

GCSE (9–1)

Examiners' report

**GATEWAY SCIENCE
COMBINED
SCIENCE A**

J250

For first teaching in 2016

J250/02 Autumn 2020 series

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.



Reports for the Autumn 2020 series will provide a broad commentary about candidate performance, with the aim for them to be useful future teaching tools. As an exception for this series they will not contain any questions from the question paper nor examples of candidate answers.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

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Paper 2 series overview

This paper was sat by a very small number of candidates, following the cancellation of examinations in Summer 2020 and the subsequent award of grades based on schools' data.

J250/02 is the second biology foundation tier paper in the Gateway GCSE Combined Science suite and it assesses content from specification topics B4-B6 and CS7. To perform well on this paper, candidates need to have a sound knowledge of the theory covered in topics B4-B7 and be able to apply this to novel situations. They also need to apply the skills and understanding that they have developed in the practical activities covered in topic CS7. In addition, this paper also contains questions that have elements of synopticity, drawing on material covered by topics B1-3. There are also questions that involve the assessment of key mathematical requirements from Appendix 5f of the specification.

<i>Candidates who did well on this paper generally did the following:</i>	<i>Candidates who did less well on this paper generally did the following:</i>
<ul style="list-style-type: none"> • Correctly calculated the median in Question 12(c)(i) • Identified the use of a hypothesis and a quadrat in Question 12 • Used or defined, as required, the specification terms mutualism, phenotype, ecosystem, community and population. • Correctly explained trends in data in Question 12(c)(ii) and in Question 15(a)(i). 	<ul style="list-style-type: none"> • Confused the median with the mean or mode. • Identified the nucleus as a structure in bacterial cells in Question 11(d) • Confused the use of the term conclusion with hypothesis in Question 12(a) • Could not define the term phenotype in Question 13(a)(i) • Could not describe how the process of selective breeding is carried out (Question 13(b)) • Could not identify genetic engineering as another way of modifying genomes in Question 13(c).

Section overview

Section A includes 10 multiple choice questions assessing topics across B3-B6. Comments on individual questions are shown below.

Section B also assesses topics from B3-B6, including some synoptic questions requiring some knowledge of B1-3 topics. It contains a mixture of short answer, continuous prose questions and a level of response question. Comments on these questions are shown below.

Option overview

Themes in candidate responses

Candidates scored the majority of their marks on the multiple-choice questions and the short answer type questions. The continuous prose questions, especially those requiring factual knowledge, were less well answered. Answers to the mathematical and practical based questions showed significant variation in standard.

Comments on responses by question type

Multiple choice questions

Questions 1, 3 and 7 were well answered by most candidates.

Question 2, 5, 6 and 8 proved more challenging. In Question 2 a number of candidates chose C as an incorrect answer, highlighting the importance of the rapid reproduction of bacteria rather than its role in decomposition. In Question 5, D proved to be a common incorrect answer with candidates linking transpiration to an increase in water in the soil. In Question 6, antiseptics was the most common incorrect answer.

Questions 4, 9 and 10 proved to be the most difficult. Many incorrect answers to Question 4 were D, with candidates thinking that skin cells were haploid. In Question 9, C was the most common incorrect answer. Question 10 required some knowledge of the process of meiosis, which candidates found challenging. More learning about meiosis would be beneficial to candidates.


Level of response questions

The level of response question was Question 13(b) involving the selective breeding of Belgium Blue cattle. A number of candidates could give a limited description of selective breeding or could give a risk or benefit but these were usually generic, rather than related to the cattle. This therefore limited their answers to Level one.

Other

The questions requiring mathematical skills proved to cover a range of difficulties.

Most candidates could substitute into the equation correctly in Question 7. In Question 12(c)(i) there was a range of different approaches. Although some of the candidates correctly added up the dots and calculated the median, some did not include the reading from the figure. Others either calculated the mean or the mode. Calculating the ratio in Question 15(a)(ii) proved to be the most challenging calculation and there were few correct answers.

	OCR support	This Mathematical skills handbook and Mathematical skills check in would be useful to use with candidates. The tasks allow candidates to self-evaluate their confidence with Mathematical skills, as well as practise them.
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In the prose questions, there were also a mixture of responses.

In Question 11(c), very few candidates appreciated the interaction between HIV and TB, often believing that they were contracted in similar ways. Question 12(d) had only a small number of candidates identifying a mutualistic relationship. In Question 13(a)(iii), the candidates did not appreciate the requirement for characteristics to be advantageous in order to be acted on by natural selection. Answers to Question 11(e) scored well, with candidates being able to use the information provided in the box. In Question 12(c)(ii) most candidates scored one mark for a description of the trend in the results but did not go on to give an explanation.

In the practical based Question 12, many candidates correctly identified the quadrat in part (b)(ii), however, fewer could select hypothesis in (a). Identifying the controlled variable in (b)(i) was a challenge, with answers including the plastic grid, the tape, the tree or the road.

Common misconceptions

In Question 11(d) the majority of candidates correctly selected the cell membrane as a common structure but a large number also choose the nucleus. In Question 14(a), a number of candidates chose organism as the level of organisation for the zebras although this has been given in the row below for zebra. The terms population and community were also often interchanged.

	OCR support	This Organism level systems transition guide contains activities and videos to support candidates with this topic. There is also a checkpoint task that can be used to assess learning.
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Key teaching and learning points – comments on improving performance

The incorrect answers to Question 4 indicated that candidates did not appreciate the diploid nature of skin cells. They also need more experience at identifying dominant alleles when provided with evidence, as in Question 9. Differences between the structure of eukaryotic and prokaryotic cells also need some attention, as indicated by answers to Question 11(d). Question 12(c)(ii) highlighted the need for candidates to appreciate the difference between the command words 'explain' and 'describe'. Probably one of the most notable areas that would benefit from improvement was the recall of definitions required by the specification. This was highlighted in Question 13(a)(i) and Question 14(a). The need for answers to be more precise is also important, as vague references to 'improved diets' in Question 15(c) were not credited.

Guidance on using this paper as a mock

This paper and the associated mark scheme were constructed in the same way as in all summer examinations and the questions tested a good range of topic areas. It is therefore very suitable for use as a mock paper.

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