Syllabus

Cambridge IGCSE Agriculture
Syllabus code 0600
For examination in November 2013

UNIVERSITY of CAMBRIDGE
International Examinations

Contents

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1. Introduction

1.1 Why choose Cambridge?

University of Cambridge International Examinations (CIE) is the world's largest provider of international qualifications. Around 1.5 million students from 150 countries enter Cambridge examinations every year. What makes educators around the world choose Cambridge?

Recognition

Cambridge IGCSE is internationally recognised by schools, universities and employers as equivalent to UK GCSE. Cambridge IGCSE is excellent preparation for A/AS Level, the Advanced International Certificate of Education (AICE), US Advanced Placement Programme and the International Baccalaureate (IB) Diploma. Learn more at **www.cie.org.uk/recognition**.

Support

CIE provides a world-class support service for teachers and exams officers. We offer a wide range of teacher materials to Centres, plus teacher training (online and face-to-face) and student support materials. Exams officers can trust in reliable, efficient administration of exams entry and excellent, personal support from CIE Customer Services. Learn more at **www.cie.org.uk/teachers**.

Excellence in education

Cambridge qualifications develop successful students. They build not only understanding and knowledge required for progression, but also learning and thinking skills that help students become independent learners and equip them for life.

Not-for-profit, part of the University of Cambridge

CIE is part of Cambridge Assessment, a not-for-profit organisation and part of the University of Cambridge. The needs of teachers and learners are at the core of what we do. CIE invests constantly in improving its qualifications and services. We draw upon education research in developing our qualifications.

1. Introduction

1.2 Why choose Cambridge IGCSE Agriculture?

Cambridge IGCSE Agriculture is accepted by universities and employers as proof of knowledge and understanding. By considering 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.

1.3 Cambridge International Certificate of Education (ICE)

Cambridge ICE is the group award of the International General Certificate of Secondary Education (IGCSE). It requires the study of subjects drawn from the five different IGCSE subject groups. It gives schools the opportunity to benefit from offering a broad and balanced curriculum by recognising the achievements of students who pass examination in at least seven subjects, including two languages, and one subject from each of the other subject groups.

The Cambridge portfolio of IGCSE qualifications provides a solid foundation for higher level courses such as GCE A and AS Levels and the International Baccalaureate Diploma as well as excellent preparation for employment.

A wide range of IGCSE subjects is available and these are grouped into five curriculum areas. Agriculture falls into Group III, Science.

Leave more about ICE at **www.cie.org.uk/qualifications/academic/middlesec/ice**.

1.4 How can I find out more?

If you are already a Cambridge Centre

You can make entries for this qualification through your usual channels, e.g. British Council or CIE Direct. If you have any queries, please contact us at **international@cie.org.uk**.

If you are not a Cambridge Centre

You can find out how your organisation can become a Cambridge Centre. Email either your local British Council representative or CIE at **international@cie.org.uk**. Learn more about the benefits of becoming a Cambridge Centre at **www.cie.org.uk**.

2. Assessment at a glance

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Candidates enter for Paper 1 and Paper 2.

Paper 1: Theory	**1 hour 45 minutes**

This paper has two sections:

Section A: A number of compulsory, short, structured questions. Worth 70 marks.

Section B: Candidates answer two out of five free-response questions. Each question is worth 15 marks.

Total marks: 100
Weighting: 70%

Paper 2: Teacher-assessed Coursework – testing Practical and Investigatory Skills

A Coursework assessment marked by the teacher and moderated by the Ministries in the candidate's home country or CIE. Detailed instructions for teacher assessment are available from the Ministries of Education or CIE.
When planning practical work, teachers should make sure they do not contravene any school, education authority or government regulations.

Total marks: 90 (Practical skills 60, Investigatory skills 30)
Weighting: 30% (Practical skills 20%, Investigatory skills 10%)

2. Assessment at a glance

Information for Teachers

This booklet relates to examinations taken in the year printed on the cover. It is the normal practice of CIE to print and distribute a new version of this booklet each year. Centres should receive copies well in advance of them being required for teaching purposes.
Teachers who are about to teach syllabuses in this booklet for the first time should obtain and study the relevant past examination papers and Subject Reports.
Any queries relating to this booklet should be addressed to CIE Customer Services.

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.
It is intended that, in order to avoid difficulties arising out of the use of *l* as the symbol for litre, use of dm^3 in place of *l* or litre will be made.

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.

Availability

This syllabus is examined in the October/November examination session.

This syllabus is not available to private candidates.

Combining this with other syllabuses

Candidates can combine this syllabus in an examination session with any other CIE syllabus, except:

- syllabuses with the same title at the same level

Please note that IGCSE, Cambridge International Level 1/Level 2 Certificates and O Level syllabuses are at the same level.

3. Syllabus aims and objectives

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.

3.1 Aims

The syllabus aims to:

1 promote an appreciation of Agriculture as an applied science;

2 stimulate an interest in, and create an awareness of, existing problems and opportunities in agricultural and rural development;

3 stimulate positive attitudes by showing that efficient farming can be both a profitable and a rewarding occupation;

4 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;

5 encourage the teaching, in a practical manner, of basic principles and skills in agriculture and of efficient farm business management;

6 ensure that schools take an active part in rural development by integration of agricultural activities into the school curriculum;

7 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;

8 develop initiative, problem-solving abilities, scientific methods and self-education so as to encourage resourcefulness and self-reliance;

9 provide a basis, together with the basic sciences and mathematics, for more advanced studies in Agriculture.

3.2 Assessment objectives

There are three assessment objectives that describe the knowledge, skills and abilities that candidates are expected to demonstrate at the end of the course. They reflect those aspects of the aims that will be assessed.

A Knowledge with understanding

Candidates should be able to demonstrate agricultural knowledge and understanding in relation to the correct use of:

1 facts, concepts, principles, patterns, models and theories;

2 terms, symbols, quantities and units;

3 the techniques, procedures and principles of safe agricultural practice.

The subject content defines the factual knowledge that candidates may be required to recall and explain. Questions testing these objectives will often begin with one of the following words: *define*, *state*, *name*, *describe*, *explain* or *outline*. (See the glossary of terms at the back of this booklet.)

B Handling information and solving problems

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

1 locate, select, organise and present information from a variety of sources;

2 translate information from one form to another;

3 use information to identify patterns, report trends and draw inferences;

4 present reasoned explanations for phenomena, patterns and relationships;

5 make predictions and propose hypotheses;

6 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 at the back of this booklet.)

C Practical skills and investigations

Candidates should be able to:

1 use and organise techniques, apparatus and material;

2 observe, measure and record;

3 interpret and evaluate experimental observations and data;

4 plan and carry out investigations (and, where appropriate, make predictions and propose hypotheses).

Weighting of Assessment Objectives

Assessment Objective	Weighting
A Knowledge, knowledge with understanding	30%
B Handling information and solving problems	40%
C Practical skills and investigations	30%

4. Curriculum content

1 General Agriculture

Content

1.1 General principles of land use

1.2 Principles of agricultural economics

Learning Outcomes

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;

(d) 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;

(e) 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

Content

2.1 Soil formation

2.2 Soil types, composition, texture and temperature

2.3 Soil fertility

2.4 Soil erosion and soil conservation

2.5 Drainage and irrigation

2.6 Water cycle

Learning Outcomes

Candidates should be able to:

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

(b) describe soil profile in terms of top soil, sub-soil and underlying materials;

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

(d) 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;

4. Curriculum content

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

(f) 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);

(g) 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 seed beds and shading of transplanted seedlings;

(h) explain the importance of the following 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;

(i) carry out practical soil sampling and tests for soil pH;

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

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

(l) 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;

(m) explain how fertilising practices and liming can affect soil pH;

(n) describe types of soil erosion, their causes, agents, prevention and control;

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

(q) 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);

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

3 Principles of Plant Growth

Content

3.1 Movement of materials through plants

3.2 Reproduction in plants

3.3 Germination

Learning Outcomes

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 *translocation* in terms of 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;

(j) define *sexual reproduction*;

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

(l) define *pollination*;

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

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

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

4 Crop Production

Content

4.1 Land preparation

4.2 Cultivation of cash crops

Learning Outcomes

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);

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

(c) 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

Content

5.1 Weed control

5.2 Pest control

5.3 Disease control

5.4 The use of farm chemicals

Learning Outcomes

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 *(Heliothus spp.)*);

(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;

(e) 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 and viral diseases;

(f) 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;

(g) explain the importance of safe storage of farm chemicals to include chemicals that are toxic e.g. insecticides and flammable e.g. fuels.

6 Livestock Anatomy and Physiology

Content

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.

6.2 Sexual reproduction in mammals

Learning Outcomes

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);

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

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

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

7 Livestock Production and Health

Content

7.1 Livestock housing

7.2 Livestock nutrition

7.3 Livestock health

7.4 Study of **one** ruminant and **one** non-ruminant animal with particular reference to (a) to (k) below

Learning Outcomes

Candidates should be able to:

(a) describe suitable housing and living conditions for livestock;

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

(c) 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);

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

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

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

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

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

(i) explain the problems caused by parasites;

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

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

8 Pasture Management

Content

8.1 Extensive pasture management

8.2 Intensive pasture management

Learning Outcomes

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 *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

Content

9.1 Monohybrid inheritance

9.2 Selective breeding in animals and plants

Learning Outcomes

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 *genotype* and *phenotype* and assess their importance in animal and plant breeding;

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

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

(f) understand the benefits of artificial insemination;

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

10 Farm Structures and Tools

Content

10.1 Fencing

10.2 Farm buildings

10.3 Farm water supplies

10.4 Farm tools

10.5 Farm machinery

Learning Outcomes

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;

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

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

(d) outline methods of water treatment by settling and filtration;

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

(f) 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;

(g) describe the use and maintenance of saw, hammer, screwdriver, file, spanner, sprayer and hand tools for cultivation;

(h) explain the advantages and disadvantages of farm mechanisation;

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

5. Coursework

5.1 Introduction

Paper 2 is a teacher-assessed continuous assessment of the candidate's practical work.
The agriculture teacher, who is responsible for allocating marks, is required to submit the complete schedule of all marks for the purposes of moderation.
The number of marks available for the assessment of practical work during the course is 90 marks.
There are four practical exercises which test practical skills. Together these are worth 60 marks.
There is one practical investigation which tests investigatory skills. This is worth 30 marks.

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.

Internal moderation of Coursework
When several teachers in a Centre are involved in internal assessments, arrangements must be made within the Centre for all candidates to be assessed to a common standard.
It is essential that, within each Centre, the marks for each skill assigned within different teaching groups (e.g. different classes) are moderated internally for the whole Centre entry. The Centre assessments will then be subject to external moderation.

External moderation of Coursework
Individual Candidate Record Cards and Coursework Assessment Summary Forms, with internally moderated marks for all candidates, must be received by CIE no later than 31 October. Examples of forms are shown in Section 6.5.
If there are ten or fewer candidates, all the Coursework that contributed to the final mark for **all** the candidates must be sent to CIE.
Where there are more than ten candidates, CIE will select the candidates whose Coursework is required. CIE will communicate the list of candidates to the Centre, and the Centre should despatch the work of these candidates to CIE immediately. A further sample may also be required, so all records and supporting written work should be retained until after publication of results.
Further information about external moderation may be found in the Handbook for Centres and the Administrative Guide for Centres.

5.2 Paper 2: Practical coursework

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.

Practical exercises. Much essential 'field work' in agriculture has no written component but, clearly, credit should be given for practical ability. At least four discrete practical exercises involving assessment objective C (see Section 3.2) should be assessed over the course.

5. Coursework

Each practical exercise should be assessed according to the criteria stated in Section 5.2.2.
Ideally these exercises should be set on the different sections of the syllabus. A maximum of three of these exercises may be set as part of the longer practical investigation exercise. See Section 5.2.6.

At least one discrete practical exercise involving Assessment Objective C should be assessed in **each** of four terms of study.

Practical investigation. This should address the parts of Assessment Objective C where candidates produce a hypothesis, plan and carry out an investigation. The data collected is recorded, analysed and conclusions made. A written report is required and the limitations of the investigation noted. This is assessed according to the criteria stated in Section 5.2.9. The practical work done during this investigation can be organised in such a way as to constitute practical exercises which can be assessed as such. Up to a maximum of three discrete practical exercises may be assessed during the carrying out of the investigation.

5.2.1 Examples of tasks suitable for the practical exercises

Vegetable production, animal husbandry, soil and crop husbandry offer many opportunities to assess the candidates' practical work.
The following are a few examples, as a guide to the teacher:

- digging and preparation of a rough tilth
- preparation of a seed bed
- 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
- care of livestock, including: routine hygiene measures (clean water, feed, removal of litter)
- maintenance of cages, pens, nest-boxes, in a clean and tidy condition.

5. Coursework

5.2.2 Criteria for the assessment of practical exercises

The following five criteria should each be assessed and marked out of a maximum mark of three.

1. Responsibility	the ability to assume responsibility for the task in hand, and to work from given instructions without detailed supervision and help
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. Technique	the ability to tackle a practical task in a methodical, systematic way, and to handle tools skillfully and to good effect
4. Perseverance	the ability to see a task through to a successful conclusion with determination and sustained effort
5. Quality	the ability to attend to detail, so that the work is well finished and is well presented

5.2.3 Guide for marking the practical exercises criteria

1. 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	0–1
2. 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

5. Coursework

• 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	0–1
3. Technique	**Marks**
• Approaches tasks methodically and systematically • Handles tools/apparatus skillfully 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	0–1
4. Perseverance	**Marks**
• Completes all the required practical tasks and attendant written work • Has a positive attitude and is well motivated • Carries out repetitive procedures willingly	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	0–1
5. 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	0–1

5.2.4 Practical Investigation

This should address the parts of Assessment Objective C where candidates produce a hypothesis, plan and carry out an investigation. The data collected is recorded, analysed and conclusions made. A written report is required and the limitations of the investigation noted. This is assessed according to the criteria stated in Section 5.2.9. The practical work done during this investigation can be organised in such a way as to constitute practical exercises which can be assessed as such.
The candidates will carry out an investigation and write a report, not exceeding 1000 words.
The teacher evaluates and marks the report and awards an overall mark out of 30.

5.2.5 The type of work required to test investigatory skills

The main aim of the investigation is that it should be done by the individual candidate, in connection with some particular study problem. It should not be confused with the writing up of class work exercises. 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 5 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.

5.2.6 Examples of acceptable investigations

Investigations can be based on a variety of topics. 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 weight 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 on 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 seed bed. 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.

5.2.7 The degree of guidance by the teacher

This calls for skill on the part of the teacher. Ideally, the candidate should be free to choose a topic for the investigation and to decide on the methods to be used. In practice, the candidate will need help, because of inexperience. The teacher should never leave the candidate in doubt for long about what to do next, so that the candidate does not lose interest or enthusiasm for the investigation.

5.2.8 The layout of the investigation 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.

5.2.9 Criteria for the assessment of the practical investigation

The following six criteria should be assessed and marked out of the maximum marks indicated.

Criteria	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

5.2.10 Guide for marking the investigation report criteria

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 student	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, 0 plot, 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
	0

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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
	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
	0

The scheme of assessment is intended to encourage positive achievement by all candidates.

6. Grade descriptions

Grade F candidates must show competence in answering questions based on the Core curriculum.

Grade C candidates must show mastery of the Core curriculum.

Grade A candidates must show mastery of the Core curriculum and of the Extended curriculum.

Criteria for the standard of achievement likely to have been shown by candidates awarded Grades F, C, and A are shown below. The standard of achievement required for the award of Grade C, include the criteria for Grade F. Similarly, the standard of achievement required for the award of Grade A includes the criteria for Grade C.

A **Grade A** candidate should be able to:

- relate facts to principles and theories and vice versa
- state why particular techniques are preferred for a procedure or operation
- select and collate information from a number of sources and present it in a clear, logical form
- solve problems in situations that may involve a wide range of variables
- process data from a number of sources to identify any patterns or trends
- generate a hypothesis to explain facts, or find facts to support a hypothesis.

A **Grade C** candidate should be able to:

- link facts to situations not specified in the syllabus
- describe the correct procedure(s) for a multi-stage operation
- select a range of information from a given source and present it in a clear, logical form
- identify patterns or trends in given information
- solve a problem involving more than one step, but with a limited range of variables
- generate a hypothesis to explain a given set of facts or data.

A **Grade F** candidate should be able to:

- recall facts contained in the syllabus
- indicate the correct procedure for a single operation
- select and present a single piece of information from a given source
- solve a problem involving one step, or more than one step if structured help is given
- identify a pattern or trend where only minor manipulation of data is needed
- recognise which of two given hypotheses explains a set of facts or data.

It is expected that candidates will demonstrate a background knowledge of, and/or an increased depth of knowledge, in the physical, chemical and mathematical concepts and processes listed in section 7.3.

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7.1 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.

7.2 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.

7. Appendix

7.3 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.

7.3.1 Numbers

The decimal point will be placed on the line, e.g. 52.35.
Numbers from 1000 to 9999 will be printed without commas or spaces.
Numbers greater than or equal to 10 000 will be printed without commas. A space will be left between each group of three whole numbers, e.g. 4 256 789.

7.3.2 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

N.B. 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

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mass	tonne (1000 kg) kilogram gram milligram microgram	(no symbol) 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 square metre square decimetre square centimetre square millimetre	ha m^2 dm^2 cm^2 mm^2
volume	cubic kilometre cubic metre cubic decimetre (preferred to litre) litre cubic centimetre cubic millimetre	km^3 m^3 dm^3 dm^3 (**not** l) cm^3 mm^3
density	kilogram per cubic metre *or* gram per cubic centimetre *or*	kg m^{-3} g cm^{-3}

(d) Use of solidus

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

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7.3.3 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. Pie charts should preferably contain no more than six sectors.

(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.

7. Appendix

7.4 Glossary of 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 (which is relevant only to biology, human and social biology and agriculture) 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. 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.

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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.

7. Appendix

7.5 Coursework forms

Following are the forms:
Practical Exercises – Individual Candidate Record Card
Investigation – Individual Candidate Record Card
Coursework Assessment Summary Form

AGRICULTURE – Practical Exercises
Individual Candidate Record Card

Please read the instructions printed on the following page and the General Coursework Regulations before completing this form.

Centre Number						Centre Name		November	**2**	**0**	**1**	**3**
Candidate Number						Candidate Name		Teaching Group/Set				

Brief description of Practical Exercises undertaken	1 Responsibility – following instructions	2 Initiative – coping with problems	3 Technique – tackling tasks systematically and skillfully	4 Perseverance – seeing a task through to the end	5 Quality – attending to detail	
Marks to be transferred to Coursework Assessment Summary Form	(max 12)	(max 12)	(max 12)	(max 12)	(max 12)	TOTAL (max 60)

Instructions for completing individual candidate record cards

1. Complete the information at the head of the form.
2. Mark each Practical Exercise for each candidate according to instructions given in the Syllabus booklet.
3. Enter marks and total marks in the appropriate spaces. Complete any other sections of the form required.
4. Ensure that the addition of marks is independently checked.
5. **It is essential that the marks of candidates from different teaching groups within each Centre are moderated internally.** This means that the marks awarded to all candidates within a Centre must be brought to a common standard by the teacher responsible for co-ordinating the internal assessment (i.e. the internal moderator), and a single valid and reliable set of marks should be produced that reflects the relative attainment of all the candidates in the Coursework component at the Centre.
6. Attach this form to the candidate's Practical Exercises, **and retain until required for external moderation**. Further detailed instructions about external moderation will be sent in early October of the year of the Examination. See also the instructions on the Coursework Assessment Summary Form (0600/06/CW/S/13).
7. Transfer the marks to the Coursework Assessment Summary Form (0600/06/CW/S/13) in accordance with the instructions given on that document.

AGRICULTURE – Investigati
Individual Candidate Record C

Please read the instructions printed on the following page and the General Coursework Regulations before completing this form.

Centre Number						Centre Name		November	**2**	**0**	**1**	**3**
Candidate Number						Candidate Name		Teaching Group/Set				

Brief description of Investigation undertaken, comments on results, assessment and degree of guidance by teacher, etc.	Skills	Marks to be transferred to Coursework Assessment Summary Form
	1 Selection of questions (hypothesis)	/5
	2 Plan and principles of investigation	/5
	3 Handling evidence	/5
	4 Deductions	/5
	5 Recognition of limitations	/5
	6 Description of Investigation	/5
		TOTAL (max 30)

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Instructions for completing individual candidate record cards

1. Complete the information at the head of the form.
2. Mark each Practical Investigation for each candidate according to instructions given in the Syllabus booklet.
3. Enter marks and total marks in the appropriate spaces. Complete any other sections of the form required.
4. Ensure that the addition of marks is independently checked.
5. **It is essential that the marks of candidates from different teaching groups within each Centre are moderated internally.** This means that the marks awarded to all candidates within a Centre must be brought to a common standard by the teacher responsible for co-ordinating the internal assessment (i.e. the internal moderator), and a single valid and reliable set of marks should be produced that reflects the relative attainment of all the candidates in the Coursework component at the Centre.
6. Attach this form to the candidate's Practical Investigation, **and retain until required for external moderation**. Further detailed instructions about external moderation will be sent in early October of the year of the examination. See also the instructions on the Coursework Assessment Summary Form (0600/06/CW/S/13).
7. Transfer the marks to the Coursework Assessment Summary Form (0600/06/CW/S/13) in accordance with the instructions given on that document.

AGRICULTURE
Coursework Assessment [illegible]rm

Please read the instructions printed on the following page and the General Coursework Regulations before completing this form.

Centre Number						Centre Name		November	2[illegible]3

			Practical exercises					Investigation							
Candidate Number	Candidate Name	Teaching Group/ Centre Set	1 Responsibility (max 12)	2 Initiative (max 12)	3 Technique (max 12)	4 Perseverance (max 12)	5 Quality (max 12)	1 Selection of questions (hypotheses) (max 5)	2 Plan and principles of investigation (max 5)	3 Handling evidence (max 5)	4 Deductions (max 5)	5 Recognition of limitations (max 5)	6 Description of investigation (max 5)	Total Mark (max 90)	Internal Moderated Mark (max 90)

Name of teacher completing this form		Signature		Date						
Name of internal moderator		Signature		Date						

A. Instructions for completing coursework assessment summary forms

1. Complete the information at the head of the form.
2. List the candidates in an order that will allow ease of transfer of information to a computer-printed Coursework mark sheet MS1 at a later stage (i.e. in candidate index number order, where this is known; see item B.1 below). Show the teaching group or set for each candidate. The initials of the teacher may be used to indicate group or set.
3. Transfer each candidate's marks from his or her Individual Candidate Record Cards (0600/04/CW/I/13 and 0600/05/CW/I/13) to this form as follows:
   (a) Where there are columns for individual skills or assignments, enter the marks initially awarded (i.e. before internal moderation took place).
   (b) In the column headed 'Total Mark', enter the total mark awarded *before* internal moderation took place.
   (c) In the column headed 'Internally Moderated Mark', enter the total mark awarded *after* internal moderation took place.
4. Both the teacher completing the form and the internal moderator (or moderators) should check the form and complete and sign the bottom portion.

B. Procedures for external moderation

1. University of Cambridge International Examinations (CIE) sends a computer-printed Coursework mark sheet, MS1, to each Centre in early October showing the names and index numbers of each candidate. Transfer the total internally moderated mark for each candidate from the Coursework Assessment Summary Form to the computer-printed Coursework mark sheet MS1.
2. The top copy of the computer-printed Coursework mark sheet MS1 must be despatched in the specially provided envelope to arrive as soon as possible at CIE but no later than 31 October.
3. CIE will select a list of candidates whose work is required for external moderation. As soon as this list is received, send candidates' work with the corresponding Individual Candidate Record Cards, this Summary Form and the second copy of MS1, to reach CIE by 31 October.
4. If there are ten or fewer candidates, all the Coursework that contributed to the final mark for all the candidates must be sent to CIE. Where there are more than ten candidates, CIE will select the candidates whose Coursework is required.
5. Photocopies of the samples may be sent **but** candidates' original work, with marks and comments from the teacher, is preferred.
6. (a) The pieces of work for each skill should **not** be stapled together, nor should individual sheets be enclosed in plastic wallets.
   (b) Each piece of work should be clearly labelled with the skill being assessed, Centre name, candidate name, and index number and the mark awarded.
7. CIE reserves the right to ask for further samples of Coursework.

8. Additional information

8.1 Guided learning hours

IGCSE syllabuses are designed on the assumption that candidates have about 130 guided learning hours per subject over the duration of the course. ('Guided learning hours' include direct teaching and any other supervised or directed study time. They do not include private study by the candidate.)

However, this figure is for guidance only, and the number of hours required may vary according to local curricular practice and the candidates' prior experience of the subject.

8.2 Recommended prior learning

Candidates beginning this course are not expected to have studied Agriculture previously.

8.3 Progression

IGCSE Certificates are general qualifications that enable candidates to progress either directly to employment, or to proceed to further qualifications.

8.4 Component codes

Because of local variations, in some cases component codes will be different in instructions about making entries for examinations and timetables from those printed in this syllabus, but the component names will be unchanged to make identification straightforward.

8.5 Grading and reporting

IGCSE results are shown by one of the grades A*, A, B, C, D, E, F or G indicating the standard achieved, Grade A* being the highest and Grade G the lowest. 'Ungraded' indicates that the candidate's performance fell short of the standard required for Grade G. 'Ungraded' will be reported on the statement of results but not on the certificate. For some language syllabuses CIE also reports separate oral endorsement grades on a scale of 1 to 5 (1 being the highest).

8. Additional information

Percentage uniform marks are also provided on each candidate's statement of results to supplement their grade for a syllabus. They are determined in this way:

- A candidate who obtains…
  … the minimum mark necessary for a Grade A* obtains a percentage uniform mark of 90%.
  … the minimum mark necessary for a Grade A obtains a percentage uniform mark of 80%.
  … the minimum mark necessary for a Grade B obtains a percentage uniform mark of 70%.
  … the minimum mark necessary for a Grade C obtains a percentage uniform mark of 60%.
  … the minimum mark necessary for a Grade D obtains a percentage uniform mark of 50%.
  … the minimum mark necessary for a Grade E obtains a percentage uniform mark of 40%.
  … the minimum mark necessary for a Grade F obtains a percentage uniform mark of 30%.
  … the minimum mark necessary for a Grade G obtains a percentage uniform mark of 20%.
  … no marks receives a percentage uniform mark of 0%.

Candidates whose mark is none of the above receive a percentage mark in between those stated according to the position of their mark in relation to the grade 'thresholds' (i.e. the minimum mark for obtaining a grade). For example, a candidate whose mark is halfway between the minimum for a Grade C and the minimum for a Grade D (and whose grade is therefore D) receives a percentage uniform mark of 55%.

The uniform percentage mark is stated at syllabus level only. It is not the same as the 'raw' mark obtained by the candidate, since it depends on the position of the grade thresholds (which may vary from one session to another and from one subject to another) and it has been turned into a percentage.

8.6 Resources

Copies of syllabuses, the most recent question papers and Principal Examiners' reports for teachers are available on the Syllabus and Support Materials CD-ROM, which is sent to all CIE Centres.

Resources are also listed on CIE's public website at **www.cie.org.uk**. Please visit this site on a regular basis as the Resource lists are updated through the year.

Access to teachers' email discussion groups, suggested schemes of work and regularly updated resource lists may be found on the CIE Teacher Support website at **http://teachers.cie.org.uk**. This website is available to teachers at registered CIE Centres.

University of Cambridge International Examinations
1 Hills Road, Cambridge, CB1 2EU, United Kingdom
Tel: +44 (0)1223 553554 Fax: +44 (0)1223 553558
Email: international@cie.org.uk Website: www.cie.org.uk