edexcel

Examiners' Report/ Principal Examiner Feedback

Summer 2013

International GCSE
Biology (4BI0) Paper 1B
Science Double Award (4SC0) Paper 1B

Edexcel Level 1/Level 2 Certificate
Biology (KBI0) Paper 1B
Science (Double Award) (KSC0) Paper 1B

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2013
Publications Code UG035492

Chief Examiner's report International GCSE Biology

The examiners were once again impressed by the knowledge and understanding shown by the students on the papers. Students were also able to demonstrate application of knowledge and understanding, analysis and evaluation and investigative skills. Many centres have worked hard to carefully prepare students for the examination and this was evident in the responses of many students. The more able students had little difficulty in applying their knowledge to new situations and novel contexts. Only a small number of students failed to attempt questions.
The papers gave a balance of question types and topics and the proportion of marks for each Assessment Objective matched those published in the specification.

4BI0 1B

Q1(a) gave part of a food web and students had to determine the number of different groups in the web. Most students had no difficulty with this item with the few errors observed being for the number of secondary consumers. In Q1(b)(i) most responses correctly predicted that the population of blue jays would decrease. Some students gave the reason for the change but did not state the effect on the population size. In Q1(b) (ii) a significant number of students were unable to state the meaning of population and the 'number of animals' or the 'number of people' were given. For (c) most could give two molecules that the tick could feed on from the deer's blood. A few students put blood cells or starch as suggestions.

In Q2 (a) students were given a cross section diagram of an artery and a vein and asked to give three differences. Most could do this but some got the answers the wrong way round or their language lacked precision as they described wider or bigger without specifying which tissue. Some gave differences in function rather than structure. In part (b) information on DVT and clot formation was given and in part (i) students had to suggest why blood flow in a vein is slow when there is lack of movement. Only the best students described how lack of muscle contraction would not squeeze the blood back to the heart. Almost all answers were correct in (ii) for the cells that transport oxygen. In part (iii) most students were able to suggest why a clot that blocks the small vessels in the lungs could cause death. The weakest students wrote about oxygen being taken to the lungs.

Q3 had a labelled section of the eye and students had to match a health problem to the part of the eye. This proved more difficult than we would have predicted with up to 20% of students getting an item incorrect.

Q4 presented a table of genotypes and phenotypes for wing length in *Drosophila.* Most were able to complete the table showing the genotype, description of genotype and phenotype. The most common omission was the description of ll as 'homozygous' rather than 'homozygous recessive'. In part (b) most students could calculate the expected number of Ll offspring from a Ll x Ll cross. In (c) almost all could correctly draw a food

chain to show how fruit flies feed on yeast growing on fruit. The few who did not gain full credit had the arrows facing the wrong way. In part (d) an investigation was described and students had to name the factors to control, most could do this. They were also able in (d)(ii) to suggest that the results of the investigation may be unreliable as the experiment was not repeated.

Q5 was about fish farming. In part (a) most responses gained some credit on how to maintain the water quality in the pond. The best students suggested putting in water plants to maintain or increase the oxygen content or removing fish waste to prevent eutrophication or algal growth. Weaker students suggested not dropping rubbish or littering the pond. In part (b) more students scored marks with many suggesting that separating different species or ages of fish into cages would reduce predation as would covering the pond with a net. In (c) students had to suggest how to control disease in the pond again most earned some credit with the best responses suggesting sing antibiotics to reduce bacterial disease and isolated any fish that showed signs of disease. In part (d) only the best students could suggest that feeding should be high in protein and given in small amounts often so as not to lead to build up of waste and bacterial growth.

Q6 described an experiment on diffusion. Most students could, in (a), describe what is meant by diffusion. The weaker answers were about substances or described movement along a gradient. In part (b) students had to draw a graph to show the effect of concentration on the time taken for the gas to diffuse. Most students scored 5 or 6 out of 6 for plotting the graph with the most common error being the axes the wrong way around or omitting the units. A few students used coloured pens to show different concentrations. This causes problems with the scanning of the scripts as some colours do not show up clearly. In part (c) most could correctly describe the results shown in the graph. In (d) students were asked to calculate the average rate of diffusion between 4 and 24 cm. Many found this difficult or calculated the rate from 0 to 24. In part (e) most could explain the difference in rates between the two concentrations but some merely stated the difference without linking it to the concentration or number of ammonia molecules. We would expect students to know the difference between describing and explaining results. In part (f) most could suggest that by varying the temperature and keeping the concentration of ammonia the same Lily could investigate the effect of temperature on diffusion rate.

Q7 required students to complete a passage on air pollution and most scored 9 or 10 marks. The most common errors being gas combining with oxygen in red blood cells and failing to name methane gas produced from the digestive system of cows.

Q8 gave a photograph of lichen and then a diagram of a fungal hypha. In part (a) around half of the students could explain what is meant by saprotrophic nutrition.
This is despite it being a direct quote from the specification. In part (b) most could correctly identify the part made from chitin but only a minority could identify the part made from glycogen.

In (c) most could correctly identify chlorophyll as the molecule that makes algae look green, with only a few suggesting chloroplasts. Most could give a word equation for photosynthesis but some chose to give a chemical symbol equation and some then got it wrong.

Q9 gave students the opportunity to write a longer prose answer explaining the development of pesticide resistance in a population. About half of the answers scored full marks and these answers included the idea of variation caused by a random gene mutation that allows a pest to survive. This variety would then reproduce and pass on its resistance allele to the next generation so that over time resistance would increase. Weaker students wrote about 'survival of the fittest' but gave no context or explained what that means in this case. Some wrote about immune response.

Q10 was about an experiment to measure the rate of water loss from a leafy shoot. How well students did on these items was determined by their experience of such experiments. In (a) about half of the students could identify the apparatus as a potometer. In (b) almost all could name the process by which a plant loses water. Part (c) required a description of how Stephen could set up and use the apparatus to measure the rate of water loss. Most students score 2 or 3 marks for explaining how to measure the distance in cm moved by the bubble in a certain time say a minute and repeating their readings. The students who had carried out such an experiment could describe how to set up the potometer cutting the stem under water, ensuring a water tight seal and how to introduce a bubble to the tube. In part (d) students had to explain the different rates of water loss in different conditions. Most could explain the increase in water loss in wind due to moist air being blown away thus maintaining a steep diffusion gradient. Very few could explain he reduction in water loss in lower light intensity. Many students seemed to think that less light meant less water was used in photosynthesis and did not refer to closing of stomata at all. The better students could explain why removing half the leaves reduced the rate by reducing the surface area and the number of stomata. Weak students once again described the results without any explanation of their cause.

Q11 gave a diagram of a sperm cell and in (a) most students could give the number of chromosomes present in its nucleus. In (b) most could explain the importance of respiration in providing energy for the sperm to swim using its tail. In part (c) almost all could correctly calculate the number of sperm capable of swimming from the data provided. Part (d) described a fertility test that measures the oxygen use by respiring sperm. In (i) the best students realised that if the solution stayed purple no oxygen was being used for respiration by the sperm so they must be dead or not moving. In (ii) the best answers explained that a break in the seal, a lack of temperature control or a small semen sample could make the results incorrect. Other students suggested that one sample may be atypical.

Q12(a)(i) required students to draw a phagocyte. Most scored 2 or 3 marks with the best drawings showing and labelling a cell membrane, cytoplasm a lobed nucleus. Some labelled a cell wall and others drew a red blood cell. In part (ii) almost all answers gave a correct difference between this cell and a

red blood cell. In part (b) the many students who had revised the material gained 5 marks by describing how white blood cells defend the body against infection.

Q13(a) students did less well with a few seeming to have no idea about genetic modification. The better responses included extraction of the gene, that codes for growth hormone, from human DNA using a restriction enzyme. Using the same restriction enzyme to cut a bacterial plasmid and using ligase to insert the human gene into the plasmid to make a vector contain recombinant DNA. In part (b)(i) students had to explain what is meant by a hormone. The majority of students earned some credit. The best responses clearly stated that a hormone is released by endocrine glands into the blood stream carried to target cells upon which it has an effect. In part (ii) students had to describe how selective breeding could be used to increase milk production. About half of the answers scored full marks. Some responses had cows mating with other cows, some referred to cloning and some had cows marrying! The best responses described selecting cows with high milk yield and mating these with bulls from mothers who had high milk yield. This process could then be repeated with their offspring for many generations.

Q14 was the experimental design question and many students who had practiced such items performed well. Many centres have encouraged students to use the CORMS prompt. This has led to improved answers. However, merely writing down O and same species or S and water will earn no credit. We still expect students to write in prose and clearly explain their method, they should only use CORMS as a prompt.

Grade Boundaries

Grade boundaries for this, and all other papers, can be found on the website on this link:
http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE