



General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Report on the Examination

2008 Examination – June Series

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Science B / Biology

Higher Tier BLY1H

General

There were seven questions on the paper. Questions two and three (termed Standard Demand) were common to Foundation and Higher Tiers. These were targeted at grades C and D. Question one and four parts (a) and (b) were also targeted at grades C and D. The final questions, termed High Demand, were targeted at grades B to A*.

Most candidates followed the instructions in the question correctly. There were however a few candidates who did not. For example when asked to state **one** example or give **one** reason, candidates should not give a list of possible alternatives.

Performance on questions addressing ‘How Science Works’ was very variable. Centres are reminded that the examination will test both sections 10 and 11 of the specification.

Question One (*Standard Demand*)

In both parts (a) and (b), candidates were very well aware of adaptations, and most scored highly on this question. However, many candidates failed to read the question properly or look at the photographs, and came up with inappropriate learned adaptations of polar bears in part (a), and with adaptations of camels for living in hot conditions in part (b).

There were many excellent answers to part (a), often giving more than one appropriate adaptation. Marks were most frequently lost because of lack of precision, for example fur or fat rather than *thick* fur or *thick* layer of fat. Thick fur and white fur were the most common answers given, although small ears and small surface area : volume ratio was also a frequent correct response.

Many described the animal as being small, rather than small SA:V ratio. Large SA:V ratio was also frequently seen, but the idea of less heat being lost from a smaller surface was well understood.

Many candidates referred to white fur *absorbing* more heat whilst others described the fur as being greasy to protect against wetting, obviously referring to the polar bear.

Many candidates referred to big paws to prevent sinking into the snow ignoring the photograph, others referring to big ears to hear prey above the noise of the howling wind.

An amazing number picked out the bushy tail; some suggesting that the fox could cover itself up with its tail, but other suggesting that a greater surface area could help to keep the fox warm, or even that a predator would go for the tail and not damage the fox's body

Horns and skin colour were the most common adaptations given in part (b), although skin colour was often unqualified, and camouflage was often given as the adaptation rather than how it helps. Some candidates ignored the request for adaptations for avoiding being killed by predators, so gave instead adaptations for living in the desert. These were usually camel rather than antelope adaptations eg storing water inside them, wide feet which don't sink into the sand, thin skin for greater heat loss so doesn't get too hot running away from predators, small SA:V ratio so when it's running it loses less water, long eyelashes to keep sand out of its eyes, no sweat glands so loses less water.

Bizarrely, several thought that the horns and tail were for balancing when climbing the rocks in the mountains.

Question Two (*Standard Demand*)

In part (a)(i) there were a significant number of clear, accurate and concise answers. Most candidates indicated that something was trapped though many suggested that carbon dioxide

trapped radiation on its way to the Earth from the Sun. A considerable number of responses referred simply to sunlight or even just the sun. On many occasions it was clear that no distinction was being made between UV, IR, light and heat rays. Other answers referred to the carbon dioxide itself being trapped or not being able to escape or sometimes being reflected. There were frequent references to carbon dioxide making holes in the ozone layer or damaging the ozone thereby allowing more Sun in. Occasionally acid rain was described as being the cause of the greenhouse effect. Some statements were very simplistic such as the more carbon dioxide the greater the greenhouse effect.

A significant proportion of candidates ran out of space and had to continue the answer on an extra sheet, or at the bottom of the page. This was usually because they tried to write everything they knew about the greenhouse effect, and did not form a response that directly answered the question

Part (a)(ii) saw the majority of answers gaining the mark here, the most commonly credited response being melting icecaps closely followed by global warming. Most incorrect statements made reference to acid rain or ozone. Many secondary effects were suggested such as destruction of habitats, death of plants and animals, formation of deserts etc.

In part (b)(i) a high proportion of candidates stated that customers would be attracted by what they saw as the green or environmentally friendly credentials of the supermarket. However many had difficulty expressing this idea and resorted to phrases such as wanting to help the world or trying to save the earth. Many answers were just too vague, for example they want to make a difference or do their bit or, it's a good cause.

Most answers in part (b)(ii) showed that candidates understood that there would be less transportation of food which was often expressed in terms of the number and type of vehicles used. However many lost the second mark by explaining simply that this would result in less pollution.

A small but significant number of responses suggested that this would result in less wasted food or less packaging. Some candidates referred to British food as being safer, fresher, cheaper, more natural or more organic etc. Others decided that there would be less destruction of forests abroad as they would no longer need the land for crops. More than a few explanations stated that the plants grown in Britain would help to use up the excess carbon dioxide.

Many candidates gave very long answers which filled most of the page. These are unnecessary for a two mark question and candidates should be trained to write concise, scientific responses.

Question Three (*Standard Demand*)

Part (a) saw the majority of candidates referring to diet, those who did not usually referring instead to the various control variables.

Most candidates identified a control variable in part (b). Exceptions were those who thought it was the diet itself that was being controlled. There were several references to the dependent variable.

In part (c) most candidates gained at least one, if not two marks. The most common reasons for incorrect answers were: only overweight people were used, a control group (*of normal weight people?*) should have been used, the experiment should have been repeated. Some thought that the test was flawed because no initial measurements of mass, body fat, blood HDL and LDL levels were taken. Many candidates referred to the volunteers having different BMI's. Interestingly nobody actually expanded to define a BMI.

Although many candidates gained both marks in part (d), common misconceptions and incorrect answers were seen. Several areas where the data was incorrectly used were: No as it does not measure the speed of weight loss, No as only 57% of group 2 finished the trial or Yes as 76% finished the trial,

Quite a few candidates stated that losing weight does not mean that you are healthy as they missed the point that all these volunteers were overweight.

Many candidates confused HDL as bad cholesterol and LDL as good cholesterol, whilst others commented on changes in LDL alone, without mentioning the effect this might have on HDL:LDL ratio. Indeed, very few candidates referred to the HDL:LDL ratio.

Question Four (Standard / High Demand)

Please refer to general comments regarding the demand of this question.

Throughout the question terms such as antigen, antibody and antitoxin were used with varying degrees of accuracy. In some instances there was a lot of confusion and had candidates used simpler language they might have been more successful!

Good and bad bacteria were often mentioned by weaker candidates.

In part (a) correct information about viruses was seen more often than correct information about bacteria. Some candidates confused toxins with antitoxins, and others made general statements about the immune system which did not gain credit. Many candidates wrote ambiguous answers, which referred to the release of toxins by viruses without making it clear whether the toxin came from the virus or the cell.

Some candidates said that the viruses were inside the host cells without saying anything about the damage that they caused to the host cell and so failed to gain the mark. Many candidates gave very similar answers for both bacteria and viruses, occasionally the two answers were identical

There were many excellent answers to part (b), the inaccessibility of the virus being the marking point least referred to. A few candidates stated that you couldn't kill a virus as it wasn't alive or referred to its hard protein shell. Some candidates described the virus attached to the outside of the cell and others made confused statements about drugs moving around looking for viruses which were hiding in cells.

Several candidates wrote about the relative size of bacteria and viruses, about mutation rates or about the fact that viruses could only be destroyed by the body's own system.

In part (c) a majority of candidates seemed to be under the impression that failure to complete a course of antibiotics has an effect on bacteria which are then able to mutate or become stronger or become more resistant. Many candidates appear to think that a certain number of bacteria are killed by each antibiotic tablet.

A surprising number of candidates gave prepared answers to a question on the spread of MRSA in hospitals. These answers were usually in terms of unhygienic practices and gained no credit.

Question Five (High Demand)

There were quite a lot of very good answers, many concise, and gaining all five marking points. There were also many who began with a text book explanation of natural selection, Darwin and the "survival of the fittest" without any reference to crossbills and hence to the question. A few even substituted their own preferred species to illustrate their account; Darwin's finches and giraffes were examples.

The presence of genetic variation within the species was also frequently quoted as a reason for the shape of the present crossbill's bill without going on to state that mutations were responsible for the variation and therefore were responsible for the curved beak. Others simply stated that natural selection had resulted in them getting crossed bills, again without any reference to mutation having occurred.

Some wrote of the beak being an acquired character. Some thought that if the beak was clipped the beak would mutate to grow back again.

There were many references to competition and most related it to food, seeds or cones. Some only related it to mates or territory but a significant minority did not relate it to anything. There was just competition between the two types of crossbills or the crossbills and other animals or the crossbills developed these beaks because of the competition.

In many answers there was a vagueness about mutation. A statement such as mutation developed features which benefited the crossbills because it made them more suited to their environment, was not uncommon. They did not say what the mutation was or how it benefited them. Crossbills did feature in vague comments about mutations but in many cases was effectively referring to the bird and not a change in the beak. Good candidates answered the question by simply stating that crossbills had started off with normal beaks but a mutation brought about a beak which crossed.

While most candidates assumed that clipping the beaks simply removed the crossed over bit, as stated in the question, thus leaving them effectively with a normal bill, some candidates thought it meant removing the bill altogether. Some candidates thought that having clipped bills was a natural phenomenon and had arisen as a result of damage during fighting. A few others thought the mutation gave them the clipped bills. Perhaps they thought the clipping gave them the points on the ends of the beaks?

A surprising number of candidates either did not refer to breeding at all or went the other way explaining at length about survival and breeding of the mutant then again for its offspring then again for their offspring.

It was not entirely uncommon for the candidate to mention that the crossbills had arisen from simple life forms obviously quoting a text book answer that had started evolution from the primordial soup.

Question Six (High Demand)

In part (a) it was encouraging to note that a majority of candidates could correctly describe the functions of the three hormones. There was however the familiar confusion between maturation and ovulation.

Part (b) was an application question, asking candidates to interpret given information in an unfamiliar situation. Centres were not expected to teach this technique. The candidates were asked to use the information in the question to formulate their answers and over 95% of candidates made an attempt at this question.

For teachers sceptical about the technique, the egg is treated with phospholipase C-zeta (PLC-zeta), an enzyme produced by sperm discovered by Swann with Cardiff colleague Tony Lai. Human eggs contain two sets of chromosomes, one of which is normally jettisoned within two hours of fertilisation. Swann and his team used a standard chemical treatment to prevent this, so both sets in the parthenogenic embryos come from the mother. The embryos appear to undergo the same changes as naturally fertilised eggs.

Better candidates recognised that the egg had not been fertilised and the embryo was therefore a clone of the mother. They also usually identified ethical issues associated with cloning the mother, and the fact that cells used for medical treatment did not develop into embryos. The majority of candidates gained 1 mark, mainly for the unethical nature of the experiment.

Some candidates gave prepared answers on the pros and cons of genetic engineering, receiving no credit. Similarly there were many answers concerned solely with designer babies or with multiple births. Some candidates thought that the cells used to treat disease came from the baby which would therefore be deformed.

Question Seven (*High Demand*)

Relatively few answers were laid out as evaluations, describing the pros and cons of the method and coming to a conclusion. Those candidates who answered in this way tended to score full marks.

Many candidates only answered in terms of conclusions. Although the mark scheme made it possible to obtain four marks in this way, most of these candidates scored only two marks for describing the results of the investigation, then stating that this provided evidence for the link in humans.

Several candidates obviously had no idea how to handle a question like this and merely wrote about addiction to drugs in general with little or no reference to the data.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the [Results Statistics](#) page of the AQA Website.