



General Certificate of Secondary Education

**Additional Science 4463 /
Biology 4411**

BLY2F Unit Biology 2

Report on the Examination

2009 Examination – January Series

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Additional Science / Biology Foundation Tier BLY2F

General

Although the vast majority of candidates had been entered for the correct tier, there were a few candidates who might have achieved more than a grade C if they had been entered for the Higher Tier paper. However the number of such candidates is very small and it is important that centres continue to be careful when selecting the most appropriate tier for their candidates.

Candidates are requested to write in black ink or black ball-point pen and to ensure their writing is clearly legible as the scanning process involved in on-line marking does not pick up pale colours well. Some progress is being made here, with the great majority of candidates writing in the correct colour and the examiners are grateful to centres for trying to ensure their candidates comply with this request. There remain those candidates whose writing is so poorly legible that this compromises their potential to get marks. Although examiners do their utmost to read poor quality writing, there is a limit to their powers.

Progress is also being made by centres in discouraging candidates from spreading their responses up to the edge of the page, as these cannot be read under any circumstances, once papers have been cut for the scanning process.

Question 1 (Low Demand)

Most candidates found all of part (a) straightforward, with over three-quarters correctly identifying the relevant cellular components.

Those who did not look carefully at the end of the label line for part (a) often suggested cell membrane.

As might be expected, weaker candidates confused various parts of the leaf cell in part (a)(ii).

In part (b) it is likely that some candidates failed to read the question and just looked for the correct statement from the three offered. Unfortunately, all three were correct, however only one, the last, answered the question. As a result over half ticked one of the other two boxes.

Question 2 (Low Demand)

In part (a), most candidates correctly identified microorganisms, however mammals was also a popular, incorrect, choice. Once again, it is vital that candidates are encouraged to read all the information, rather than simply answering what they believe the question to be, as mammals certainly produce enzymes, but not those used in the home and in industry.

Correct answers to part (b)(i) were more often given than to part (b)(ii) and it might seem reasonable that thoughtful candidates, who happened not to have revised this part of their work, were able to work out the response to part (b)(i), from the prefixes, more easily than they might arrive at the answer to part (b)(ii).

A large majority of candidates were able to correctly read the scale in part (c)(i), although 13 minutes was a common wrong answer.

In part (c)(ii) many candidates correctly identified Z as the enzyme and explained their reasoning in terms of it taking the shortest time or working the fastest, the examiners were willing to accept the slightly ambiguous faster acting or shorter time. Some candidates selected W, which was incorrect, but went on to provide a correct reason and gained one mark. Other candidates made it difficult for examiners to be quite sure what they were describing by referring to time going quicker, although again examiners were generous with this sort of phrase.

Once more, in part (c)(iii) the need to read, and follow, instructions was highlighted with a number of candidates ticking only one box, when the need to tick **two** boxes was emboldened twice in the question and furthermore, the mark allocation implied that more than one answer was required. As a result only around half the candidates ticked two correct boxes.

Question 3 (Low Demand)

Just under half the candidates correctly identified 2 and 3, in part (a), with 3 and 7 being a popular choice. This belief that the embryos in stage 7 consisted of gametes had an impact in part (c).

A similar proportion of candidates scored the mark in part (b), perhaps the need to think about two types of cell, along with two types of chromosome created difficulties which might have been overcome by candidates adding to the diagram so that they could sort out their thoughts.

It should not have been difficult to gain two marks in part (c), however candidates often showed an alarming ignorance of what goes on in reproduction. Although there were good answers, many of which made all three points on the mark scheme, other responses suggested that the difference was due to there being more eggs in C, or that A split and C did not. A common error was the idea that the chromosomes had been halved in number in A. Despite the provision of three key words, some candidates chose not to use any of them often suggesting that A is a boy but C is a girl.

Answers to parts (d)(i) and parts (d)(ii) showed a similar trend to previous similar styles of question and again highlighted the same problems in examination technique. Stem cells was chosen by less than half of the candidates, in part (d)(i) whilst in part (d)(ii) a considerable minority of candidates ignored the instruction and ticked just one box, again wasting the potential to gain marks.

In part (d)(iii) there was considerable confusion between stem cells and the cells in the stems of plants. Many other candidates associated stem cells with IVF, designer babies or screening and did not gain a mark.

In part (d)(iv) many candidates answered in terms of playing God, or not natural which were considered to be too vague and did not gain marks. Answers were again being linked to designer babies, IVF or screening. Some statements said it could be harmful or dangerous without mentioning the embryo. Ideas about ethical and moral objections were seen more rarely than religious ones.

Question 4 (Low Demand)

Inevitably the distracters proved to be too appealing in some of these questions. The lungs in, the relatively straightforward, part (b) were correctly encircled by a very high proportion of the candidates, with respiration being correctly identified by more than half, in part (a).

Candidates were less successful in parts (c) and part (d), though, with less than half the responses correct in each case.

Question 5 (Low Demand)

In part (a), there were many correct answers referring to water, in terms of volume or timing, nutrients, occasionally named, but more commonly by general terms such as minerals or fertiliser or soil type. The examiners gave the benefit of doubt to more vague answers such as change the fertiliser, considering that this implied changing it for a better one. The commonest errors were light and temperature, as candidates failed to recognise that these were the very conditions that were being changed in the investigation.

Part (b)(i) proved to be very straightforward for the vast majority of candidates, only requiring them to identify the wall against which the largest yield of tomatoes were grown.

In part (b)(ii), it was hoped that candidates might recognise that comparisons could only be made between the plants growing against the east wall, ie where only one variable, the variety, was changed. Unfortunately, the large majority of candidates did not have the same view of the data, most deciding that Sungold would be the best, despite this producing the lowest yield on the east wall.

In part (c) some candidates still think that repeating a test makes it fair. Others realised what was required but examiners reported that it was common to see answers implying that changing the light, temperature, wall or variety made the test unfair, showing that they had missed the point of the investigation. Some answers simply stated that more Sungold were planted but did not go on to develop the idea sufficiently, whilst others found it difficult to express their ideas and did not give enough information to make the point clearly.

Question 6 (Standard Demand)

Considerably fewer than half the candidates correctly identified the sun or light as the source of energy for the plants, in part (a). The majority of incorrect responses usually suggested water or minerals, of one kind or another and there were several imaginative suggestions, including insects. Candidates should be advised not to offer more than one answer in questions such as these, as a list of responses will almost inevitably contain at least one that is incorrect, leading to any mark they might have gained, being cancelled.

In part (b), it appeared that for most candidates it was not the problem of creating a ratio that was the prime difficulty, rather counting the width of the blocks for frogs and insects, with a large proportion of answers incorrectly suggesting that these were 5 and 10 respectively. As a result the examiners saw many answers of 2. Other candidates showed poor examination technique by failing to show any working and although this is not necessary if the right answer is given, the correct use of the scale along with an incorrect answer was worth one mark. Those that did use the scales correctly often arrived at the correct answer of 2.5, although some reversed their calculation to reach 0.4.

In part (c), it appeared that many candidates believed the pyramid to be one of numbers, rather than biomass. Had it indeed been the former, then most candidates may well have scored two marks, unfortunately for these candidates, pyramids of number are part of the Key Stage 3 programme of study and as such should not appear in examinations at this level. Answers were often in terms of numbers of frogs and insects, their respective reproduction rates or their positions in a food chain. Some candidates pointed out that energy was lost between insects and frogs, even suggesting that this loss was in the order of 90% but did not go on to state how the energy or biomass was lost. The examiners were generous in terms of allowing ways in which biomass was lost whether it was from the insect or the frog, but were not willing to accept the idea that energy is used *for* respiration. A few candidates gave one good answer such as losses due to movement of the frog but then went on to describe a second factor to do with a number pyramid.

Part (d) should have provided candidates with the opportunity to secure at least two or three of the four marks, the mark scheme being deliberately wide-ranging. However many candidates gained just one mark for the idea that the insects were eaten but then went on to develop the food chain idea and scored no more marks. Alternatively single marks were often awarded for reference to decomposition or one of several synonyms, but with no further detail. Most did not mention that the carbon was given off as carbon dioxide and there was confusion about the gases used and produced in photosynthesis and respiration, some believing that carbon dioxide is turned into oxygen by plants. The candidates who gained a mark for the decomposition idea usually thought that the carbon went into the ground to be absorbed by plant roots; the involvement of enzymes was very rarely mentioned. There were a few responses referring to fossil fuels and these were more likely to be coupled with burning and even the production of

carbon dioxide. A few suggestions indicated that some candidates had misunderstood the recycling in the question, believing that this was part of the government's drive to reduce waste.

Question 7 (Standard Demand)

Liver and kidneys were, as expected, common errors in part (a)(i).

In part (a)(ii) it was evident that a large proportion of candidates had not covered this area in their revision. Some, though, had clearly been taught part of the BLY3 specification, as centres choose to rearrange the triple science specifications, and attempted glycogen. However poor spelling regularly let these candidates down, as this is one of the few terms that should be entirely correct to avoid confusion with other similar terms.

Part (b) was designed to assess candidates' understanding of 'How Science Works' and responses were largely disappointing.

Part (b)(i), however was correctly answered by around half the candidates; weaker responses were often related to part of the information given regarding the monitoring methods, rather than the manufacturer's claims.

Reliability and fair testing were commonly confused in part (b)(ii) and some answers were in terms of biased results, which did not gain credit here. There were other answers that were not worthy of credit regarding different types of diabetes, patients cheating and data from the graph. Less than a quarter of candidates recognised that reliability can be achieved by having a large sample or by repeating investigations.

In part (b)(iii) the idea that there was little or no difference between the values with and without the drug was made by many of those candidates who could sort out which part of the graph was being asked about. A few suggested that as values for this parameter were low, then it did not matter. However, only a very low proportion made an attempt to answer the whole question, and explain why the manufacturer would not wish to highlight this part of the information. Some candidates believed that this data was derived from patients going without food for three months!

Candidates who understood the question in part (b)(iv) often made correct statements about avoiding bias. Many other candidates did not understand independent and answered in terms of the company who were developing the drug. Incorrect answers were often about patient confidentiality, company security and unfair tests. It was alarming to see how many candidates believe that drug companies routinely make up or alter research results to suit their own ends.

Mark ranges and award of grades

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