



**General Certificate of Secondary Education**

**Science A 4405 / Biology 4401**

**BL1FP      Unit Biology 1**

**Report on the Examination**

*2012 examination – January series*

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**Science A / Biology**  
**Foundation Tier BL1FP****General**

In this first examination of the new specification examiners were a little disappointed that some students seemed unprepared for the demands of the new specification. There are clearly some areas where skills need to be developed. This is most notable firstly, in questions requiring evaluation skills and secondly, in answers to questions which require explanations which can now only gain full marks if a full and complete answer is given. Furthermore, the introduction of the assessment of Quality of Written Communication (QWC) adds a further element of difficulty to the paper. These, and other examples, will be referred to where appropriate in this report.

Examiners continue to be concerned that a small minority of students are inappropriately entered for Foundation Tier papers. In excess of 1500 students scored 45 or more of the available marks and it is likely that a good proportion of these could have achieved higher than the maximum C grade for this paper, if they had been entered for the Higher Tier paper.

Students should be encouraged to read all the information provided in questions as this gives clues as to what is needed in the answer and then to pay particular attention to the command words. 'Explain', 'describe' and 'compare' have particular significance with regards to the style of answer required and further instructions such as 'use information from the table / graph / diagram' direct students to what they need to include in their answers in order to gain full credit. It was clear to many examiners that a significant number of students either do not understand these vital instructions or choose to ignore them; perhaps too keen to fill the space available with what they have learnt, rather than apply this knowledge and understanding to answer the question they have been asked. Guidance on the use of command words used in Science examinations can be found in the Science area on the AQA website under the heading 'Command Words for GCSE Science'.

Students should be reminded that answers written outside the frame on the page may not be scanned for marking and despite the instruction, 'Do not write outside the box', on each page a significant minority still do so. Furthermore, if students continue their answers beyond the printed lines, it is important to indicate that they have done so at the end of those printed lines, as continuation in spare 'white space' around the page will otherwise remain unseen and therefore be unmarked.

**Question 1 (Low Demand)**

Some students formed letters so poorly that it was difficult for examiners to decide what response they were offering. Furthermore others, having made a choice, then changed their mind and attempted to over-write their original answer in such a way that it was again impossible to determine what the answer was. Occasionally students offered two answers. Students should be reminded that it is not the role of the examiner to pick the right answer from a mixture. In the case of a change of mind students are advised to clearly cross out the original answer and write their new answer alongside, to the right or to the left of the box.

- (a) The majority of students correctly chose 'C'.
- (b) This proved to be more of a problem as many students presumably failed to spot the key reference to 'dark night' in the question and decided to go for 'A', rather than 'B'.
- (c) Was straight-forward for almost all students, with only a few suggesting something other than 'E'. Those who did not get this mark chose all distractors with equal frequency.

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- (d) The ears, 'B', proved to be a powerful distractor, as students presumably linked this part with the role of the ears as receptors in the nervous system.
- (e) The function of whiskers, 'F', is perhaps less well known to students, so it was not unexpected that students might suggest any of the letters they had not already used. Although the question does not preclude the use of the same letter more than once, students are usually reluctant to do so. Of course any incorrect answer in parts (a) – (d) made choosing the right one even more difficult, even so, and despite all these potential distractions, more than half of the students correctly chose 'F'. Once again, 'A' was selected frequently as many students seem to imagine that jerboas can 'see in the dark'.

### Question 2 (*Low Demand*)

- (a) A significant minority of students did not attempt to complete the diagram. Of those who did, a number simply extended the root and shoot horizontally. Credit was given for correctly growing roots and shoots, even if they were poorly drawn and not representative of either roots or shoots. If several roots were drawn, all of them had to grow downwards to gain credit. A number of students drew an extra structure emerging from the seed, for which no credit could be given since examiners did not know if this was intended to be a root or a shoot. It is important that students read all the information and instructions on the paper; examiners find it difficult to believe that such a high proportion of students did not know what to do in this question, but rather that they simply skipped over the information to 'get at' the more obvious questions.
- (b) Many students knew that roots are sensitive to gravity, though more than half thought that the response was due to light. Once more, as in Question 1 (b) and (d), students showed either a mistaken understanding of the term 'dark' or simply missed the information in the question stem.
- (c) Many students correctly named the hormone as 'auxin', although 'statin' was an attractive distractor for many.
- (d) (i) Despite being told to give a use other than as a weed killer, a considerable number of students suggested this very role, or the same as a description such as 'hormones kill some plants but not others'. In addition there were frequent vague references to 'increasing growth' of plants along with answers about 'fertilisers', 'statins' and apparent insecticidal properties of plant hormones. Furthermore unqualified references to cloning did not gain this mark as examiners were looking for just a little more detail in terms of use in promoting rooting. Consequently very few students scored the mark here and a significant minority could offer no suggestions.
- (d) (ii) Most students gained at least two of the three marks, with responses including 'light' and 'water'. 'Space' was also not uncommonly seen by examiners, although weaker answers along these lines, such as 'land', 'soil' and 'territory' were insufficient to gain credit. A few students gave 'food' or 'nutrition' and these were not considered adequate replacements for 'nutrients', 'minerals' or 'ions'.

### Question 3 (*Low Demand*)

- (a) Many students correctly named the 'lemur' as being the first primate to evolve, although 'tarsier' was a commonly given incorrect answer.

- (b) Many students could go on from part (a) to deduce that ‘chimpanzees’ and ‘gorillas’ were most closely related to humans, although some seemed to lose their way, after identifying one of these and suggested ‘gibbon’ as a second answer.
- (c) (i) There was again a relatively high proportion of non-attempts in part (c)(i), whilst other students managed to arrive at the names of almost every scientist they had ever heard of along with many who have never existed. ‘Albert Einstein’, in a wide variety of spellings, was common amongst incorrect answers and although the examiners only required ‘Darwin’ in the answer, those who attempted a first name, but got it wrong, were denied the mark.
- (c) (ii) Answers to this question were good with around three-quarters of students scoring all four marks and a further good percentage gaining three.

#### Question 4 (*Low Demand*)

- (a) (i) It is important that students take heed of the advice on the front page of the paper, one of which is ‘In all calculations, show clearly how you work out your answer.’ Failure to do this inevitably cost some students a mark, as although correct answers, here ‘251.2’, automatically gained two marks, incorrect, but close answers such as ‘261.2’ but without working gained nothing despite it being possible that students had simply misread their calculators. Other students failed to realise that the data was given in terms of ‘100 g’ of biscuits and this, allied to incorrect mathematical manipulations, resulted in answers that would have exceeded the annual output of a large biscuit factory, let alone the consumption by one ten-year-old child in a day. Students should be reminded that they are likely to need a calculator in the examination as it was clear that many had failed to use one, with lines of numbers being added up with varying degrees of accuracy, particularly by those students who believed they had to add up 400 lots of 62.8.
- (a) (ii) In cases where the correct answer, ‘31.2’ was not given, examiners applied the ‘error carried forward’ rule, so that an incorrect answer in (a)(i) would still allow students to gain the mark, provided they had done the correct calculation. Some, unfortunately, seemed to forget that question was about a 10 year-old child and not an adult, as they subtracted 230, rather than 220 from their answer in (a)(i), and lost this mark.
- (b) A wide range of possible answers was acceptable in part (b). Despite this only a little over half of the students could give two possible health effects of over-indulging in biscuits every day. There were some who seemed to suggest that eating four large packets of biscuits each day would be ‘normal’. ‘Overweight / obesity’ and ‘diabetes’ were the most common correct answers. More vague suggestions, such as ‘gain weight’, were not considered to be good enough, as all ten-year-olds might be expected to gain weight. Similarly ‘cholesterol’ required the qualification, ‘high’ to achieve the mark.

#### Question 5 (*Low Demand*)

- (a) Students were being asked to evaluate the advantages of the each type of compost bin. In order to gain the marks, answers to this type of question must be comparative, that is, ‘it takes six weeks’ does not answer the question as to why a gardener might buy the tumbler bin, instead of the fixed bin, as there is no indication in that response of the required advantage. To make the evaluation, answers must contain comparisons, thus ‘*only* takes six weeks (to make the compost using the tumbler bin)’ or ‘is longer (to make compost) using the fixed bin’ would have been sufficient. Note, it was assumed that

answers referred to the tumbler bin unless students made it clear they were describing events in the fixed bin. Although many students did make these comparisons, it was felt that had students used comparative terms, many more would have gained all three marks.

- (a) (i) Common answers that did not gain credit were that the ‘tumbler bin was bigger’ (although the information stated that each bin held the same amount of compost), ‘had a handle’ or ‘had two doors’.
- (a) (ii) Provided that they remembered to give comparative answers, most students were able to identify two of the three acceptable responses in (a)(ii), although again a significant minority believed that the fixed bin itself was ‘smaller’, rather than ‘taking up less space’.
- (b) (i) Poor reading of the instructions led to some students attempting to explain the differences in (b)(i), rather than in (b)(iii). However, a high proportion of students achieved at least one of the two marks available. As in part (a), questions phrased in terms of comparisons usually require answers phrased in the same format, in this case the ‘levelling out’ of the temperature in the tumbler bin did not require a comparison as it was considered that this alone conveyed the relevant comparison. It was surprising to examiners that so many students suggested that the temperature in the fixed bin ‘does not rise for a week’ when the graph showed a clear, if not large, increase in temperature. When students chose to quote figures, usually for 6-week temperatures, it was common for the temperature scale to have been misread, thus ‘38 °C in the tumbler bin and 23 °C in the fixed bin’ gained no mark.
- (b) (ii) Many students realised that waste is converted into compost by microorganisms (or any of a wide range of alternatives, including ‘detritivores’ or named examples), however relatively few realised that the presence of ‘oxygen’ helped these organisms to work well. There were many who gave suggestions such as ‘damp’ or ‘wet’ for the second space, despite ‘moist’ having already been given and ‘dark’ was another frequent incorrect suggestion.
- (b) (iii) Many students struggled with this question, with a large proportion being unable to gain even a single mark. The link between the higher temperature and faster respiration releasing more heat, or between the presence of oxygen and faster respiration, was clearly beyond the great majority of students. Although most students made attempts to answer the question, many included speculative suggestions that had not been hinted at in the information such as ‘sun shining on the tumbler bin but not the fixed bin’ or that ‘by having only one door less heat escapes from the tumbler bin’. Others suggested that because the tumbler bin was more expensive it was ‘probably made of material that gave better insulation’ or as it was mounted ‘it did not get cold from the ground’. None of these gained credit.

### Question 6 (*Low Demand*)

- (a) (i) The great majority of students knew that nicotine is ‘addictive’ although spelling the word proved more difficult. Some spellings were so weak that different words, such as ‘additive’, were given and these were not accepted.
- (a) (ii) Many students had incorrect ideas about a synapse and commonly described it as an area of the brain concerned with addiction or a connection in the brain. Examiners were looking for the idea that a synapse was the junction or gap

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between neurones. A few students described what happened at a synapse rather than what a synapse was.

- (b) (i) Many acceptable descriptions of a placebo were seen including the frequent ‘fake drugs’, ‘empty pills’ or ‘sugar pills’. Common incorrect answers were a ‘nicotine patch’ or a ‘drug to stop you smoking’. A ‘drug which does not work’ was a common misconception, since a placebo is not a drug. Sometimes descriptions of psychological effects were given instead of what a placebo actually is. These answers were not relevant here. Some confused students thought that a placebo was a group of people or a disease.
- (b) (ii) Students found it more difficult to explain why the placebo group was used. Some managed to describe the comparison required, or describe the psychological effect and gained credit. A few incorrect answers were about fair tests, bias and stopping drug addiction.
- (b) (iii) Many students suggested that ‘doctors but not volunteers’ would know the composition of the tablets. Presumably the information about ‘double-blind trials’ had been missed in the information for part (b) so less than half of students gained this mark.
- (b) (iv) About a third of the students gave two acceptable similarities. A range of acceptable factors which needed to be similar were seen, including ‘age’, ‘gender’, ‘previous smoking habits’, ‘numbers of people’ and their ‘general health’. Only one mark could be awarded for a description of two previous smoking habits, e.g. ‘length of time’ and ‘number smoked’. References to ‘all the people being smokers’ or ‘all wanting to stop smoking’ were ignored (as these were given as prerequisites for the trials), as were the amounts of the drug and when it was taken, as these were not part of the selection of the groups and were already given in the question.
- (c) There were many correct responses referring to the relative success of drug A. Examiners were looking for ideas about the best results rather than ‘the best drug’, which was a common answer.

### Question 7 (*Standard Demand*)

- (a) (i) The examiners had hoped that students would be well-versed in a definition of ‘sexual reproduction’. Unfortunately, this was not the case and there were only a small number of very good answers which included reference to the fusion of gametes or fertilisation. Instead, answers more often referred to the need for ‘two parents’, ‘sexual intercourse’ or ‘producing a baby’, and no mark was awarded. A significant number of students referred to gametes which ‘met’ or ‘mixed’, rather than ‘fused’, and these ideas were not credited.
- (a) (ii) Students fared better in this part, where many described the significance of the ‘genes’ of the two parents resulting in the characteristics of the zorse, and so gained both marks. A common error was simply to rephrase the question and provide no extra information, for example ‘it has the characteristics of the horse and zebra’. It should be noted that acquisition of the second mark, in the mark scheme, was dependent upon a sensible attempt at identifying what was responsible for the characteristics.
- (b) Many students were able to use the diagram to help them to describe some of the early stages of adult cell cloning, though the origin of the cells was not always given. Others

managed to go on to describe some or all of the later stages and gain more credit. A common error was poor observation of the diagram which showed the nucleus of the skin cell being transferred, thus many answers referred to the whole zorse skin cell being put into the egg cell, rather than just the nucleus. Some confused students described this as fertilisation, while others included sperm. Many students placed embryos into horses but failed to point out the uterus and only a small minority included ideas about electric shock treatment, often at the wrong stage. Students should be reminded that good quality QWC skills will affect the mark they gain for their biological knowledge in these questions and it was apparent that the majority paid scant attention to this. The lack of sentences, capital letters, full stops and correct spellings meant that some students were penalised. Marks were spread across the range from 0 to 6, however very few students reached the higher level.

### Question 8 (*Standard Demand*)

- (a) Many students scored a mark for pointing out that the number of measles cases fell following both vaccine introductions. Some of these went further and described the MMR as (almost) completely eradicating the disease. However, relatively few were able to add numerical detail about the effect of the measles vaccine. Those who attempted to do so often misread one or other scale or simply missed or misread the ‘in thousands’ part of the label on the y-axis, suggesting, for example that a mere ‘460 people’ or that ‘460 people per thousand’ had measles in 1968. Some students believed that the vaccines were a cure for measles or that MMR was, itself, the disease.
- (b) Only about a third of students knew both ‘mumps’ and ‘rubella’. There was a variety of spellings, but only those which were phonetically correct were acceptable, thus answers such as ‘monks’ gained no credit. A considerable proportion of students made no attempt to suggest any diseases here, which is somewhat surprising as it might be expected that they would know of at least some diseases which could be ‘guessed’.
- (c) The fine details required to gain full marks here were beyond most students, however a good proportion did know the basic components of the immune response. Some students scored a mark for the correct reference to ‘white blood cells’, although examiners ignored references to memory cells. The students who stated that the white blood cells ‘produced antibodies’ gained a second mark. There was inevitable confusion with similar words such as ‘antitoxins’, ‘antigens’ and even ‘antibiotics’. Very few students gained the third mark for the idea of ‘*rapid* antibody production on reinfection’. Many appeared to believe that the antibodies, once produced, waited in the body for reinfection to happen and so were ‘ready to fight it’. Over a third of students made no creditworthy points and wrote confused general accounts of what they believed to be immunity or made no attempt.

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