

Examiners' Report/ Principal Examiner Feedback

June 2011

360Science

GCSE Science
Multiple Choice Paper B1b (5006)

GCSE Biology
Multiple Choice Paper B1b (5026)

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5006 Science/ 5026 Biology (B1b) Examiners' Report

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General Overview

Some questions on the foundation tier of the paper posed a particular challenge to weaker candidates and it is evident that topics that higher tier candidates have previously found difficult have presented problems again in this examination series. Despite this, it is clear that many students are demonstrating improved skills in certain areas, particularly in interpretation and analysis and are able to use the information given, albeit in a new context, to good effect.

Foundation Tier (Questions 1 - 16)

As expected, the first section of the paper, 'The chemicals in cigarettes', with the exception of question 4, enabled all but the weakest candidates to gain credit. 86% of candidates were able to read straight from the graph to arrive at the correct response for question 1 and were then able to go on to interpret the graph to answer question 2 successfully. 13% of candidates were unable to link the cigarette brand with the highest tar content to lung cancer which is disappointing as previously candidates have shown good knowledge in this area. Question 5 presented a challenge to 45% of candidates who were unable to recognise pathogens as the name given to microbes that cause disease. A fair number of candidates chose antibodies as the correct answer for this question with another 16% choosing antigens. Few candidates were able to gain credit for question 5. It could have been the case here where many may have recognised bacteria as the disease causing agent but may have been further challenged in determining how TB was spread. Similarly, the response to question 8 was disappointing. Nearly as many candidates chose an incorrect option (D), as those choosing the correct option of A. Candidates' understanding of disease transmission has proven to be a repetitive problem throughout many examination series despite questions covering this area of the specification arising frequently. There are several ways in which this could be tackled in the classroom; using 'match up' cards which give the mode of transmission and a description may be used to start a lesson, or guided internet research where candidates may be instructed to find microbes that are transmitted in a specific way. 48% of candidates were able to recognise structure X, the iris, as controlling the amount of light entering the eye and only 19% gained credit for their response to question 20. It is important that the candidates understand the structure of the eye and its component parts in order to understand its role as a receptor organ. A full understanding of the iris reflex and accommodation cannot be achieved without this understanding and an awareness of the reasons why and how these actions occur. It appears that this may have been overlooked to some extent, as many candidates are clearly unaware of the function of the various parts of the eye. Only 38% of candidates were able to arrive at the correct option for question 11 with almost the same percentage choosing option A

implying a lack of understanding of the structure of the central and peripheral nervous systems.

The responses to questions 12 and 13 were pleasing. Question 13 in particular required candidates to read the graph in a way that was slightly different to normal and they managed this well.

The section on hormones was answered well by only the most able candidates. The majority, however, were unaware of the effects of insulin on blood sugar levels and its target organ which was surprising. Only 26% of candidates gained credit for question 14, with a significantly higher percentage under the impression that insulin raises blood sugar levels (option A). For question 15, 55% of candidates opted for the pancreas as being the target organ for insulin and it is clear where the confusion is here. Only 21% arrived at the correct response in this case.

Overlap Questions (17 - 24)

The majority of questions were answered as expected across the common tier with higher tier candidates outperforming those at foundation tier. Questions 20 and 22 were answered well by candidates across both tiers despite the context of the question being slightly different to that offered in previous series. 81% of higher tier candidates and 58% at foundation tier were aware that a slow blood flow was important to ensure efficient delivery of oxygen to body cells and fair understanding was shown by candidates on the role of white blood cells in the third line of defence. The questions presented on the nervous system, particularly questions 20 to 22 were challenging for foundation candidates and also to higher tier candidates to a lesser extent. Candidates are still confused on nerve transmission across synapses, again a topic area that is frequently tested in multiple choice papers. Only 16% of foundation tier candidates were able to state that nerve signals are transmitted from one neurone to the next by the diffusion of chemicals across the synapse. Nearly 50% of foundation tier candidates were under the impression that this communication occurs by electrical impulses diffusing, with 34% of higher tier candidates assuming the same. Interestingly, more foundation tier candidates decided that receptors in the skin were the 'effector' in the reflex response shown. 31% in this case chose this option. Candidates at all abilities answered question 23 demonstrating a good awareness of the characteristics of a reflex action although less success was obtained from candidates at both tiers for the final question in this section. 53% of higher tier candidates were able to correctly recall how drugs affect the nervous system but more foundation candidates chose an incorrect option (C) than the correct one.

Higher Tier (Questions 25 – 40)

With the exception of question 26, the majority of candidates were successful in their responses to the questions to 'Drug driving'. Only the weakest of candidates were unable to score credit in this section. Analysis of the graph was carried out well by most as was question 26 where candidates proved that they were aware of the reasons for doctors not supporting the legalisation of cannabis. Only the most able candidates gained marks for their response to question 26 which was surprising although many may have been challenged in having to analyse the graph as

well as to link their findings to the second part of the options to categorise both cannabis and alcohol.

The structure of the brain has historically proven to be a challenging area for candidates and question 29, which asked candidates to determine the area of the brain responsible for 'seeing and hearing music', was no exception. Although asked in a different context, candidates must be aware that the underlying scientific knowledge and understanding needed is the same.

Varied performance was evident across questions 32 to 35 with candidates still being confused on terminology related to immunology. Only 32% of candidates scored a mark for their response to question 33 with more choosing option C as the correct answer. It appeared in this case that these candidates did not read the question thoroughly and digest the fact that it was asking about the third line of defence. They did not link this to their response where many thought that phagocytes were affected by HIV.

The final section of the paper covering questions 36 to 40 were generally answered well with the percentage of candidates gaining credit higher, in some cases, than expected. In this examination series, candidates proved to have a much better understanding of the hormones involved in the menstrual cycle and their role in the events of the cycle. This was particularly pleasing taking into account that a thorough understanding of the diagram was required, particularly in relation to where the hormones were placed, in order to arrive at the correct answer. Over 50% of candidates scored marks on the questions in this section with the exception of the final question where only the most able gained credit. As a final question, this was as expected. 19% of candidates were able to link their understanding of the effects of smoking to a lower birth weight in babies with the majority of candidates (46%) incorrectly choosing option C. Candidates should be made aware that the answer to questions structured in this way is not always 'both'. This seems to be a running pattern where, if candidates are asked how many statements are correct, they tend to opt for both without reading thoroughly what information the statements are giving.

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