



# **Examiners' Report**

## Principal Examiner Feedback

Summer 2017

Pearson Edexcel International GCSE  
in Human Biology (4HB0) Paper 02



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1ai Many candidates gave 'grass' as their answer to this question.

1aii Most candidates scored full marks for their response to this item, giving clear food chains that included the correct organisms with arrows indicating the correct direction of energy flow. Some candidates gave random organisms in their food chains rather than use organisms from the food web given in the question but, more often, these were able to score one mark for the arrows in the correct direction. Less successful candidates gave partial food webs, some containing the correct organisms but not enough of them or that contained four organisms but with at least one arrow pointing in the wrong direction. These responses failed to score any marks.

1aiii The most popular answers given by the majority of candidates included 'respiration', 'heat' and 'movement' although the full range of alternatives was covered in the responses seen. Most candidates gained one mark although some were less fortunate, giving details such as 'when there is no Sun' or 'the grass died' implying little understanding of what the question expected of them.

1b Terms such as 'feed' or 'eaten' (by bacteria/decomposers) often limited the score that candidates obtained to one mark. However, most candidates answered this question well and were able to score two marks for details that most often included 'bacteria' for marking point one and 'decompose' or 'decay' for marking point two. Named organic matter was seen infrequently and, likewise, details relating to marking point four (nutrients released back into the soil) were rarely given in responses.

2aii Many candidates failed to link an increase in the amount of water lost through breathing to an increase in aerobic respiration but instead focussed on the amount of water lost through sweat which was irrelevant. A fair number of candidates lost a mark for stating that more energy was '*produced*' rather than more energy was '*needed*' for the second marking point. Very few candidates mentioned lactic acid production (marking point 3) in their answer.

2bi Candidates that lost marks for their bar charts either failed to give fully labelled axes or drew one or more bars that did not match the data given in the table. Some bars were poorly drawn leading to ambiguity in their height with the most common 'mis-plotted' bar being 1040 followed by 1180. Student's choice of scale sometimes made plotting of bars more difficult and, consequently, several failed to gain the plotting mark. Some candidates copied data over from the table to construct the Y axis scale for the chart although most gave clear indication on what each bar represented either by providing a key or by labelling the bars themselves with 'hot day/cold day'. The vast majority of charts were carefully drawn allowing the most candidates to gain full marks.

2bii A good number of students analysed the data correctly and gained full marks for stating that a lower volume of urine produced on a hot day (or vice versa)

2biii Candidates that gave more simplistic answers i.e. sweating and its cooling effect tended to be more successful in gaining marks than candidates that gave more complicated responses involving hormones. Often these candidates missed marks for errors about reabsorption. Many candidates that gained a mark for sweating frequently failed to link this with the cooling effect on the body for a second mark. Several candidates covered the same marking point more than once in their answers e.g. 'more water loss on a hot day because you sweat more and less water lost on a cold day because you sweat less'. A fair number of students just repeated information that they gave in the previous question in their responses, giving details such as 'more water is lost on a hot day than a cold day (so less lost in urine)' or lifted values from the table to describe the difference in the volumes of water lost. Other candidates failed to understand the intention of the question and gave details related to heat gain and loss such as vasodilation and vasoconstriction and although some linked water loss to these processes, the answers given were not creditworthy.

2bv The most popular correct answer for one mark was to repeat the test and this was inevitably followed by a second mark – calculate an average – for many students. Some candidates thought that carrying out the test with people of the same gender, age, health and mass would make the investigation more reliable although these failed to score marks.

3a Some gaps were left blank rather than attempted guesses here. Most candidates knew the stomach contained acid and this was frequently awarded. Antibodies were often confused for antibiotics which was not credited and similarly, ciliated epithelium (for the second response) along with several variations such as ciliated cells, rather than trachea was often seen.

3b Most candidates drew a vertical line on the syringe at  $0.56 \text{ cm}^3$  and these were mostly clear and unambiguous. Some of the lines were very thick and spanned too large an area to credit. Most Few candidates drew a horizontal line which were credited if they were drawn from the right hand side of the diagram and stopped at  $0.56 \text{ cm}^3$ . Curved lines, in an attempt at drawing a meniscus, were sometimes drawn the wrong way which often gave the wrong value.

3c A variety of responses were seen with the majority getting at least one of the two marks available for understanding that vaccines are tested to 'see if they work/are effective' or 'to see whether they cause harm/side effects'. Responses that failed to gain credit most often included details along the lines of 'to prevent white blood cells attacking.....'.

4aii Some candidates that were not awarded full marks mostly gave answers that were too vague – 'Insulin causes blood glucose levels to return to normal' was seen frequently but these answers did not specify whether being brought back to normal meant an increase or a decrease. Some candidates confused similar words and their function: glycogen/glucagon, some hedging their bets by correctly describing the function of both insulin and glucagon and scoring zero. A significant number of candidates seemed to think that the blood glucose levels were detected by the pituitary or hypothalamus and the brain instructed the pancreas to release hormone X. An alarming number of responses suggested that 'glucose was broken down into glycogen'. Students gaining one mark often

included details about glucose being converted into glycogen but then omitted to describe how this affected the blood glucose levels for the second mark.

4bi Some candidates picked up marks for simplistic comparisons between the diabetic and non-diabetic with most being able to gain a mark for stating that the blood glucose levels in diabetics were higher than those in non-diabetics. Many were also able to gain a mark for a comparison of the peak levels but less frequently for comparing the rate of the decrease in both. Less able students often quoted incorrect data from the graph or miscalculated data which was included in answers that failed to gain full credit. Some candidates attempted to explain the data and gave information on how the presence of hormones affected blood glucose levels without making adequate reference to the graph.

4bii There was similar confusion here with glucagon and glycogen as found in a previous question and quite a few responses referred to reabsorption of glucose in the kidneys. Again candidates, and a significant minority, wrongly indicated that it was a function of the brain to detect the increase in blood glucose level and then instruct the pancreas to release glucagon. High scoring answers were seen as candidates referred to  $\beta$  cells of the Islets of Langerhans secreting glucagon followed with clear descriptions of the action of glucagon and its role in raising blood sugar. Incorrect use of terminology led to some students losing marks e.g. pancrease rather than pancreas was seen at times which was not credited.

4ci Nearly all candidates scored a mark for correctly naming the elements found in a glucose molecule. Responses failing to score nearly all managed to identify at least one element with carbon being the one seen most frequently. Nitrogen was often included in incorrect answers.

4cii Most candidates knew to use Benedict's solution to test for glucose for one mark although some were confused on the indicator used and named Biuret or iodine. There were many responses that understood that the reactants needed to be heated in some way and although the use of a water bath was frequently stated in the majority of responses, a large number of these failed to state that the contents of the test tube needed to be *heated* in a water bath. Candidates that did give details on heating often quoted unrealistically high temperatures e.g. boil the contents or heat to 80°C and conversely, some students even quoted temperatures lower than room temperature (the latter obviously failing to score).. A large proportion of candidates knew the correct positive result for the test and a fewer number stated that a blue colour would give a positive result.

5ai Although the question asked students to show the flow of blood from the body to the lungs by drawing arrows on the diagram too many candidates drew arrows on both sides of the heart which negated both marking points. Although in many cases these arrows showed the correct direction of blood flow through the heart on both sides these responses failed to translate their understanding of blood flow through the heart as asked by the question. It appeared that many candidates overlooked this question – there were a fair number of diagrams left blank. Candidates gaining one mark either drew only one arrow going into the heart or one arrow leaving the pulmonary artery which did not fully answer the

question. There were very few responses that gained one mark for placing an arrow on the right side of the heart but pointing in the wrong direction.

5a ii Most candidates were able to describe the function of the valve (part W). Some did not mention 'from the lungs' for vessel X and some did not state where the blood was being pumped to for vessel Y. Some candidates gave the name for each structure rather than their functions.

5b i Most answers gave clear, correct details that gained one mark. There were other, more wordy responses that tried to explain why it was important that the vein graft came from the leg of the patient and although many of these implied some understanding they did not quite hit the mark e.g. 'so that antibodies aren't produced' or 'because they have the same antigens/blood group' or 'different people have different tissue types'.

5b ii Many candidates found this question challenging but, as in previous series and mentioned several times in examiner reports, the majority of responses failed to incorporate key points in their answers which, if used, would have enabled a larger proportion of candidates to gain higher marks for this question. Students gave details about blood flow in or to 'the heart' rather than to 'heart/cardiac muscle' – a key point that is expected when evidencing understanding of heart disease and there were very few references to blocked coronary arteries. The majority of candidates failed to recognise the core purpose of the graft in that it bypassed the coronary blockage allowing blood to flow to heart tissue and this led to marking point three being rarely awarded. Although a fair number of responses implied some understanding of heart disease by stating that oxygen delivery was resumed this was, again, more often than not to 'the heart' rather than to the cardiac muscle/tissue and, therefore, failed to gain marks. Other responses were vague e.g. 'the vein supplies oxygen/blood to the heart which reduces heart failure' Some errors included describing how the veins from the leg were 'bringing fresh blood from the legs, to the heart and reference to the reduced risk of heart failure due to 'no rejection'.

5c i Some students arrived at the correct answer in their working out and then proceeded to multiply this answer by 365, presenting their final answer with a figure representing one day rather than a year. This was unfortunate and likely a case of misreading the question. Many candidates showed very clear working and gained two marks for giving a correct final answer. Few students failed to show working out – some of these gained full marks although others less fortunate and did not score at all.

5c ii Most candidates gained full marks here although some need to be aware that generalities like 'a good diet with.....' are unlikely to score. The full range of marking points was covered in the responses seen.

6a Most candidates scored well, gaining three marks for correctly naming the stages of mitosis shown in the diagrams. There appeared to be few 'guessed' answers although those that may have been generally scored one mark. Although incorrect answers gave the correct names for the stages shown in the diagrams, they were not in the right order and several candidates, rather than give names, attempted to describe the events taking place in the cells shown.

6b Responses to this question generally gained at least one mark, with very few unable to score at all. The majority of candidates were able to correctly sequence the stages of mitosis for two marks.

6c There were surprisingly few responses that mentioned one function of mitosis as the production of *genetically identical* cells. Many candidates seem to prefer to just state that it 'makes new cells' or 'replaces body cells'. Answers along these lines were not awarded. The most commonly seen correct answer for one mark, which was obtained by the majority of candidates, was a description of the role of mitosis in either 'growth' or 'repair' although it was unfortunate that some candidates had this mark negated for stating that 'mitosis repairs (body) *cells*' rather than body 'tissues'. Few candidates included information about the production of diploid cells in their response.





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