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Examiners' Report/ Principal Examiner Feedback

Summer 2013

International GCSE Biology (4BI0) Paper 1BR

Science Double Award (4SC0) Paper 1BR

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4BI0 1BR report

Q1(a) examined knowledge about different groups of organisms and was well answered by most students. The most common responses were names that appear in the specification such as humans, *Mucor*, *Lactobacillus* and *Amoeba*, but there were many other acceptable alternatives. The names of diseases were not accepted. Part (b) was clearly more challenging with only the very best students gaining all three marks. In part (c)(i), most students were aware of a difference between the structure of viruses and bacteria. The most common answer made reference to the protein coat. Some students believe that a difference is the lack of a nucleus but this is also true of bacteria so was not credited. In part (ii), many students lost credit by giving the name of a virus, frequently HIV, rather than a disease caused by a virus.

Q2(a) examined basic knowledge of plant and animal cells. Most students were able to label the cell membrane and to name the cell wall, vacuole and chloroplasts as the parts of a typical plant cell not found in an animal cell. In part (b), it was pleasing to note that many students were aware that osmosis was responsible for the change in the level of water and duly completed the diagram to show a lower water level on the left hand side of the container compared to the right hand side of the container.

Q3 tested knowledge about the male and female reproductive systems. Correct responses were common but it was clear that some students wrongly think that the testes release oestrogen, and that implantation and gamete formation occur in the oviduct.

In Q4 the style of question asked in part (a)(i) has been a feature of several past papers and yet there are still students who draw pyramids of biomass, or put the arrows in the wrong direction. These students could still gain one mark providing they wrote all three names and put the parakeet in the middle. Part (a)(ii) was answered very well and it was pleasing to note that most students are aware of the digestion of starch by amylase into maltose. In Q4 (b), most were able to correctly calculate 25.5 as the volume of oxygen used when flying in part (i), but many struggled in part (ii) to gain all three marks. Most appreciated that the volume of oxygen used would increase but only the best students appreciated the link between this and the need to respire more because of the heat loss that would occur when moving to a colder environment.

In Q5(a) most students were able to score at least 4 marks with excellent bar charts. The most common loss of a mark was for not labelling the axes fully, including appropriate units. Part (b) was well answered with most showing good understanding of abiotic factors that affect photosynthesis, temperature and light being the most common responses. A few gave vague references to humidity and wind speed confusing it with transpiration. Part (c)(i) was challenging for many. The mark scheme rewarded students who appreciated that farming practices improve primary production. The better students made the connection and scored well but

the weaker students made bland references to photosynthesis or made vague references to farming intensity. Student understanding of selective breeding in part (ii) was impressive with many appreciating that human involvement is part of the process. In part (d), many students had no understanding of how to use quadrats. Students who were familiar with the technique scored at least two marks for mentioning the importance of random sampling and repeats. The question asked for an estimate of biomass not numbers but most students referred to counting plants rather than weighing them.

Q6 there were many outstanding answers to this question, often showing impressive use of correct terminology. There were, however, some who failed to score much credit by simply giving vague references to DNA cutting or irrelevant discussions about fermenters. Sadly, very few actually named a human protein in their answer. Those who did often chose insulin.

For Q7 most gave a satisfactory definition of transpiration though there were some who believe that the process involves the absorption of water by plant roots. Many struggled to appreciate that the polythene bag ensures that an accurate measure of transpiration can be obtained as all the water loss has to occur from the plant. Explanations in part (c) were poor. Marks were given to students who appreciated that stomata open in light and that warm air will provide more kinetic energy to water molecules allowing them to move faster and therefore increase the rate of diffusion. Many answers gained no credit because they made reference to light increasing the rate of photosynthesis which in turn increases the need for water.

Q8 students were able to recognise the parts of the human thorax represented in the model. However, those who chose bronchioles for (iv) lost credit as the only accepted answer was bronchus. In part (b), many appreciated the how an increase in volume would decrease the pressure and lead to inflation of the balloons, and many appreciated in part (c) that the model did not have ribs, muscles or pleural membranes and that there was no movement involved. Part (d) was challenging to most and a surprising number made reference to measuring heart rate. Credit was given for answers that demonstrated quantification of exercise, measuring by counting breaths per stated time period and for understanding the need to replicate for reliability.

Most gained a mark in Q9(a). There were a minority of students who used inappropriate terminology in describing faeces and their answers were not credited. Part (b)(i) was well answered with many appreciating that removal of the waste would prevent bacterial decomposition and the depletion of oxygen. Part (b)(ii) was also well answered with many appreciating that antibiotics kill bacteria and reduce the risk of disease. A small number of students wrongly believe that antibiotics kill viruses. In part (c) many students appreciated that bacterial decomposition of the waste releases mineral ions that help plants grow. Many also appreciated that bacterial respiration would release carbon dioxide gas which would assist photosynthesis. A few misread the question and discussed events that would take place in step 2. In part (d) there were many correct answers but

it was clear that some students do not understand the term interspecific as their answers concentrated on intraspecific competition.
Q10(a) of this question tested understanding of sex inheritance and was well answered by most students. A minority lost a mark for not stating the sex of the offspring and a very small number lost credit for using X and Y symbols rather that the ones given in the question. The remaining parts of this question were extremely well answered by the vast majority of students. Protein providing amino acids for growth was the most popular response in part (b)(i), most appreciated the role of the shell in protecting the developing embryo in (b)(ii), and a pleasing number knew a source and a function of vitamin A in (b)(iii). In part (c), most were able to gain full marks though there was occasionally evidence of confusion about the role of meiosis and mitosis.

Q11 was a good discriminator. Some excellent, very detailed answers were seen. However, weaker students were confused about the roles of the egg cells and the body cells involved. Many poor answers contained information about genetic engineering and gave hybrid answers often implying a role for restriction enzymes in transferring DNA to eggs. A surprising number of students believe that the adult nucleus is obtained from Dolly.

In Q12 only the best students were able to access part (a) of this question fully. Few recognised that the difference in the diameter of the afferent and efferent arterioles is responsible for the pressure needed for ultrafiltration, and many students gave irrelevant answers concerning capillary structure and diffusion. In part (b), most recalled that the blood vessels of the glomerulus are capillaries. In part (c), only the better students were able to gain full marks, no doubt understanding that the numbers on the diagram indicate the involvement of active transport. Most appreciated in part (d) the importance of glucose as a substrate for respiration.

Q13 challenged student understanding of the structure and function of the heart. About a third of students gained both marks in part (a) which was pleasing to note. Those that made errors often referred to two ventricles. Only the strongest students gained credit in part (b)(i) with most wrongly thinking that both levels would rise. Most students did better with part (b)(ii) although the majority thought the reason was linked to the heart valves.

Q14 examined knowledge about the homeostatic control of blood glucose. There were many very good answers, often gaining full credit. However, the examiners noticed that there was considerable confusion about the roles and naming of glycogen and glucagon, and the site of insulin production, which was often quoted as the hypothalamus or pituitary. Vague references to altering blood sugar were common.

Q15 provided students with an opportunity to demonstrate their understanding of how to design an investigation. Many students used the familiar CORMS prompt to structure their answers, though it is clear that those who simply list the CORMS letters and then answer in bullet point format tend to lose credit because their answers lack the required detail.

Students should be encouraged to write continuous prose to have the best chance of gaining full marks.
Most students designed investigations where rats of the same species (O) were divided into groups (R) and each group was given a different concentration of calcium ions in their diet (C). The examiners saw many answers that measured the mass or length (M1) of the rats after a sensible stated time period (M2). The control of variables was less evident, though it was pleasing to see comments about keeping the rats at the same temperature and giving them the same water regime (S1 and S2).

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

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