OCR
Oxford Cambridge and RSA

GCSE

Biology B

Gateway Science Suite

General Certificate of Secondary Education **J263**

OCR Report to Centres June 2015

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

OCR will not enter into any discussion or correspondence in connection with this report.

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General Certificate of Secondary Education

Biology B (Gateway) (J263)

OCR REPORT TO CENTRES

B731/01 Modules B1, B2, B3 (Foundation Tier)

General Comments:

Most candidates made a good attempt at the paper, producing answers for most questions. Candidates generally wrote at an appropriate length. The quality of candidates' spelling, punctuation and grammar was generally good overall, although there were some cases where it was very difficult to interpret a candidate's writing and the candidate might have been better served by using a keyboard or an amanuensis. Candidates should ensure that where a question has several components they need to answer all of them to gain full marks. For example, in Q2(c)(iii) candidates had to say yes or no as well as give an explanation, and in Q3(b) candidates were asked three things and were also told to use data in their answer.

Comments on Individual Questions:

Question No. 1

1(a) Most candidates gained at least one mark. Common errors were 'Monocular' and 'Wider field of view'.

1(b) Some candidates misread the question and described examples of other reflexes or explained the benefits of reflexes. Those who did correctly explain that reflexes are fast and automatic usually only gave one of these ideas, the former being the most common.

1(c)(i) Many candidates misread the question and wrote about insulation, although a large minority did correctly explain that fur reduces sweating. Quite a few candidates left this blank.

1(c)(ii) Most candidates correctly explained that the saliva would cool cats down.

Question No. 2

2(a)(i) About half the candidates correctly chose 'ciliated epithelial cells'. All the other options were frequently seen too.

2(a)(ii) Most candidates wrote general answers about how smoke affects lungs, which did not gain any credit, for example, 'smokers' cough' was a common response, as was the 'build-up of tar'. A minority gave good answers which focused on the epithelial cells as the question instructed and described how smoke damages cilia so they can't remove mucus.

2(b) A minority of candidates explained that people who smoke are more likely to get infections because the build-up of mucus means that microbes are not removed from the lungs. Non-scoring answers described, for example, tar, or other chemicals in the smoke, killing white blood cells, or they explained that if the cells lining the bronchi were killed or damaged, there was nothing stopping infection entering the lungs.

2(c)(i) This was well answered with most candidates gaining full marks.

2(c)(ii) Most candidates correctly worked out 8%.

2(c)(iii) A majority of candidates gained at least one mark, usually for pointing out that the reduction in risk was 8% not 10%. Although there was no mark on its own for saying whether or not the evidence supported the claim, candidates did need to give an answer to this, as well as an explanation, to gain credit.

Question No. 3

3(a) To gain full marks candidates had to explain both what causes the high pressure in arteries as well as its purpose. Around half the candidates gained at least one mark, usually for the idea that the pressure ensures blood gets around the whole body. Fewer gained the second mark for explaining that the pressure is generated by the heart pumping or contracting.

3(b) The most common mark on this six-mark question was two, usually for working out the missing totals in the table, but all marks were awarded, up to and including six. Very few candidates gained no marks at all.

3(c) Over half the candidates correctly stated that ADH would be carried in the blood. Incorrect answers often suggested blood cells.

Question No. 4

4(a)(i) Most candidates gained the mark, usually by choosing algae.

4(a)(ii) Most candidates correctly chose the rat and dragonfly larva.

4(b) A majority of candidates correctly chose ‘producer’, although the other options were frequently seen, most commonly ‘consumer’ or ‘parasite’.

Question No. 5

5(a) There were a variety of acceptable answers and most candidates gave at least one and many gave two. It was not enough to simply state an adaptation, it had to be explained as well. Common correct answers referred to either the lemmings being small so they could hide, being camouflaged so they couldn’t be seen, or having eyes on the sides of their head to give a wide field of view to spot predators. Some candidates incorrectly stated that lemmings use binocular vision.

5(b)(i) Many candidates presumably relied on knowledge of predator-prey cycles rather than using the graph because they described the numbers of lemmings rising when the number of snowy owls fell, or vice versa. Of those who realised that the peaks in the snowy owl figures coincided with the peaks in the lemming numbers, many incorrectly stated that the graph showed snowy owl numbers rather than the numbers of nests. Consequently the majority did not gain the mark.

5(b)(ii) Candidates found this a very challenging question, with many candidates again incorrectly stating that the number of lemmings fell when the number of snowy owls, or their nests, was high.

5(c) A small majority of candidates correctly named bacteria, fungi or decomposers as being responsible for decay. Common incorrect answers included ‘detritivores’ and examples of these.

Question No. 6

6(a) A majority of candidates correctly chose fly A and gave a valid explanation.
6(b) Around half the candidates correctly named the genus. Incorrect answers usually gave the name of one of the species, another ranking (e.g. kingdom), or used the term ‘speciation event’. A significant minority of candidates omitted this question.

6(c)(i) A majority of candidates gained at least one mark and a minority gained two. The most common answer was that Darwin’s ideas went against religious views, although many also referred to insufficient evidence. There was no mark for saying there was ‘no evidence’ – as

otherwise Darwin would never have published. Some left the question blank. Some misread the question and tried to explain natural selection.

6(c)(ii) Less than half the candidates gained a mark, and only a few gained both. Some left the question blank. Those gaining a mark usually did so for the idea that now we have more evidence or proof. There was no credit for stating that people are less religious these days.

Question No. 7

7(a)(i) The full range of marks was seen, with a noticeable minority of candidates gaining six. To gain full marks candidates needed to describe how the populations were affected by the oil spillage, highlighting at least one difference, and supporting their observations with data from the graph. With a variety of suitable answers many candidates made more points than were required, which helped them gain marks if some of their readings from the graph, or calculations of population changes, were incorrect.

7(a)(ii) Most candidates gave a valid reason why pod B was most at risk of dying out.

7(b) Most candidates gained at least one mark and a minority gained two. The most common correct answers referred to the lack of freedom or captivity being cruel. Some gained a mark for the idea that whales would not know how to survive in the wild after being kept in captivity. No credit was given to the commonly held idea that keeping them in captivity was dangerous in case they attacked humans.

Question No. 8

8(a) Most candidates gained no marks because instead of selective breeding they described taking cuttings, cloning or genetic engineering. Some thought it was enough to simply plant two strawberries, or two strawberry plants, next to each other. Others thought that you just needed to give a strawberry plant the best growing conditions. Those who did gain marks, usually gained one for selecting plants with bigger fruit. Some went on to say that these plants need to be bred together. Very few got the third mark for explaining that the selection and breeding had to be repeated over many generations.

8(b) This was better answered than part (a), although more candidates gained one mark than two, usually for the idea that asexual reproduction is faster than growing from seed, or that plants with larger fruit will be produced. Few mentioned that the new plants would be clones or genetically identical to the original.

Question No. 9

9(a) A small minority correctly explained what stem cells are, and those that did, usually gained one mark for the idea they can develop into different types of cells. Many thought they were just to do with reproduction, making sex cells for example.

9(b) This was the question on the whole paper that was most commonly unattempted. Around a third of candidates correctly explained that the stem cells were made from skin cells, but very few explained that normal stem cells come from embryos.
9(c) Around a quarter of candidates correctly stated in part (i) that mouse stem cells contain 40 chromosomes, whereas over half correctly said mouse egg cells would contain 20 in part (ii). Common errors were to give 20 for both questions, to give 80 and 40 respectively, or to give 46 and 23 respectively.

9(d) Most candidates gained at least one mark and around a quarter gained two. Marks were usually awarded for the ideas that the technique would allow otherwise infertile couples to have

children, or that it was unethical. There was no mark for the commonly given statement that the technique is unnatural.

Question No. 10

10(a) Most candidates correctly chose either the digestive system or the kidneys.

10(b)(i) Most candidates correctly calculated 11 500 ml.

10(b)(ii) Most candidates appreciated that the blood flow to the heart muscles increases during exercise because the blood carries, for example, oxygen. Many did gain further marks by explaining that the flow increases because more oxygen is needed, but very few explained that the reason more oxygen is needed is because of increased respiration for muscle contraction. Some did however gain credit for explaining that without an increased blood flow anaerobic respiration would increase, or that the increase in blood flow was necessary to remove or prevent lactic acid. Answers such as 'more blood is needed because the muscles are working harder' were common but on their own gained no credit.

10(c)(i) Most candidates correctly calculated 17 500 ml per minute.

10(c)(ii) Over half the candidates gained full marks. Some thought it was the lungs.

10(d) Most candidates correctly chose 'increase'.

B731/02 Modules B1, B2, B3 (Higher Tier)

General Comments:

- In general the paper was balanced and accessible to all candidates. There was little evidence to suggest that candidates had struggled to complete the paper as most candidates answered the final question.

- Answers were appropriate to the question and there was little evidence of guessing taking place. Questions which tested the quality of written communication were largely approached in a suitable manner by the candidates and as these questions included an element of using data in their response it was important that this actual use of the data was evident. Where the evidence was not clear or data hadn't been used this often limited the access to the higher marks in this type of question. Very few of these questions were no response answers and in many cases because of the correct use of data candidates were able to score well.

- No artistic embellishments were observed indicating that the candidates were 'on task' throughout the session.

- The rubric of most questions was interpreted correctly.

- Candidates continue to find difficulty in questions which test the candidates' ability to apply their knowledge and understanding. With interpretation of trends in graphs there was a tendency to identify a trend and then rephrase the same trend and assume they had identified more than one. Marks ranged from low teens to the high sixties and it is encouraging to see high marks are continuing to be obtained by the more able candidates.

- Most candidates were able to apply their knowledge of energy flow in food chains and the associated mathematical calculations involved in energy efficiency. Fewer candidates were able to apply their knowledge accurately to factors that determine human attributes like sporting abilities. Although some were able to identify the role of the environment through training few were able to specifically link the role of genes. It was also very rare to see that they had considered both genetic and environmental factors, often only detailing one of these. Encouragingly, most candidates could calculate BAC and this helped their performance on the question.

- Candidates, as in previous exam seasons need to be more aware of making comparisons to avoid losing marks. Candidates should also be more alert to applying their knowledge to given situations in questions. They should not be put off when interpreting familiar scientific questions seen in unfamiliar contexts.

Comments on Individual Questions:

Question No 1.

Q 1(a). Candidates got off to a confident start with most scoring both marks.

Q 1(b). Many candidates wrote about muscles and ligaments rather than the lens shape. An understanding of refraction helped them score at least 1 mark.

Question No 2.

Q 2(ai). Most got this mark but when they didn't it was red blood cells that they confused the cells with.

Q 2(aii). Although this was in the main reasonably well answered, some responses indicated inaccurately that the cilia are destroyed or killed. Some responses mentioned that tar builds up in the lungs instead of mucus building up. The low ability responses mentioned that this results in smokers' cough and lung cancer.

Q 2(aiii). A significant number did not know the word benign, spellings were many and varied but if they had identified benign they usually were able to indicate that these tumours do not spread.

Q 2(bi). A well answered question in the main.

Q 2(bii). Very few candidates got the mark for identifying the lowest risk, a few got the 1% mark. Candidates then struggled to link reasons as to why they had the lowest risk. Many lost out by only mentioning 'less risk' rather than 'least' and it was surprising how few quoted data on risk.

Question No 3.

Q 3(a). Most candidates gained marks, there was no problem with the rubric. However many were limited to a mark of 5 by missing relative increased risk was 25 'times' often the candidates gave answers of 25% or just 25. A small number of candidates could not gain any higher than a L1 due to not working out the BAC value correctly.

Q 3(b). Many candidates referred to the alcohol itself being toxic rather than the breakdown products. A significant number were able to refer to cirrhosis or scarring of the liver.

Question No 4.

Q 4(ai). Well answered, although some went into unnecessary detail and a few missed the point of the question and attempted to define strength and cardiovascular efficiency instead of comparing them.

Q 4(aii). Most identified 'B' correctly and the need for a high cardiovascular element to the training, but some lost a mark by not identifying the requirement for medium speed in the training as well.

Q 4(b). There was a surprising lack of knowledge of the importance of genes in determining abilities. Many knew that abilities were inherited but didn't mention genes, random shuffling of chromosomes, just statements like 'got it from her mother' and therefore were not awarded the first marking point. Environmental factors and training were mentioned in the vast number of answers so marking point 2 was awarded. Higher level responses seemed to demonstrate a sound understanding of the concept of both genetics and environment being involved.

Question No 5.

Q 5(a). A significant number of responses referred to numbers of lichens varying, this was not evident from the graph, possibly candidates were just relating their answer to the general idea of indicator species, rather than specifically answering the question from the data available.

Q 5(b). Many candidates gave answers that simply repeated the answer to 5a. Very few got the second marking point.

Question No 6.

Q 6(a). Most candidates got a mark for describing the pattern, although some didn't link the pattern to what was happening in the wild i.e. the owls were breeding as they had plenty of food. There was some confusion over lemmings eating owls. Only some candidates recognised the cyclical, out of phase or predator-prey relationship to get full marks.

Q 6(b). A few candidates said that lemmings had antifreeze proteins in their blood. Some mentioned small surface area but did not link this to volume.

Q 6(c). Many got the idea of the necessity of warming blood going to the body core; fewer scored marks for the importance of keeping feet cold to reduce heat loss. They often had the correct idea but failed to express it clearly and accurately enough to gain marks e.g. just "cold blood warmed by hot blood" or similar. Some inappropriately discussed penguins huddling together on the ice to keep warm and changing position.

Question No 7.

Q 7(a). A well answered question.

Q 7(b). Candidates often used species, hybrid, and fertile offspring in their answers but failed to express their ideas linking these together correctly in the context of the question. Candidates failed to link infertility to them being hybrids and failed to acknowledge that as they were fertile, they could be classified as a species.

Q 7(ci). Most scored full marks here, often identifying it being against the religious beliefs and the lack of proof idea.

Q 7(cii). The majority of candidates got the more evidence mark. The 'tested' mark was less frequently awarded.

Question No 8.

Q 8(a). In the main this was well answered. Some mis-calculated the efficiency percentage with 11.1% rather than 10%. Most candidates recognised that not enough energy would be passed on, although a few said NO energy would pass on which is a misconception that needs addressing.

Q 8(b). Most candidates scored both marks and all aspects of the mark scheme were covered in their responses.

Question No 9.

Q 9(a). A well answered question.

Q 9(b). Most mentioned the idea of denaturation, but hardly any linked this to the poison not working or the rate of denaturation. Few candidates got both marks.

Q 9(c). Many candidates responses referred to the toxin damaging the cell rather than the gene not being switched on.

Q 9(d). This was a well answered question. Most disagreed with the closing of beaches but several said yes on the basis of the rights and well-being of the fish (ecological reasons).

Question No 10.

Q 10(a). Candidates either did really well with good calculations and scored high marks or they gave qualitative answers, often high quality, but failed to use the data in their response. It is important that candidates recognise that if the question asks for data to be used the evidence of the use of specific data from the question needs to be present in their response. Many candidates wanted to explain 'why' it changed rather than 'how'.

Q 10(b). Some candidates failed to realise that all blood has to go through the lungs. They reverted to more superficial responses.

Question No 11.

Q 11(a). Good responses were evident, they knew what a stem cell was. Some tried to use the information in the question to guess. Some gave the information that stem cells are normally found in embryos/ bone marrow here and then didn't pick up this mark on 11b.

Q 11(b). Many candidates realised that skin cells were used but didn't refer to usually being taken from embryos or bone marrow.

Q 11(c). Many candidates saw the word 'clone' and responded with 'Yes'. Some responded no but then suggested that the genetic variation came from the sperm cell at fertilisation rather than the egg cell due to meiosis.

Q 11(d). Not well answered. Many candidates had not read the question carefully enough and mentioned designer babies and being unethical. Susceptibility to disease was mentioned but not specific to genetic disorders so no marks could be gained.

Q 11(e). In the main this was well answered. However there were quite a range of misconceptions here on what ATP is. Some candidates stated that it was needed for respiration and many implied that ATP created energy.

Q 11(fi). Many responses identified protein synthesis as the correct answer but incorrect responses included ribosomes carry the DNA.

Q 11(fii). Most got this correct but some suggested MRSA.

Q 11(fiii). A well answered question.

B732/01 Modules B4, B5, B6 (Foundation Tier)

General Comments:

The entry for this foundation tier paper is always very low in comparison to the higher tier paper and this gap is widening with the foundation tier entry falling. The lack of very few high marks seemed to indicate that the majority of candidates were entered for the correct tier.

The standard of numeracy in the papers continues to improve but many candidates are still hindered by their ability to express themselves clearly. This was particularly the case in Q11(c) where candidates gave very vague descriptions of the data. There were areas of the specification that had not been learnt well by many candidates, such as the process of yogurt making. There were also issues that have appeared before, such as the confusion of detrivores with decomposers.

Comments on Individual Questions:

Question No.

Q1(a) This was a well answered question to start the paper.

(b)(i) The majority of candidates correctly answered root and stem although there were some higher level answers that gained credit such as xylem.

(ii) Plants or weeds were equally common correct answers but herbs, herbivores or insects were incorrectly stated by some candidates.

Q2(a) A substantial number of candidates did not realise that the decay was carried out by microorganisms and even fewer realised that waterlogged soils would provide little oxygen.

(b) Many candidates simply assumed that the traps were green for camouflage reasons.

(c) There were a significant number of correct answers referring to competition, however far fewer that correctly linked this to light.

(d) Many candidates correctly answered osmosis with the most common errors being diffusion or respiration.

Q3(a) Both parts to this quest were well answered.

(b)(i) Many candidates were quoting figures in their answers from the graph which was rewarded but there were a number of candidates who tried to explain the changes rather than describe them.

(ii) This was a challenging question and few candidates at this level appreciated that a temperature of about 30 degrees would be the best balance between cost and increased rate.

(iii) A small number of answers indicated that increased temperature might mean more watering is needed but most candidates listed other possible limiting factors.

Q4(a) Well answered by most.

(b) Very few candidates could recall 'pleural', with 'cell' being given instead. 'Simple' was given slightly more often and most candidates could name 'X-rays'.

Q5(a) The stomach was correctly stated by more than half of the candidates.

(b) This was also well answered with references to lubrication and the digestive action of saliva both commonly featuring in answers

(c)(i) A small number of candidates simply added one set of figures from one side of the diagram and so only scored one mark but many scored two.

(ii) Candidates could state how the extra water is lost eg in sweating or in urine but found it much harder to state where the water was absorbed.

Q6 Many candidates are still not making the distinction between blood reaching the heart muscle in the coronary arteries and blood returning to the atria. Therefore answers linked the blockage with a lack of blood to pump to the tissues.

Q7(a) Candidates did pick up on the ethical issues of doctors having to decide whether to go against relatives wishes but very rarely did they realise that doctors have to decide which patients receive the limited number of organs available.

(b)(i) Many answers correctly stated that the people may have forgot to opt out or don't have to register so it is easier.

(ii) Candidates are still very reluctant to give both sides of an argument and most simply stated that there were more donors in countries that use opt out. Very few pointed out that there were only three countries in each sample or that Poland was an anomaly.

Q8(a) Very well answered.

(b)(i) A good discriminatory question with about one third of the candidates correctly stating protein.

(ii) There were many good references to the subjective nature of taste and the impossibility of measuring it scientifically, although some candidates simply repeated the question.

(iii) Many candidates concentrated on the chocolate and not the actual enzyme production.

Q9(a) This was another good discriminator with weaker candidates concentrating on the data in the table about numbers, rather than the size of the microbes. They therefore incorrectly answered fungi.

(b) Few candidates realised that they needed to multiply 100 000 by 10.

(c) There are many candidates who still think that earthworms are decomposers, directly adding minerals to the soil. The better answers referred to neutralisation and aeration.

10(a) Most candidates appreciated that the milk yield increased with antibiotics but the idea that they are not cost effective after 5 months was too subtle for many candidates at this level.

(b) The process of yoghurt making was poorly described by most candidates. A number did not realise the importance of bacteria and fewer still made the link between the use of antibiotics and the death of the bacteria.

11(a) Answers were split between phytoplankton and zooplankton with some candidates ringing both!

(b) Many candidates scored one mark for either less oxygen or the fish having no food if the plants die. Few could make the link with fertilisers.

(c)(i) Some candidates lost marks by giving answers such as 'it decreases', without any explanation of what 'it' is. Many others could describe the evidence but few could explain it.

(ii) The same problem occurred here as in part (i).

Q12(a)(i) Most points were plotted correctly.

(ii) Many candidates correctly stated that as the length of pregnancy increase, life span increases and then gave examples of anomalies.

(iii) A significant number of candidates simply repeated the statement in the question about there not being enough results.

(b)(i) This was well answered with candidates noticing the trends.

(ii) Many candidates stated that most of the animals have similar results but did not give any data to back this up. Others correctly stated that chickens do not fit the pattern.

B732/02 Modules B4, B5, B6 (Higher Tier)

General Comments:

Most candidates made a good attempt at the paper, answering most questions. Generally they appeared to have sufficient time to complete the paper.

Candidates often wrote at an appropriate length but there is an increasing tendency on this paper for some candidates to write answers that are far too long. Some candidates gained full marks in the first few lines yet continued to write at some length, using any remaining answer lines, plus any empty space following the question, or using continuation sheets. In the most extreme cases candidates wrote answers more than a side long which meant they didn't have time to finish the paper properly. This is clearly not good exam technique, even for the six mark questions. Evidence from examiners suggests that perhaps a third of candidates used supplementary answer sheets and centres should encourage candidates to write more sharply focused answers. Although there will always be times when it is appropriate to use supplementary answer sheets, many candidates did so unnecessarily, for example, when they only needed to add a single word, or even part of a word, to an answer. There is no need to use sheets for short additions, and it is perfectly acceptable to use the space below the answer line(s) if candidates need to (although they should not go into the 'margins' as these are not scanned). Candidates should only use supplementary sheets if there is not enough space on the paper. If they do use supplementary sheets, they must make sure that they clearly, and correctly, number their answers, and not leave it to the examiner to work out which question are answering.

The quality of candidates' spelling, punctuation and grammar was generally good, although there were a not insignificant number of cases where it was very difficult to interpret a candidate's writing. Centres should be aware that in these cases candidate would be much better served by using a keyboard or an amanuensis.

Candidates should be aware that to gain full marks they need to answer as instructed by the question. For example, many candidates did not heed the command words 'Describe' and 'Explain' in Q1(a)(i) and (ii) respectively and so gave answers that did not match the mark scheme. In Q8, candidates were asked to write about the link between the coronary artery and heart disease, as well as do a calculation and explain what it showed. Many candidates omitted one or more of these aspects.

Comments on Individual Questions:

Question No. 1

1(a)(i) Many candidates gained three marks for fully describing the graph. Candidates who didn't gain full marks usually omitted to include the section of the graph where the rate of photosynthesis was constant. Some described the rate falling but not rising initially, and others didn't make the variables explicit. Most correctly included data in their description.

1(a)(ii) Most candidates attempted to describe the shape of the graph in more detail than in part (i) but only a minority did as the question asked, and **explained** the shape of the graph. Those who did, usually gained one mark for explaining the fall in rate being due to enzymes denaturing, although some did also explain the rise in rate being due to particles having more energy. Very few used the idea of limiting factors to explain the constant part of the graph; of those that did, many incorrectly thought that temperature was the limiting factor at this point.

1(a)(iii) Less than half the candidates correctly chose a temperature in the range of 28-30^{o}C, although those who did, usually went on to correctly explain why. A common error was to choose a temperature around 35 ^{o}C, the reason being given that it was in the middle of the range of temperatures giving the maximum rate of photosynthesis.

1(b) A minority of candidates correctly suggested other factors that should be considered. Those who did, usually cited the cost of the heaters.

Question No. 2

2(a) This question was well answered with very few candidates gaining no marks and many gaining full marks, although the full range of marks was seen. Candidates usually addressed all parts of the question and attempted to use appropriate scientific terminology. All acceptable answers on the mark scheme were seen.

2(b)(i) Most candidates correctly explained what pesticides being 'persistent' means, although a minority clearly thought that pesticides are living organisms.

2(b)(ii) Most candidates correctly explained a disadvantage of pesticides being persistent. Some incorrectly thought that they would harm the crop plants. No credit was given for repeating the answer to part (i) or for the idea that the pesticides would have to be continually reapplied.

Question No. 3

3(a) A minority correctly explained what 'extracellular' means. A common error was that it involves additional cells.

3(b) Most candidates gained at least one mark, usually for the idea that low levels of oxygen would reduce the rate of respiration, and about a quarter went on to link this to a low rate of reproduction. Commonly, non-scoring answers just repeated ideas from the question, stating, for example, that without oxygen, bacteria couldn't survive.

3(c) This question was targeted at A* and proved to be very challenging. Although many candidates explained that the cells would become turgid because they gained water, very few could suggest what could cause water to enter.

3(d) This was also a challenging question, with a minority of candidates drawing a line that dropped to zero (or close to zero) in the red part of the spectrum.

Question No. 4

4(a) The majority of candidates gained at least one mark, although all scores were frequently seen. The most common correct answer was 'pituitary'. Common errors included progesterone stimulating egg production or release, and FSH stimulating egg release. Some candidates gave non-specific answers such as progesterone 'controls' the lining of the uterus, or that FSH 'affects' egg development; these did not gain any credit.

4(b) A minority of candidates gained marks in this question. No credit was given for simply taking the information from the table in part (i) and saying that a lack of ADH would decrease the permeability of kidney tubules, rather candidates had to describe the consequences of this. Commonly seen correct answers were that less water would be reabsorbed, more urine would be produced, urine would be more dilute, and that people would become dehydrated. Some candidates gave the reverse of these ideas; others gave contradictory answers such as less water reabsorption would make urine more concentrated.

Question No. 5

5(a) Over half the candidates gained at least one of the marks, although few gained both. To gain marks candidates had to describe the difficult ethical decisions the doctors would be faced with, not difficult decisions that potential donors or their families might face, which is where many candidates lost marks. It was clear from their answers that a not insignificant number of candidates think that doctors deliberately let patients die so they can harvest their organs.

5(b)(i) Most candidates gained at least one mark, although far fewer gained both. A mark was usually given for the idea that people would forget or not be bothered to opt out, although some also gained the mark for the idea that the opt out system is easier for those who have made a conscious decision to donate.

5(b)(ii) Most candidates gained at least one mark, and of these, almost half went on to gain full marks. It was not enough to repeat the prediction however, and candidates had to either pick out specific countries that did or didn't support the prediction, or use the data to make appropriate calculations.

Question No. 6

6(a) About half the candidates chose the correct statement. All the other choices were seen.

6(b) To gain marks, candidates had to refer to enzymes in their answers. Less than half the candidates scored, but those that did, more commonly gained both marks.

Question No. 7

7(a) Most candidates correctly named adrenaline. Incorrect answers included lactic acid, testosterone, insulin and ADH.

7(b)(i) Most candidates correctly gave 0.08 seconds. Common incorrect answers included 0.04 and 0.16.

7(b)(ii) Most candidates gained at least one mark and many gained both. One common incorrect answer was that while the ventricles pump blood to the body, the atria pump it to the lungs.

Question No. 8

Most candidates scored, and the full range of marks was seen. The most common mark was four, usually for a correct calculation and the idea that although the index fell in both groups, it was closer to the mean of the group who develop heart disease. Only the higher scoring candidates also correctly explained the link between the coronary artery and heart disease. A common non-scoring response was that a narrowed coronary artery means that a heart has to work harder to pump blood, and then this 'strain' is the cause of heart disease. Of those who did explain that a narrowed coronary artery reduces blood flow to the heart, a minority correctly explained that this means a reduced supply of oxygen to the heart muscle itself.

Question No. 9

9(a) The majority of candidates gained both marks, although many only gained one, usually because they mistakenly linked lactase to the reagent strips.

9(b)(i) The majority of candidates correctly identified proteins. Common incorrect answers were sugar or amino acids.
9(b)(ii) Most candidates gained one mark, usually for the idea that the statement was only an opinion. A minority gained two marks for also pointing out that the claim could not be quantified, or that taste cannot be measured.

9(b)(iii) A minority of candidates could name an example of a suitable vector; of those that did, both viruses and plasmids were commonly seen. Incorrect answers included bacteria, syringes, mosquitoes, restriction enzymes and ligase.

Question No. 10

10(a)(i) Most candidates correctly named fertilisers, or examples such as nitrates. The common incorrect answer was pesticides.

10(a)(ii) Most candidates gained marks, with roughly equally numbers gaining one or two marks. All the marking points from the mark scheme were commonly seen.

10(b)(i) It was not enough to say that measurements had to be made at the same times of the year to make it a fair test, rather candidates had to explain why, linking the amount of algae to seasonal changes. A minority of candidates gained the mark.

10(b)(ii) Some candidates just described the graph describing how the maximum depth changed, however the majority did correctly link this to changes in pollution. Roughly equal numbers gained either one mark for describing an overall increase, or two for a more detailed description. Few gained the third mark.

10(b)(iii) Most candidates correctly identified 1988. A few chose 1984.

Question No. 11

11(a) This proved to be a very challenging question, and most candidates did not seem to appreciate how natural selection leads to an increase in the number of resistant bacteria. Most candidates simply stated that using antibiotics means that bacteria become more used to it and so somehow become more resistant. Others stated that using antibiotics makes mutations more likely. Of those who did gain marks, roughly equal numbers gained one and two marks.

11(b) Although all marks were seen, by far the most common mark was two for describing the graph. Relatively few candidates knew that yoghurt making involves bacteria producing lactic acid, although those who did know this often gave a clear description including the name of the bacteria. Very few spelled out the effect of the antibiotics on lactic acid production, the changing pH and the consequent effect on yoghurt production.

Question No. 12

12(a) A minority of candidates gained the mark for explaining that there were so many bacteria, or that the colonies joined together. Many simply just stated that bacteria reproduce quickly, which didn't go far enough. Some thought that the plate had been contaminated and the colonies were covered by viruses or fungi.

12(b) About half the candidates gained marks, with fewer gaining two. When using data to answer questions like this, candidates should be encouraged to make their working out or conclusions clear, and not just simply put down numbers.

Question No. 13

13(a)(i) This was well answered with most candidates gaining full marks, usually for linking the three variables together in a sentence like 'as mass increases, heart rate decreases and life span increases'.

13(a)(ii) To gain marks it was not enough to just repeat the hypothesis, rather, candidates had to use examples or data to support their points. To gain full marks, points for and against had to be given. The majority of candidates gained at least one mark, although fewer gained two.
13(a)(iii) More candidates gained full marks than one or zero. There were many valid ways to gain marks, but it was necessary that the points were made clearly.

13(b)(i) Most candidates gained one mark, usually for the idea that doctors could use the study's findings to target patients for treatment or preventative care. It was not enough to simply state that the doctors would know the outcomes of the study, it was what they would use that information for that was important.

13(b)(ii) Most candidates gained one mark, usually for the ideas that the study only included heart disease patients, that there was no data for patients with heart rates between 58 and 78 (beats per minute), that there are other factors affecting heart disease, or that four years isn't a long time. No credit was given for the idea that the number of patients was small in comparison with the world population and so wasn't enough.

B733 Controlled Assessment

General Comments:

Overall, centres are coping well with the controlled assessment process and some excellent work with good clear marking has been submitted.

Most centres submitted work that was well organised and easy to follow with all of the appropriate documents enclosed and clear annotations explaining why particular marks had been awarded. This aided the process of moderation and centres are thanked for the effort involved.

Some centres, however, are still submitting work with errors of various kinds:

- There have been a number of clerical errors where marks submitted to OCR differ from those on the work sent to the moderator. Centres are advised to double check the marks on scripts before sending them to the moderator. In particular, if internal moderation has taken place and marks are changed, it needs to be clear which mark is being submitted.

- A significant number of centres have submitted the wrong task for the year. Tasks are only valid for one year and it is not permissible for centres to submit work either using tasks from previous years or from the next year. Any centres that used a task from next year are reminded that they will not be allowed to use this task again in the coming year.

- A number of centres also gave more support to their candidates than is acceptable. No form of writing frame, table grid or guidance notes, other than those provided as part of the task, are allowed to be given to the candidates. Use of such material can reduce the marks available to candidates as their own work has not met the marking criteria.

- Centres are reminded that in signing the CCS160 (Centre Authentication) form they are guaranteeing that the work submitted is each candidate's own unaided work.

Previous reports have given considerable guidance on the application of the marking criteria, how to avoid common errors and the requirements for the award of high marks. Centres are advised to consult the reports written in 2012, 2013 and 2014 in addition to the notes given below.

Comments on each Skill quality:

Research: Work submitted was generally of a high standard. Candidates frequently demonstrated that they were aware of the need to produce a full bibliography with full URLs when referencing internet sites. Few candidates made use of resources other than those on the internet, but when a text book is referenced then page numbers should be given. The range of sources used was generally suitable and relevant to the tasks.

Some candidates put a lot of effort into an analysis of the sources commenting on their likely reliability and accuracy and giving reasons for their decisions. This is not a requirement of the marking criteria and candidates could be advised to use their time to better effect. The main issue for the award of high marks lies in the candidate's ability to "select" relevant information from the sources. This needs to be specific to the bullet points in part one and to be scientifically correct. It is rarely possible to effectively fulfil this requirement by simply cutting and pasting from web sites as it usually means that irrelevant material is copied alongside relevant material.

Planning: This was also generally tackled effectively by the candidates. The methods now often include a diagram which helps to explain the plan and detailed information that can easily be followed by someone else. The most common weakness in this skill quality is an insufficient consideration of how errors can be minimised. This is required at all marking points above 2 with the difference between 3 and 6 being in the depth and detail given by the candidates.

In all but the science specification, candidates need to produce a suitable hypothesis. This should be based on the information given in part 2. Candidates make it more difficult for themselves when they choose to investigate something which is not really what the task was asking for. For higher marks candidates need to provide a detailed scientific justification for their hypothesis.

Candidates should clearly indicate any changes they might have made to their plan. For example, candidates need to select a suitable number and range of data points as part of their plan. If the number in the plan differs from the number used in the actual experiment then an explanation of the change should be given.

Collecting: This was one of the highest scoring of the Skill qualities. Candidates generally produced clear tables with full headings and units and quoted data to an appropriate and consistent number of decimal places in line with the equipment they had chosen. Some centres penalised candidates for inconsistency or errors in processed data such as averages. Marking in this Skill quality needs only be applied to raw data. Some centres over marked by giving high marks when all of the raw data had not been recorded and processed data was shown instead. For example, initial and final temperatures should be recorded and not just temperature change.

Candidates are not allowed templates to use in these tasks. If candidates have been given a table to complete then it is unlikely that they would be able to get many, if any, marks for this Skill quality.

Managing Risk: This was also a high scoring Skill quality but some centres are still being too generous. The following comment was made on last year's report and bears repeating, as some centres are still failing to take it into account when giving high marks.

The criteria for 5/6 marks state 'All **significant** risks in the plan **evaluated**'. The risk of having a heart attack whilst squeezing a clothes peg is not significant. Too many times candidates invent spurious risks. 'Evaluated' means that the candidate needs to appreciate and state whether it is a low risk or a serious risk.

The criteria also state '**Reasoned** judgements made to reduce risks by **appropriate specific** responses'. The highlighted words speak for themselves.

Processing data: Graphs were well drawn by most candidates. However, some centres are still giving high marks when candidates have inappropriate scales on one or more axes. A graph does not need to have the point (0,0) on the scale in all cases. As a general rule the data points should cover at least half of the available space.

Some of the tasks have been designed with the opportunity for more able candidates to use more complex mathematical techniques that are relevant to the task, for example, calculating an energy change. However, candidates do not need to carry out an additional complex mathematical technique in order to get high marks if there is not a process which is relevant and adds to the understanding of the task. For example, calculating a gradient may be irrelevant and provide no additional useful information, particularly when candidates do not understand what the gradient shows.

Without some form of processing of uncertainty then full marks are not available in this Skill quality. Range bars are generally the most accessible method for candidates to use.

Analysing & Interpreting: There were some tasks this year in which candidates failed to obtain data that supported their hypothesis or the hypothesis given. For example, in those who undertook the portable stoves experiment, some candidates failed to control the amount of fuel used in each experiment, by either burning a fixed mass of fuel or calculating a temperature change per gram, and obtained data which showed no real trend at all. Candidates should not try to force their hypothesis on to the data. There were some candidates who were given high marks for stating that a trend was supported when only 2 out of four data points followed this trend. They may then have commented that the other two data points were anomalies. This is not good science and is not worthy of high marks. Candidates may obtain high marks by pointing out that the data does not show a clear trend, comparing this to data from secondary sources and making appropriate comments to explain the differences.

Evaluating: Although often marked well by the centres this continues to be a Skill quality that candidates find difficult. This is partly because candidates need more space to answer question 4 of part 3 than is available on the standard version. Centres may provide candidates with a reworked version of part 3 with more space available for answers if they choose to, as long as the wording is identical to that provided in part 3. This can be easier for candidates than using additional paper.

Question 4 of the task requires candidates to evaluate their method, their data and to make comments about risk. Many candidates fill the space available but focus primarily on just one of these issues and consequently can only score low marks.

To obtain high marks candidates need to make a “detailed and critical consideration” of the data. This is rarely seen. Although range bars are often included as part of processing, many candidates do not understand the significance of them and how they relate to the quality of the data. Where data is of poor quality, candidates need to try to link this to their method and explain why their plan gave rise to data that did not match their expectations or where there were a number of anomalies. Suggestions for improvement should ideally be derived from this rather than chosen almost at random.

Comments about risk do not contribute significantly to the mark for analysis but can be used to further support the mark awarded in the risk Skill quality.

Conclusion: As with analysis and evaluating, the conclusion should be based on the actual data obtained. In most cases candidates are justified in saying the data supports the hypothesis but in some cases this is not the case and candidates should say so and go on to explain why.

There is also the requirement in this Skill quality for candidates to clearly link their research to their own experiment and to appropriate scientific knowledge and understanding. Question 6 of part 3 provides an opportunity for this but it is to be remembered that evidence for any of the marking criteria can be obtained from any part of the candidates’ work. Annotation helps considerably if marks awarded are related to work from elsewhere in the task.

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