



Grade 8 guarantees

Premium video tutorials, exam-style questions and revision resources for the 9-1 Science GCSEs

GCSE Biology

Summary of Examiners Reports

The introduction of the 9-1 Science GCSEs has been a challenging experience for students and teachers alike. Consequently, 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 reports for both the 2018 and 2019 Biology papers, with a focus on 2019. Next to each point, we highlight the relevant year.

The summary 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](#)

Overview

Traditionally, Biology has had the highest grade boundaries of the three sciences, as students found the subject more accessible than Chemistry or Physics. But that is no longer the case, because the introduction of more advanced topics to the Biology specification (some of them previously taught at A-level) has proved a major challenge. Below we highlight key points from the examiner reports, which help explain why grade boundaries in Biology remain relatively low.

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). [2018]

We've split the examiners comments into five categories: Key exam skills, Maths skills, Graph skills, Required practicals and Subject areas for development.

Key exam skills

Key exam skills were lacking in both 2018 and again in 2019 and accounted for a large share of lost marks, according to the examiners. Many marks were missed due to students giving vague ideas. Examiners suspected that many students may well have known the answers if they had "stopped to think". [2019]

They suggested that teachers encourage students to stop and review answers to check that they have included the required scientific detail. [2019] When dealing with extended response questions, examiners recommended that students are reminded to give attention to all information in the stem of the question rather than to just a few aspects and added that students should be advised to "marshal their ideas in a brief plan" before answering. [2018, 2019]

The examiners commented regularly on errors that could have been addressed by improving students' exam technique. Specifically:

- On occasions, some students wrote excessively and should be reminded that the answer space provided has been specifically designed to fit the anticipated length of a response. [2019]
- Repeating, rather than using, information given in the question wastes both time and space and does not gain any marks. [2019] Many marks were lost when students repeated the stem of the question without adding value to their answer or using their own knowledge. [2018]

- Marks were lost by failing to follow instructions in multiple-choice questions, such as to tick the correct number of boxes. [2019] Multiple choice question technique needs to be improved, to help students avoid distractors. This was especially the case for foundation learners. [2018]
- Poor handwriting, for example with numerals – and especially the distinction between the numbers 1 and 2 – can result in lost marks. [2019]
- When asked to write a word equation, it is important for students to follow instructions carefully. Although chemical formulae are generally acceptable as alternatives to the names of substances, they need to be correct, for example CO₂ is an acceptable alternative to carbon dioxide. But CO2 and CO₂ are not and will gain no marks. [2019] Students had to write CO₂ with a subscript (not a superscript) to ensure marks. [2018]
- Although the command word in the question was ‘describe’ many students still felt the need to ‘explain’. As a result, they both wasted time and also failed to focus on the detailed descriptions of events that were required. [2019] Students often confused the ‘describe’ and ‘explain’ command words, which limited their answers. Explanations were often not developed enough to gain full marks. [2018]
- Careless reading of the question resulted in inappropriate answers, for example failure to give a comparative answer to a comparative question, or failure to use the information given in a table or a graph, or not presenting both sides of an argument when the instruction in the question is to ‘evaluate’. Many students failed to appreciate the requirements of the ‘evaluate’ question, neglecting to make a clear judgement and good comparative statements. [2019] Students lacked confidence in answering ‘comparison’ questions, by ensuring that their points were clear and that all comparisons were between two items. [2018]
- Students lost marks for failing to include all stipulated factors in an answer, for example ‘lifestyle’ *and* ‘medical risk’ factors. [2018]
- Where comparative vocabulary was required, terms like ‘higher’, ‘faster’ gained marks, while ‘high’ and ‘fast’ did not. [2018]
- Many students did not 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”. [2018]
- Students must ensure answers fit the question and *avoid prepared answers*. [2018]

The errors above can be addressed by using My GCSE Science to help improve students' exam technique. 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.

Our teachers have also prepared blogs that deal directly with exam skills:

- [Common misconceptions in Biology GCSE](#)
- [Command words in GCSE Biology](#)
- [Tricky vocabulary in Biology](#)
- [GCSE Biology: The application of knowledge to unfamiliar contexts](#)

Graph skills

A significant number of students were unable to read values from a graph accurately, or plot an even scale and axis. [2019] Students struggled to compare data from the graphs provided and found it difficult to deal with data with unusual scales. [2018] Many students lost marks when drawing scale pyramids of biomass, for example, by forgetting to label axes. [2018]

- Many students failed to achieve a mark when asked to draw a line of best fit. Some plotted points were drawn too finely and were then obscured by the student's curve of best fit. Other points were plotted using large, thick crosses which made it difficult to achieve the required accuracy. The examiners recommended students are exposed to a variety of graph drawing experiences that involve both curves and straight lines of best fit. [2019]
- To avoid the need for additional paper in graph drawing questions, students should be advised to initially draw graphs in pencil, so that if errors are made, they can be corrected easily. Several students used additional paper after making an error, but then drew their graph on standard paper which meant no plotting marks could be awarded. The examiners suggested that students must be reminded to request graph paper if required. [2019]
- The examiners noted that students always find it more difficult to interpret data when it is given in a table, rather than displayed as a graph and that it might help if students sketched the data as a graph so that changes in rate, for example, would be more obvious. [2019]

My GCSE Science teachers have written a blog that deals directly with many of the graph-related issues raised by the examiners in 2018 and 2019. It is available here:

- [Describing, explaining and comparing graphs](#)

Maths skills

More students are showing their working for calculations and students generally demonstrated good maths skills, according to the examiners. [2019]

- Some students, however, struggled with rounding numbers and the use of significant figures. [2019]
- 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. [2018]
- 38% of students gained full marks for calculating the length of the root hair in micrometres. But one third of students lost marks because they made an error with the unit conversion. [2019]
- The examiners recommended that students are reminded to check whether the answer to a calculation is sensible. [2019]

Our teachers have written blogs on maths skills, which cover all of the issues raised by the examiners above, and are available free on www.my-GCSEscience.com.

- [Maths skills in GCSE Biology](#)
- [Decimal places and significant figures](#)

Required practicals

In 2018, examiners reported that students lacked exposure to and in-depth understanding of required practicals and, as a result, they lost many marks on a number of exam questions. In 2019, examiners reiterated the necessity for all students to have the opportunity to carry out all required practicals throughout their GCSE course. However in general, questions regarding required practical showed an improvement compared with 2018.

- In 2018, there was much confusion regarding vocabulary such as 'valid' and 'repeatable'. While in 2019, examiners reported that most students showed understanding of methods, variables and validity.
- In 2018, 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'.

- In 2019, examiners noted continued inappropriate use of the terms ‘accurate’, ‘precise’, ‘reproducible’, ‘repeatable’ and ‘valid’. The term ‘fair’ is always inadequate unless suitably qualified. And there was still confusion between a control and a control variable.
- It was clear to examiners that a significant proportion of students do not understand the methods involved in the required practical on testing foods. [2019]
- 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”. [2018]

It’s clear that, in preparing students for the 2020 exams, a focus on the teaching and learning of required practicals continues to be essential for all schools.

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

In addition, our 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 available free on www.my-GCSEscience.com:

- [Practicals: key vocabulary](#)
- [Practicals: measurements and data](#)
- [Describing, explaining and comparing graphs](#)

Subject areas for development

- The examiners referred repeatedly to a significant and regular misconception which relates to the Principle of Conservation of Energy (Physics). Energy can be stored, or it can be transferred. It cannot be created or destroyed. Examiners noted with some exasperation that every year students write that respiration ‘produces’, ‘makes’ or ‘generates’ energy or that energy is ‘used’ in respiration. The examiners recommend that students are advised that such statements gains no marks in the exam (and are scientifically impossible). In respiration, energy is not ‘produced’ but is released or transferred from glucose. [2019]

- In general, examiners reported that many responses demonstrated a poor understanding of transport processes. Many students continue to confuse the processes of osmosis, diffusion and active transport. Examiners noted that students “continue, year on year”, to state that osmosis is the movement of water from an area of high concentration to low concentration. Because of the lack of reference to water concentration, examiners have to assume that the concentration to which students refer is the solute concentration and therefore, that the answer is incorrect. References to water moving down the concentration gradient are also, therefore, incorrect. Students need to be advised to make clear and specific statements regarding osmosis. [2019]
 - [Osmosis](#)
 - [Diffusion](#)
 - [Active transport](#)
- Students struggled to explain in detail why sexual reproduction is beneficial. There were regular confusions between mitosis and meiosis. [2018]
 - [Asexual vs sexual reproduction and meiosis](#)
 - [Chromosomes and Mitosis](#)
- The examiners reported that the subject area that seemed to confuse students the most, and one where teachers could perhaps spend more curriculum time, is the section on inheritance, variation and evolution. [2019]
- Students generally do not understand the differences between sexual and asexual reproduction, selective breeding, natural selection and evolution, genetic engineering and cloning. [2019]
 - [Genetic engineering](#)
- Students often gave weak explanations of evolution by natural selection. [2018] 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. [2018]
 - [Selective breeding](#)
- In 2018 most students did not understand selective breeding, but possibly due to subsequent emphasis by teachers on this topic, many now tried to apply the selective breeding process to a question about natural selection and speciation.
 - [Natural selection](#)
 - [Theories of evolutions and speciation](#)

- Students struggled to remember Kingdom-Phylum-Class-Order-Family-Genus-Species. Many remembered the acronym, but not what it stands for! 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. [2018]
 - [Classification and evolutionary trees](#)
- Some students confused insecticides and insect repellents. The insecticide kills the mosquito, but the repellent just reduces the chance of being bitten. Vague references to “bug spray” were not credited. Many students did not appreciate that malaria is not passed from person to person: some talked about isolating people, hygiene or protected sex. [2019]
 - [Communicable diseases](#)
- Across both higher and foundation tier, students found it difficult to explain how to focus a microscope to give clearer or larger images. [2018] Many students either did not understand how to use a light microscope, or could not explain the procedure in a clear step by step way. Knowledge of the names of the parts of a microscope was poor. Many responses lacked detail, or gave confused accounts of how to focus a microscope. [2019]
 - [Microscopes and magnification](#)
- About 31% of students were able to give a complete account of how insulin and glucagon would control a person’s blood glucose concentration after a meal. Some students confused the roles of the two hormones and hybrid spellings between the terms glucagon and glycogen often resulted in lost marks. The term ‘blood sugar’ did not gain credit, nor did answers that referred to ‘amounts’ of glucose ‘in the body’ rather than concentrations of glucose in the blood. [2019]
 - [Controlling blood glucose](#)
- Students were required to provide a straightforward and general definition of homeostasis – the idea that internal conditions of a body or cell are regulated so that they are optimal for all functioning. [2019] The first key aspect of this definition (internal) was often given correctly, although no marks were given for statements such as ‘control of the body’ or ‘maintenance of the body’s living conditions’ where there was no qualification of this being ‘internal’. The second key aspect of the definition (optimal), however, was seen far less frequently. Words such as regular, correct, normal, good, healthy or right were all considered too vague as replacements for ‘optimal’. Similarly, references to conditions being kept stable, steady or balanced, while true, did not go far enough, as they may not necessarily be ‘optimal’. [2019]
 - [Controlling blood glucose](#)
 - [The nervous system](#)
 - [Adrenaline and thyroxine](#)

- Many students were confused about the difference between guard cells and stomata, often believing them to be the same thing. References to guard cells being in stomata were common, as were references to the guard cells themselves closing or opening. Some students confused xylem with phloem and transpiration with translocation. [2019]
 - [Organisation in plants](#)
- Around 37% of students knew that pacemaker cells are found in the right atrium. Almost as many thought that they are found in the left ventricle. Most students simply did not understand the concept of a double circulatory system. Many failed to reference the idea of two separate pathways coming from each side of the heart. A common misconception was that a leaking heart valve would lead to the mixing of oxygenated and deoxygenated blood, rather than a backflow of (some) blood. [2019]
 - [The circulatory system](#)
- Only a few students knew that radioactive substances, toxins or drugs were attached to monoclonal antibodies, and very few understood that it was this (and not the monoclonal antibodies themselves) that killed the cancer cells. The idea that monoclonal antibodies block the signals that tell cells to divide was rarely seen. A common misconception was that the binding of the monoclonal antibody to the cancer cell would inhibit its division or destroy it. Some students thought that the monoclonal antibody would engulf the cancer cell and others thought that the monoclonal antibody would divide and increase in number. [2019]
 - [Monoclonal antibodies](#)
- Most students were clearly confused about the nature of long-sightedness and short-sightedness. Many students also confused accommodation with adjustment to a change in light intensity and wrote about the action of the iris. Many students had difficulty explaining how spectacles could correct long-sightedness. Some were confused over whether a converging or diverging lens was required (usually described as convex or concave). Only 12% of students scored full marks. [2019]
 - [The eye](#)
- It was evident that many students had limited knowledge of how the kidneys work. About 71% of understood that the pituitary gland is the hormone-producing gland for the control of water loss from the body and round 85% of students knew that the hormone that helps the kidneys control water loss is called ADH. However, the way in which the hormone stimulated the kidneys to reduce water loss was fully understood by only about 3% of students. Only a very small minority of students scored full marks when asked for two biological (not practical) reasons why a kidney transplant was preferable to treatment by dialysis. [2019]
 - [Maintaining water and nitrogen balance](#)
 - [Adrenaline and thyroxine](#)
- There is confusion regarding various terms, such as: phenotype and genotype; dominant and recessive; reabsorption, absorption and filtration. [2019] There was

confusion between antigens, antibodies and phagocytes. Many students referred to the body being able to “fight off” the pathogen. This gains no marks. [2019] There is confusion between immunity and resistance and between therapeutic cloning and IVF. [2018]

- 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. [2018] Students also struggled to link gene structure with protein synthesis and mutations. [2018]
- When suggesting a way to regulate experimental temperature, ‘water bath’ was insufficient, while ‘warm water bath’ gained marks. [2018] The mark scheme required the word ‘quadrat’ to be spelt correctly. [2018]
- Only 36% of students gave the correct response of glucagon as the hormone which is released if blood glucose concentration falls too low. It was expected that students could spell this scientific word and so the various combinations of glycogen, glucose and glucagon seen were not accepted and did not gain marks. [2019]
- While the concept of a placebo was generally well understood, students struggled to express their understanding clearly. Several students simply stated that use of a placebo would eliminate the placebo effect, which gained no marks. [2019]



Grade 8 guarantees