

Examiners' Report/ Principal Examiner Feedback

March 2011

GCSE

360Science

GCSE Additional Science
Structured Paper B2 (5016H/1H)
Higher Tier

GCSE Biology
Structured Paper B2 (5028H/1H)
Higher Tier

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5016H Additional Science/ 5028H Biology (B2) Examiners' Report

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General Comments

Many candidates showed a good understanding of the subject and some excellent answers were seen, showing a good knowledge of the processes covered and a clear understanding of the biological principles involved. Overall, candidates produced answers that were similar to the last few series of examination papers.

All items seemed accessible to the majority of candidates although there was some evidence of questions left blank and a number of candidates who wrote vague responses that gained no marks.

Question 1

Many candidates seemed to have a set idea of what this questions was asking without reading it properly so many described what the nucleus did and/or what the cytoplasm was. A number just stated where whichever structure was found – outside the cell membrane, in the middle or similar.

Cell wall - many candidates confused cell wall with the cell membrane and stated that it could control what entered. Many answers referred to the fact that it was rigid and therefore a good support structure.

Chloroplast - many candidates correctly explained that it was the site of photosynthesis and/or it absorbs sunlight to make glucose. There were also a number that stated that it contained chlorophyll but didn't state what it was actually used for. Several seemed to confuse it with cytoplasm and many just stated that chemical reactions took place in it.

Vacuole - a number of candidates thought it was an air sac or a 'space' and some wrote that it had no function. A lot seemed to equate it with cytoplasm and many seemed to confuse it with a chloroplast. Many of the correct answers referred to cell sap, though most correct answers stated it was to store/hold water.

Cell Membrane – candidates seemed to confuse it with nucleus and described it as the cell's brain. There were a number of vague answers that referred to 'letting things through' or similar.

8% gained all four marks, 18% gained 3, 28% gained 2 and 30% gained 1 mark.

Question 2

Most candidates could describe the DNA molecule as being a double helix or twisted ladder. Also, most candidates knew about the bases and could give the names of them or letters representing them. Many candidates show an extension of their knowledge by pairing the bases A-T and G-C.

Some candidates got confused with protein synthesis and said that the bases were amino acids or proteins. 50% gained both marks and 40% gained 1 mark.

Question 3

In part (a) many candidates picked up on the idea that more sunlight meant more photosynthesis and more food, and this was probably the most popular correct answer. The second most popular was that they were protected from predators; some thinking that being high protected them from predators on the ground; others

that the emergent provided shelter from flying predators. There were a few who thought that these classed as two separate answers for the two marks. A number mentioned that it was warmer but very few discussed that it was an appropriate habitat and that there were better places to nest.

The most common incorrect answer was something along lines of 'there is more light there' or just quoted figures from the table. Some said it was better because they have plenty of light but a bit of shade or they could shelter from rain better. Many talked about how much water was there. Some said that they couldn't live higher as it would hurt them when they fell. 48% gained 1 mark and 30% gained both marks.

In part (b) most candidates indicated that the plants got less light but their reference to photosynthesis was not always clear. 'Less light for photosynthesis' would imply that photosynthesis was occurring while 'not enough light for photosynthesis' does not imply it.

Many candidates referred to 'not enough light for growth' which is a consequence of photosynthesis and not worthy of a mark. Some candidates did refer to competition for space, water, etc. but did not give a consequence and so did not score a second mark.

Question 4

In part (a)(i) many candidates referred to fertilisers run off. There were some great answers that covered all the possible marking points – e.g. "Fertilisers containing excess nitrogen have leached into the lake causing an algal bloom. This is Eutrophication." There were a number of candidates that lost marks as they did not state that there was an increased amount of algal growth, many implied that there had been no algae previous to the fertilisers leaching into the lake. There were also many candidates that seemed to have the right idea but stated that it was herbicides, pesticides or just chemicals that had leached into the lake. There were a number of vague answers that achieved no marks. They generally wrote something like "the algae has grown". There were also a number of strange spellings of the word eutrophication, though most managed to get it close enough. There were a minority of candidates that had completely got the wrong idea and talked about the plants from the farmland growing in the lake or that somehow chlorophyll/chloroplasts had got into the lake and dyed it green. Some thought that toxic chemicals had turned it green. 28% gained 1 mark and 44% gained 2 marks.

In part (a)(ii) many candidates answered correctly, covering all three marking points – e.g. "The growth blocks out sunlight so plants can't photosynthesise and may die". Most candidates got the idea that sunlight was blocked though were sometimes a bit vague in what effect this would have. There were many candidates that stated that the plants would just die or grow less but often didn't explain why.

There were many that went further to explain what the process would then lead to; terms like "mega-growth, mega-death, mega-decay" were common. There were many references to oxygen levels and how this would affect the plants and fish in the lake, though not relevant, they were often correct. There were a lot of incorrect references to respiration as well. 17% gained 1 mark and 72% gained 2 marks.

In part (b) many candidates stated that 'less fish means less predation on water fleas so their number increase and they clear the algae by eating it' or something similar. Some went on to say that the large population of fleas could not continue as they would run out of algae or similar though this was not necessary for the mark.

Some confusion about the food chain was evident – some thought that by removing the fish there would be nothing for the fleas/algae to feed on. Some explained this by saying there would be a lack of nutrients from the fish waste as fish were not providing nutrients in their faeces any longer. Many who used this line of reasoning explained that this cleared the lake as it was devoid of any life and so clear. It seemed that the term 'flea' may have led some to think that they lived off the fish as parasites. It seemed candidates were confused by the direction of arrows in spite of this being the usual notation.

There were also a lot of incorrect references to oxygen levels in the lake, possibly because candidates assumed this was a continuation of the previous questions on eutrophication and so stating how increased nutrients had affected the animals in the lake.

Some candidates seemed to think that removing the fish meant that this would allow scientists to clean the lake physically or chemically without harming fish. 10% gained 1 mark and 64% gained 2 marks.

Question 5

In part (a) most candidates gave oxygen and glucose as answers. Very few candidates gave two energy sources e.g. glucose and protein. 70% gained the mark.

In part (b) many candidates were able to correctly state where the high and low concentrations were, although a surprising number thought that the concentrations moved rather than the carbon dioxide. Even more worrying were those who used "high concentrations changed to low" in the sense of the high concentration reducing. They clearly had not grasped the concept that chemicals move, and that diffusion is all about movement. 34 % gained 1 mark but only 1% gained the second mark.

In part (c) most candidates did know about anaerobic respiration and scored well. Some candidates gave incorrect equations e.g. glucose + oxygen = Lactic and carbon dioxide

Some candidates thought that the breakdown of lactic acid released energy. 21% gained 1 mark and 54% gained 2 marks.

Question 6

In part (a) many candidates stated that the tube was a control. Other candidates only answered in vague terms, for example: as a comparison or that it would make the test fair or valid. 67% gained the mark.

In part (b) many candidates stated that 'the plant doesn't grow properly' or something similar. It seemed clear that many didn't realise that they should be looking at the diagram and comparing with the sample with N and the sample with both N and P so just made references to the difference to the healthy plant. This resulted in many incorrect answers that referred to the state of the leaves. A lot just talked about what phosphate was used for in the plant and often correctly talked about its use in DNA and its important role in respiration and photosynthesis but did not receive any marks as they had not read the question properly.

The correct answers were a mixture of references to the number and length of the roots, with many candidates achieving both marking points. Some went further and explained what effect this would have on the rest of the plant though this was not necessary for the mark.

41% gained 1 mark and 59% gained 2 marks.

In part (c) Very few candidates scored all 3 marks and only did if they gave a good description of active transport. Many correctly identified the root hair cells and that the minerals are dissolved in water. Some only answered in superficial detail and some got the concentration gradient idea the wrong way round i.e. that active transport moves molecules from high to low concentration. Many candidates talked about osmosis being responsible but didn't appreciate that this only accounted for the movement of water. Some candidates mentioned the molecular pumps showing that they had been taught to a high level.

33% gained 1 mark, 13% gained 2 marks and 12% gained all 3 marks.

Question 7

This question worked well with 54% of candidates scoring - 1 (14%) , 2 (11%), 3 (13%) or the full 4 (16%) marks available. 46% of candidates failed to core any marks by giving vague responses. There were many misconceptions and much confusion with genetic engineering, IVF, and sexual reproduction. Many candidates referred to DNA, genes and chromosomes being removed from cells instead of the nucleus. Descriptions of IVF techniques and protein synthesis involving mRNA and tRNA were common. Some candidates gave good descriptions of genetic engineering involving bacteria and plasmids. Electric shocking the embryo after implantation into the surrogate mother was perhaps going too far, although most appreciated that an electric shock was administered at some point in the process. They only gained credit if this was at the correct stage of the process. Many candidates referred to fertilisation sperms and zygotes and lost marks for this.

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