
GCSE

BIOLOGY

8461/1H – Paper 1 Higher
Report on the Examination

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General Introduction to the Autumn Series

This has been another unusual exam series in many ways. Entry patterns have been very different from those normally seen in the summer, and students had a very different experience in preparation for these exams. It is therefore more difficult to make meaningful comparisons between the range of student responses seen in this series and those seen in a normal summer series. The smaller entry also means that there is less evidence available for examiners to comment on.

In this report, senior examiners will summarise the performance of students in this series in a way that is as helpful as possible to teachers preparing future cohorts while taking into account the unusual circumstances and limited evidence available.

Overview of Entry

This examination had a total entry of 240 compared to an entry of 723 last year, and 107 657 in 2019. The mean mark awarded this year was significantly lower than in 2019 and 2020 despite the difficulty of the papers across all three years being broadly comparable. Generally, the standard of written communication and scientific knowledge and skills seen were weaker in this year's cohort than last.

Comments on Individual Questions

Questions 1, 2 and 3 were common with Biology Paper 1 Foundation Tier.

Question 1 (standard demand)

A lack of correct terminology was seen throughout Question 1. Many students were confused over the apparatus used in the Required Practical Activity (RPA) assessed in **01.1** and the RPA on microbial growth. Unrelated equipment given as an answer included a spatula, microwave and petri dish and a number of students gave answers such as microscope, stage and objective lens, indicating that they had not read the question correctly.

Commonly, weak descriptions of the idea of focussing were given in **01.3**, with many students referring incorrectly to magnification, or more commonly, 'zoom'.

In **01.5**, most students were able to state some of the structures of a red blood cell and a plant cell, and some students were able to make comparisons between the two. Few students included similarities in their comparisons and several were confused about the different blood components, stating that red blood cells contain platelets, plasma and nuclei.

Confusion about the function of the cell wall was seen in **01.6**. Many students thought that the cell wall stops the movement of water into the cell and hence, this is the reason why the cell placed in water did not burst. Several students also thought that the plant cell already had lots of water inside of it and so would not take any additional water in, and therefore, would not burst.

Question 2 (standard demand)

Many students were able to demonstrate the mathematical skills and understanding assessed in **02.3**. Generally, the accuracy of the measurement of the radius (or equivalent) was good, however, some students used the Pi button on their calculator in their calculation, despite being given a value to use. A number of students calculated the area of the paper disc and subtracted this from their calculated value, which is neither required nor correct.

Question 3 (standard demand)

Many students struggled to articulate themselves in describing the pattern shown in the table for **03.3**. Students provided many different, incorrect descriptions of increasing BMI category, including 'going down the BMI category' (implying the BMI is getting lower, but meaning going down the table), 'going down the table', 'getting fatter', 'having more weight', 'the worse the BMI' and 'being less healthy'. It is important that students plan their answers carefully before putting pen to paper and that they use the information given in the table when structuring their responses.

Question 4 (standard, standard/high & high demand)

As in previous years, many students continue to incorrectly refer to energy production and that respiration requires energy. Very few students scored full marks in **04.6** due to a lack of understanding that both the plant and the animal were respiring. Many students appeared to not read the question or graph correctly, and referred to there being card over the tube and hence, no photosynthesis. Many students thought that the carbon dioxide concentration stayed the same because the light intensity was changing. A number of students described the 'lid' of the tube as not being held on securely and therefore, allowing the escape of carbon dioxide.

An unusually high number of students referred to the black paper in the investigation as black pepper, causing some confusion when it came to answering associated questions.

In **04.8**, a common misconception seen was that cells continue to respire once an organism has died and that as a body decomposes, the body itself releases carbon dioxide, rather than the carbon dioxide being released from respiration of microorganisms.

Question 5 (standard, standard/high & high demand)

Many students were unable to access the marks available in **05.3** due to confusion over the difference between the enzyme and the substrate. Several students thought that starch was an enzyme or that amylase fitted into the enzyme. Few students referred to the shape of the active site needed for marking point 2 and many stated that the substrate fits into the active site, but did not go on to say that binding occurred. A lack of specificity of language was common in **05.4** with students referring to 'amount' regularly. A common response was temperature, despite this being the independent variable in the investigation. **05.6** was not answered well with common references to time rather than activity.

Question 6 (standard, standard/high & high demand)

In **06.6**, most students were able to describe features of xylem and phloem, however, most did not acknowledge the command word and therefore did not make any creditworthy comparisons. Most students were good at recalling that xylem is made of dead cells and that it contains lignin. Some students thought that both xylem and phloem contain lots of mitochondria for energy and some implied that energy was used to move water. Many students think that the process of transpiration involves energy. Many students found it difficult to articulate themselves when describing cross walls and end walls, often using incorrect terminology. A few students thought that xylem vessels contained valves and went on to talk about blood vessels or substances being transported around the 'body' rather than the plant. Higher-attaining students were able to name sugars, or sucrose, as being transported by the phloem, but most students referred simply to 'food' (and sometimes incorrectly to mineral ions, confusing phloem with xylem) which was not sufficient.

In **06.7**, many students were able to access the question by attempting to find the gradient of the tangent. Whilst many were successful in undertaking this higher level skill, some students did not achieve full marks due to inaccurate graph readings and this is a skill students are advised to practise. Several students forgot to subtract the two y-axis values from one another, incorrectly assuming that the tangent started at zero.

Question 7 (standard, standard/high & high demand)

In **07.4** and **07.5**, many students had not read the stem of the question in detail and therefore gave ideas about the donor transferring antibodies to the patient. In **07.5**, several students stated that the red blood cells do not have a specific antigen 'shape' so therefore all of the antibodies can fit and bind.

In **07.7**, most students were able to describe the function of bile as an emulsifier, and many students gave long explanations of how bile works, however, they did not link this to a lack of bile and why this would cause difficulty digesting fat.

This question highlighted several misconceptions in this area. Some students thought that fat, lipase or food molecules pass through the bile duct and that big molecules of fat would not fit past the blockage. Some students stated that bile is an enzyme and were confused over the difference between lipase and bile, often thinking that they are one in the same.

Concluding Remarks

The standard of responses seen in this paper was lower than in previous years. Students generally scored well on simple recall of knowledge questions (AO1) and questions on the topic of cell structure were generally well answered. Some students were able to apply their knowledge effectively in straightforward questions (AO2), but many found application of knowledge to new situations more difficult. There was indication that many students had not carried out the Required Practical Activities assessed throughout the paper. Many student's understanding of the structure and function of plant tissues was limited and a lack of clear knowledge meant that some students did not articulate themselves well throughout the paper. Generally, students scored well on the mathematical skills, however, a lack of precision when reading data from graphs was common.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.