



General Certificate of Education

Human Biology 2406

**HBIO5 The air we breathe, the water we
drink, the food we eat**

Report on the Examination

2010 examination - June series

Further copies of this Report are available to download from the AQA Website: www.aqa.org.uk

Copyright © 2010 AQA and its licensors. All rights reserved.

COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres 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 centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334). Registered address: AQA, Devas Street, Manchester M15 6EX

General Comments

This paper proved accessible to candidates. The vast majority of candidates completed the whole paper. Some weaker candidates did not write a great deal for their essay. Average or weaker candidates might be advised to attempt the essay first because there are a number of very easily accessible marks in this question. Candidates should be advised that their essay should consist of approximately five or six paragraphs, with each paragraph relating to a topic that can be used to illustrate the theme of the title. Some candidates appeared to think that they had to write something about every single thing they could think of related to the title. This often produced very superficial content, with little AS or A2 factual content or terminology.

There was some evidence in the essays that students had been taught considerable detail about examples that are not in the current specification.

Question 1

- (a) The vast majority of candidates scored one or two marks on this question.
- (b) Almost all candidates had some idea what allopatric speciation is and almost all scored one or two marks. Where candidates failed to score marks it was usually due to an inability to express themselves clearly. For example, many wrote about 'species' becoming geographically isolated, rather than 'populations' or 'groups' of the same species.

Question 2

- (a) About half of the candidates obtained both marks here and almost all obtained at least one mark. The commonest errors were NAD or NADP, rather than reduced NADP and water.
- (b) About half of the candidates scored one mark here. Those who failed to score usually had the products being used to attach carbon dioxide to something.
- (c) This proved to be an A grade discriminator, with under ten percent obtaining two marks. It was apparent that very few candidates clearly grasp that plants respire all the time (which produces carbon dioxide) and carry out photosynthesis in light (which uses carbon dioxide).

Question 3

- (a) Almost all candidates obtained one or two marks for the description. Most of those who only scored one mark failed to make a complete description. There was a minority who misinterpreted the information and wrote about changes in the number of fish being caught.
- (b) This question discriminated well across the range. Many candidates were able to link climate change to warming of seas further north and the extension of the habitat range of the fish species. Candidates who obtained fewer than three marks often did so because they only gave part of this story. A few candidates gave answers relating to changes in air temperatures and rainfall on land, despite the question being about fish.

Question 4

- (a) It was pleasing to see that the vast majority of candidates scored one mark on this question.
- (b) The majority of candidates correctly identified respiration as the process.
- (c) This question discriminated well across the range. About a third of candidates obtained all three marks for linking the rate of carbon dioxide production to the rate of respiration of organisms breaking down the biodegradable waste and the decrease in carbon dioxide production to the reduction in the remaining waste available to be decomposed. Those candidates who scored one or two marks only gave part of this story. Some candidates wrongly thought that burning was taking place in the composter.

Question 5

- (a) In (i), about two thirds of candidates knew that glycolysis takes place in the cytoplasm. In (ii), slightly fewer candidates were able to state where the electron transfer chain is found. It was disappointing to find a number of candidates writing about chloroplasts, when the stem of the question relates to respiration.
- (b) This question was an A grade discriminator. The question required the application of knowledge with understanding and many displayed poor understanding of the role of oxygen as the terminal electron acceptor at the end of the electron transport chain. About two thirds of candidates scored one or two marks for partial answers, usually noting that nitric oxide reduces oxygen uptake by cells and then linking this to stopping respiration (oxidative phosphorylation). Only the best candidates deduced that nitric oxide must stop the functioning of the protein in the electron transfer chain and thus stop the transport of electrons and remove the requirement for oxygen as the terminal electron acceptor. Weaker candidates often thought that nitric oxide 'took the place of oxygen in respiration'.

Question 6

- (a) In (i), just over two thirds of candidates could state what a population is. In (ii), even more candidates could state what a community is. Candidates who failed to score often got very confused between populations and species, often using the terms interchangeably.
- (b) This question was, perhaps, too accessible. The majority of candidates obtained all three marks for their description of differences between the diets of foxes in Bristol and London.
- (c) Almost half of the candidates scored no marks on this question. This was almost always because they ignored the requirement in the question to consider factors other than the availability of scavenged food.

Question 7

- (a) Over two thirds of candidates obtained the mark here for the idea that brownfield sites are areas previously developed for human use. Quite a few candidates incorrectly stated that they are reserves set aside to increase biodiversity; presumably inferred from information presented later in the question.
- (b) This question discriminated well across the range. Nearly half of the candidates obtained all three marks for a description of how to use a quadrat to find the number of individuals of a plant species present at a site. A common error was to write about using percentage cover or abundance scales, rather than counting numbers in quadrats.
- (c) It was pleasing to see that over half of the candidates could work out the ratio and well over three quarters obtained at least one mark.
- (d) This question discriminated well across the range. The best candidates used the information presented and referred to the decrease in the number of species as management increased. They then linked the number of species to biodiversity. Many also looked at the study itself and noted that the results only covered one example of a park, canal bank and factory site. Many weaker candidates attempted 'generic' answers about biodiversity from memory and ignored the information given. Some even wrote about how planting in the park would increase the number of plant species and thus explain an increase in biodiversity.

Question 8

- (a) Candidates displayed good knowledge of the causes of acne. Some weaker candidates failed to score because of poor expression and use of terminology; for example, referring to 'germs' rather than 'bacteria'.
- (b) About half of the candidates obtained both marks for the calculation. Some obtained one mark because they calculated a value of 3.2 but then failed to subtract this from 7.3.
- (c) It was disappointing to find that only just over half of the candidates obtained the mark here. Some of the others simply wrote that C was 'a control', or 'a fair test' and this was not given credit.
- (d) This question was a good discriminator. Almost all candidates obtained one mark for noting that cream A did produce the greatest reduction in facial score. How many marks they scored after that depended largely on the scope of their answer. Candidates could pick up on the lack of statistical analysis, the (possibly) subjective nature of facial score, the (relatively) small number of volunteers in each group, the (relatively) short duration of the trial, how well the volunteers were matched for factors that might affect acne, the fact that C, the cream on its own, reduced facial score and the failure to test hydrocortisone on its own.

Question 9

- (a) About two thirds of the candidates could clearly state what an allergen is. Some candidates stated that it is something that causes an allergic reaction. This was not given credit.

- (b) This question was a good discriminator. The better candidates gave clear descriptions relating the roles of B cells, IgE antibody and mast cells. Weaker students wrote confused accounts where they mixed up antigens, antibodies and histamine.
- (c) The vast majority were able to give a reason for using the skin prick test that was derived from information in the table.
- (d) This question was a good discriminator. Approximately equal numbers of candidates obtained three, two or one mark and about a tenth obtained no marks. It was pleasing to see that many candidates did relate to the context in the question. They did see that it was important to find the exact cause of the anaphylaxis, because another attack could be fatal. They also saw that it was important to use tests that were specific and done under medical supervision.

Question 10

- (a) This description proved hard for many candidates, although about half obtained two marks. Many weaker candidates simply wrote out the numbers from the table but with no element of comparison. Few candidates made any use of the standard errors.
- (b) This was intended to be the most challenging question on the paper and it proved to be so. Very few candidates obtained four or three marks. Many candidates misinterpreted the information in the question and thought that a fall in HDL was a good thing. This obviously meant that their evaluation of the conclusion was flawed. It was surprising that relatively few suggested that the use of rabbits might detract from a conclusion relating to benefit to people.

Question 11

Candidates should be advised that their essay should consist of approximately five or six paragraphs, with each paragraph relating to a topic that can be used to illustrate the theme of the title. Some candidates appeared to think that they had to write something about every single thing they could think of related to the title. This often produced very superficial content, with little AS or A2 factual content or terminology. The greatest discrimination was seen in the scientific content marks where there was a normal distribution of marks between 0 and 16. Both titles appeared to be equally popular and very good essays were seen with both.

- (a) The best essays focused on the link between shape and function in proteins. Some candidates wrote at length about appropriate examples but without any reference to shape changes. For example, they would write about the induced fit and enzyme function but without any reference to changes in shape of the active site as the substrate interacts with the enzyme. It was disappointing to find that some candidates wrote about DNA as a protein.
- (b) There were many wide-ranging essays that lacked AS or A2 content or terminology. These were often written in very general terms about 'infections', 'germs' or 'how you live'. Some candidates wrote in great detail about how the immune system and, or, vaccination prevent people from becoming ill. This was not relevant to the title. The best essays chose four or five different ways in which people may become ill and used one

example of each to illustrate their answer, including appropriate AS and A2 specification content and terminology. It was interesting to note that quite a number of candidates appeared to have detailed knowledge of examples of parasites and illnesses linked to diet that are not in the specification and are not usually relevant to people in Britain.