

GCSE
COMBINED SCIENCE:
SYNERGY

8465/1F: Life and environmental sciences (Foundation)
Report on the Examination

8465
June 2019

Version: 1.0

Further copies of this Report are available from aqa.org.uk

Copyright © 2019 AQA and its licensors. All rights reserved.

AQA retains the copyright on all its publications. However, registered schools/colleges for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to schools/colleges to photocopy any material that is acknowledged to a third party even for internal use within the centre.

General

The paper ramps in demand from beginning to end, and to a lesser extent ramps within questions.

Students made good attempts at answering the whole paper, with no indication of problems with time constraints being seen.

Mathematical questions seem to have been attempted more frequently this year relative to last year. Students need to have a calculator in this exam.

Confusion was seen in some responses regarding command words, with the terms describe and explain causing the most significant issues for students. Guidance on command words can be found on the AQA website.

Questions 8 and 9 were common to Foundation and Higher tiers and were targeted at standard demand.

Levels of demand

Questions are set at two levels of demand for this paper:

- **low demand** questions are designed to broadly target grades 1–3
- **standard demand** questions are designed to broadly target grades 4–5.

A student's final grade, however, is based on their attainment across the qualification as a whole, not just on questions that may have been targeted at the level at which they are working.

Question 1 (low demand)

- 01.1** Around a quarter of students could name valves as the structures that prevent blood flowing the wrong way in the heart.
- 01.2** More than half of the students achieved a mark in this question for identifying arteries as the blood vessels that take blood away from the heart.
- 01.3** Around 41% of students correctly identified two differences between blood in the arteries and blood in the veins of the legs. About 7% of students only ticked one box.
- 01.4** Less than half of the students could make the link between long-term regular exercise and decreased resting heart rate.
- 01.5** Around 77% of students could calculate the mean value.
- 01.6** Most students could offer a sensible suggestion for the higher heart rate on day 3.
- 01.7** Just below half of the students gained three marks for this calculation.

Question 2 (low demand)

- 02.1** Around 44% of students were able to recognise that carbon is a pure substance in chemistry.

02.2 Many students were able to describe at least one part of the graph. Incorrect responses often attempted to explain rather than describe the graph. Incorrect responses for marking point 2 frequently referred to the temperature remaining constant for three minutes, rather than for two minutes.

Less effective responses simply referred to an increase in temperature without any reference to data or did not refer to the temperature being constant for a period.

02.3 More than half of the students could use the graph to identify the melting point of substance A.

02.4 Most students could correctly plot the data and many of these students were then able to join the data points appropriately. Students are expected to have a ruler for this exam.

Question 3 (low & standard demand)

03.1 About 29% of students could match the words abundance and distribution to the correct description.

03.2 Around 41% of students were able to give the independent variable in this investigation.

03.3 Most students could not identify where to locate their transect for the given investigation. Lines were seen at all angles across the field, but rarely from the school building. Acceptable transects could be in any direction from the school building. This question is based on a Required Practical Activity (RPA).

03.4 This question relates to RPA 12. Students are expected to have carried out all RPAs. This RPA requires measuring the population size of a common species in a habitat and using sampling techniques to investigate the effect of a factor on the distribution of this species. Apparatus and Techniques (AT) skills covered by this practical activity:

- Biology AT 1 – use appropriate apparatus to record length and area
- Biology AT 3 – use transect lines and quadrats to measure distribution of a species
- Biology AT 4 – safe and ethical use of organisms and response to a factor in the environment
- Biology AT 6 – application of appropriate sampling techniques to investigate the distribution and abundance of organisms in an ecosystem via direct use in the field.

Students rarely showed sound evidence of a distribution investigation. Some attempted to describe how abundance can be investigated and sometimes gained partial marks for this. Few students described a method using a transect.

Incorrect responses described students looking for an area with many plants to place the quadrat, or throw it. Some students presumed the quadrat was a results table or graph paper. Others described planting plants at different distances from the school building.

It should be noted that throwing a quadrat is not a valid method of ensuring randomness.

03.5 Most students could identify that plants under the tree would be exposed to less light or be shaded by the tree. Just 'light' was insufficient.

- 03.6** Most students could state one other relevant factor. This question was phrased so as to not be directional. Therefore, if not already credited in question 03.5, 'light' was correct here. This avoided some students missing out on a mark twice for the same type of error.

Question 4 (low & standard demand)

- 04.1** Around 77% of students could name both main reproductive hormones.
- 04.2** A quarter of students could calculate this percentage.
- 04.3** Most students could describe why the number of days bleeding shown in the Figure 4 is just an estimate. Vague answers such as 'all women are different' were insufficient.
- 04.4** Around 58% of students knew the egg was maturing at this stage.
- 04.5** Around 56% of students knew the egg is released from the ovary.
- 04.6** Few correct answers were seen. Students could use the abbreviation LH, or state luteinising hormone. Phonetic spelling is always credited unless there is possible confusion with another term. A range of incorrect hormones and enzymes were stated, plus other terms such as period, menopause and oviduct.
- 04.7** Students found this question challenging. The most common responses gained one mark rather than two because students were not giving an explanation.
- 04.8** The majority of students could state one form of contraception.

Question 5 (low & standard demand)

- 05.1** Around 55% of students were able to link the change in average kinetic energy of gas particles with a temperature decrease.
- 05.2** Around 62% of students gained the mark for identifying the change in speed of the gas particles.
- 05.3** Approximately 39% of students gained the mark for applying their knowledge as to why air moves into the syringe.
- 05.4** Students were asked to recall the equation that links density, mass and volume. Attempts that were incomplete, such as mass divided by volume, were insufficient. Students often made a note of the triangle method of remembering equations. These triangles are insufficient on their own, so students need to write down the full equation to show their understanding.
- 05.5** About 30% of students could convert grams to kilograms.
- 05.6** Many students gained marks here due to allowing error carried forward from question 05.5. Others used 0.031 g, without conversion, which could gain a maximum of two marks if correctly used in a calculation with the final answer given to two significant figures. Few students gave their answer to two significant figures.
- 05.7** About 64% of students gained the mark for comparing the density of helium and air.

- 05.8** Many students found it difficult to describe how the water displacement method could be used to determine the density of a small stone. Frequently, answers were too vague, such as put stone in water and see the water overflow. A common misconception was that the time taken for the stone to sink should be recorded, or whether the stone floated or sank.

Students were not expected to show how they would calculate density because this had already been tested in the previous question parts. All descriptions of calculations were ignored here, whether correct or incorrect.

Question 6 (low & standard demand)

- 06.1** Only around 15% of students knew that freshwater is obtained from seawater by desalination. The most common incorrect answer was filtration.
- 06.2** Over half of the students could apply their knowledge of evaporation and concentration correctly to this application.
- 06.3** Many students did not respond in terms of dissolved solids, but insoluble solids, such as rubbish, litter and plastics. These did not answer the question. Other responses that did not gain credit were too vague, such as pollution without further qualification.
- 06.4** Many students gained some marks here for a partial method. Most commonly this was for correctly describing heating the seawater to evaporate the water.

Some misconceptions were seen regarding the separation technique such as salt evaporating or collecting the water. More effective responses remembered to weigh the evaporating dish before adding the seawater. Some students mistook the balance to be a stopwatch.

Question 7 (low & standard demand)

- 07.1** Around 55% of students knew that plasmids are found in bacterial cells, but not animal cells.
- 07.2** About 36% of students knew that genetic engineering uses part of bacterial cells.
- 07.3** Many students could identify which diseases were caused by a bacterium and which by a virus.
- 07.4** A wide range of symptoms was seen in correct responses. Students should take care not to give the same idea twice, such as fever and high temperature, or rash and spots. Vague terms such as sickness were not credited.
- 07.5** Few students knew the term antibiotic resistance or described antibiotic resistance. Frequent incorrect answers included immunity, overdose and addiction.
- 07.6** Students frequently gained one mark here for referring to sharing shoes or socks. More thorough answers described the sequence of events fully as detailed in marking points 1 and 2.
- 07.7** More students could describe the role of mucus in the trachea than knew the role of cilia. Some responses were too vague to be awarded any credit, such as 'blocks the airways'.

Question 8 (standard demand)

08.1 Students were provided with the binomial name, but only about 7% of students could give the genus name from this with '*Canis lupus*' being a common incorrect response. In this instance, attempts to capitalise, or italicise, or not were ignored.

08.2 Very few marks were gained in this question on the Foundation tier paper. There was a clear divide between students who knew what classification is and those that did not.

Many correct answers referred to either just original methods of classification, such as groups based on behaviour, or more recent methods, such as DNA analysis, and therefore could not gain full marks.

Many incorrect answers were confused between classification and natural selection and detailed descriptions of evolution were seen. These did not answer the question.

08.3 Students found it challenging to define population and community. Answers were expected to be in terms of biological definitions, as detailed in the specification.

Frequently, incorrect responses referred only to human populations, or were too vague to gain credit. Many students defined biodiversity when attempting to describe the term community.

08.4 Most students made excellent attempts to explain the effect of killing the grey wolves on the populations of other organisms. In this extended response question:

- to reach Level 1, simple statements regarding changes in population, or interpretation of the food web were required
- for Level 2, students were expected to state and explain a population change, or describe the population change at least two steps in the food web from grey wolves
- at Level 3, responses were expected to clearly link relevant points from the indicative content in the mark scheme.

Less effective responses referred to just general increasing or decreasing populations, without being specific. Numerous responses misinterpreted the food web, with common references to rabbits having no grey wolves to eat.

08.5 More than half of the students gained the mark for identifying that reintroduction of grey wolves to an area from different areas would reduce the effect of inbreeding.

08.6 Many students correctly obtained two figures from the graph and could calculate how many times greater the population of grey wolves was in 2014 compared with 1995. Frequent incorrect answers calculated the difference in populations in the two years or read from the graph incorrectly.

08.7 Most students identified that the population of grey wolves has remained stable since 2009. This could be expressed in a variety of ways.

Question 9 (standard demand)

- 09.1** Around 38% of students could identify the difference between isotopes of the same element.
- 09.2** About 17% of students could identify both types of sub-atomic particles in an alpha particle. 38% of students only ticked one box.
- 09.3** Some students could complete the relative atomic mass and atomic number, however fewer recognised that the symbol would require looking up on the provided periodic table.
- 09.4** More than a fifth of students could determine the half-life from the graph.
- 09.5** Many students calculated that five half-lives had passed, and then used a variety of methods to calculate the mass remaining after 44 days.
- Partial credit of one mark was available for calculating the number of half-lives, or evidence of dividing 5 (mg) by two, five times but ending with an incorrect mass. The most frequent error seen was dividing by two only four times, despite notes within the response regarding five half-lives.
- 09.6** Most students were aware that emission of alpha radiation inside the body would cause cancer, or mutations. Fewer students could describe alpha radiation as highly ionising, often just referring to ionising.
- 09.7** Many students could apply their knowledge of alpha radiation to describe alpha radiation being stopped by glass. References to alpha radiation being stopped by paper were insufficient. Some students referred to 'it' being stopped by glass but were not clear whether 'it' was the isotope or alpha radiation.

Use of statistics

Statistics used in this report may be taken from incomplete processing data. However, this data still gives a true account on how students have performed for each question.

Mark Ranges and Award of Grades

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