



**General Certificate of Secondary Education
November 2011**

**Science B
(Specification 4500)**

SCB1HP

Unit 1: My World

Report on the Examination

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Science Specification B

SCB1HP

General Comments

A significant number of candidates displayed poor writing skills. Imprecise use of language often meant that the meaning of the response was ambiguous and so could not be awarded the available marks. The importance of practicing writing continuous prose responses to scientific questions cannot be overemphasised. It is not appropriate to abbreviate answers: for example, 'carbon' is not an acceptable answer when 'carbon dioxide' is required. In most cases re-writing the question is a waste of time and answer space and is to be discouraged. A significant minority of candidates did not read the question carefully and follow the instructions. Instances will be apparent in the detailed report below. A number of candidates had been inappropriately entered for this tier of paper.

Question 1 ((a), (b) Standard demand / (c) High demand)

- (a) Candidates should be encouraged to show their working. A correct answer without working shown was awarded full marks. An incorrect answer without working shown gains no marks but, often, if the candidate shows their working they could gain one mark. It is surprising that candidates entered at this level cannot calculate percentages.
- (b) Candidates should be encouraged to show their working. A correct answer without working shown was awarded full marks. An incorrect answer without working shown gains no marks but, often, if the candidate shows their working they could gain one mark. It is surprising that candidates entered at this level cannot calculate percentages.
- (c) Most candidates were able to score at least one mark for a pyramid drawn in the correct order **and** labelled, though too many did not label their diagram. Candidates are expected to make reasonable use of the grid provided, both vertically and horizontally. Many candidates were unable to select a suitable scale for their pyramid: 1 small square for 4kg or 8kg was the most sensible choice. Other values inevitably lead to fractions of small squares being required, making it difficult for candidates to gain the accuracy mark.

Question 2 (Standard demand)

- (a) Many candidates were unable to respond in a satisfactory way to this question in spite of the fact that the question attempted to limit responses to wave sources moving away from the observer. The majority of candidates answered in terms of ambulances or police cars. Answers often were in terms of 'stretching' or 'squashing' waves, which is insufficient at this level. These terms enable candidates to visualise the effect but the scientific consequences in terms of wavelength and frequency are essential parts of mark-worthy responses. Common misconceptions are that wave speed changes or loudness changes.
- (b) The more able candidates were able to gain the mark for a response relating to the red shift of the lines but few were able to interpret this in terms of movement away from the Earth and consequential expansion of the universe.

Question 3 (Standard demand)

- (a) (i) There were no issues with responses to this question.
- (a) (ii) Most candidates gained this mark though ‘fractional distillation’ and ‘respiration’ were not uncommon incorrect responses.
- (a) (iii) Very few candidates failed to gain this mark.
- (b) Surprisingly few candidates gained all three marks for this question, most gaining two marks for ‘warm and moist’. ‘Light’ was the most common incorrect response, which was ignored.
- (c) This question asked candidates to consider why the evidence in the graph is inadequate to arrive at the link between carbon dioxide concentration and global warming, but most candidates ignored this requirement. In consequence, very few gained all three marks.

Question 4 ((a) Standard demand / (b) High demand)

- (a) A Level 3 response required candidates to consider, using scientific terms, the information given in writing and visible in the pictures, and communicate their ideas in very good English. Most candidates were at Level 2 or Level 1. The responses ‘keeping warm’ and ‘hiding’ were not considered to be equivalents to ‘reducing heat loss’ and ‘camouflage’, and ‘sharp teeth’ are not visible in the pictures!
- (b) A number of candidates did not read the question carefully enough and answered in terms of horses, elephants or giraffes. The question states that there were no other birds on the island but cross-breeding was a not uncommon answer. The use of simplistic language was not uncommon; birds having ‘babies’ or ‘children’ for example, instead of ‘offspring’. The idea that the birds ‘decided to adapt’ was seen, as was ‘birds mating with long-beaked insects’ or ‘absorbing insect genes’. Most candidates failed to see the implication of the different flora on the mainland and island.

Question 5 (High demand)

- (a) The colour change was generally given correctly but without the correct reason, most common reasons being ‘the snail dies’ or ‘the snail photosynthesises’. ‘Respiration’ was not required for this mark.
- (b) ‘Photosynthesis’, correctly used, was required for this mark, together with the removal of carbon dioxide as the reason for the colour change. ‘Oxygen produced’ was ignored unless the candidate suggested that this caused the colour change. Too many candidates thought that plants remove carbon dioxide by respiration.
- (c) This was the least well answered part of the question, requiring correct reference to both respiration and photosynthesis (the lack of) to gain full marks as an explanation. Many candidates still think that plants only respire in the dark.

Question 6 (Standard demand)

- (a) The strange responses made by a significant minority of candidates suggests that they are unfamiliar with the use of 'relationship' in a scientific context.
- (b) (i) The question clearly refers to viscosity so it is surprising that a number of candidates drew a graph of boiling points. Candidates need to be aware that a 'suitable scale' is one that makes full use of the available paper but does not extend beyond it because it then is not possible to plot all points accurately. Candidates who chose to draw a bar chart were awarded the 'plotting' mark if the values were correct. Joining plots 'point to point' was not rewarded.
- (b) (ii) Candidates who completed the graph usually answered this part correctly even if they gave number of carbon atoms as a function of viscosity.
- (b) (iii) Candidates found this question very difficult, failing to link the negative boiling point, which was frequently stated, with the fact that the molecule would be a gas at the temperature of the experiment.

Question 7 (High demand)

- (a) There were a number of errors commonly seen in this type of question, including:
- not balancing equation
 - incorrect use of upper and lower case
 - Pb_2
 - completed in words.
- More surprising was the sudden appearance of iron oxide in a number of responses.
- (b) Most candidates were able to attempt this question, though few scored both marks.
- (c) Some candidates appear to have 'hedged their bets' by using the same number for protons and neutrons: unfortunate if they chose 56!

Question 8 (High demand)

- (a) The most common error was to compare the two gases in the early atmosphere and again for the current atmosphere without saying which had increased or decreased, for instance 'There used to be more carbon dioxide now there is more oxygen'. Candidates often gave a reason: this was not required, and (fortunately for many candidates) was ignored.
- (b) Candidates often 'grasped at straws' and gave helium, nitrogen or argon as a response. Of more concern is the fact that sulfur and iron were seen a number of times.

- (c) (i) The response was often incomplete, 'distillation' being given instead of 'fractional distillation'. Another common response was 'electrolysis', which is clearly incorrect.
- (c) (ii) Imprecise language featured in a significant number of answers. Balloons are not 'made of helium'; nor are bulb filaments 'made of argon'. Similarly, helium is not used in hot air balloons.
- (d) This question was surprisingly poorly answered. Many names for the compound were ingenious inventions though an answer which satisfied IUPAC conventions was accepted. It is better to encourage students to remember the uses for ammonia given in the specification rather than other more exotic uses, such as rocket fuel.

Mark Ranges and Award of Grades

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