AQA

General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H   Unit Biology 1

Report on the Examination

2009 examination – June series

Science B / Biology
Higher Tier BLY1H

General

There were seven questions on the paper. Questions 1 and 2 (termed Standard Demand) were common to Foundation and Higher Tiers. These were targeted at grades C and D. Questions 3 and 4(a) were also Standard Demand. The remaining questions were High Demand, targeted at grades B, A and A*.

Candidates should be advised to write in black ink or black ball point pen only as the scanning process involved in on-line marking does not pick up pale colours well. Furthermore candidates should be advised to ensure that if their answers extend beyond the printed lines or space then they should keep these extensions away from the edges of the page as they may be removed during scanning. Candidates who wrote far too much irrelevant material in the earlier questions often left insufficient time to complete the last question.

Some examiners expressed concern about illegible handwriting. Although a very small percentage, candidates should be aware that if the examiner cannot read the script they will not be awarded any marks for that part.

Fundamental knowledge and understanding of How Science Works in the world at large, as well as in the laboratory, were tested throughout this paper. This means that candidates should be reminded that it is essential to read all of the question carefully, analyse the information provided and think about their response before writing their answer.

Question 1

(a)   The majority of candidates gave a satisfactory adaptation. Unsuccessful candidates usually gave unqualified descriptions such as the shape of their wings, shaped to turn quickly and small body. Several candidates referred to the head in terms of the beak or head being pointed or the head being rounded but did not develop the answer in terms of making it streamlined or aerodynamic. Other candidates gave features which were not visible on the photograph eg light body and bones. A significant number of candidates linked tail shape with stability rather than with speed as required by the question.

(b)   Most of the candidates gave a satisfactory suggestion. Too cold was a very common answer but many of these candidates went on to develop the answer by explaining that this resulted in fewer insects being around and hence the shortage of food triggers migration. Some referred to there being insects in Africa but failed to say whether the insect population had changed in any way in Britain. Weaker candidates stated that the birds were not adapted to the cold, could not cope with cold, or conversely were adapted to warmer climates.

(c)   (i)   Nearly all of the candidates gave two satisfactory suggestions and a further tenth gave one. The majority of candidates answered in terms of feeding height and times of feeding. Weaker candidates often gave non-comparative answer eg swallows feed near the ground or during daytime. Others stated that they fly at different heights without any reference to hunting or feeding.

(c)   (ii)   Half of the candidates gave a satisfactory suggestion. Large numbers of candidates ignored the information in the rest of the question and simply gave the answer food. Other common errors included competing for mates and competing for water.

Question 2

(a)   Three quarters of candidates correctly identified two control variables, and a further fifth correctly identified one. Significant numbers of candidates gave the independent variable (diet programme), the dependent variable (mass change) or the control group. Some candidates saw age, gender and mass in the stem of the question and used this as their first answer. Weaker candidates often answered in terms of the same type of person was chosen.

(b)   Two thirds of candidates gave two correct conclusions, and a further quarter one. The most common error was to state that the control group had put on weight or more had put on weight in the control group rather than referring to the mean change in mass. Another common error was to single out the Rosemary Conley classes as being the most successful because one individual from that programme had lost the most mass, rather than using the means for mass loss. Many candidates stated that if you are not on a diet you will automatically put on weight!

(c)   Two thirds of the candidates gained two marks and a further sixth gained one mark. Many candidates stated that Rosemary Conley classes were the most cost-effective rather than the Atkins book. This was presumably a reflection of the fact they were unaware of the difference between effective and cost-effective. Many, who deduced it was Atkins failed to use a comparator to describe cost of Atkins eg Atkins cost least, only cost £3 or was cheaper etc.

(d)   Half of the candidates gained two marks and most of the rest gained one mark. Most candidates realised that exercise used energy. A pleasing number of candidates also referred to increases in the rate of metabolism or respiration. However, relatively few correctly related energy use to food or to fat stores. Weaker candidates often answered in terms of sweating.

Question 3

(a)   (i)   The large majority of candidates gave a legal recreational drug. Failure to gain the mark was usually because the answer was too vague eg cigarettes. Weak candidates often gave painkillers or antibiotics.

(a)   (ii)   Nearly all of the candidates gave an illegal recreational drug. It is a quirk that more candidates know what is illegal rather than legal.

(b)   (i)   Most of candidates gave a correct example. Many candidates ignored the words very addictive in the stem of the question. Answers such as alcohol and cannabis were ignored because, although there is some addiction in these two cases, these two drugs are not highly addictive.

(b)   (ii)   Only a sixth of candidates gave a correct explanation in terms of drugs altering chemical processes in the body. Many candidates gave long answers which merely referred to withdrawal symptoms and cravings. Others answered in terms of the nervous system slowing or quickening.

(c)   Three quarters of candidates gave two correct conclusions, and the large majority of the rest one. A number of candidates gave no comparative answer, merely describing two points of the table; 68% for women as their answer to number one, and 9% for men as their answer to number two, leaving the examiner to work out the significance of these. By quoting the top of one column and the bottom of the other they gave no clue as to whether they thought it was due to frequency of smoking, gender, a combination of the two or some other factor. Many candidates gave the converse answer as their second point and often expressed it simplistically eg

1.   The more cannabis you smoke the more likely you are to get depressed.
2.   The less cannabis you smoke the less likely you are to get depressed.

Question 4

(a)   Two thirds of the candidates gained two marks and a further quarter gained one mark. Many candidates correctly stated that viruses are found inside the body cells. However in a significant number of responses the viruses were described as being attached to or latching onto the cells or, more vaguely, the virus simply uses the human cells. Disease and virus were often regarded as interchangeable, thus expressions such as the disease replicates inside the cell were seen.

The most commonly gained mark was for having to kill or damage the cell in order to destroy the virus. Many candidates indicated that antibiotics could not be used, usually for the reasons given above. Unfortunately the terminology was often very shaky eg the virus is immune to antibiotics.

In many cases marks were lost because answers were based on the body's own defence mechanisms rather than on treatment eg the white blood cells cannot make enough antibodies. On a number of occasions no distinction was made between antibiotics and antibodies. Although some answers included the statement that viruses mutate not all of these indicated that it was the frequency or speed of mutation that made treatment difficult.

(b)   (i)   Only half of the candidates gained two marks and a further quarter gained one mark. Very few calculations included a clear outline of working method. Most candidates seemed at least to be able to read the figure 60 on the graph for week 4 even though they did not always know how to make use of it. A very common misreading of the question occurred which prompted many candidates to calculate the number of deaths by week 4 instead of in week 4. Others simply gave the total number of deaths for the whole period, sometimes even for the 1918 and 1957 epidemics as well.

(b) (ii) Only a tenth of the candidates gained three marks, a further quarter gained two marks and a third gained one mark. A majority of candidates understood that the virus had probably mutated in these years and that people would not be immune to this new form. Some candidates were able to suggest that the lack of immunity in the population may have been because there was no vaccine available. This was often followed by an explanation of how vaccination results in immunity. These accounts were sometimes very confused and white blood cells were frequently described as making antigens or antibiotics.

A considerable number of explanations were based on the idea that the virus itself had developed an immunity and was therefore able to resist any drugs or medicines that were administered.

A significant number gave pre-prepared answers on antibiotic resistance in bacteria, these answers failed to gain any credit.

Many candidates homed in on the idea that the living conditions prevailing at the time contributed to the high number of deaths because people were left with a weak immune system. It was often imagined that standards of hygiene were very low (descriptions often verging on the mediaeval). It was also pointed out that the population was probably suffering from malnourishment as a result of a poor diet following the war. Answers from weaker candidates often contained statements that were too vague to credit eg there was no cure and people had not had a jab.

Question 5

A quarter of the candidates gained four marks, a fifth gained three marks, a further fifth gained two marks and a sixth gained one mark. Many excellent answers worth the full mark allocation were seen. Some candidates responded to this question by giving a very general account of evolution without referring to the snakes or any of the information provided. A great many responses were muddled and confused. A misunderstanding of cause and effect coupled with a lack of appreciation of the chronology of events gave rise to statements such as it was the snakes that survived that grew longer and the snakes that developed resistance to the toads grew longer.

Other candidates suggested that the snakes had to have undertaken a deliberate mutation or adaptation and phrases along the lines of the short snakes needed to mutate in order to cope with the toxin and they adapted because longer snakes survive were often seen. Many explanations for the change in length revolved around the action of the toxin (or toad) itself, for example the toxin caused a mutation and the toad stretched the snake's body. Although most candidates were able to point out that the short snakes died and the long snakes survived, quite often no further explanation was given, implying that the only reason for the resulting large population of long snakes was the constant poisoning of any short ones.

A number of accounts were based entirely on attempts to explain how the long snakes managed to survive the toxin while the shorter ones succumbed eg the toxin is more dilute and digestion takes longer in a longer body. A significant number of candidates imagined that the scientists had interfered in some way either by carrying out genetic engineering or selecting long snakes for breeding. Terms such as survival of the fittest and natural selection were frequently inserted into these accounts in a rather random and inappropriate fashion indicating that the actual meaning of these terms was not fully understood.

Question 6

(a)   Only a fifth of the candidates gained three marks, just over a third gained two marks with a third gaining one mark. Most candidates gained credit for saying that methane was a greenhouse gas and that global warming occurred. Information about the ozone layer, not always correct, was often included and there was considerable confusion between the layer of greenhouse gases and the ozone layer. A small number of candidates confused greenhouse gases and CFC's.

Candidates often found difficulty in expressing how methane contributes to global warming. The source of the radiation and the direction in which it was travelling were not always clear and usually definitely wrong. The type of radiation was also sometimes incorrect or vague. There were many answers which included general statements about methane trapping heat without the required detail. Many candidates included irrelevant information about the consequences of global warming, eg melting ice caps or rising sea levels. A surprising number wrote about the earth's climate increasing.

(b)   (i)   Only a quarter of the candidates gained three marks, a tenth gained two marks and another tenth gained one mark. Many candidates gained all three marks in one compact sentence. Some candidates did not relate their knowledge directly to the question asked and described the insertion of the gene into a bacterium, instead of in the rye grass. Others made confused statements about plasmids. Candidates who did not realise what genetic engineering was, usually answered in terms of adding fertilisers, watering the plant with sugar, or using hormones.

References to cloning, taking cuttings, tissue culture and embryo transplants were frequent, but ignored by the examiners, as they did not directly answer the question. Splicing was a commonly used word, but it was not always used with enough additional information to gain credit. There were a number of answers which extended beyond the demands of the question, many of these included detail of how large numbers of plants with the desired characteristic could be produced following genetic engineering.

(b)   (ii)   Only a tenth of the candidates gained two marks and a further half gained one mark. Many candidates gained marks by referring to concerns about the health of cows and humans. Answers referring to environmental effects were much less common. Many candidates answered in terms of religious, moral, ethical and financial objections which were not relevant in this question. Weaker candidates were usually content with not natural which did not gain credit. Some candidates stated that it would lead to designer babies which was a rather remote idea from a rye grass context and was not given credit. Other weak answers referred to lack of understanding about genetic engineering.

Question 7

(a)   Fewer than a sixth of candidates gained three marks, a further third gained two marks and a sixth gained one mark. Many excellent answers were seen. Most candidates understood the role of FSH and LH although in a number of cases they just stated the roles of the hormones without putting them into the context of the question. Many candidates had the misconception that FSH produces eggs. A significant number of candidates added oestrogen to the list of hormones used in IVF. Some even added progesterone as well.

(b)   A fifth of the candidates gained four marks, of the rest nearly a half gained three marks, a fifth gained two marks and only a few gained one mark. Most candidates obtained the three marks that could be gained by a correctly analysing the passage for the pros and cons of IVM treatment. Common errors included failure to list more than one advantage of IVM, or confusion between IVM and IVF. It is pleasing to note that a majority of candidates have been taught how to evaluate a process. Most answers were correctly set out as a list of advantages and disadvantages followed by a conclusion.

Conclusions which did not commit to either IVM or IVF or which were restricted to only one of the treatments were not given credit. Candidates were more likely to gain this mark if they pointed out that both treatments had advantages and disadvantages and weighed one against the other before choosing. Pupils who did not write the conclusion at the end of the answer were not given credit for it.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.