CAMBRIDGE
International Education

Syllabus

Cambridge O Level
Agriculture 5038
for centres in Brunei and Mauritius

Use this syllabus for exams in 2027.
Exams are available in the November series.

Version 2

For the purposes of screen readers, any mention in this document of Cambridge IGCSE refers to Cambridge International General Certificate of Secondary Education.

Cambridge Pathway

Why choose Cambridge?

We work with schools worldwide to build an education that shapes knowledge, understanding and skills. Together, we give learners the confidence they need to thrive and make a positive impact in a changing world.

As part of the University of Cambridge, we offer a globally trusted and flexible framework for education from age 3 to 19, informed by research, experience, and listening to educators.

With recognised qualifications, high-quality resources, comprehensive support and valuable insights, we help schools prepare every student for the opportunities and challenges ahead.

Qualifications that are recognised and valued worldwide

From the world's top-ranked universities to local higher education institutions, Cambridge qualifications open doors to a world of opportunities.

Setting a global standard

With over 160 years of experience in delivering fair, valid and reliable assessments to students worldwide, we offer a global, recognised performance standard for international education.

Your path, your way

Schools can adapt our curriculum, high-quality teaching and learning resources and flexible assessments to their local context. Our aligned offer helps Cambridge schools support every learner to reach their potential and thrive.

Learning with lasting impact

Cambridge learners build subject knowledge and conceptual understanding, and develop a broad range of skills, learning habits and attributes to help make them ready for the world.

Improving learning outcomes through data-led insight and action

Our trusted baseline and diagnostic assessments, together with our insights and evaluation service, help schools turn data into knowledge and actionable insights, to inform teaching decisions and improve learner outcomes.

Bringing together a community of experts

We bring together the collective knowledge of experts and our diverse community of educators worldwide, supporting them to learn from one another and share ideas and information.

Tackling the climate crisis together

We believe that education is key to tackling the climate crisis. Together with Cambridge schools, we can empower young people with the skills and knowledge to take action on climate change, helping them be ready for the world.

School feedback: 'We think the Cambridge curriculum is superb preparation for university.'

Feedback from: Christoph Guttentag, Dean of Undergraduate Admissions, Duke University, USA

Contents

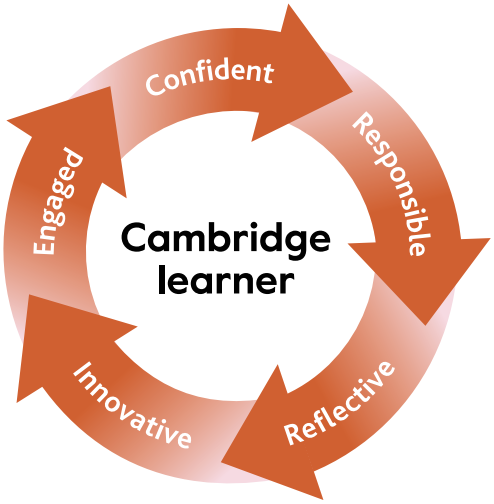
Important: Changes to this syllabus

For information about changes to this syllabus for 2027, go to page 43.

1 Why choose this syllabus?

Key benefits

Cambridge O Level is typically for 14 to 16 year olds and is an internationally recognised qualification. It has been designed especially for an international market and is sensitive to the needs of different countries. Cambridge O Level is designed for learners whose first language may not be English, and this is acknowledged throughout the examination process.



Our programmes promote a thorough knowledge and understanding of a subject and help to develop the skills learners need for their next steps in education or employment.

By studying **Cambridge O Level Agriculture** as an applied science, candidates learn basic agricultural principles and skills through extensive practical experience.

The syllabus develops candidates' ability to apply a scientific approach to the study of topics such as:

- crop and livestock husbandry
- farm structure and machinery
- agricultural economics.

As a result, students gain a positive attitude towards farming and rural development, and appreciate the ways in which improved agricultural practice can be used to alleviate the problems of famine and malnutrition.

School feedback: 'Cambridge O Level has helped me develop thinking and analytical skills which will go a long way in helping me with advanced studies.'

Feedback from: Kamal Khan Virk, former student at Beaconhouse Garden Town Secondary School, Pakistan, who went on to study Actuarial Science at the London School of Economics

Qualifications that are recognised and valued worldwide

Cambridge qualifications prepare and equip learners with the skills they need to thrive at university and beyond. The world's best higher education institutions recognise our qualifications and value the critical thinking skills, independent research abilities and deep subject knowledge that Cambridge learners bring.

We continually work with universities and colleges in every part of the world to ensure that they understand and accept our qualifications. Cambridge O Level provides a springboard to the Cambridge Advanced stage, as well as other post-16 routes. The combination of knowledge and skills in Cambridge O Level Agriculture gives learners a solid foundation for further study. Candidates who achieve grades A* to C are well prepared to follow a wide range of courses including Cambridge International AS & A Levels.

Many universities require a combination of Cambridge International AS & A Levels and Cambridge O Levels or equivalent to meet their entry requirements.

Learn more at **www.cambridgeinternational.org/recognition**

Supporting teachers

Support materials

We provide a wide range of resources so that you can give your students the best possible preparation for Cambridge O Level.

Find out more on the School Support Hub at **https://schoolsupporthub.cambridge.org**, our secure online site for teachers (username and password required).

A range of additional support materials is available online from the School Support Hub. This O Level syllabus shares content with other Agriculture syllabuses. Go to **www.cambridgeinternational.org/support** (username and password required) for IGCSE™/O Level Agriculture. If you do not have access, speak to the School Support coordinator at your school.

Training

We offer a range of support activities for teachers to ensure they have the relevant knowledge and skills to deliver our qualifications.

2 Syllabus overview

Aims

The aims describe the purposes of a course based on this syllabus.

It is expected that the subject matter will be treated practically as far as is possible. Some of the practical work will be in the form of demonstrations and visits to places of agricultural interest, but candidates will also be expected to have carried out individual and group practical work in agriculture, at least on a small scale, such as in a school garden.

The syllabus aims to:

- promote an appreciation of agriculture as an applied science
- stimulate an interest in, and create an awareness of, existing problems and opportunities in agricultural and rural development
- stimulate positive attitudes by showing that efficient farming can be both a profitable and a rewarding occupation
- demonstrate the value of agriculture to the family and community, so as to show how improved agriculture can contribute to the worldwide campaign for freedom from hunger
- encourage the teaching, in a practical manner, of basic principles and skills in agriculture and of efficient farm business management
- ensure that schools take an active part in rural development by integration of agricultural activities into the school curriculum
- encourage the development of a school farm, ensuring that students actively participate in the farming events throughout the course, including at weekends and during school holidays
- develop initiative, problem-solving abilities, scientific methods and self-education so as to encourage resourcefulness and self-reliance
- provide a basis, together with the basic sciences and mathematics, for more advanced studies in agriculture.

We are an education organisation and politically neutral. The contents of this syllabus, examination papers and associated materials do not endorse any political view. We endeavour to treat all aspects of the exam process neutrally.

Content overview

The syllabus is divided into 10 topics designed to encourage a broad, applied and practical science-based study of agriculture.

It includes:

1 General agriculture
2 Soil
3 Principles of plant growth
4 Crop production
5 Crop protection
6 Livestock anatomy and physiology
7 Livestock production and health
8 Pasture management
9 Livestock and crop breeding
10 Farm structure and tools

This O Level syllabus shares content with other Agriculture syllabuses. For further support see the School Support Hub for IGCSE Agriculture.

Assessment overview

All candidates take two components. Candidates will be eligible for grades A* to E.

All candidates take:	
Paper 1	1 hour 45 minutes
Theory	70%
100 marks	
Short, structured and extended response questions.	
This paper tests the subject content in section 3.	
These questions will assess AO1 and AO2.	
Externally assessed	

and:	
Component 2	
Practical Coursework	30%
90 marks	
Candidates undertake at least **four** practical exercises carried out during the course and a practical investigation.	
Internally assessed and externally moderated	

Information on availability is in the **Before you start** section.

Check the samples database at **www.cambridgeinternational.org/samples** for submission information, forms and deadlines for Component 2.

Assessment objectives

The assessment objectives (AOs) are:

AO1 Knowledge and understanding

Candidates should be able to demonstrate agricultural knowledge and understanding of:

- facts, concepts, principles, patterns, models and theories
- terms, symbols, quantities and units
- the techniques, procedures and principles of safe agricultural practice.

Subject content defines the factual material that candidates may be required to recall and explain. Questions testing this objective will often begin with one of the following words: *define*, *state*, *name*, *describe*, *explain* or *outline* (see the *Glossary of terms*).

AO2 Handling information and solving problems

Candidates should be able – using oral, written, symbolic, graphical and numerical forms of presentation – to:

- locate, select, organise and present information from a variety of sources
- translate information from one form to another
- use information to identify patterns, report trends and draw inferences
- present reasoned explanations for phenomena, patterns and relationships
- make predictions and propose hypotheses
- solve problems, including some of a quantitative nature.

These assessment objectives cannot be precisely specified in the subject content because questions testing such skills may be based on information that is unfamiliar to the candidate. In answering such questions, candidates are required to use principles and concepts that are within the syllabus and apply them in a logical, reasoned or deductive manner to a novel situation.

Questions testing these objectives will often begin with one of the following words: *discuss*, *predict*, *suggest*, *calculate* or *determine* (see the *Glossary of terms*).

AO3 Practical skills and investigations

Candidates should be able to:

- use and organise techniques, apparatus and material
- observe, measure and record
- interpret and evaluate experimental observations and data
- plan and carry out investigations (and, where appropriate, make predictions and propose hypotheses).

Weighting for assessment objectives

The approximate weightings allocated to each of the assessment objectives (AOs) are summarised below.

Assessment objectives as a percentage of the qualification

Assessment objective	Weighting in O Level %
AO1 Knowledge with understanding	30
AO2 Handling information and solving problems	40
AO3 Practical skills and investigations	30
Total	100

Assessment objectives as a percentage of each component

Assessment objective	Weighting in components %	
	Paper 1	Component 2
AO1 Knowledge with understanding	45	0
AO2 Handling information and solving problems	55	0
AO3 Practical skills and investigations	0	100
Total	100	100

3 Subject content

This syllabus gives you the flexibility to design a course that will interest, challenge and engage your learners. Where appropriate you are responsible for selecting resources and examples and subject contexts to support your learners' study. These should be appropriate for the learners' age, cultural background and learning context as well as complying with your school policies and local legal requirements.

Teachers should take note that there is a higher weighting for skills (including handling information, problem solving, practical, experimental and investigative skills) in the assessment than for knowledge and understanding. Teachers' schemes of work and the sequence of learning activities should reflect this balance.

It is expected that the subject matter will be treated practically as far as is possible. Some of the practical work will be in the form of demonstrations and visits to places of agricultural interest, but candidates will also be expected to have carried out individual and group practical work in agriculture, at least on a small scale, such as in a school garden.

1 General agriculture

1.1 General principles of land use

Candidates should be able to:

(a) describe different forms of land use, including different agricultural systems and farming practices (rotations, mixed farming and monoculture), forestry and aquaculture

(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

(c) understand that population growth leads to a need for efficient use of land and farm planning.

1.2 Principles of agricultural economics

Candidates should be able to:

(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

(b) explain the principles of supply and demand, diminishing returns, opportunities and choices facing the farmer, decision-making based on understanding of economic factors.

2 Soil

2.1 Soil formation

Candidates should be able to:

(a) explain soil formation from parent material by physical, chemical and biological agents of weathering.

2.2 Soil types, composition, texture and temperature

Candidates should be able to:

(a) describe soil profile in terms of topsoil, subsoil and underlying materials

(b) describe soil texture in terms of different sizes of soil particles, sand, silt and clay

(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 loss of soil structure causing capping and soil pans

(d) describe different soil types (sandy soils, loam soils and clay soils) and their properties, including water-holding capacity and drainage

(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)

(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 temperatures by mulching of seedbeds and shading of transplanted seedlings.

2.3 Soil fertility

Candidates should be able to:

(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

(b) carry out practical soil sampling and tests for soil pH

(c) describe the nitrogen cycle and its importance to soil fertility

(d) explain the importance of legumes and the use of organic fertilisers (manure and compost) in maintaining good soil structure and fertility

(e) describe the use of inorganic fertilisers (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

(f) explain how fertilising practices and liming can affect soil pH.

2.4 Soil erosion and soil conservation

Candidates should be able to:

(a) describe types of soil erosion, their causes, agents, prevention and control.

2.5 Drainage and irrigation

Candidates should be able to:

(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

(b) understand the effects of poor drainage on soil organisms and root respiration

(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).

2.6 Water cycle

Candidates should be able to:

(a) describe and understand the significance of the water cycle and ground-water resources.

3 Principles of plant growth

3.1 Movement of materials through plants

Candidates should be able to:

(a) describe the distribution and function of root tissues and the structure and function of root hairs

(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

(c) explain how the structure of a leaf is related to function (cellular detail is **not** required)

(d) outline gas exchange by diffusion through the stomata

(e) describe photosynthesis in terms of carbon dioxide, water, light and chlorophyll leading to the synthesis of carbohydrates and the production of oxygen

(f) describe the distribution and function of tissues in a stem (dicotyledon only)

(g) define the term *translocation* 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

(h) explain transpiration in terms of the transpiration stream, loss of water by evaporation and diffusion of water vapour through stomata

(i) describe the effects of temperature, humidity, wind and light intensity on the rate of transpiration.

3.2 Reproduction in plants

Candidates should be able to:

(a) define the term *sexual reproduction*

(b) describe the structure and functions of the flowers of a maize plant and of a bean plant

(c) define the term *pollination*

(d) describe the process of fertilisation in a **named** plant

(e) describe how seeds and fruits are dispersed and explain the importance of dispersal in relation to weed control

(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).

3.3 Germination

Candidates should be able to:

(a) describe seed structure and the germination of maize and bean (or other legume) and understand the conditions required for germination.

4 Crop production

4.1 Land preparation

Candidates should be able to:

(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).

4.2 Cultivation of cash crops

Candidates should be able to:

(a) name the main types of crop found locally (legumes, roots and tubers, edible fruits and cereals) and their products

(b) describe in detail the cultivation of **one** crop of local importance in relation to:

- 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
- 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).

5 Crop protection

5.1 Weed control

Candidates should be able to:

(a) identify one **named** local weed species of a crop and describe its harmful effects and the mode of spread

(b) explain methods of weed control including cultural, mechanical and chemical methods.

5.2 Pest control

Candidates should be able to:

(a) describe the life cycle, effect and method of spread of **one** pest from **each** of the following:
- 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 bollworm (*Helicoverpa armigera*))

(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

(c) describe biological and biotechnical methods of controlling pests

(d) describe methods of cultural pest control including rotation and catch cropping.

5.3 Disease control

Candidates should be able to:

(a) describe the mode of infection, harmful effects, prevention and control of **one named** plant disease from each of the following groups:
- bacterial diseases
- fungal diseases
- viral diseases.

5.4 The use of farm chemicals

Candidates should be able to:

(a) explain the importance and methods of safe 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

(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).

6 Livestock anatomy and physiology

6.1 Digestion in ruminants and non-ruminants

Note

The differences between ruminant and non-ruminant digestion should be discussed generally but can be illustrated using relevant examples from local agriculture. Examples of ruminants include sheep, cows and goats. Examples of non-ruminants include pigs and poultry.

Candidates should be able to:

(a) describe the structure and function of the digestive system of a ruminant and a non-ruminant

(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).

6.2 Sexual reproduction in mammals

Candidates should be able to:

(a) describe the reproductive systems (male and female) of a **named** mammalian farm animal

(b) describe the processes of fertilisation and birth in a **named** mammalian farm animal

(c) define the terms *weaning* and *lactation* and understand the importance of colostrum.

7 Livestock production and health

Study of **one** ruminant and **one** non-ruminant animal with particular reference to:

7.1 Livestock housing

Candidates should be able to:

(a) describe suitable housing and living conditions for livestock

(b) describe the care and rearing of young stock.

7.2 Livestock nutrition

Candidates should be able to:

(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)

(b) outline the meaning of the terms *maintenance ration* and *production ration*

(c) explain the importance of an adequate, clean water supply

(d) demonstrate stockmanship, including care in the handling of animals, record keeping, including a diary of events and production records.

7.3 Livestock health

Candidates should be able to:

(a) recognise the signs of health and of ill-health in livestock

(b) explain the ways in which infectious and contagious diseases are spread

(c) explain the problems caused by parasites

(d) explain what is meant by the terms *notifiable/scheduled diseases*

(e) explain the importance of livestock hygiene and the isolation of sick animals.

8 Pasture management

8.1 Extensive and intensive pasture management

Candidates should be able to:

(a) describe the vegetation of grazing lands, including grasses and legumes for grazing and bush for browsing

(b) describe how improved pastures can be established

(c) explain what is meant by the terms *rotational grazing*, *paddock* and *zero grazing*, *unenclosed* and *enclosed grazing systems* and *intensive* and *extensive grazing*

(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

(e) explain how pasture utilisation can be improved by fencing and rotational grazing.

9 Livestock and crop breeding

9.1 Monohybrid inheritance

Candidates should be able to:

(a) define the terms *chromosome*, *gene*, *allele*, *homozygous*, *heterozygous*, *dominant* and *recessive*

(b) calculate and predict the results of simple genetic crosses involving 1:1 and 3:1 ratios

(c) explain the meaning of the terms *genotype* and *phenotype* and assess their importance in animal and plant breeding.

9.2 Selective breeding in animals and plants

Candidates should be able to:

(a) describe how breeding can improve yield, disease resistance, hardiness and appearance in livestock and in crops

(b) understand the role of artificial selection in the production of improved varieties of animals and plants of economic importance

(c) understand the benefits of artificial insemination

(d) understand the differences between selective crop breeding and genetically modified (GM) crops.

10 Farm structures and tools

10.1 Fencing

Candidates should be able to:

(a) describe the treatment of fencing posts, methods of fence construction, types of fence suitable for different purposes, the use of hedges and windbreaks.

10.2 Farm buildings

Candidates should be able to:

(a) outline the properties and uses of wood, concrete blocks, metal, stone, brick, earth and thatch in the construction of farm buildings.

10.3 Farm water supplies

Candidates should be able to:

(a) list suitable sources of water for human consumption, for livestock and for irrigation

(b) outline methods of water treatment by settling and filtration

(c) outline suitable methods of construction of storage dams to resist water pressure, which increases with depth

(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.

10.4 Farm tools

Candidates should be able to:

(a) describe the use and maintenance of saw, hammer, screwdriver, file, spanner, sprayers and hand tools for cultivation.

10.5 Farm machinery

Candidates should be able to:

(a) explain the advantages and disadvantages of farm mechanisation

(b) describe the use and maintenance of mould-board plough, cultivator, harrow, planter and ridger (either ox- or donkey- or tractor-drawn).

Faculty feedback: ‘Understanding how and why our climate is changing and providing the knowledge and skills to explore the challenges plays a key role in every student’s education.’

Feedback from: Dr Amy Munro-Faure, Head of Education and Student Engagement of Cambridge Zero

4 Details of the assessment

All candidates take two components.

Paper 1 – Theory

Written paper, 1 hour 45 minutes, 100 marks

Section A: 70 marks

Candidates answer **all** questions in Section A.

Short answer questions and structured questions testing AO1 and AO2.

Section B: 30 marks

Candidates answer **two** questions from a choice of five in Section B. Each question is worth 15 marks.

Free response structured questions testing AO1 and AO2.

Externally assessed

Component 2 – Practical Coursework

90 marks

The coursework consists of at least **four** discrete practical exercises and one practical investigative project which takes the form of a report.

Practical work assesses skills and abilities essential to the study of agriculture that are not suitably measured by theory examinations. All candidates must complete practical exercises and an investigation.

Practical exercises 60 marks

Candidates are assessed on four practicals. They are to be spread evenly over the course where possible.

Practical investigation 30 marks

Candidates choose an investigation topic, produce a hypothesis, plan and carry out an investigation, collect data, analyse the results and make a conclusion. A written report of no more than 1000 words should evaluate the project including the limitations of the investigation.

This component tests assessment objective AO3.

Internally assessed and externally moderated

Planning Practical Exercises and Practical Investigation tasks

The practical work carried out by candidates should be assessed by the agriculture teacher. This entails keeping a record for all the candidates, showing the operations carried out and the marks awarded.

It is the responsibility of the teacher to ensure that the work planned is safe and legally permitted by local legislation. It is recommended that a simple risk assessment be carried out by the teacher for each of the practical tasks and investigations to ensure that the health and safety of the candidates is not put at risk by the planned activities. See the *Coursework Handbook* for more information on health and safety. The *Coursework Handbook* can be found at Mauritius School Support **www.cambridgeinternational.org/mauritius** or Brunei School Support **www.cambridgeinternational.org/brunei**

Centres are free to carry out more than four practical exercises, submitting only those they consider to be the best four. You may wish to combine up to three of the practical exercises with the practical investigation. Alternatively you may prefer the simplicity of keeping the two parts of the assessment separate.

Practical exercises

You should assess at least four discrete practical exercises over the course but may choose to do more practical exercises and choose the best four for submission.

They are to be spread evenly over the course where possible.

It is important that the practical exercises are taught as part of the delivery of the relevant syllabus area before candidates are assessed on the practical aspects of the topic. Vegetable production, animal husbandry, soil and crop husbandry all offer opportunities for learners to develop assessable skills.

Practical investigation

The main aim of the investigation is that it should be done by the individual candidate, in connection with some particular study problem.

The practical work done during this investigation can be organised in such a way as to constitute practical exercises which can be submitted for the assessment of the practical exercises. Up to a **maximum of three** discrete practical exercises may be assessed during the carrying out of the investigation at the discretion of the teacher.

Teachers should consider the facilities in the centre and other local facilities, local growing/breeding seasons and how these relate to teaching time and the requirement to spread the practical exercises across the course when planning the practical exercises and investigation. See the *Coursework Handbook* for more information on planning practical exercises and practical investigation. The *Coursework Handbook* can be found at Mauritius School Support **www.cambridgeinternational.org/mauritius** or Brunei School Support **www.cambridgeinternational.org/brunei**

Practical Exercises

The practical exercises should be spread evenly over the course where possible.

The practical exercises should ideally be drawn from as many sections of the syllabus as possible.

Examples of tasks suitable for the practical exercises

Almost any agricultural task or activity can be used as a basis for the assessment of practical skills through the practical exercises. Such tasks may be carried out in almost any agricultural context, from school or college farms, through allotments and backyard chicken- or bee-keeping to extensive forestry or cattle ranching.

It is essential that the candidates have sufficient opportunity to acquire and practise the skills before the assessment so that they can confidently show what they can do.

Tasks associated with crop production

Any plant or non-plant crop is suitable. The tasks may involve manual tasks (e.g. digging with a spade or adze) or mechanised or animal-powered tasks (e.g. ploughing) or a combination of these.

- digging to produce a rough tilth
- ploughing
- preparation of a seedbed
- seed sowing (drills left open for checking depth and spacings)
- fertilising (calculation of quantities, placement, top dressing)
- transplanting and shading
- mulching
- weeding
- pruning
- crop protection (spraying, pest and disease control)
- harvesting and storage of crops

Examples of suitable tasks associated with livestock/poultry production

The animals involved may be conventional livestock, poultry or any other agricultural animal production (e.g. bees, farmed fish or silkworm larvae). The tasks may be manual (e.g. removing soiled bedding and replacement with clean material) or mechanised (e.g. herding using a quad-bike, milking using a mechanical milking parlour) or a combination of these.

Candidates must have been properly trained in dealing with the animals, both for their own safety and also to ensure the humane treatment of the animals concerned.

The following are examples of tasks that will prove suitable. Again, this is not a list of all the possibilities (and the bracketed sections beginning 'including …' are not comprehensive lists of all the activities that might make up the task, and the task selected might not include all of the listed activities).

- herding (including keeping the herd together; avoiding predators; ensuring access to food and clean water)
- tending animals in any enclosure (e.g. field, chicken run or house) (including ensuring access to food and water; dealing with waste; providing clean bedding; measures to minimise the risk of disease)
- enclosure and house maintenance (including fence construction or maintenance; hedge planting or maintenance; construction, routine maintenance, repair, cleaning or disinfection of housing, pens and nest boxes)
- dealing with disease (including measures to avoid disease, identification of diseased animals, isolation, appropriate treatment where possible [e.g. application of oil to poultry infected with scaly leg mite], disinfection of housing; deciding when to ask for advice [e.g. from an experienced farmer or veterinarian])
- husbandry (including selection of animals suitable for breeding, care for breeding animals, preparations for nesting, birth or hatching, supervision of birthing or hatching, care of newborn or newly hatched animals, deciding when to ask for advice)
- obtaining the product (including milking; collection, grading, cleaning and preparation of eggs for consumption or sale; humane preparations for taking stock to market)

Evidence of performance of practical exercises

The practical exercises will involve candidates in tasks and activities in which they demonstrate skills which will be assessed and will generate evidence of the demonstration of the skill for moderation.

Assessment of the practical exercises by the teacher needs to take place at the time of the performance of the skill by the candidate in order to ensure that the assessment is authentic. The teacher may well use ticksheets, notes or other teacher-dated records to document the assessment, for later transfer onto the mark sheets. However, these tick-sheets and teacher-dated records do not provide evidence of the candidate's performance that is suitable for moderation since such evidence should show the candidate performing the task or activity.

The evidence of the practical exercises submitted for moderation can take many forms. In each case what is being sought is authentic evidence that shows that the candidate has carried out the various chosen practical tasks or activities. The evidence should show that the candidate has skills in such practical agricultural work, and also when the work was carried out.

The preferred forms of evidence are those generated by the candidate and those showing the candidate carrying out the work. See the *Coursework Handbook* for more information on evidence for practical exercises. The *Coursework Handbook* can be found at Mauritius School Support
www.cambridgeinternational.org/mauritius
or Brunei School Support **www.cambridgeinternational.org/brunei**

Authentic records must include the date when the practical activity took place and may include:

- Photographs of the candidate doing the task or activity. The images must clearly show the individual candidate carrying out the skill being assessed. These images may be presented in any convenient form (e.g. JPEG, GIF or BMP) or in a document or presentation with written or audio annotations referring to the skills, by the candidate, as well as their thoughts about their own performance of those skills (critical reflections).
- Short videos of the candidate carrying out the task or activity (not longer than 1 minute per activity). No editing or titles are required but candidates should add annotations and critical reflections as an audio or written commentary. Any common format is suitable (e.g. AVI or MPEG).

- Original diaries or notes recording the candidates carrying out of the tasks and activities. These must not be edited or written up neatly. They should be the authentic records kept by the candidate of the skills, and critical reflections, at the time of doing the task or activity. These should be scanned or clearly photographed.

For information, dates and methods of submission of the coursework marks and sample, please refer to the samples database at **www.cambridgeinternational.org/samples**

Method of assessment for Practical Exercises

The total mark available for the four practical exercises is 60 marks. For each practical exercise task the total is 15 marks, with 3 marks being available for each of the five assessment criteria.

Teachers must ensure that all work produced by candidates and records of assessment are retained and are available for inspection, if required, by the external Coursework Moderator.

Marking criteria for Practical Exercises

Each practical exercise should be assessed according to the Marking Criteria for the assessment of Practical Exercises.

Each practical exercise should be marked using the following criteria:

Criteria	Description	Marks available
1 Responsibility	the ability to assume responsibility for the task in hand, and to work from given instructions without detailed supervision and help	3
2 Initiative	the ability to cope with problems arising in connection with the task, to see what needs to be done and to take effective action	3
3 Technique	the ability to tackle a practical task in a methodical, systematic way, and to handle tools skilfully and to good effect	3
4 Perseverance	the ability to see a task through to a successful conclusion with determination and sustained effort	3
5 Quality	the ability to attend to detail, so that the work is well finished and is well presented	3

Marking Criteria for the assessment of Practical Exercises

Teachers should make a best-fit match between the candidate's performance in each of the criteria for the practical exercises and the level descriptors.

Responsibility	Marks
• Follows written or verbal instructions without the need for help • Carries out appropriate safety procedures • Assumes responsibility easily and leads in group work	3
• Follows written or verbal instructions with a little help • Is aware of the need for safety procedures but has difficulty recognising them without guidance • Shows responsibility for the work	2
• Follows written or verbal instructions with considerable help • Shows little regard for safety procedures, even when told • Shows some responsibility for the work	1
• No creditable response	0

Initiative	Marks
• Offers solutions or explanations to unexpected problems • Recognises, and is able to anticipate, problems • Solves problems without help • Comments on imperfections of experimental methods or results	3
• Offers solutions or explanations to unexpected problems after seeking advice • Solves problems with help • Recognises faults in experimental methods, given some pointers	2
• Is uncertain how to proceed and requires considerable help • Recognises only the most obvious errors in experimental methods after considerable guidance	1
• No creditable response	0

Technique	Marks
• Approaches tasks methodically and systematically • Handles tools/apparatus skilfully and confidently • Carries out practical procedures with dexterity	3
• Handles tools/apparatus effectively • Carries out practical procedures adequately	2
• Handles tools/apparatus clumsily • Carries out practical procedures with difficulty	1
• No creditable response	0

Perseverance	Marks
• Completes all the required practical tasks and associated written work • Has a positive attitude and is well motivated	3
• Completes the required practical tasks and attendant written work with a little encouragement • Carries out repetitive procedures willingly	2
• Does not complete the required practical tasks and attendant written work • Is somewhat disinterested/impatient when carrying out work and is disinclined to repeat procedures	1
• No creditable response	0

Quality	Marks
• Performs practical work thoroughly, pays attention to detail and produces a very good final result • Produces accurate, clear and neatly presented written work	3
• Performs practical work thoroughly for the most part and produces a satisfactory to good result • Produces mostly accurate and clearly presented written work	2
• Performs practical work in a rushed and superficial way and shows little concern for the finished product • Produces inaccurate and poorly presented written work	1
• No creditable response	0

Practical Investigation

The practical investigation is a major piece of work and should be investigatory in nature.

The report produced should be presented carefully and include a hypothesis, plan for how to carry out an investigation of this hypothesis, a record and analysis of data collected and conclusions made. The report should also consider limitations of the investigation.

The main aim of the investigation is that it should be done by the individual candidate, in connection with some particular study problem.

Agriculture offers a wide scope for such projects, and it should not be difficult to find suitable topics, bearing in mind the following principles:

(a) The work must be investigatory. Candidates must find the information for themselves by direct observation and measurement.

(b) Though the programme of study must be carried out by the candidate, it is the teacher's responsibility to guide the candidate, or even to select problems that suit the candidate's investigatory abilities. The teacher may also suggest methods of investigation that are likely to be effective. Candidates are not research workers but, when given appropriate guidance, they can learn how to carry out investigations for themselves.

(c) The nature of the problem to be investigated should be stated and discussed by the candidate in the introduction.

(d) Time allocated to investigation work should be approximately five periods of 40 minutes, including homework. This should be enough to achieve a good standard. Candidates should be discouraged from spending so much time on their projects that their normal classwork suffers.

(e) Candidates will not necessarily solve all the problems they tackle, but they should make a worthwhile attempt to do so. When problems fail to yield positive results, candidates should be encouraged to discuss their actual findings and comment on the implications. Good investigation work by candidates often leads them to understand the difficulties and subtleties of the problem, and this can be very educational. For some candidates, negative results can be depressing, and teachers must use their judgement when guiding them, so that they do not become discouraged.

Examples of acceptable investigations

Investigations can be based on a variety of topics.

Teachers should provide advice for learners in selecting suitable questions and hypotheses. See the *Coursework Handbook* for more guidance on helping candidates select suitable topics for practical investigations. The *Coursework Handbook* can be found at Mauritius School Support **www.cambridgeinternational.org/mauritius** or Brunei School Support **www.cambridgeinternational.org/brunei**

The following examples are intended as a guide, but teachers may wish to help their candidates to devise investigations of their own along similar lines.

Field experiments

- comparison of sowing depths, to discover effects; minimum, optimum and maximum depths
- thinning of root crops; no thinning, thinning to various spacings, effects upon total yield and size of roots produced
- plant population in relation to yield; spacing of plant stations and rows, comparison to find optimum spacings
- spraying versus not spraying; effects on infestation with disease or pest organisms, effects on yield, cost-effectiveness
- top-dressing versus not top-dressing; various treatments and effects, comparison of costs and yields
- fertiliser trials; organic versus inorganic, effects of differing application rates upon yields, diminishing returns
- rationing of livestock feed versus ad-lib feeding; effects on production, cost-effectiveness
- effects of different levels of nutrition on young stock (e.g. broiler chickens); measurement of live mass gain under different rationing regimes, effects on health, cost-effectiveness

In the case of field trials, it is often useful to have a group of candidates involved, in order to make possible replication of treatments on plots in different parts of the garden or field. This improves the statistical accuracy of the trial. However, each candidate's contribution must be assessed and **individual reports must be written**.

When different treatments are tried, the effect upon yield of produce is often a factor to be measured. The cost-effectiveness of alternative treatments should also be worked out, to see which one is the most profitable.

Attention should be paid to the presentation of results in a clear and concise form, i.e. tabulation or graphical representation. Reasons should always be given for treatments carried out, methods tried, or conclusions reached.

An example of how the practical exercises may be integrated within the practical investigation

A candidate has decided to carry out an investigation into the effect of nitrate fertiliser on the yield of cabbages. Having proposed a hypothesis with the scientific reasons behind it and planned a suitable investigation, the practical work is carried out. The first practical assessment could involve the preparation of the soil seedbed. The second assessment could involve the planting and spacing of cabbages and the application of nitrate fertiliser. The third assessment could involve harvesting and measuring the cabbage yield. The recording of the data, subsequent analysis and limitations are then written up as part of the practical investigation.

Evidence of the practical investigation

The assessable evidence of the investigation is the 1000 word report.

Title: The report should have a clear title. This should appear on the first page, together with the name of the candidate and the name of the school.

Contents: A list of contents should be included, showing clearly the main sections of the report and the numbers of pages where they appear. Lists of tables, graphs and photographs can also be included, if appropriate.

Introduction: This should state the objective(s) of the investigation, the questions to be asked or a hypothesis, and describe briefly the plans for carrying it out. Sources of material, such as reference books or people interviewed, should be acknowledged. Details of the time (with dates) and the place where the investigation was carried out should be given.

Methodology: A description of the investigation. Relevant details of the methods used to plan, sample, measure, collect and analyse data.

Presentation of data findings: Data collected should be presented in this section as tables, charts, graphs or histograms. They must always be labelled with a brief description of the data.

Findings and conclusions: The conclusions of the investigation should be summarised in a few paragraphs. The findings should be compared to the original plan set out in the introduction. Limitations of the data should be noted and suggestions made for improvements. Help received from other people should be acknowledged.

See the *Coursework Handbook* for more guidance on the format and presentation of the report for the practical investigation. The *Coursework Handbook* can be found at Mauritius School Support **www.cambridgeinternational.org/mauritius** or Brunei School Support **www.cambridgeinternational.org/brunei**

Method of assessment for the Practical Investigation

The practical investigation is marked out of a total of 30 marks with 5 marks allocated for each of the six assessment criteria.

Teachers must ensure that all work produced by candidates and records of assessment are retained and are available for inspection, if required, by the external Coursework Moderator.

Marking criteria for Practical Investigation

Each practical investigation should be assessed according to the Marking Criteria for the assessment of Practical Investigation.

Each practical investigation should be marked using the following criteria:

Criteria	Description	Marks available
1	The selection of relevant questions (hypothesis) for the investigation	5
2	The planning of the investigation and the principles on which it is based	5
3	The handling of evidence	5
4	The ability to make deductions from the evidence or the data acquired	5
5	The ability to recognise limitations of the investigation	5
6	Description of practical, presentation, layout and originality (candidate's own work)	5

Marking Criteria for the assessment of Practical Investigation

Teachers should make a best-fit match between the candidate's performance in each of the criteria for the practical investigation and the level descriptors.

1 The selection of relevant questions (hypothesis) for the investigation	Marks
• Relevant questions (hypothesis) selected without guidance, appropriate and clearly stated	5
• Relevant questions (hypothesis) selected without guidance, appropriate but poorly expressed	4
• Relevant questions (hypothesis) selected with guidance, appropriate and clearly stated	3
• Relevant questions (hypothesis) selected with guidance, appropriate but poorly expressed	2
• Relevant questions (hypothesis) selected with considerable guidance	1
• Relevant questions (hypothesis) provided for the candidate	0

2 The planning of the investigation and the principles on which it is based	Marks
• Investigation well-planned, without guidance, showing evidence that the relevant principles are understood	5
•	4
• Investigation adequately planned, with some guidance, relevant principles understood	3
•	2
• Investigation plan sketchy, plan produced with considerable guidance or no evidence that principles are understood	1
• Investigation plan provided for the candidate	0

3 The handling of evidence	Marks
• Results presented neatly and clearly in a table, appropriate method of analysis chosen, graphs and/or histograms accurate and correctly presented (i.e. correct scale, axis, labelling, etc.)	5
•	4
• Results presented neatly and clearly in a table, inappropriate method of analysis chosen, graphs and/or histograms inaccurate and incorrectly presented	3
•	2
• Results not presented in a table, inappropriate method of analysis chosen, graphs and/or histograms inaccurate and poorly presented	1
• No creditable response	0

4 The ability to make deductions from the evidence or the data acquired	Marks
• Comprehensive deductions based on the evidence, conclusions given with reasons	5
• Several deductions based on the evidence, conclusions given with reasons	4
• Few deductions based on the evidence, one conclusion given	3
• Few deductions based on the evidence, no conclusions given	2
• One deduction, no elaboration	1
• Tasks carried out with considerable help, inaccurate observations and records	0

5 The ability to recognise limitations of the investigation	Marks
• All major limitations identified, assessed and improvements suggested	5
•	4
• Several limitations identified, assessment superficial, no improvements suggested	3
•	2
• One or two limitations identified but no assessments or improvements given	1
• No creditable response	0

6	**Description of investigation, presentation, layout and originality (candidate's own work)**	**Marks**
•	Clear, full description of the aims and nature of the topic; work neat and well presented; layout as required by the syllabus; candidate's own work	5
•		4
•	Description of the aims and nature of the investigation given; lacking in either neat presentation or layout not as required by the syllabus; candidate's own work	3
•		2
•	Outline only of the aims and nature of the investigation; poorly presented; layout not as required by the syllabus; candidate's own work	1
•	No creditable response	0

Submission of coursework

Each candidate will have a mark out of 90 marks for their Practical Coursework. This is made up of a mark out of 60 for the four practical exercises and a mark out of 30 for the practical investigation.

Recording and submitting candidates' marks and work

Please refer to the samples database at **www.cambridgeinternational.org/samples** for information, dates and methods of submission of candidates' marks and work. You should follow the instructions for Component 2 Practical Coursework on the samples database.

You should record marks on the required form(s) which you should download each year from the samples database at **www.cambridgeinternational.org/samples**. Follow the instructions on the form to complete it. The marks on these forms must be identical to the marks you submit to Cambridge International.

Using the samples database

The samples database refers you to key information about administering coursework, speaking tests and examined coursework for each syllabus.

Use the database to find out:

- when and how to submit your marks for moderated coursework and non-coursework tests
- when and how to submit your candidates' work
- which forms to complete and return with your candidates' work.

The samples database at **www.cambridgeinternational.org/samples** will ask you for:

- your country/territory
- the syllabus code (i.e. 5038 for this syllabus).

The database will then take you to the information you need, including dates and methods of submission of candidates' marks and work, as well as any forms you may need to complete.

Internal moderation

If more than one teacher in your centre is marking internal assessments, you must make arrangements to moderate or standardise your teachers' marking so that all candidates are assessed to a common standard. If only one teacher is marking internal assessments, no internal moderation is necessary. You can find further information on the process of internal moderation in the *Cambridge Handbook* and on the samples database for the relevant year of assessment.

You should record the internally moderated marks for all candidates on the required form(s) and submit these marks to Cambridge International according to the instructions on the samples database at **www.cambridgeinternational.org/samples**

External moderation

Cambridge International will externally moderate all internally assessed components.

- You must submit the marks of all candidates to Cambridge International.
- You must also submit the marked work of a sample of candidates to Cambridge International.

The sample you submit to Cambridge International should ideally include examples of the marking of each teacher. The samples database at **www.cambridgeinternational.org/samples** explains how the sample will be selected.

The samples database at **www.cambridgeinternational.org/samples** also provides details of how to submit the marks and work.

External moderators will produce a short report for each centre with feedback on your marking and administration of the assessment.

Internal moderation for centres in Mauritius

If more than one teacher in your centre is marking internal assessments, you must make arrangements to moderate or standardise your teachers' marking so that all candidates are assessed to a common standard. (If only one teacher is marking internal assessments, no internal moderation is necessary.) You can find further information on the process of internal moderation in the *Cambridge Handbook* and on the samples database for the relevant year of assessment.

You should record the internally moderated marks for all candidates on the required forms and submit these marks to the Mauritius Examinations Syndicate (MES).

External moderation for centres in Mauritius

Moderators appointed by MES will moderate all marking by centres on behalf of Cambridge International.

- You must submit the marks of all candidates to MES on the required forms listed on the samples database at **www.cambridgeinternational.org/samples**
- You must also submit the marked work (filmed evidence and documentation) of a sample of candidates to MES. The sample you submit should ideally include examples of the marking of each teacher.

After moderation in Mauritius, MES will send a representative sample to Cambridge International.

Supervising coursework

Coursework must be a candidate's own, unaided work. The teacher must be able to authenticate the work is the candidate's own.

A general discussion on the progress of coursework is a natural part of the teacher–candidate relationship, as it is for other parts of the course.

Teachers should not correct or edit draft coursework. Advice should be kept at a general level so that the candidate leads the discussion and makes the suggestions for any amendments. Teachers must not give detailed advice to individual candidates or groups of candidates on how their work can be improved to meet the assessment criteria.

For further information about supervising coursework, see the *Cambridge Handbook* for the relevant year of assessment at **www.cambridgeinternational.org/eoguide**

Authenticity and academic honesty/avoidance of plagiarism

It is the centre's responsibility to make sure all assessed work is the candidate's original work. Candidates must **not** submit someone else's work as their own, or use material produced by someone else without citing and referencing it properly. You should make candidates aware of the academic conventions governing quotation and reference to the work of others, and teach candidates how to use them.

A candidate taking someone else's work or ideas and passing them off as their own is an example of plagiarism. It is your responsibility as a teacher to prevent plagiarism from happening and to detect it if it does happen. For more information, search for 'Preventing plagiarism – guidance for teachers' on our website at **www.cambridgeinternational.org/teachingandassessment**. Cambridge International has robust systems in place to detect, investigate and address plagiarism once work has been submitted.

Cambridge International has a policy on the use of generative AI by candidates in coursework. The inappropriate use of AI should be treated as a form of plagiarism. The policy includes guidance on how to detect use of AI in coursework and what action teachers should take. It can be found at: **www.cambridgeinternational.org/generative-ai-in-coursework**

You will be requested to declare the authenticity of the work at the point of submitting the work. The candidate must sign a statement confirming that they are submitting their own work. You countersign it to confirm that you believe the work is theirs. Centres should use the cover sheet on the samples database for this purpose.

5 Appendix

Physical and chemical concepts and processes

For the purpose of assessment, candidates will be expected to demonstrate:

1 an understanding of temperature, pressure, evaporation and relative humidity
2 an understanding of the terms *element*, *mixture*, *compound*, *atom*, *molecule* and *ion*
3 an understanding of the terms *acid*, *base* and *pH value*
4 an understanding of energy transfer/conversion.

Mathematical requirements

Calculators may be used in all parts of the assessment.

Candidates should be able to:

1 add, subtract, multiply and divide
2 understand averages, decimals, fractions, percentages and ratios
3 understand the relationship between surface area and volume
4 use direct and inverse proportion
5 draw charts and graphs, including histograms, from given data
6 interpret charts and graphs
7 select suitable scales and axes for graphs.

Terminology, units, symbols and presentation of data for agriculture

This section follows the practice laid down in the following documents:

- Association for Science Education booklet
  Signs, Symbols and Systematics: The ASE Companion to 16–19 Science (2000)
- Institute of Biology
  Biological Nomenclature, Standard terms and expressions used in the teaching of Biology (2000)

Candidates should be made aware of the information given in this section during teaching and practical work, as it will be used in examination papers.

Nomenclature

The proposals in *'Signs, Symbols and Systematics (The Association for Science Education Companion to 16–19 Science, 2000)'* and the recommendations on terms, units and symbols in *'Biological Nomenclature (2000)'* published by the Institute of Biology, in conjunction with the ASE, will generally be adopted. Reference should be made to the joint statement on chemical nomenclature issued by the GCE boards. In particular, the traditional names sulfate, sulfite, nitrate, nitrite, sulfurous and nitrous acids will be used in question papers.

Units, significant figures

Candidates should be aware that misuse of units and/or significant figures, i.e. failure to quote units where necessary, the inclusion of units in quantities defined as ratios or quoting answers to an inappropriate number of significant figures, is liable to be penalised.

Units

The International System of units will be used (SI units). Units will be indicated in the singular not in the plural, e.g. 28 kg.

(a) SI units commonly used in agriculture

Note: Care should be taken in the use of *mass* and *weight*. In many agricultural contexts, the term *mass* is correct, e.g. dry mass, biomass.

Quantity	Name of unit	Symbol for unit
length	kilometre metre centimetre millimetre micrometre	km m cm mm µm
mass	tonne (1000 kg) kilogram gram milligram microgram	t kg g mg µg
time	year day hour minute second	y d h min s
amount of substance	mole	mol

(b) Derived SI units

Quantity	Name of unit	Symbol for unit
energy	kilojoule joule (calorie is obsolete)	kJ J

(c) Recommended units for area, volume and density

Quantity	Name of unit		Symbol for unit
area	hectare = 10^4 m^2		ha
	square metre		m^2
	square decimetre		dm^2
	square centimetre		cm^2
	square millimetre		mm^2
volume	cubic kilometre		km^3
	cubic metre		m^3
	cubic decimetre (preferred to litre)		dm^3
	litre		dm^3 (not *l*)
	cubic centimetre		cm^3
	cubic millimetre		mm^3
density	kilogram per cubic metre	or	kg m^{-3}
	gram per cubic centimetre	or	g cm^{-3}

(d) Use of solidus

The solidus (/) will **not** be used for a quotient, e.g. m/s for metres per second.

Presentation of data

The solidus (/) is to be used for separating the quantity and the unit in tables, graphs and charts, e.g. time/s for time in seconds.

(a) Tables

- Each column of a table will be headed with the physical quantity and the appropriate SI unit, e.g. time/min.
- There are three acceptable methods of stating units, e.g. metres per sec *or* m per s *or* m s^{-1}.
- The column headings of the table can then be directly transferred to the axes of a constructed graph.

(b) Graphs

- The independent variable will be plotted on the *x*-axis (horizontal axis) and the dependent variable plotted on the *y*-axis (vertical axis).
- Each axis will be labelled with the physical quantity and the appropriate SI unit, e.g. time/min.
- The graph is the whole diagrammatic presentation. It may have one or several curves plotted on it.
- Curves and lines joining points on the graph should be referred to as 'curves'.
- Points on the curve should be clearly marked as crosses (x) or encircled dots (⊙). If a further curve is included, vertical crosses (+) may be used to mark the points.

(c) Pie charts

These should be drawn with the sectors in rank order, largest first, beginning at 'noon' and proceeding clockwise.

(d) Bar charts

These are drawn when one of the variables is not numerical, e.g. number of eggs of different colours. They should be made up of narrow blocks of equal width that do **not** touch.

(e) Column graphs

These are drawn when plotting frequency graphs from discrete data, e.g. frequency of occurrence of nests with different numbers of eggs. They should be made up of narrow blocks of equal width that do **not** touch.

(f) Histograms

These are drawn when plotting frequency graphs with continuous data, e.g. frequency of occurrence of stems of different lengths or chicks of different masses. The blocks should be drawn in order of increasing or decreasing magnitude and they **should** be touching.

Glossary of command terms used in science papers

During the moderation of a question paper, care is taken to ensure that the paper and its individual questions are, in relation to the syllabus, fair as regards balance, overall difficulty and suitability.

Attention is also paid to the wording of questions to ensure that it is as concise and as unambiguous as possible. In many instances, Examiners are able to make appropriate allowance for an interpretation that differs, but acceptably so, from the one intended.

It is hoped that the glossary will prove helpful to candidates as a guide (i.e. it is neither exhaustive nor definitive). The glossary has been deliberately kept brief not only with respect to the number of terms included but also to the descriptions of their meanings. Candidates should appreciate that the meaning of a term must depend, in part, on its context.

1 *Define* (the term(s) ...) is intended literally, only a formal statement or equivalent paraphrase being required.

2 *What is meant by* (the term(s) ...) normally implies that a definition should be given, together with some relevant comment on the significance or context of the term(s) concerned, especially where two or more terms are included in the question. The amount of supplementary comment intended should be interpreted in the light of the indicated mark value.

3 *State* implies a concise answer with little or no supporting argument (e.g. a numerical answer that can readily be obtained 'by inspection').

4 *List* requires a number of points, generally each of one word, with no elaboration. Where a given number of points is specified, this should not be exceeded.

5 (a) *Explain* may imply reasoning or some reference to theory, depending on the context. It is another way of asking candidates to give reasons for something. The candidate needs to leave the examiner in no doubt **why** something happens.

(b) *Give a reason/Give reasons* is another way of asking candidates to explain **why** something happens.

6 (a) *Describe*, the data or information given in a graph, table or diagram, requires the candidate to state the key points that can be seen in the stimulus material. Where possible, reference should be made to numbers drawn from the stimulus material.

(b) *Describe*, a process, requires the candidate to give a step-by-step written statement of what happens during the process.

Describe and *explain* may be coupled, as may *state* and *explain*.

7 *Discuss* requires the candidate to give a critical account of the points involved in the topic.

8 *Outline* implies brevity (i.e. restricting the answer to giving essentials).

9 *Predict* implies that the candidate is not expected to produce the required answer by recall but by making a logical connection between other pieces of information. Such information may be wholly given in the question or may depend on answers extracted in an earlier part of the question.

Predict also implies a concise answer, with no supporting statement required.

10 *Deduce* is used in a similar way to *predict* except that some supporting statement is required (e.g. reference to a law/principle, or the necessary reasoning is to be included in the answer).

11 *Suggest* is used in two main contexts (i.e. either to imply that there is no unique answer (e.g. in chemistry, two or more substances may satisfy the given conditions describing an 'unknown') or to imply that candidates are expected to apply their general knowledge to a 'novel' situation, one that may be formally 'not in the syllabus').

12 *Find* is a general term that may variously be interpreted as *calculate*, *measure*, *determine*, etc.

13 *Calculate* is used when a numerical answer is required. In general, working should be shown, especially where two or more steps are involved.

14 *Measure* implies that the quantity concerned can be directly obtained from a suitable measuring instrument (e.g. length, using a rule, or mass, using a balance).

15 *Determine* often implies that the quantity concerned cannot be measured directly but is obtained by calculation, substituting measured or known values of other quantities into a standard formula (e.g. the Young modulus, relative molecular mass).

16 *Estimate* implies a reasoned order of magnitude statement or calculation of the quantity concerned, making such simplifying assumptions as may be necessary about points of principle and about the values of quantities not otherwise included in the question.

17 *Sketch*, when applied to graph work, implies that the shape and/or position of the curve need only be qualitatively correct, but candidates should be aware that, depending on the context, some quantitative aspects may be looked for (e.g. passing through the origin, having an intercept, asymptote or discontinuity at a particular value).

In diagrams, *sketch* implies that a simple, freehand drawing is acceptable; nevertheless, care should be taken over proportions and the clear exposition of important details.

In all questions, the number of marks allocated are shown on the examination paper and should be used as a guide by candidates to how much detail to give. In describing a process, the mark allocation should guide the candidate about how many steps to include. In explaining why something happens, it guides the candidate to how many reasons to give, or how much detail to give for each reason.

6 What else you need to know

This section is an overview of other information you need to know about this syllabus. It will help to share the administrative information with your exams officer so they know when you will need their support.

Before you start

Previous study

We recommend that learners starting this course should have studied a broad curriculum such as the Cambridge Lower Secondary programme or equivalent national educational framework.

Guided learning hours

We design Cambridge O Level syllabuses to require about 130 guided learning hours for each subject. This is for guidance only. The number of hours a learner needs to achieve the qualification may vary according to each school and the learners' previous experience of the subject.

Availability and timetables

You can enter candidates in the November exam series.

Check you are using the syllabus for the year the candidate is taking the exam.

Private candidates cannot enter for this syllabus. For more information, please refer to the *Cambridge Guide to Making Entries*.

Combining with other syllabuses

Candidates can take this syllabus alongside other Cambridge International syllabuses in a single exam series. The only exceptions are:

- Cambridge IGCSE Agriculture (0600)
- syllabuses with the same title at the same level.

Cambridge O Level, Cambridge IGCSE and Cambridge IGCSE (9–1) syllabuses are at the same level.

Making entries

Exam administration

To keep our exams secure, we produce question papers for different areas of the world, known as administrative zones. We allocate all Cambridge schools to an administrative zone determined by their location. Each zone has a specific timetable.

Some of our syllabuses offer candidates different assessment options. An entry option code is used to identify the components the candidate will take relevant to the administrative zone and the available assessment options. Please refer to the *Cambridge Guide to Making Entries* for the relevant series for the correct entry option code.

Retakes and carrying forward marks

Candidates can retake the whole qualification as many times as they want to. Information on retake entries is at **www.cambridgeinternational.org/retakes**

Candidates cannot resubmit, in whole or in part, coursework from a previous series for remarking. For information, refer to the *Cambridge Handbook* for the relevant year of assessment at **www.cambridgeinternational.org/eoguide**

Marks achieved in Component 2 Practical Coursework can be carried forward to future series, subject to the requirements set out in the *Cambridge Handbook* for the relevant year of assessment and the *Carry-forward regulations supplement* at **www.cambridgeinternational.org/eoguide**

To confirm what entry options are available for this syllabus, refer to the *Cambridge Guide to Making Entries* for the relevant series. Regulations for carrying forward component marks can be found in the *Cambridge Handbook* for the relevant year of assessment at **www.cambridgeinternational.org/eoguide**

Language

This syllabus and the related assessment materials are available in English only.

Accessibility and equality

Syllabus and assessment design

At Cambridge we recognise that our candidates have highly diverse socio-economic, cultural and linguistic backgrounds, and may also have a variety of protected characteristics. Protected characteristics include special educational needs and disability (SEND), religion and belief, and characteristics related to gender and identity.

We follow accessible design principles to make our syllabuses and assessment materials as accessible and inclusive as possible. We review language accessibility, visual resources, question layout and the contexts used in questions. Using this approach means that we give all candidates the fairest possible opportunity to demonstrate their knowledge, skills and understanding.

Access arrangements

Our design principles aim to make sure our assessment materials are accessible for all candidates. To further minimise barriers faced by candidates with SEND, illness or injury, we offer a range of access arrangements and modified papers. This is the principal way in which we comply with our duty to make 'reasonable adjustments', as guided by the UK Equality Act 2010.

Important:

Requested access arrangements should be based on evidence of the candidate's barrier to taking an assessment and should also reflect their normal way of working. This is explained in section 1.3 of the *Cambridge Handbook* **www.cambridgeinternational.org/eoguide**

- For Cambridge to approve an access arrangement, we need to agree that it constitutes a reasonable adjustment and does not affect the security or integrity of the assessment.
- Details of our standard access arrangements and modified question papers are available in section 1.3 of the *Cambridge Handbook* **www.cambridgeinternational.org/eoguide**

- Centres are expected to check the availability of access arrangements and modified question papers at the start of the course. All applications should be made by the deadlines published in section 1.3 of the *Cambridge Handbook* **www.cambridgeinternational.org/eoguide**
- Contact us at the start of the course to find out if we can approve an access arrangement that is not included in the list of standard access arrangements.
- Candidates who cannot access parts of the assessment may be able to receive an award based on the parts they have completed.

After the exam

Grading and reporting

Grades A*, A, B, C, D or E indicate the standard a candidate achieved at Cambridge O Level.

A* is the highest and E is the lowest. 'Ungraded' means that the candidate's performance did not meet the standard required for grade E. 'Ungraded' is reported on the statement of results but not on the certificate.

In specific circumstances your candidates may see one of the following letters on their statement of results:

- Q (PENDING)
- X (NO RESULT).

These letters do not appear on the certificate.

On the statement of results, Cambridge O Level is shown as GENERAL CERTIFICATE OF EDUCATION ORDINARY LEVEL.

On certificates, Cambridge O Level is shown as General Certificate of Education.

How students and teachers can use the grades

Assessment at Cambridge O Level has two purposes:

1 to measure learning and achievement

The assessment confirms achievement and performance in relation to the knowledge, understanding and skills specified in the syllabus.

2 to show likely future success

The outcomes help predict which students are well prepared for or likely to be successful in a particular course or career.

The outcomes help students choose the most suitable course or career.

Changes to this syllabus for 2027

The syllabus has been updated. This is version 2, published July 2026.

You must read the whole syllabus before planning your teaching programme. We review our syllabuses regularly to make sure they continue to meet the needs of our schools. In updating this syllabus, we have made it easier for teachers and students to understand, keeping the familiar features that teachers and schools value.

Changes to version 2 of the syllabus, published July 2026

Changes to availability	• This syllabus is available in November 2027 in Brunei and Mauritius. • This syllabus is available from November 2028 in Mauritius only.

Syllabuses and specimen materials represent the final authority on the content and structure of all of our assessments.

Quality management

We are committed to providing exceptional quality. In line with this commitment, our quality management system for the provision of international education programmes and qualifications for students aged 5 to 19 is independently certified as meeting the internationally recognised standard, ISO 9001:2015.
Learn more at **www.cambridgeinternational.org/about-us/our-standards/**

We are committed to making our documents accessible in accordance with the WCAG 2.1 Standard. We are always looking to improve the accessibility of our documents. If you find any problems or you think we are not meeting accessibility requirements, contact us at **info@cambridgeinternational.org** with the subject heading: Digital accessibility. If you need this document in a different format, contact us and supply your name, email address and requirements and we will respond within 15 working days.

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