

AGRICULTURE

Paper 5038/12
Theory

Key messages

Weaker candidates should be reminded to check carefully that they have answered two full questions in the last section.

Candidates should recognise the importance of the command words for each question. An 'explain' question will generally require a much fuller answer than one that uses a lower-level command word.

When using diagrams as part of a response, candidates should ensure that these are sufficiently clear. Candidates may use a pencil to assist.

General comments

Candidates mostly gave full responses to the extended questions. In data response questions, those candidates that used the available space for their calculations tended to do better than those who did not. Weaker candidates tended to find applying their knowledge difficult.

Comments on specific questions

Section A

Question 1

- (a) (i) Most candidates answered this question well.
- (ii) Many candidates could identify the appropriate layer.
- (iii) This was generally very well answered with good application of knowledge by most candidates.
- (b) (i) The causes of soil pans were not well understood by weaker candidates. Stronger candidates generally focused their answer on ploughing well.
- (ii) The impact of soil pans on plant growth was generally better understood than formation.

Question 2

- (a) These data response questions were generally very well answered.
- (b) It seemed some weaker candidates may have confused acidity and pH in their responses.

Question 3

- (a) (i) Generally this was answered well but candidates should be made aware that their label lines must be carefully placed and clear. Some responses were sometimes on the borderline between two areas. Some weaker candidates confused the vacuole and cytoplasm.
- (ii) Weaker candidates often described the role of the root without suggesting how its structure supported that role.

- (b) Many candidates seemed aware that osmosis was the movement of water but fewer could make a clear distinction between osmosis and diffusion.
- (c) (i) Candidates who included clear description of the condition usually performed well.
(ii) Some stronger candidates covered relevant methods clearly. It seemed some stronger candidates drew on practical experience in their responses.

Question 4

- (a) Some weaker candidates gave answers relating to the room where the container should be stored rather than the features of the container itself.
- (b) Weaker candidates seemed to have difficulty interpreting the graph and applying knowledge of pest control.
- (c) Some candidates did not use the space provided for their answer, which sometimes left their working difficult to follow to its conclusion.
- (d) The strongest candidates tended to gain full credit for describing all relevant stages in the process. Weaker candidates tended to miss out the transfer from diseased plant to healthy plant.

Question 5

- (a) The location of the caecum and rectum were more challenging for weaker candidates. Many candidates answered well.
- (b) Application of the information in the question to digestion was generally only successful for the stronger candidates. Generally weaker candidates resorted to repeating the question terms without application.

Question 6

- (a) (i) Most candidates were able to calculate the volume drunk per day but the total volume proved more challenging for weaker candidates.
(ii) This was answered well by many candidates.
- (b) (i) Most candidates were able to identify the answer from the graph.
(ii) There were some answers only describing the data in the graph rather than explaining the reduction in deaths in the young animals. Generally, stronger candidates could do better than this and showed a detailed knowledge of this area.

Question 7

- (a) Some candidates did not follow the direction in the question and gave general signs of ill-health not those related to the specific question asked.
- (b) This was generally answered well with most candidates including at least one relevant precaution.
- (c) Some weaker candidates did not focus their answers to notifiable disease. Those candidates that did do this generally performed well.

Question 8

- (a) (i) Weaker candidates tended to describe elements they could see in the photograph rather than answering the question.
(ii) There were some very good answers from those who understood the concept of zero grazing with careful use of language being a feature of stronger responses.
(iii) This question was answered well by stronger candidates.

- (b) Weaker candidates tended to repeat some of the answers that they had given to the previous questions without making comparisons. Some candidates gave their answer in the form of a table to aid making direct comparisons.

Question 9

- (a) Many candidates correctly identified the first operation and at least one other in the correct order. Stronger candidates were able to correctly order all processes.
- (b) Most candidates gained full credit here. A few weak candidates gave answers relating to other syllabus areas suggesting the cultivator was not understood.
- (c) Only some candidates seemed to have experience of carrying out this task.

Section B

Question 10

- (a) Most candidates were able to identify basic ideas about selective breeding but fewer could explain their importance to the farm.
- (b) This area was usually well understood with a good range of reasons given. Weaker candidates sometimes included the overstatement that AI does not require a bull at all.
- (c) Only stronger candidates were able to give more than one or two suggestions, possibly showing a lack of practical experience of the process.

Question 11

- (a) There were some weaker answers covering the features of good animal housing without reference to the materials used.
- (b) Responses to this question were generally stronger but weaker candidates sometimes resorted to repetition.
- (c) Generally weaker candidates did not include explanation.

Question 12

- (a) This was a very well answered question with many candidates giving detailed suggestions.
- (b) Only stronger candidates were able to give more than a couple of reasons for the move to organic production. Weaker answers generally lacked breadth of consideration.
- (c) The stronger candidates could give clear links. Some weaker responses showed misunderstanding of the terms.

Question 13

- (a) Most candidates answered well if they focused on sources. Some weaker candidates seemed to discuss the properties of water generically instead.
- (b) This was a very well answered question.
- (c) While most candidates could describe hydroponic production, fewer were able to go on to explain how using hydroponics could free up land for production.

Question 14

- (a) This was very well covered by the candidates who attempted this question.
- (b) Many candidates gave a detailed description of erosion mitigation techniques.

- (c) Only the strongest candidates were able to answer this question well. Those who did tended to use vocabulary with care.

AGRICULTURE

Paper 5038/02
Coursework

Key messages

The coursework should be incorporated into the teaching scheme of work. Centres should consider the local environmental factors and seasons when planning the delivery of the coursework. This approach enables the practical work to enhance the understanding of agriculture in practice and can incorporate the related science and economic awareness.

Photographic and video evidence usually enhances learning and is valuable in supporting the practical exercises and in the production of candidates' investigations. Evidence must be unique to individual candidates and should lead to a discussion of how any difficulties or problems were managed or adapted to allow a good outcome wherever possible. Photographic evidence can be annotated by candidates to explain tasks being demonstrated and should incorporate comments related to factors encountered. Video evidence can include candidate commentaries to evidence knowledge of tasks undertaken.

General comments

The majority of centres submitted candidate work promptly and organised candidates' evidence well. Work was of a good standard and presented in a range of interesting and creative formats.

Many centres made full use of photographic and video evidence and incorporated live audio discussion and/or high-quality annotation of photographic evidence of work being performed. The strongest examples included constructive, critical reflections of the tasks being performed. Stronger candidates related their experience to the relevant science and the recognised agricultural practice.

Comments on specific marking criteria

Practical exercises

Centres carried out a wide range of practical exercises with many offering a range which was clearly linked to the delivery of the theory content. Most centres provided evidence of the practical skills involved in crop production relating to individual investigations including plot preparation, planting, weeding, and harvesting. Some centres included practical skills such as soil testing for pH or soil composition, which can support theory work and help with many investigation topics, in particular these cultivation-based investigations.

When selecting practical exercises, it is important that the exercises chosen allow stronger candidates to access an appropriate level of demand. This provides an excellent opportunity for these candidates to think critically about the task they are undertaking and make suggestions for how they can improve the methods. There were some very good video clips of candidates working and achieving excellent outcomes from their efforts.

It is helpful if centres annotate candidate work to identify achievement when candidates carry out a task. This could be added to a candidate record card or to the visual evidence.

When carrying out a skill/task in a practical exercise, it is important that high marks are only awarded for work where the candidate uses tools and equipment fully correctly and demonstrates they are using an awareness of good health and safety. A few videos and photographs showed multiple candidates using tools and carrying out tasks. When submitting evidence in this format, the materials must be individual, and candidates should annotate their photographs or make commentaries on videos.

Some candidates used a format such as PowerPoint to present their work. Video links should not be embedded unless the linked file is carefully included. When recording their work, candidates need to explain their practical work in sufficient detail and should assume the reader is unfamiliar with the centre and the specific content.

A few centres made submissions which were overmarked. Centres should use the marking criteria carefully and ensure they differentiate performance, only awarding full marks for excellent performances. Effective annotation by candidates was evident this year from some centres.

Practical investigation

The range and diversity of topics investigated was generally very good and the quality of presentation often enabled candidates to showcase their creativity. Work of a higher standard was often detailed and fully discussed and explained. Stronger candidates incorporated research into their plans and then made full use of the data collected to produce well-reasoned deductions based on the relevant science and agricultural practice.

The selection of relevant questions (hypothesis) for the investigation

Where candidates from individual centres carried out very similar investigations, this suggested that centres had led decisions on the practical work. Where it is not clear how the candidate selected and researched the topic, the teacher must annotate as required to ensure work is original.

Most candidates produced a hypothesis. However, some candidate reports contained identical hypotheses. Candidates need to relate their hypothesis to their own research and evidence it in a way which demonstrates their understanding of the investigation. This can be done by investigating different factors on a crop or livestock for example. Where candidates have developed the same hypothesis, this should be annotated as to whether it is original or devised as a group, and marks awarded accordingly.

Centres should annotate work to indicate the amount of support given to candidates in developing their hypothesis to demonstrate its originality. Only fully independent selection and the formation of an appropriate challenging hypothesis should be awarded full credit.

The planning of the investigation and the principles on which it is based

Methods were generally well researched incorporating a good range of background information. Where candidates accessed additional sources, most of these were included in a bibliography or next to the information.

Equipment and methods stated were generally clear and indicated an understanding of the processes needed to prepare ground for planting and test factors that affect the growth of a crop or animal. The time required to carry out methods was omitted in many cases and this should be considered when planning an investigation.

The strongest candidates referred to their background research and their hypothesis, and used this to develop a suitable plan for carrying out their investigation. Where amendments to the plan were required, these candidates explained and justified the modifications to the plan in appropriate detail.

The handling of evidence

Many candidates collected a good range of data to support their findings. A good range might be measurements of growth of a crop or animal over a period of many weeks. This enables a trend to be seen in data. In some cases, the data collected was quite limited and only just sufficient to produce a basic analysis of results. If candidates are to produce meaningful data, they need to have taken a comprehensive range of results throughout the investigation. Simply producing a bar chart of final crop yield is insufficient to access higher marks.

Presentation of the data was generally good but sometimes data was presented in a simplistic way with little or no explanation. In some cases headings on tables and axis on graphs were not labelled. Stronger candidates incorporated more than one method of analysing their data, showing how it affected the outcome of their investigation. These candidates provided tables and charts which were clearly labelled using appropriate units with a clear, sufficiently detailed heading. Graphs were annotated to ensure the reader

could understand what was being shown. These candidates identified any anomalies clearly and referenced them for further discussion.

Results of investigations need to be recorded in detail and for the highest bands of the mark scheme, with precision. Candidates need to indicate any specific procedures which were used to collect accurate data, taking care to use appropriate and reliable sample sizes.

Stronger candidates discussed local modifications to procedures which might be needed to cope with their local environmental situations, such as water shortages or erosion of soil, and identified clearly the precautions required to ensure results were as accurate as possible.

The ability to make deductions from the evidence or data acquired

In some cases, this was carried out well, focusing on the trends in data acquired and also on the scientific reasons for why the trends may have been evident. Stronger candidates also recommended further investigative procedures to check and extend the investigation to ensure repeatability.

Generally, this is an area which would benefit from more focus as a significant proportion of candidates only focused on the initial trend and were unable to produce valid deductions from their own evidence. Candidates need to be encouraged to do more than simply state or describe the results they have obtained. The strongest candidates fully explained the reason for their results, and their conclusions related to the data and outcomes of their investigation. Weaker candidates needed to draw conclusions and explain and discuss their results and outcomes in detail, taking care to use background research and to link this to their own findings.

Many candidates saw experimental error or natural events beyond their control as spoiling or limiting their ability to draw conclusions and to evaluate their results appropriately. Candidates need to be encouraged to show and explain the importance of events beyond their control, and to link these to the conclusions that can be drawn from such events when addressing the final outcomes. It is important that candidates identify and explain how errors may have occurred and how these might impact on their ability to draw a firm conclusion.

The ability to recognise limitations of the investigation

Most candidates addressed this area in some detail and attempted to demonstrate a clear understanding of this skill by explaining the limitations of their investigations. The strongest candidates took great care to fully explain how future amendments or alterations to their procedure could possibly overcome the problems which they had encountered, incorporating scientific agricultural understanding as to how their investigation was affected. However, some candidates made general statements which were not explained sufficiently to meet the marking criteria. The importance of this skill area needs to be explained to candidates before attempting to deliver the coursework.

Description of investigation, presentation, layout, and originality

In the strongest submissions, candidates used appropriate sub-headings, and made full use of diagrams and charts. The investigations were fully explained and annotated, referenced and linked to the discussions and outcomes obtained in the production of deductions and conclusions.

Annotated photographs greatly improved many reports making it easier to see and understand the work undertaken and these showed the outcomes which the candidates had achieved. This year a lot of candidates' work was supported with annotated photographs which were clearly identified using headings and were sometimes referred to, discussed and explained in detail. Where group photographs are used candidates should identify themselves and say how the photo is relevant to their investigation.

Many centres marked this section accurately and in general, the investigations were well presented.