Biology GCSE 2018
Summary of examiners reports

The introduction of the new '9-1' Science GCSEs of 2018 has been a challenging experience for students and teachers alike. This year, therefore, the examiners' reports are more useful than ever as a diagnostic tool, to help teachers provide targeted guidance to students taking these exams in future.

This blog provides a summary of the examiner's reports for the 2018 Biology papers. It covers both combined science and the separate sciences, foundation tier and higher tier. We have used the examiner reports prepared for the AQA exam board, but the same lessons apply to students taking Edexcel and OCR exams.

The links below provide tables of grade boundaries for all three sciences.

- Grade Boundaries – Combined Science
- Grade Boundaries – Separate Sciences

Traditionally, Biology has had the highest grade boundaries of the three sciences, as students found the subject more accessible than Chemistry or Physics. But in 2018, the introduction of more advanced topics to the Biology specification (some of them previously taught at A-level) proved a major challenge and Biology actually had the lowest grade boundaries.

Below we highlight points from the examiners' reports, which help explain why grade boundaries in Biology were unusually low this year.

The examiners reported that, overall, AO1 (knowledge) questions were answered well, including answers to simple factual questions and questions which required basic calculations such as percentage change. The problems were with in-depth knowledge: answering AO2 questions (*apply* knowledge) and AO3 questions (analyse, interpret, evaluate, draw conclusions).

We've split the examiners comments into three broad (and overlapping) categories: 'Required practicals', 'Key exam skills' and 'Subject areas for development'.

Required practicals

In both combined and separate science Biology, examiners reported that students lacked exposure to, and in-depth understanding of, required practicals, and that as a result, they lost marks on a number of exam questions. Many students were unable to give a detailed enough account of how to carry out practicals, for example, or could not explain and interpret the data analysis from practical experiments.

Specifically:

- There was a lot of confusion regarding key practical vocabulary such as 'valid' and 'repeatable', which meant that students were unable to answer exam questions effectively.
- There was confusion regarding the difference between a 'control experiment' (which forms a baseline, before any experimental manipulation, with which to compare experimental results) and a 'control variable' (a variable that is deliberately kept constant throughout the investigation).
- Many students did not understand the term 'independent variable'.

- Students displayed a limited understanding of investigative terms such as 'reliability'. When asked to suggest ways to improve reliability, many students simply stated to "repeat" the experiment when it was required to state: "repeat and look to see if results are similar".
- Students struggled to compare data from the graphs provided and found It difficult to deal with data with unusual scales.
- Across both higher and foundation tier, students found it difficult to explain how to focus a microscope to give clearer or larger images.

It's clear that, in preparing students for the 2019 exams, a focus on the teaching and learning of required practicals is essential for all schools.

My GSCE Science complements lab demonstrations of required practicals with learning videos on each of them. These videos are useful as preparation ahead of a class demonstration and can also be used for revision. My GSCE Science exam-style questions on practicals thoroughly test students' knowledge and help prepare them for the exams. All videos on required practicals are available directly from a student's video dashboard, by clicking on the PRACTICALS button at the top of the video dashboard, or by using the SEARCH function.

In addition, My GCSE Science teachers have prepared a number of blogs that deal directly with the issues raised by examiners and summarised above. The blogs are invaluable sources of advice on required practicals and graph skills, for teachers and students alike. They are freely available on www.my-GCSEscience.com.

- Practicals: key vocabulary
- Practicals: measurements and data
- Describing, explaining and comparing graphs

Key exam skills

Key exam skills were lacking and accounted for a large share of lost marks, according to the examiners. Specifically:

- Multiple choice question technique needs to be improved, to help students avoid distractors. This was especially the case for foundation learners.
- Many students lost a considerable number of marks by failing to read the stem of question carefully.

- Many marks were lost when students repeated the stem of the question without adding value to their answer or using their own knowledge.
- Students lost marks for failing to include all stipulated factors in an answer, for example 'lifestyle' _and_ 'medical risk' factors.
- Students often confused the 'describe' and 'explain' command words, which limited their answers. Explanations were often not developed enough to gain full marks.
- Students lacked confidence in answering 'comparison' questions, by ensuring that their points were clear and that all comparisons were between two items.
- Where comparative vocabulary was required, terms like 'higher', 'faster' gained marks, while 'high' and 'fast' did not.
- Many students did now follow instructions properly and were not awarded full marks in questions where they were asked to "use the information provided", "use the information in the diagram/graph", "give an alternative use" or "use your own knowledge".
- Students would benefit from practising unit conversions and need to ensure they round answers at the _end_ of a calculation, not at each stage. These maths skills errors caused many students to lose marks.
- When plotting graphs, students must plot points as crosses, not as dots. Doing the latter cost students marks.
- Students must ensure answers fit the question and _avoid prepared answers_.

The errors above can be addressed by using My GCSE Science to help improve students' exam technique. 1,000 multiple-choice questions are available to answer directly on the website. In addition, My GCSE Science long-form exam-style questions (and corresponding mark schemes) help students build an in-depth understanding of each topic while at the same time developing exam technique.

My GCSE Science teachers have also prepared blogs that deal directly with exam skills and maths skills in Biology. These blogs cover all of the issues raised by the examiners and are freely available on www.my-GCSEscience.com.

- Maths skills in GCSE Biology
- Decimal places and significant figures
- Command words in GCSE Biology

Subject areas for development

- Students struggled to remember Kingdom-Phylum-Class-Order-Family-Genus-Species. Many remembered the acronym, but not what the it stands for!
- Furthermore, those students who *did* remember the full list often lost marks due to a limited understanding of the three domains.
- Of note, few students associated archaea with extremophiles.
- When given a specific example to *explain*, students often gave weak explanations of evolution by natural selection. Mark schemes required examples of the variations available and an indication of which variant was the most advantageous.
- Many students struggled to *describe* how selective breeding would take place.
- When referring to natural selection or selective breeding students were expected to say breed or reproduce *with the opposite gender.* (Writing simply 'breed' or 'reproduce' was insufficient).
- Students struggled to explain in detail why sexual reproduction is beneficial.
- There were regular confusions between mitosis and meiosis, between immunity and resistance and between therapeutic cloning and IVF.
- Students found it difficult to link different areas of the specification, for example linking the rate of decay with respiration and the role of bacteria in digestion of sewage treatment. Students also struggled to link gene structure with protein synthesis and mutations. These more challenging questions were often found towards the end of the paper within 'high demand' questions.
- Many students lost marks when drawing scale pyramids of biomass by, for example, forgetting to label axes.
- When suggesting a way to regulate experimental temperature, 'water bath' was insufficient, while 'warm water bath' gained marks.
- The mark scheme required the word 'quadrat' to be spelt correctly.
- Students had to write CO_2 with a subscript (not a superscript) to ensure marks.

All of this subject matter is of comprehensively covered by My GCSE Science video tutorials and the associated exam-preparation resources. In addition, My GCSE Science teachers have prepared blogs that deal directly with the areas for improvement as outlined above. These blogs are freely available on www.my-GCSEscience.com.

- Tricky vocabulary in Biology
- GCSE Biology: The application of knowledge to unfamiliar contexts