Pearson Edexcel

Examiners' Report

Principal Examiner Feedback

November 2021

Pearson Edexcel International GCSE

In Biology (Single Award) (4SS0) Paper 1B

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This November 2021 series gave centres an opportunity to take the International 9-1 GCSE in a year in which summer examinations did not take place.

The examining team commented on the knowledge and understanding shown by many of the students on the November papers. Most students were able to apply their knowledge and understanding of biology to analyse and evaluate data and information from unfamiliar contexts and experiments. Schools have worked hard in difficult circumstances to prepare students for the examination, and this was reflected in the responses of many of the students. Some students performed well on the new style of questions and on the new specification content. There was no evidence of students being short of time on this paper. There were few blank responses and most students attempted to answer all items.

Question 1 gave students a diagram of the female reproductive organs. In part (a) most students could identify the uterus and the vagina. In part (b) almost all gained some credit for describing the role of the oviduct. The best responses described it as the site of fertilisation to which the egg travels from the ovary and to which the sperm travels from the vagina. In part (c) most responses could correctly explain the role of the ovary in the development of secondary sexual characteristics. The best responses describing the production of oestrogen at puberty and giving a suitable example of a female secondary sexual characteristic such as breast development or growth of pubic hair.

Question 2 gave students a diagram showing part of a food web from a forest. In part (a) most students were able to give a food chain that has four trophic levels and includes the mouse. In part (b) students were asked to explain the effect of the number of caterpillars decreasing on the population of mice. Most gained credit with the best answers explaining that as there is less food for the mice their population would decrease slightly as they would till have the oak as a source of food. In part (c) only the best responses were able to explain why the biomass of the oak tree is much greater than the total biomass of all of the organisms at the end of all of the food chains. Many students failed to recognise that the reduction in biomass is due to energy losses along the food chain. These weaker responses often stated that that the oak tree was bigger so had greater biomass.

Question 3 was about the control of coat colour in mice. In part (a) almost all students could state which allele is dominant. In part (b)(i) students were required to draw a genetic diagram to show the genotypes of the parents, the gametes they produce and the expected genotypes and phenotypes of the offspring from a second cross between a white male mouse and one female offspring from the first cross. Most students recognised that his would be a homozygous recessive male crossed with a heterozygous female.

These students usually then gained full marks for the gametes and the offspring genotypes and phenotypes. Those students who used the wrong parent genotypes could get some credit for indicating the correct gametes and offspring genotypes from their selected parents. In part (b)(ii) only the best students were able to recognise that the sex ratio in the offspring is due to random fertilisation. In part (b)(iii) only the best students could calculate the probability of a mouse from this cross being male and white. Part (c) concerned the response of the mouse immune system to bacterial infection. Many students gained credit with many gaining full marks for a description of the role of white blood cells with phagocytes engulfing bacteria and lymphocytes releasing antibodies.

Question 4 was about photosynthesis. In part (a) most students could identify the term for plants at the beginning of food chains as producers and in part (b) correctly identify the balanced chemical equation for photosynthesis. Part (c) described an experiment to demonstrate that light is required for photosynthesis. In (c)(i) students were asked to explain why the plants were put in a dark cupboard for 24 hours in step 1.

Most responses were able to explain that this was to remove any stored starch but only the best responses linked the removal of starch to respiration. In (c)(ii) most students were able to offer some explanation as to how ethanol could be heated safely with many referring to a water bath. The better students further explained that since ethanol is flammable Bunsen flames should be extinguished. In part (c)(iii) most students could state the colour change for each of he leaves.

Question 5 gave a diagram showing the internal anatomy of a cat with some organs labelled. In part (a) most students could correctly identify the part of the digestive system and the part of the circulation system. In part (b) most students could also identify the correct changes in the diaphragm and rib cage as the cat inhales. In part (c) students were given data about the composition of inhaled air and exhaled air. In (c)(i) only the very best responses correctly used the data to determine which gas shows the greatest percentage change from its volume in inhaled air to its volume in exhaled air. In part (c)(ii) students had to explain the differences between the composition of inhaled air and exhaled air shown in the table. Most responses gained some credit, but some gave incomplete explanations such as ‘oxygen used in cells’ but not linking this to respiration. Likewise, in (c)(iii), most students earned some marks with the best responses clearly explaining how each structural adaptation results in more efficient gas exchange.

Question 6 described an investigation into diffusion of a liquid into different sized agar cubes. In part (a) almost all students could correctly state what is meant by the term diffusion. In part (b) students were asked to give two factors that should be controlled in the investigation some students could give at least one factor such as temperature of concentration of dye. In part (c) many students were able to correctly calculate (i) the surface area and (ii) the surface area to volume ratio of one cube of side 2 cm. In (c)(iii) most could accurately measure the distance that the dye had diffused into each cube. In (c)(iv) students were required to use the data from the table and the measurement from (c)(iii) to comment on the effect of size on transport in an organism. The best responses included : reference to the dye moving the same distance into each cube, the smaller cube having a greater proportion of its volume being penetrated by the dye, this being due to its higher surface area to volume ratio. The very best response then went on to link this to smaller organisms which have a higher surface area to volume ratio being able to rely on diffusion alone whilst larger organisms need a transport or circulation system.

The final question 7 was the usual experimental design item. On this occasion students were asked to design an investigation to find out if crop yield is increased by changing the carbon dioxide concentration in a glasshouse. Those students who had practised these kinds of items scored well. A small number of responses explained the effect of increasing carbon dioxide on plant growth but did not describe an experiment. The best responses described how the same species of plants could be grown in two greenhouses one with an increased concentration of carbon dioxide. The yield of the crop plant would be measured after 2 months by measuring the dry mass of the crop. During the growth period the light intensity, temperature and minerals and water provided would be the same for each greenhouse. The experiment would be repeated for each carbon dioxide concentration by using multiple plots within in each greenhouse.

Based on their performance on this paper, students are offered the following advice:

- ensure that you read the question carefully and include sufficient points to gain full credit.
- identify the command word such as ‘determine’ and use it to inform you what you should include in your response.
- in explain and comment items include as many points as there are marks available and remember to use all the information in the question and your own knowledge.
- write in detail and use correct and precise biological terminology.
- always read through your responses and ensure that what you have written makes sense and answers the question fully.
- ensure that you are familiar with all the specification content.

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