct input from you.

Syllabus ref.	Learning objectives	Suggested teaching activities
	temperatures by mulching of seed-beds and shading of transplanted seedlings.	<p>A simple graph to show the effect of temperature on enzyme action can be found at 2.2f Effect of Temperature on Enzymatic Reaction</p> <p>Learners can research the effect of mulching using the website https://www.rhs.org.uk/advice/profile?pid=222 (I)</p> <p>The use of shading to protect seedlings can be found at http://www.fao.org/3/AD225E/AD225E05.htm#:~:text=Shading%20reduces%20the%st%2C%20rain%20and%20sun.</p> <p>A PowerPoint which can be used with learners can be found in 2.3a Plant Nutrients and used and labelled by learners. (F)</p> <p>Extension activity: With more advanced learners, and if facilities allowed an investigation of nutrient deficiency. A description of a suitable investigation can be found at: https://www.saps.org.uk/attachments/article/83/Plant_mineral_nutrition_in_the_classroom.</p> <p>A PowerPoint presentation covering the importance of soil pH can be found at 2.3b pH in Soils along with a worksheet on how to carry out a pH test.</p>
	potassium, calcium, magnesium and sulfur (b) carry out practical soil sampling and tests	<p>Learners could brain-storm why, when taking soil samples for testing, a) there should be a <u>number of</u> samples and b) the samples should be taken randomly. Methods to take random soil samples for testing can be found at https://www.protocols.io/view/soil-sampling-and-preparation-for-soil-chemical-an-x72frqe</p> <p>A useful introduction to the nitrogen cycle can be found in the resources for 2.3c along with a printable nitrogen cycle for a self-test for learners to check their understanding (F)</p> <p>able to use with learners 2.3d Organic and Inorganic fertilisers along with a self-test. (F)</p> <p>Learners could be tasked with finding what types of organic and inorganic fertilisers are available in produce a table showing what nutrients they contain and for what crops are they applied. (I)</p> <p>or 2.3f there is a chart which shows the availability of nutrients at different pH. This can be used to showing the importance of managing pH.</p> <p>ers can be supplied with acidified soil samples and using Universal Indicator, attempt to add lime to soil.</p>
Past and specimen papers		
<p>Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)</p> <p>2.1 Soil formation Nov 2018 0600/12 Q1, Nov 2019 0600/12 Q1</p> <p>2.2 Soil types, composition, texture and temperature - Nov 2015 0600/11 Q3, Nov 2017 0600/12 Q14, Nov 2018 0600/11 Q1</p> <p>2.3 Soil fertility- Nov 2015 0600/11 Q13, Nov 2017 0600/12 Q8, Nov 2017 0600/11 Q11,</p> <p>2.4 Soil erosion and soil conservation – Nov 2016 0600/11 Q2(b), Nov 2018 0600/11 Q2(a)(b)</p> <p>2.5 Drainage and irrigation- Nov 2015 0600/11 Q8 (b), Nov 2018 0600/11 Q14(c)</p> <p>2.6 Water cycle- Nov 2020 0600/11 Q2</p>		

1 General agriculture

Syllabus ref.	Learning objectives	Suggested teaching activities
1.1 General principles of land use	<p>(a) describe different forms of land use, including different agricultural systems and farming practices (rotations, mixed farming and monoculture), forestry and aquaculture</p> <p>(b) describe and explain the ways in which the uses of land in different areas may be limited by topographical, climatic and other environmental factors.</p> <p>(c) understand that population growth leads to a need for efficient use of land and farm planning.</p>	<p>Learners view images of these different forms of agriculture and classify them into monoculture / crop rotation / mixed / forestry and aquaculture. Although this is covered later in the syllabus it would be useful to introduce here the concept of intensive and extensive agriculture.</p> <p>Watch the video on mixed farming - https://www.youtube.com/watch?v=asdPYMSWN8</p> <p>Watch the video on crop rotation - https://www.youtube.com/watch?v=cNtnAXqYw4</p> <p>A handout on crop rotation can be found in the teaching resources section for 1.1</p> <p>Coursework opportunities – Carry out weed quadrat surveys on pastures under different management systems. Collect eggs from different management systems e.g., deep litter and free range, the data collected can be used to practice skills for data analysis AO2 skill.</p> <p>Learners could produce a table giving the main features, advantages and disadvantages of each form of agriculture. (I)</p> <p>Learners can research the distribution of the different forms of agriculture within their country to see if there is a pattern to that distribution. i.e., are certain crops grown in certain areas or livestock kept in particular places and the possible reasons for this. (I)</p> <p>Coursework opportunity – Measure temperature and humidity in different microclimates.</p> <p>Learners should consider the differences between farming on sloping and flat land and how this impacts on what can be produced. If applicable to the local situation learners could also research how climate changes with seasons, altitude and with distance from the coast. The impact of temperature, rainfall and soil on crop growth can also be introduced here although these will be covered in more detail later. (I)</p> <p>Use the FAO database to research population growth and food production in different countries. http://www.fao.org/faostat/en/#country (I)</p> <p>Brain storm ideas of how food production could be increased to meet growing population with learners producing a mind map. (F)</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
1.2 Principles of agricultural economics	<p>(a) describe organic production, hydroponics and genetically modified (GM) crops and be able to discuss arguments for and against the use of GM crops and organic production</p> <p>(b) explain the principles of supply and demand, diminishing returns, opportunities and choices facing the farmer, decision-making based on understanding of economic factors.</p>	<p>Learners can watch the video on what is organic farming - https://www.youtube.com/watch?v=WhOrIUlnPo and the video on the pros and cons of organic farming - https://www.youtube.com/watch?v=QpkKW45cHaA</p> <p>Learners should be able to list the advantages and disadvantages of organic production. (F)</p> <p>If facilities allow learners could grow the same crop using organic and inorganic methods and report on the impact on yield and pest damage. If done over many years schools can build up a database of results, and comparisons of the soils of organic and inorganic plots can produce interesting results. This could form the basis of the coursework investigation.</p> <p>A GM crops presentation is to be found in the teaching resources section for 1.2</p> <p>Learners should be able to list the advantages and disadvantages of GM production and its impact on the issues raised in 1.1(c). (F)</p> <p>Learners can watch the following video to introduce the concept of supply and demand and its impact on price. https://www.youtube.com/watch?v=720uyg0Dd_M</p> <p>Learners should be able to draw simple graphs to show the impact of supply and demand on price. https://www.investopedia.com/articles/economics/11/intro-supply-demand.asp</p> <p>Learners can discuss how changing demand for a crop might affect what the farmer grows. (F)</p> <p>Learners can brainstorm all the costs that a farmer might have in producing a crop, and if the market price is fixed, how this impacts on the profit or loss a farmer makes from those crops. (I)</p> <p>The law of diminishing returns is perhaps best demonstrated in this syllabus by the example of increasing fertiliser application to a crop. See past paper 0600/12 Nov 2020 question 5.</p>
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		
1.1 General principles of land use 1.2 Principles of agricultural economics – Nov 2020 0600/11 Q1 ,		

2 Soil

Syllabus ref.	Learning objectives	Suggested teaching activities
2.1 Soil formation	(a) explain soil formation from parent material by physical, chemical and biological agents of weathering.	<p>The following website gives a good introduction to the topic suitable for learners - https://www.qld.gov.au/environment/land/management/soil/soil-explained/forms#:~:text=Parent%20materials,help%20break%20down%20parent%20material.</p> <p>Learners can also watch this video which explains weathering in simple terms. https://www.youtube.com/watch?v=x7pmsCL6Ytc</p> <p>Extension activity: This video, while going into detail on soil types which are not needed for the course, does provide a good introduction to the topic. https://www.youtube.com/watch?v=PyZHPmXp2pQ</p> <p>The following PowerPoint can be used with learners to support the teaching of this topic – https://www.slideshare.net/PreetiGhosh2/8-g-rocks-weathering-boardworks-32923152</p>
2.2 Soil types, composition, texture and temperature	<p>(a) describe soil profile in terms of topsoil, subsoil and underlying materials</p> <p>(b) describe soil texture in terms of different sizes of soil particles, sand, silt and clay</p> <p>(c) understand soil structure, including the importance of forming and maintaining a good crumb structure, the effects of humus and maintenance of organic matter in the soil, oxidation of organic matter and the</p>	<p>If time allows learners could dig a pit to look at the soil profile in the local area a profile under grassland usually works best. http://www.fao.org/tempref/FI/CDrom/FAO_Training/FAO_Training/General/x6706e/x6706e02.htm</p> <p>Learners can be introduced to this topic using the PowerPoint 2.2b Soil the stuff of life.</p> <p>Practical activity - Use the “dirty hands” test to identify soil type by touch – 2.2b Soil texture (I)</p> <p>A useful resource for teachers - http://www.soil-net.com/legacy/downloads/resources/structure_brochure.pdf</p> <p>Learners could read a newspaper article such as that at https://www.thedailystar.net/country/plough-pan-hits-crops-1363960 and then a worksheet could be devised for learners to answer questions about the article.</p> <p>An excellent resource “Super Soils” can be found at https://www.countrysideclassroom.org.uk/resources/1442. Many other resources suitable for this course can be found by registering for free at the LEAF Countryside Classroom.</p> <p>Soil capping - https://allotmentgardening.org.uk/soil-capping/#:~:text=Soil%20capping%20is%20the%20forming,pounding%20of%20the%20water%20droplets.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	<p>loss of soil structure causing capping and soil pans</p> <p>(d) describe different soil types (sandy soils, loam soils and clay soils) and their properties, including water-holding capacity and drainage</p> <p>(e) outline soil constituents in terms of mineral matter, organic matter, air, water (free or gravitational water, capillary and hygroscopic water) and living organisms (bacteria, nematodes, fungi and earthworms)</p> <p>(F) understand the influence of soil temperature on the rate of plant growth, the danger of excessive heat to young seedlings and the danger of frost to some crops, and the methods of reducing the effect of extreme</p>	<p>The PowerPoint 2.2b Soil Testing gives a more detailed description of soil types and a number of investigations that can be used with learners to reinforce their understanding of this topic. If possible, learners can bring soil samples from home to be used in the soil testing. Centres may need to change the soil type descriptions to match their local soils.</p> <p>Coursework opportunity - Investigations for learners can be found in the 2.2d resource section.</p> <p>Learners should be able to label a soil crumb diagram showing the position of sand, silt and clay humus, water and air. See 2.2e soil crumb resource.</p> <p>A description of the different forms of water found in soil can be found on this web site – http://pinova-meteo.com/en_UK/blog/water-in-soil#:~:text=Porous%20space%20is%20a%20natural,water%20in%20a%20short%20period.</p> <p>The importance of soil organisms can be found at - https://www.soils4teachers.org/biology-life-soil#:~:text=Living%20organisms%20present%20in%20soil,organisms%20such%20as%20burrowing%20rodents.</p> <p>Factors affecting soil temperature can be found in the online resource: https://horticulture.tekura.school.nz/soils/soils-2/ht1032-soils-2-study-plan/soil-temperature/#:~:text=Soil%20temperature%20is%20influenced%20by%3A%20climate%2C%20season%2C%20aspect%2C,also%20slower%20to%20cool%20down</p> <p>Investigations into the impact of temperature on growth and germination can be found at https://www.scienceprojects.org/how-does-the-temperature-affect-the-plant-growth/</p> <p>The general effects of temperature on plants can be found in the resource 2.2f Effect of temperature on plants.</p> <p>A simple graph to show the effect of temperature on enzyme action can be found at 2.2f Effect of Temperature on Enzymatic Reaction</p> <p>Learners can research the effect of mulching using the website https://www.rhs.org.uk/advice/profile?pid=323 (I)</p> <p>The use of shading to protect seedlings can be found at http://www.fao.org/3/AD225E/AD225E05.htm#:~:text=Shading%20reduces%20the%20temperature%20of,against%20fro st%2C%20rain%20and%20sun.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	temperatures by mulching of seed-beds and shading of transplanted seedlings.	
2.3 Soil fertility	<p>(a) explain the importance of the following major nutrients to soil fertility and describe the signs and effects of their deficiency in plants: major nutrients – compounds of nitrogen, phosphorus, potassium, calcium, magnesium and sulfur</p> <p>(b) carry out practical soil sampling and tests for soil pH</p> <p>(c) describe the nitrogen cycle and its importance to soil fertility</p> <p>(d) explain the importance of legumes and the use of organic fertilisers (manure and compost) in maintaining good soil structure and fertility</p> <p>(e) describe the use of inorganic fertilisers</p>	<p>A PowerPoint which can be used with learners can be found in 2.3a Plant Nutrients along with a sheet which can be used and labelled by learners. (F)</p> <p>A PowerPoint presentation covering the importance of soil pH can be found at 2.3b pH in Soils along with a worksheet on how to carry out a pH test.</p> <p>Learners could brain-storm why, when taking soil samples for testing, a) there should be a number of samples and b) the samples should be taken randomly. Methods to take random soil samples for testing can be found at https://www.protocols.io/view/soil-sampling-and-preparation-for-soil-chemical-an-x72frqe</p> <p>A useful introduction to the nitrogen cycle can be found in the resources for 2.3c along with a printable nitrogen cycle for learners to keep, and a self-test for learners to check their understanding. (F)</p> <p>A PowerPoint is available to use with learners 2.3d Organic and Inorganic fertilisers along with a self-test. (F)</p> <p>Extension activity: Learners could be tasked with finding what types of organic and inorganic fertilisers are available in their local areas and produce a table showing what nutrients they contain and for what crops are they applied. (I)</p> <p>In the resources area for 2.3f there is a chart which shows the availability of nutrients at different pH. This can be used to introduce this topic showing the importance of managing pH.</p> <p>If facilities allow learners can be supplied with acidified soil samples and using Universal Indicator, attempt to add lime to try and achieve a neutral soil.</p> <p>Extension activity: For more advanced learners an article on how fertilisers affect soil pH - https://www.croptonutrition.com/resource-library/fertilizers-and-soil-acidity (I)</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	<p>(limited to one example each of a fertiliser containing predominantly phosphorus and predominantly potassium and one example of a compound fertiliser) in maintaining soil fertility</p> <p>(F) explain how fertilising practices and liming can affect soil pH.</p>	
2.4 Soil erosion and soil conservation	(a) describe types of soil erosion, their causes, agents, prevention and control.	<p>https://youmatter.world/en/definition/soil-erosion-degradation-definition/</p> <p>An experiment for learners to carry out can be found at https://www.lapappadolce.net/science-experiment-on-soil-erosion/</p>
2.5 Drainage and irrigation	<p>(a) describe drainage as movement of gravitational water down through the soil and understand the drainage of waterlogged land by means of ditches and the loss of plant nutrients due to leaching</p> <p>(b) understand the effects of poor drainage on soil organisms and root respiration</p>	<p>A detailed description of field drainage for more advanced learners can be found at https://projectblue.blob.core.windows.net/media/Default/Imported%20Publication%20Docs/Field%20drainage%20guide%200818.pdf. Teachers could produce worksheets, appropriate to their learners, based on this resource.</p> <p>An investigation to demonstrate leaching can be found in the resources section for 2.5a.</p> <p>The impact of poor drainage can be found at https://www.rhs.org.uk/advice/profile?PID=235</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	(c) explain the need for irrigation and describe methods of irrigation with the effects on crop yield and quality (details of irrigation programmes for individual crops and of equipment specification are not required).	<p>A graph showing the effects of irrigation and inputs on yield can be found at http://www.fao.org/3/y3918e/y3918e10.htm. Teachers can use this to give learners practice at interpreting what the graph shows in practice for similar exam questions.</p> <p>Types of irrigation can be found at https://www.cdc.gov/healthywater/other/agricultural/types.html</p>
2.6 Water cycle	(a) describe and understand the significance of the water cycle and ground water resources.	<p>A simple water cycle diagram can be found at https://water.usgs.gov/edu/watercycle-kids-adv.html.</p> <p>A video demonstrating the water cycle is available at https://www.youtube.com/watch?v=al-do-HGulk</p>
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		
2.6 Water cycle- Nov 2020 0600/11 Q2		

3 Principals of plant growth

Syllabus ref.	Learning objectives	Suggested teaching activities
3.1 Movement of materials through plants	<p>(a) describe the distribution and function of root tissues and the structure and function of root hairs</p> <p>(b) explain the absorption of plant requirements from the soil, including the principles of diffusion, osmosis, the passage of water and dissolved mineral salts through vascular tissues</p> <p>(c) explain how the structure of a leaf is related to function (cellular detail is not required)</p> <p>(d) outline gas exchange by diffusion through the stomata</p> <p>(e) describe photosynthesis in terms of carbon dioxide, water, light and chlorophyll leading to the synthesis of</p>	<p>Learners should research the four primary functions of roots and in each case describe how the root is adapted to perform that function. (I)</p> <p>If bean seeds are germinated on damp paper in a warm environment, learners can see the root hairs clearly.</p> <p>A short video explains how roots absorb their requirements https://www.britannica.com/science/root-plant the main functions of plant roots are also covered in the article.</p> <p>A suitable video can also be found at https://www.youtube.com/watch?v=JQvdXX7hGqI</p> <p>A suitable video to introduce this topic can be found at https://www.youtube.com/watch?v=pFaBpVoQD4E</p> <p>A PowerPoint presentation is available in the resources section for 3.1e which includes activities for learners to test their understanding. (F)</p> <p>Teachers could make cards with the one card for each of the raw materials, products and symbols in the formulae for photosynthesis which learners then have to put in order to check their understanding. (F)</p> <p>A suitable video to revise some of the previous sections and introduce the remaining topics can be found at https://www.youtube.com/watch?v=9FTafxnbwHQ</p> <p>The different roles and structure of phloem and xylem tissue can be found at https://ib.bioninja.com.au/higher-level/topic-9-plant-biology/untitled/xylem-versus-phloem.html</p> <p>A sheet is available which shows the main root storage organs at https://ib.bioninja.com.au/higher-level/topic-9-plant-biology/untitled/storage-organs.html</p> <p>In addition, it is recommended that learners test a slice of Irish potato or sweet potato with iodine to demonstrate the presence of starch.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	<p>carbohydrates and the production of oxygen</p> <p>(F) describe the distribution and function of tissues in a stem (dicotyledon only)</p> <p>(g) define the term <i>translocation</i> as the movement of synthesised food to storage organs and explain the principles of modification of different parts of plants to form food storage organs and the types of food materials stored</p> <p>(h) explain transpiration in terms of the transpiration stream, loss of water by evaporation and diffusion of water vapour through stomata</p> <p>(I) describe the effects of temperature, humidity, wind and light intensity on the rate of transpiration.</p>	<p>Learners can be encouraged to discuss what are the best weather conditions to dry washing dry air or humid, cold air or warm, a windy day or a still day? (I)</p> <p>Extension activity: If facilities allow, experiments can be done to measure the effects of different environmental conditions on transpiration. A more advance investigation using a potometer is demonstrated at https://www.youtube.com/watch?v=gXocZZDDPaw</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
3.2 Reproduction in plants	<p>(a) define the term <i>sexual reproduction</i></p> <p>(b) describe the structure and functions of the flowers of a maize plant and of a bean plant</p> <p>(c) define the term <i>pollination</i></p> <p>(d) describe the process of fertilisation in a named plant</p> <p>(e) describe how seeds and fruits are dispersed and explain the importance of dispersal in relation to weed control</p> <p>(F) describe asexual reproduction from stem tubers (e.g., Irish potato and yam) and from stem cuttings (e.g., sweet potato, cassava and sugar cane).</p>	<p>It is suggested that learners start this unit by discussing the differences between sexual and asexual reproduction rather than treating them as separate topics. The key differences can be found in the resources section for 3.2a.</p> <p>A simple video explaining the differences can be found at https://www.youtube.com/watch?v=LgLkt02HI9s</p> <p>Diagrams of insect and wind pollinated flowers can be found in the resources for 3.2b</p> <p>Learners can be asked to produce a table to show the differences between wind pollinated and insect pollinated flowers. A blank table can be found in the resources for 3.2b. (F)</p> <p>Extension activity: If available, learners can dissect and, using Sellotape to cover them, mount labelled examples of insect and wind pollinated flowers in their workbooks. (I)</p> <p>A PowerPoint presentation can be found in the resources for 3.2c and a short video at https://www.youtube.com/watch?v=Smb5ZbykWQk</p> <p>An animation to demonstrate pollination and fertilisation can be found at https://www.youtube.com/watch/iE8eMLbuEJs.</p> <p>The main methods of seed dispersal can be found at https://www.britannica.com/list/falling-far-from-the-tree-7-brilliant-ways-seeds-and-fruits-are-dispersed</p> <p>Learners can be encouraged to collect a range of seeds and fruit and try and decide from their appearance how those seeds are spread. (I)</p> <p>Learners can be encouraged to brainstorm ideas as to how weeds can find their way into growing crops.</p> <p>Ideally learners should be growing examples of plants produced from stem tubers and stem cuttings as part of the practical aspect of this course.</p> <p>If this is not possible learners can produce a set of instructions describing how these two types of crop are grown. (F)</p>
3.3 Germination	<p>(a) describe seed structure and the germination of maize and bean (or another legume) and understand the</p>	<p>The PowerPoint in the resource area for 3.3. covers the parts of a seed and the general conditions needed for germination.</p> <p>Germination in both beans and Maize can be found at https://www.britannica.com/science/germination</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	conditions required for germination.	
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		

4 Crop production

Syllabus ref.	Learning objectives	Suggested teaching activities
4.1 Land preparation	(a) describe land preparation by stumping and clearing and soil preparation by primary and secondary cultivations by hand or machine (e.g., ploughing or digging, harrowing or raking).	<p>Coursework opportunity – These units provide the ideal opportunity for learners to demonstrate many of the skills required as part of the practical coursework exercises.</p> <p>All work carried out should be carefully recorded so that it can be used as evidence submitted for moderation. (Please refer to the coursework handbook for details)</p>
4.2 Cultivation of cash crops	<p>(a) name the main types of crop found locally (legumes, roots and tubers, edible fruits and cereals) and their products.</p> <p>(b) describe in detail the cultivation of one crop of local importance in relation to:</p> <ul style="list-style-type: none"> • soil and climatic requirements • soil preparation • sowing or planting time and method • choice of suitable cultivars • seed rate and spacing • rates of application of fertiliser and manure 	<p>Learners could produce a handbook for visitors to their area, with illustrations and descriptions of the different crops grown locally and what those crops are used for. (I)</p> <p>Ideally learners should be involved in the cultivation of their specialist crop.</p> <p>An illustrated diary using the headings for this unit should be kept. This work can also be used to provide evidence for the practical coursework. (F)</p> <p>Coursework opportunities – A good investigation is comparing maize grown in blocks and in rows, also investigating the effect of raising or lowering pH on a growing crop or using organic and inorganic fertilisers.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	<ul style="list-style-type: none"> • prevention and control of common pests, weeds and diseases • recognition of crop maturity • harvesting, yield and storage • record keeping (including a diary of events and production). 	
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		
4.1 Land preparation - Nov 2020 0600/11 Q10		

5 Crop protection

Syllabus ref.	Learning objectives	Suggested teaching activities
5.1 Weed control	<p>(a) identify one named local weed species of a crop and describe its harmful effects and the mode of spread</p> <p>(b) explain methods of weed control including cultural, mechanical and chemical methods.</p>	<p>Learners can collect samples of a suitable local weed which can then be pressed to form part of a classroom display. Details of how to do this can be found at https://www.rhs.org.uk/science/conservation-biodiversity/conserving-garden-plants/rhs-herbarium/pressing-and-collecting-samples</p> <p>The poster featuring the weed can be added to with details of how the weed spreads, how it harms the crop and the different ways the weed can be controlled.</p> <p>A discussion of the reasons for weed control and the different methods used to control weeds can be found at https://pasture.io/farm-diseases-pests-weeds/control</p> <p>There is a PowerPoint to support this unit “What helps them grow” in the resource section for 5.1</p> <p>Coursework opportunity - Practical exercises could include using different methods of weed control amongst growing crops.</p>
5.2 Pest control	<p>(a) describe the life cycle, effect and method of spread of one pest from each of the following:</p> <ul style="list-style-type: none"> • biting and chewing pests (e.g. grasshoppers, locusts, termites, leaf miners and beetles) • piercing and sucking pests (e.g. aphids, Bagrada bugs, mealy bugs and scale insects) • boring pests (e.g. weevils, stalk borer and American 	<p>A good website with details of a range of pests and diseases can be found at https://infonet-biovision.org/plant_pests</p> <p>Examples of plant pests can be found in the PowerPoint - Pests of Plants in the resource section for 5.2</p> <p>If pests damage the crop’s learners are involved in growing, this can provide an opportunity to look at the pests and the damage they do more closely and investigate the effectiveness of different methods of control.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	<p>bollworm (<i>Helicoverpa armigera</i>)</p> <p>(b) name and describe the mode of action of chemical controls for pests including contact pesticides and systemic pesticides and understand the appropriate use of these pesticides in controlling pests in the groups listed above</p> <p>(c) describe biological and biotechnical methods of controlling pests</p> <p>(d) describe methods of cultural pest control including rotation and catch cropping.</p>	<p>It is suggested that learners research the different methods of pest control required by the syllabus. A table for learners to collate their findings is included in the resource section for 5.2 (I)</p> <p>Suitable web sites for learner's research include –</p> <p>https://www.canna-uk.com/how_control_pests_and_diseases_biological_vs_chemical</p> <p>https://www.justagric.com/natural-methods-of-pest-control/</p> <p>https://www.gardeningknowhow.com/plant-problems/pests/pesticides/systemic-pesticide-in-gardens.htm#:~:text=A%20systemic%20pesticide%20is%20any,transports%20it%20to%20its%20tissues.</p>
5.3 Disease control	<p>(a) describe the mode of infection, harmful effects, prevention and control of one named plant disease from each of the following groups:</p> <ul style="list-style-type: none"> • bacterial diseases • fungal diseases • viral diseases. 	<p>Examples of plant diseases can be found in the PowerPoint - Plant Diseases in the resource section for 5.3</p> <p>A suitable video can be used with learners https://www.youtube.com/watch?v=05ITJlgPcR0</p> <p>It is suggested that learners choose one disease that commonly occurs in their local area, or which they have found on their growing crops, and find ways to prevent this disease spreading and control it within the crop. (I)</p>
5.4 The use of farm chemicals	<p>(a) explain the importance and methods of safe</p>	<p>A suitable video to introduce this topic with learners can be found at https://www.youtube.com/watch?v=OPLRS9y4wTw</p> <p>It is suggested that learners produce a poster to show the importance of safe handling of farm chemicals. (F)</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	<p>handling of farm chemicals, including the use of specifically designed protective clothing, correct dilution and mixing, precautions before, during and after application and avoidance of pollution when cleaning spraying equipment</p> <p>(b) explain the importance of safe storage of farm chemicals to include chemicals that are toxic, (e.g., herbicides, insecticides and flammable, e.g., fuels).</p>	<p>A short video on storage can be found at https://www.youtube.com/watch?v=8Bu_6ldjOCc</p>
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		
5.1 Weed control - Nov 2020 0600/12 Q12		

6 Livestock anatomy and physiology

Syllabus ref.	Learning objectives	Suggested teaching activities
6.1 Digestion in ruminants and non-ruminants	<p>(a) describe the structure and function of the digestive system of a ruminant and a non-ruminant</p> <p>(b) describe the processes of digestion and absorption in the alimentary canals of a ruminant and a non-ruminant (reference to specific enzymes is not required).</p>	<p>Learners should learn the purposes of digestion i.e., breaking large molecules into smaller ones and insoluble molecules into soluble ones so that they can pass out of the digestive system and be carried in the blood stream to where they are needed.</p> <p>If large posters of both types of digestive systems can be produced, learners can be encouraged to test themselves by adding self-adhesive labels to the correct places on the digestive system posters. (F)</p> <p>A simple video explaining the role of the ruminant stomach compartments can be found at https://www.youtube.com/watch?v=XPGovQW7J8U and a simple description of ruminant digestion at https://extension.umn.edu/dairy-nutrition/ruminant-digestive-system#stomach-compartments-1000460</p> <p>A fact sheet with diagrams for the different digestive systems can be found at https://courses.lumenlearning.com/bccc-bio101/chapter/digestive-systems/</p> <p>Learners can be encouraged to produce a mind map of how and why the digestive systems are different and, in particular, what are the advantages of having a ruminant digestive system. (F)</p>
6.2 Sexual reproduction in mammals	<p>(a) describe the reproductive systems (male and female) of a named mammalian farm animal</p> <p>(b) describe the processes of fertilisation and birth in a named mammalian farm animal</p> <p>(c) define the terms <i>weaning</i> and <i>lactation</i> and understand the</p>	<p>there are a range PowerPoint presentations and work sheets that can be used with learners in the resource section for 6.2a</p> <p>A short video explaining the process of fertilisation at - https://www.youtube.com/watch?v=IAmPm0rlg9c</p> <p>A video of a cow giving birth can be found at - https://www.youtube.com/watch?v=WA5jAdml0sw</p> <p>There is a PowerPoint presentation in the resource section for 6.2b which takes learners through the stages of the birth of a calf , which includes diagrams of calves in the correct position and incorrect positions for birthing. Students can discuss what is wrong with each of the foetal positions.</p> <p>Students should learn simple definitions for the terms weaning and lactation such as found in the resource area for 6.2c possibly producing illustrated posters for use in the classroom.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	importance of colostrum.	<p>A sheet explaining the process of weaning a calf can be found at https://www.teagasc.ie/media/website/animals/beef/dairy-beef/Segment-002-of-Section7-Routine-calf-management-practices.pdf</p> <p>Learners should research how colostrum differs from ordinary milk and why it is important that young animals get colostrum. (I)</p> <p>Coursework opportunities – Investigation - Comparing the growth and health of calves fed on natural colostrum compared with artificial colostrum.</p> <p>Practical exercises – Bottle feeding of young offspring, preparing livestock for breeding, selecting livestock for market, weighing livestock and recording weights, preparing livestock for sale, gutting and plucking poultry, mixing animal feeds or dried colostrum or milk powder.</p>
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		
6.2 Sexual reproduction in mammals –Nov 2020 0600/12 Q8		

7 Livestock production and health

Syllabus ref.	Learning objectives	Suggested teaching activities
7.1 Livestock housing	<p>(a) describe suitable housing and living conditions for livestock</p> <p>(b) describe the care and rearing of young stock.</p>	<p>There are a range of PowerPoints and photographs to support the teaching of this unit in the resources section for 7.1a. In addition, there is a mix and match test (Housing cut and stick) for learners to check their understanding of the condition's livestock need. (F)</p> <p>In the resources section for 7.1b there are PowerPoints on calf rearing and pig breeding that can be used to support the teaching of this unit.</p>
7.2 Livestock nutrition	<p>(a) describe the nutritional requirements (including food materials, their nutritional content and signs of deficiency) and feeding practices (including the importance of a balanced ration suited to the age and the stage of development of the livestock)</p> <p>(b) outline the meaning of the terms maintenance ration and production ration</p> <p>(c) explain the importance of an adequate, clean water supply</p>	<p>A PowerPoint to support the teaching of livestock nutrition is in the resources section for 7.2a. In addition, there is a mix and match which learners can use to test themselves on their understanding following the PowerPoint.</p> <p>If possible, learners should be involved in the feeding of livestock and should be encouraged to keep a detailed diary of when the animals were fed, what they were fed, and how much. (I)</p> <p>Coursework opportunities – Comparing the growth rate of livestock given different feeds, or on different feeding systems e.g. feeding a ration compared to ad-lib feeding.</p> <p>Reference should be made to the work learners have done on care of young livestock in 6.2c at this point.</p> <p>This is covered in the PowerPoint for 7.2a</p> <p>Learners could brain storm all the problems that might occur if livestock had insufficient water or water that is dirty or contaminated. (F)</p> <p>In the resources section for 7.2c is an AO2 exercise that students can try based on the different amounts of water livestock need.</p> <p>An overview of the problems of contaminated water can be found at https://www.cdc.gov/healthywater/other/agricultural/contamination.html</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	(d) demonstrate stockmanship, including care in the handling of animals, record keeping, including a diary of events and production records.	<p>For a full understanding of this unit learners do need to be involved in the care and handling of livestock themselves, either on their own farms, the school farm or visit to commercial farms.</p> <p>Learners should research the legal requirements for keeping livestock records in their own locations as these vary from country to country. (I)</p>
7.3 Livestock health	<p>(a) recognise the signs of health and of ill-health in livestock</p> <p>(b) explain the ways in which infectious and contagious diseases are spread</p> <p>(c) explain the problems caused by parasites</p> <p>(d) explain what is meant by the terms notifiable/scheduled diseases</p> <p>(e) explain the importance of livestock hygiene and the</p>	<p>Using the line drawings of sick and healthy cattle in the resources section for 7.3a, learners can decide which is the sick and healthy animal. They should then discuss which signs they can see that show that the animal is not well, and which other signs, which cannot be seen here, might tell us that an animal is unhealthy? (F)</p> <p>Sheets in the resources section for 7.3b outline some of the causes of ill health in animals. These can be modified by teachers to include diseases more common in their location.</p> <p>Learners can brainstorm both the internal and external parasites they have heard of and suggest how each harms the livestock and the farm business.</p> <p>A resource to help the teaching of this unit can be found at https://www.gov.uk/government/collections/notifiable-diseases-in-animals#:~:text='Notifiable'%20diseases%20are%20animal%20diseases,UK%2C%20such%20as%20bovine%20TB but teachers should check for more local examples and use these wherever possible.</p> <p>A good starter for this topic might be to ask learners how they think we can prevent animals becoming sick in the first place.</p> <p>A word sort activity in the resources section for 7.3e can be used as part of the teaching of this topic. These can be modified by teachers to include diseases more common in their location.</p> <p>Coursework opportunities – Practical exercises – Identification of parasites or diseases, recognising signs of health, grading livestock, caring for livestock e.g., cleaning housing and bedding livestock.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	isolation of sick animals.	
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		
7.3 Livestock health – Nov 2020 0600/12 Q6		

8 Pasture management

Syllabus ref.	Learning objectives	Suggested teaching activities
8.1 Extensive and intensive pasture management	<p>(a) describe the vegetation of grazing lands, including grasses and legumes for grazing and bush for browsing</p> <p>(b) describe how improved pastures can be established</p> <p>(c) explain what is meant by the terms rotational grazing, paddock and zero grazing, unenclosed and enclosed grazing systems and intensive and extensive grazing</p>	<p>A possible resource for this unit can be found at https://en.wikipedia.org/wiki/Grassland which includes a general description and links to the different types of grassland found in different parts of the world.</p> <p>Coursework opportunities – Investigation – Comparing the species diversity in different pastures, comparing the productivity of different leys. Investigate the impact of different stocking rates on species diversity in the pasture. Comparing the impact of lime or different fertilizers on pasture productivity.</p> <p>Practical exercises – Sowing grass leys, testing soil moisture levels, cutting grass and spreading fertiliser.</p> <p>A flow chart can be used as a resource to aid teaching of this unit found in the resource section for 8.1b. Learners can be encouraged to brain storm what else can be used to improve pastures e.g., drainage, humus content etc, referring back to the unit on soils. (F)</p> <p>Simple descriptions of these systems can be found at:</p> <p>Rotational grazing - https://ahdb.org.uk/knowledge-library/rotational-grazing-systems-for-cattle There is also a table of the benefits of rotational grazing that teachers can modify to make an A) data response question for learners to try.</p> <p>Paddock Grazing - https://ahdb.org.uk/knowledge-library/paddock-division-for-rotational-grazing</p> <p>Zero grazing - https://www.youtube.com/watch?v=-aK1QMIBHmM&list=PUWk7CyrAY742y8nf_quBabg&index=1 Learners can watch this video and list the advantages that this farmer has found using a zero-grazing system.</p> <p>All the above are enclosed grazing systems learners should try and describe what is meant by an un-enclosed grazing system.</p> <p>Intensive or extensive grazing - Extensive grazing is that in which livestock are raised on food that comes mainly from natural grasslands, shrublands, woodlands, wetlands, and deserts. It differs from intensive grazing, where the animal feed comes mainly from artificial, seeded pastures.</p> <p>Intensive and extensive grazing – learners can be encouraged to produce a table with the features on intensive and extensive grazing compared. Many of the grazing systems above are examples of intensive systems so learners will need to research extensive systems of grazing. (I)</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	<p>(d) describe extensive management methods, including the importance of stocking rates, carrying capacity and the dangers of overstocking, bush control and the use and misuse of fire</p> <p>(e) explain how pasture utilisation can be improved by fencing and rotational grazing.</p>	<p>In the resources area for 8.1c a worksheet and crossword can be found to help learners test their own knowledge and understanding. (F)</p> <p>A resource covering most of the areas needed by this topic can be found at http://www.fao.org/agriculture/crops/thematic-sitemap/theme/spi/scpi-home/managing-ecosystems/management-of-grasslands-and-rangelands/grasslands-how/en/</p> <p>A resource on the dangers of overstocking that can be used by learners is at https://www.conserve-energy-future.com/causes-effects-solutions-overgrazing.php</p> <p>A useful explanation of the factors that can affect stocking rate and carrying capacity can be found at https://www.ag.ndsu.edu/publications/livestock/determining-carrying-capacity-and-stocking-rates-for-range-and-pasture-in-north-dakota#:~:text=Carrying%20capacity%20is%20expressed%20as,units%20grazed%20for%20one%20month.</p> <p>Having identified the problems over overstocking and the advantages of intensive systems learners can be asked to describe how fencing and rotational grazing can be used to increase the carrying capacity of pasture. (F)</p>
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)		
8.1 Extensive and intensive pasture management - Nov 2020 0600/12 Q4		

9 Livestock and crop breeding

Syllabus ref.	Learning objectives	Suggested teaching activities
9.1 Monohybrid inheritance	<p>(a) define the terms chromosome, gene, allele, homozygous, heterozygous, dominant and recessive</p> <p>(b) calculate and predict the results of simple genetic crosses involving 1:1 and 3:1 ratios.</p> <p>(c) explain the meaning of the terms genotype and phenotype and assess their importance in animal and plant breeding.</p>	<p>A PowerPoint presentation on monohybrid inheritance can be found in the resource section for 9.1</p> <p>Also, within this section, is a card sort exercise which learners can use to check their recall of genetic terms and a worksheet which learners can use to check their understanding. (F)</p> <p>Learners should work through examples of questions from past papers until they are confident in producing genetic diagrams. (F)</p> <p>Learners can discuss how genetics can be used to improve breeds of livestock and species of plants.</p>
9.2 Selective breeding in animals and plants	<p>(a) describe how breeding can improve yield, disease resistance, hardiness and appearance in livestock and in crops</p> <p>(b) understand the role of artificial selection in the production of improved varieties of animals and plants of economic importance</p>	<p>A PowerPoint presentation on artificial selection (selective breeding) can be found in the resource section for 9.2.</p> <p>A video showing an example of extreme selective breeding and Artificial Insemination can be found at https://www.youtube.com/watch?v=Nmkj5gq1cQU</p> <p>In the resource section for 9.2 along with a sheet for learners to test their understanding of the reasons for selective breeding. (F)</p> <p>A good exercise at this stage might be for learners to discuss the way plant and animal breeding might help farmers produce more food to meet the needs of a growing population (link to unit 1.1). (F)</p> <p>Coursework opportunities – Investigations – Comparing the productivity of different plant or animal breeds , comparing the growth rate of castrated and non-castrated livestock.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
	(c) understand the benefits of artificial insemination (d) understand the differences between selective crop breeding and genetically modified (GM) crops.	a video showing artificial insemination can be found at https://www.youtube.com/watch?v=Nmkj5gg1cQU A PowerPoint presentation on GM is available in the resource section for 9.2d . A video which can be used to explain GM can be found at https://www.youtube.com/watch?v=CfTnVx31pr0
Past and specimen papers		
Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F) 9.2 Selective breeding in animals and plants – Nov 2020 0600/12 Q7 (b&c)		

10 Farm structures and tools

Syllabus ref.	Learning objectives	Suggested teaching activities
10.1 Fencing	(a) describe the treatment of fencing posts, methods of fence construction, types of fence suitable for different purposes, the use of hedges and windbreaks.	<p>Learners could be asked to consider why fence posts need to be treated. A worksheet can be found in the resources section for 10.1 which learners can use to decide the type of treatment should be used. (F)</p> <p>A video showing the use of burning to protect fence posts can be found at https://www.youtube.com/watch?v=nvt2BA091XA</p> <p>Learners could be asked to discuss what a farmer needs to think about when choosing what type of fencing to use with livestock.</p> <p>Simple guides to erecting stock fencing can be found at https://www.fwi.co.uk/machinery/farm-maintenance/build-perfect-livestock-fence , https://www.conservationhandbooks.com/how-to-build-a-fence/ https://www.wikihow.com/Build-a-Livestock-Fence.</p> <p>A simple comparison of the effects of different hedges and windbreaks can be found at http://www.gcnursery.co.uk/windbreak.htm. Learners can try and explain why hedges make a better windbreak than a solid fence.</p> <p>Learners can be encouraged to think about the other advantages of hedges - for wildlife habitats and erosion prevention for example.</p> <p>Coursework opportunities – Investigation – comparing the effect of different fences and hedges on wind speed.</p>
10.2 Farm buildings	(a) outline the properties and uses of wood, concrete blocks, metal, stone, brick, earth and thatch in the construction of farm buildings.	<p>Using the worksheet in the resources section for 10.2, learners can research the properties and uses of these materials and fill in the blank spaces. (I)</p> <p>In addition, learners could be encouraged to think about what else determines the choice of building material, apart from their properties.</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
10.3 Farm water supplies	<p>(a) list suitable sources of water for human consumption, for livestock and for irrigation</p> <p>(b) outline methods of water treatment by settling and filtration</p> <p>c) outline suitable methods of construction of storage dams to resist water pressure, which increases with depth</p> <p>(d) describe the use of storage tanks, the distribution of water through pipe systems and simple plumbing, sufficient for maintaining a plastic pipe system, including pipe-joining and fitting of tap washers.</p>	<p>A printable online resource outlining the sources of water for different uses with self-assessment questions that can be used by learners can be found at https://www.open.edu/openlearncreate/mod/oucontent/view.php?id=79999&printable=1 (F)</p> <p>Learners should also discuss what uses of water require the water to be fit to drink, which just require the water to be clean, and for what uses does it not matter if the water is dirty.</p> <p>Learners can make a solution of dirty water, putting into two empty clear bottles. They then time how long it takes to settle but add a small amount of lime (a flocculent) to one of the bottles.</p> <p>Using bottles with the bottom cut off they can also investigate the best arrangement of layers of sand and gravel to clean dirty water. A few balls of cotton wool can be added to each bottle first to prevent the sand and gravel falling out. See https://kids.nationalgeographic.com/explore/books/how-things-work/water-wonders/</p> <p>At https://gwmwater.org.au/component/edocman/612-on-farm-water-reticulation-guide/download?Itemid= there is pdf file - water supply, which teachers can use sections from and produce suitable worksheets for learners.</p> <p>Simple videos for learners can be found at https://www.youtube.com/watch?v=HyD82O9t210 which shows jointing plastic water pipe and https://www.youtube.com/watch?v=OwvbXjlnxLA fitting tap washers.</p> <p>Coursework opportunities – Practical activities- Connect a water system for extending a water supply using appropriate pipes and joints , taps and filters as required by the system, repair a leaking pipe or tap, set up an irrigation system.</p>
10.4 Farm tools	<p>(a) describe the use and maintenance of saw, hammer, screwdriver, file, spanner, sprayers and hand tools for cultivation.</p>	<p>Learners should be shown the correct way to hold each of these hand tools to use them effectively and safely. A simple guide to the use of these tools can be found at: https://bettergardeners.com/common-gardening-tools-and-their-uses/</p> <p>Learners will be aware that the maintenance of most hand tools is simply cleaning and oiling to prevent rust. The maintenance of a hand saw is a little more complicated and a video showing how to restore old hand saws can be found at https://www.youtube.com/watch?v=sjbM9sttRjA</p>

Syllabus ref.	Learning objectives	Suggested teaching activities
		<p>The maintenance of a backpack sprayer can be found in a video https://www.youtube.com/watch?v=kuf8tozqek</p> <p>Coursework opportunities – Practical activities- cleaning and/or sharpening tools.</p>
10.5 Farm machinery	<p>(a) explain the advantages and disadvantages of farm mechanisation</p> <p>(b) describe the use and maintenance of mould-board plough, cultivator, harrow, planter and ridger (either ox- or donkey- or tractor-drawn).</p>	<p>A useful resource outlining the advantages and disadvantages of farm mechanisation, that is suitable for learners, can be found at https://www.fabioclass.com/2017/10/advantages-and-disadvantages-of.html</p> <p>Short videos that learners can watch on the use of these various machines can be found at:</p> <p>mould-board plough https://www.youtube.com/watch?v=l4FpcrQ52Zo cultivator (called a tiller here) https://www.youtube.com/watch?v=5fn2bXr0wUo harrow - https://www.youtube.com/watch?v=XWANhjupylY potato planter and ridger - https://www.youtube.com/watch?v=RHEsq1EpUVI</p> <p>Learners should be asked to compare the advantages and disadvantages of using a tractor rather than an ox or a donkey. (F)</p>
Past and specimen papers		
<p>Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support (F)</p> <p>10.3 Farm water supplies – Nov 2020 0600/11 Q14 10.5 Farm machinery – Nov 2018 0600/1 Q3, Nov 2020 0600/12 Q14</p>		

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