



General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H Unit Biology 1

Report on the Examination

2010 Examination – June series

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Set and published by the Assessment and Qualifications Alliance.

Science B / Biology Higher Tier BLY1H

General

There were eight questions on the paper. Questions 1 to 4 were Standard Demand questions and of these questions 2 and 3 were common to Foundation and Higher Tiers. These four were targeted at grades C and D. 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 (*Standard Demand*)

- (a) Three quarters of candidates gave two correct adaptations and a further quarter gave one correct adaptation. Most candidates conveyed the idea that the actual shape of the seal's body would help it to swim. Although expressions such as aerodynamic, bullet shaped and narrow with a pointed nose were often seen most managed to offer the most straight forward description ie streamlined.

The next most frequently awarded mark was for flippers or fins even though many candidates struggled to name the feature. The word flipper appeared in various forms, some too extreme eg flaps. Wings were seen more than a few times. Many candidates stated tail but did not gain credit if this was not qualified.

A significant number of answers were based on features not directly related to swimming. These included references to the position of the eyes watching for predators, camouflage and fat to keep warm.

- (b) Three quarters of candidates gained two marks and a further sixth gained one mark.

The majority of candidates gained two marks by stating it has fat for insulation or to keep it warm. Quite a few responses gave thick skin for the first marking point, omitting to mention the presence of fat. A number of other features of the skin were suggested as contributing to its insulating properties including, its colour prevents it from emitting heat and it is waterproof so doesn't get cold.

Other answers made no mention of heat or even warmth and simply offered phrases such as withstands the cold or not affected by the cold and even stops the cold getting in. Some candidates attempted explanations in terms of surface area and volume but very often one or both marks were lost because the ratio was misquoted or because the

animal was simply said to have a small or large surface area. Many of these responses were based solely on the size of the seal eg it is hard for a large animal to lose heat with no explanation as to why.

Question 2 (Standard Demand)

It was obvious that many candidates had not conducted an ecological survey, or even done a theoretical ecological exercise.

- (a) (i) Just under half of candidates gained the mark for this question. Comparatively few candidates could name a quadrat or even give a description of one. Examiners accepted alternatives such as grid, square and frame. Many candidates gave a metre rule as the named apparatus. These candidates were given credit in part (a)(i) if they gave a correct description of the use of a rule to mark out a square metre in part (a)(ii). There was a wide range of strange answers, including a surprising number of spades or scissors to remove the plants prior to counting.
- (a) (ii) A fifth of candidates gained two marks and a just under half gained one mark. Many candidates gained a mark for counting the plants. Very few descriptions of transects were seen. There were some confused ideas about random quadrat placing around the whole area. Random placing at each metre interval was creditworthy but sampling once at each metre interval was sufficient to gain the mark.
- (a) (iii) Most candidates described the Plantain distribution correctly. A few confused the information given in the key and chose the wrong plant.
- (b) (i) Half of candidates gained two marks and a third gained one mark. One mark was awarded in this part to the many candidates who described the White deadnettle's distribution pattern. Many then went on to gain the second mark for pointing out its sensitivity to the pollutants from cars. Competition ideas were seen less frequently. Other factors causing the distribution, eg trampling, were rarely seen. Carbon dioxide was often named as a polluting gas.
- (b) (ii) A fifth of candidates gained two marks and a further third gained one mark. No credit was given here for describing the distribution pattern of the Plantain, since credit had already been given for this in part (a)(ii). Two factors or a factor and its effect were required.

There were frequent creditworthy references to withstanding pollution but preferring pollution was not given credit. Ideas about competition for light, water, nutrients and space were seen here more frequently than in part (b)(i).

There were a few good answers which described the Plantains using the carbon dioxide from traffic fumes to enhance photosynthesis. Some candidates thought that Plantain was planted to enhance the appearance of the verge and others confused White deadnettle with stinging nettles.

Question 3 (Standard Demand)

- (a) More than half of candidates correctly defined pandemic. There were three common errors. The first concerned the range of the spread where terms such as widespread, over a large or vast area, countrywide, or other ideas of spreading throughout the

country. Others with no conception of scale thought it would spread to everyone in the town or city.

Some candidates thought a pandemic was less significant than an epidemic so it would not spread worldwide. The second error that occurred more frequently was that it was the term applied to a new disease or new form of a disease that we had not come across before, bird flu and particularly swine flu being quoted examples. Others thought it was the name given to the sudden, outbreak stage of the disease and therefore applied to the early stages of the spread. The third and probably most common error was the grand scale involving numbers of people infected rather than the spread through a geographic area.

- (b) Just over a tenth of candidates gained three marks, a third gained two marks and a further third gained one mark. Many candidates found it difficult to write a coherent answer, English language skills continuing to be inadequate.

Significant numbers failed to make explicit the understanding that mutation means change in some form or other. It was not uncommon to find candidates who wrote in terms of the pre-mutation situation without relating their answer to the effect of mutation. There continues to be the belief with some candidates that antibiotics will cure viral infections, and confusion between antibiotics and antibodies as terms.

There were many correct references to old vaccines being no longer any use against this mutation and therefore a new vaccine would have to be made. Equally common were references to drugs and treatments which had previously worked on the old strain being ineffective against the new one. Recognition, however, caused a problem for quite a few. Many got no further than saying that the body did not recognise the virus. Many answers stated that the mutation or virus was hard to recognise but did not go on to say anything more about what might do the recognising. Those who mentioned the role of antibodies usually knew how they worked. Antitoxins only got infrequent mention.

There were occasional references to influenza being caused by a bacterium, despite being told in the question that it was caused by a virus.

Question 4 (Standard Demand)

- (a) Nearly two thirds of candidates gained two marks and a further third gained one mark. Some candidates lost marks by citing heart disease related answers eg heart attacks and angina although the question specifically stated that these were excluded. The most common answers which failed to gain credit were cancer, asthma and lung disease. High cholesterol was also another common answer that gained no credit.
- (b) (i) Two thirds of candidates gained two marks and a quarter gained one mark. The main reason for failing to gain credit was a failure to describe patterns as required eg simply comparing deaths of men and women at a single age. Many candidates gave vague statements such as men die younger than women.
- (b) (ii) One quarter of candidates gained two marks and a further two fifths gained one mark. Two marks could be gained by referring to two from smoking, diet and exercise. However many candidates misunderstood the question and thought they were being asked to comment on the difference in the number of deaths between men and women aged 40–60 compared to men and women outside this age group This precluded the award of any marks. Unacceptable answers included references to body mass, alcohol and hormones.

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- (c) A tenth of candidates gained three marks, over a third gained two marks and a further two fifths gained one mark. Most of the candidates who achieved one mark did so by referring to animal testing or laboratory testing or tissue testing. A second mark was often obtained by referring to tests on patients. The third mark proved more difficult to obtain. Many candidates mentioned testing for side effects, but few qualified this answer by referring to testing on volunteers or healthy people.

Question 5 (High Demand)

A tenth of candidates gained three marks, a third gained two marks and a further two fifths gained one mark. A significant number of candidates wrote about beer itself and its effects on people. Some went even further, referring to drinking too much and injuring yourself on the treadmill or getting yourself to various degrees of dehydration and the consequences on the body.

On the positive side, many candidates picked up on the fact that these candidates were probably of a similar age but that a wider spread of ages would have been better. Small sample size was frequently referred to. They commented on how there were two groups of 12 and these could, in themselves, be very different in composition from a point of view of gender, fitness, size and weight. There were many references to the fact that the students were allowed to drink as much water as they liked. Similarly many candidates noted that beer was only slightly better than water for rehydration.

Question 6 (High Demand)

- (a) Three quarters of candidates gained two marks and a fifth gained one mark. Two marks could be gained by stating that clones are genetically identical. Those who lost a mark did so mainly as a result of not mentioning genetics in their answer. Another misconception was that cloning was replication after fertilisation.
- (b) A third of candidates gained three marks, a quarter gained two marks and a further fifth gained one mark.

Virtually all the marks lost were due to the candidates not specifying that it was the genetic material of the frozen mouse that was placed in the egg cell and that the egg cell had been emptied of genetic material. For example, many candidates stated that either a brain cell was placed in the empty egg cell or the nucleus of the brain cell was placed in the egg cell.

Another common mistake was to imply that fertilisation would take place between the two nuclei ie the brain cell nucleus would be placed in the egg cell which was still nucleate. Most candidates gained one mark by referring to electric shock treatment. Candidates who described implantation frequently omitted reference to the uterus or womb. Some candidates confused this cloning method completely with IVF with multiple births being mentioned. Others referred to plasmid rings instead of genetic material.

- (c) Two thirds of candidates gained the mark. By far the most common response was that religions would not like it or that it was not ethical. As usual, the most common unacceptable answers were it is unnatural or scientists should not play God. It was good to see however how many candidates did have the idea that cloning would not bring the same person back.

Question 7 (High Demand)

- (a) A third of candidates gained three marks, a quarter gained two marks and a further quarter gained one mark.

A considerable number of these responses, although correct, failed to be specific and consisted of cover-all statements such as this is survival of the fittest and it happened by natural selection. Nevertheless a high proportion of candidates did explain that the birds would show variation in the length of their legs while others pointed to the possibility that mutation may have given rise to a flamingo with longer legs than normal.

The second mark on the scheme proved elusive for many candidates who, although able to say that the long legged bird suited its environment or competed more effectively failed to pinpoint the advantage that might be derived from possessing longer legs than usual.

The third marking point, that the best adapted survive to breed, was gained by most candidates.

Incorrect statements such as they survived and so mutated and after they adapted they grew longer legs were frequently seen, particularly when the answers were not presented in a chronological way. On many occasions mutation was said to be intentional, for example they realised they needed longer legs so mutated. Even if there was no positive statement to the effect, an intention to mutate was often implied, for example in statements such as they mutate so that the legs grow longer. A number of these explanations made no mention of legs at all and were woven around beaks or necks, sometimes not even flamingos' necks.

- (b) Over a third of candidates gained two marks and a fifth gained one mark.

Many candidates understood that, according to Lamarck, a flamingo might lengthen its own legs during the course of its life either by making a determined effort to do so or through continuous use.

The phrase acquired characteristic was frequently used though in many cases it appeared that this term was not fully understood. Thus acquired was taken to mean inherited as in the offspring acquired long legs from their parents and the flamingos acquire the long legs at birth.

Again there were numerous accounts given that omitted any reference to flamingos or their legs. Some of these included the standard Lamarck illustration involving giraffes.

Question 8 (High Demand)

- (a) Nearly two thirds of candidates gained two marks and a further third gained one mark. The most common errors were to give oestrogen or progesterone rather than FSH and LH.
- (b) One sixth of candidates gained four marks, two fifths gained three marks, a fifth gained two marks and a further tenth gained one mark.

Overall, this question was answered much better than in previous series. Most candidates gained two marks for the advantages of the use of the invocell technique and were able to express their ideas clearly, taking ideas from the text and putting them into a clear explanation. They also found the disadvantages relative easy to explain particularly the lower success rate.

The other disadvantages were given less frequently and the second disadvantage, embryo development cannot be monitored, was rarely given. Some candidates recognised that 800 women was a very low sample size clearly indicating their understanding of data and reliability, however, weaker candidates gave it as an advantage.

The most common misunderstandings were firstly that the invocell technique incurred no expense at all for the procedure. Secondly, some candidates believed that the embryo continued to develop inside the capsule for the duration of the pregnancy and therefore that this was more natural compared to standard IVF where the embryo developed in the laboratory.

The quality of evaluations has greatly improved. A much larger proportion of candidates are now recognising that this must be given at the end of their answer and that they need to compare both advantages and disadvantages before suggesting their opinion. There are still, however, a number of candidates who just repeat previous advantages or disadvantages. Weaker candidates also give less evidence based opinions and misunderstand the concept of weighing up the information given.

Mark Ranges and Award of Grades

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