



**GCSE**

**Biology B**

Gateway Science Suite

General Certificate of Secondary Education **J643**

## **OCR Report to Centres**

**June 2012**

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

© OCR 2012

## CONTENTS

### **General Certificate of Secondary Education**

#### **Biology B (Gateway) (J643)**

### **OCR REPORT TO CENTRES**

<b>Content</b>	<b>Page</b>
Overview	1
B631/01 Modules B1, B2, B3 (Foundation Tier)	2
B631/02 Modules B1, B2, B3 (Higher Tier)	6
B632/01 Modules B4, B5, B6 (Foundation Tier)	9
B632/02 Modules B4, B5, B6 (Higher Tier)	12
B635 Can-Do tasks and report on Science in the News	17
B636 Research Study, Data Task and Practical Skills	20

## Overview

### General Comments

Candidates' performance in this session was comparable with previous sessions. It was pleasing to see in candidates' responses that many had clearly made use of mark schemes or examiners' reports from earlier sessions. Candidates do however also need to be aware that simply repeating answers that may have been applicable in the past may not always be appropriate for similar questions set in different contexts. It is to be hoped that Centres and candidates will benefit from the comments in the reports on the individual papers.

# B631/01 Modules B1, B2, B3 (Foundation Tier)

## General Comments

The cohort for this session was small compared to previous years. In general, the paper was balanced and accessible to all candidates. There were very few marks right at the top end of the distribution, perhaps indicating that most candidates were entered at the correct tier. Very few candidates failed to complete the paper. The quality of candidates' spelling, punctuation and grammar was good overall and there were only a few cases where it was very difficult to interpret a candidate's writing.

Candidates need to be more aware of making comparisons to avoid losing marks, as in 10(b)(ii) where identifying the error as using the wrong temperature, as opposed to using a temperature that was too high, was not credit worthy. Knowledge and understanding of cuttings and selective breeding were poor.

## Comments on Individual Questions

### Question 1

- (a) Nearly two thirds of candidates correctly named oxygen as the gas used in respiration. The most common incorrect answer was carbon dioxide.
- (b) Around half the candidates gained at least one mark for the idea that the muscles are working harder or need more energy or that they require more oxygen. Few candidates put more than one reason, limiting them to one mark. The common reasons for not gaining any marks were failing to mention muscles, failing to give a comparative answer and giving answers referring to heart rate, not breathing rate.
- (c)
  - (i) The majority of candidates gained a mark by naming sweating as a way that the body loses heat.
  - (ii) Most candidates made the correct choice that high body temperature can cause dehydration.
- (d)
  - (i) At least three quarters of candidates identified the pancreas as the organ that makes insulin.
  - (ii) Nearly two thirds of candidates knew that glucose or sugar levels were controlled by insulin.

### Question 2

- (a) Nearly two thirds of candidates gained at least one mark which was most commonly for the description of a mutation being a change to a gene. The nucleus was the next most commonly gained mark and the third mark of recessive, was rarely seen. Many candidates incorrectly said that the smaller wings were an inherited or mutated characteristic.
- (b) The majority of candidates identified earlobe shape as the characteristic inherited by humans.

**Question 3**

- (a) Only the more able candidates appreciated the differences between binocular and monocular vision and many of these candidates went on to gain the two marks available. Many thought that binocular vision would enable owls to see a greater distance or had the positioning of the eyes the wrong way around and therefore did not gain any marks.
- (b) Less than half the candidates identified X as the iris. The most common incorrect answers were cornea and lens.
- (c) With there being a few acceptable reasons why owls need large pupils, two thirds of candidates gained the mark. Candidates were not awarded the mark for simply stating that 'owls are nocturnal'.

**Question 4**

- (a) (i) Over half the candidates knew that the body uses protein for growth and/or repair. A few candidates named energy as the use, although emergency energy source would have gained a mark.
- (ii) Most candidates could calculate Clare's RDA as 52.5g.
- (b) (i) Around two thirds of candidates gained at least one mark, usually by recognising that Clare was smaller. The candidates that gained two marks were those that calculated Clare's BMI as 24.22.
- (ii) This question was asking for a reason for a high BMI and therefore answers repeating the information from the table used to calculate BMI, did not gain a mark. Less than half of the candidates gave a reason, such as lack of exercise or not playing sport.

**Question 5**

- (a) Many candidates gained at least one mark with thick fur or white fur being the most common answers. The candidates that lost this mark tended to do so because they were too vague stating 'fur' or 'claws' and not 'thick fur' or 'sharp claws'.
- (b) The majority of candidates gained at least one mark. Two marks were gained for giving the correct trend and then linking one reason to either the rise or fall in population of the polar bears. Few candidates then went on to give another linked reason to get the third mark.
- (c) (i) Most candidates could describe what endangered means.
- (ii) Over half the candidates could not correctly name a pollutant that is causing global warming, with many suggesting carbon monoxide or providing vague answers such as 'gases'. Carbon dioxide, methane and CFCs were the most common correct answers given.

**Question 6**

- (a) The majority of candidates correctly identified at least two of the three missing words from the sentences, with the responses photosynthesis and starch. Carbon dioxide was frequently the incorrect response given when choosing the waste product of photosynthesis.
- (b) (i) More than half of the candidates could not describe what sustainable resource means, on many occasions, confusing this with renewable resources and giving responses about resources not being able to be used again.

- (ii) Most candidates answered this question even if they did not demonstrate a clear understanding of sustainable resources in the previous question. No credit was given for wood as that was in the question, and sea was a common incorrect answer. Only a quarter of candidates provided a correct example, most commonly from water, wind or solar.
- (c) Less than half the candidates could name the air pollutant that causes damage to limestone statues. The most common incorrect response was carbon monoxide.

### Question 7

- (a) Most candidates could use the biological key to gain both marks.
- (b)
  - (i) This question was designed to target the highest grade and as such, only a quarter of candidates gained both marks. Some candidates did recognise and perform a part of the calculation to pick up one mark.
  - (ii) Over a third of candidates correctly multiplied the area of the field by their answer to part (b)(i).
- (c) There was no mark for suggesting what would happen to the population of leaf beetles. Over half the candidates gave one reason for the decline, with very few giving two reasons. Some candidates incorrectly suggested that the grasshoppers would eat the leaf beetles.

### Question 8

- (a)
  - (i) Over half the candidates could not name the growth phases correctly, with responses such as toddler and baby.
  - (ii) Many candidates appreciated that the steepest gradient of the graph was the fastest growth of height and that was between one and two years.
- (b) Two thirds of candidates knew that differentiation was the process making different types of cells.
- (c) Around half the candidates knew that red blood cells carry oxygen. Incorrect responses often confused red and white blood cells and therefore gave responses linked to immunity and killing bacteria.

### Question 9

- (a) Few candidates gained both marks for this question. Very few knew that hormones can be used to make fruit ripen more quickly and a large number thought it was fertilisers that did this.
- (b) Nearly two thirds of candidates gained at least one mark, with very few gaining all the marks available. Many candidates' knowledge of cuttings was poor and often confused with taking and planting seeds. Answers were frequently vague and lacked specific detail and so only gained credit for the general ideas, such as planting in soil or watering, often shown in a diagram.
- (c)
  - (i) The majority of candidates correctly picked redgold and sweetred varieties of apple.
  - (ii) Very few candidates knew how to answer this question and missed the point that they were asked to describe selective breeding. Incorrect answers suggested that seeds should be mixed or that genes could be transferred in genetic engineering.

**Question 10**

- (a) Over half the candidates could calculate the average volume as  $0.6\text{cm}^3$ .
- (b) (i) Only a quarter of candidates could pick out the anomalous result from the table. Some candidates described what an anomaly was while others picked numbers such as 10.0 or 39.7.
- (ii) Very few candidates could give a reason why the amount of oxygen collected was not what they expected. Answers such as the wrong temperature or wrong amount of yeast were not credit worthy, as candidates had to realise that the number was lower than expected and therefore that could have been caused by more specifically, a **higher** temperature or **not enough** yeast.

**Question 11**

- (a) Two thirds of candidates knew that the lungs are where oxygen enters the blood with the heart being the most common incorrect answer.
- (b) The majority of candidates recognised the sperm cell was adapted for fertilisation.
- (c) Only a third of candidates could express that white blood cells kill bacteria, prevent infection or make antibodies. Many candidates used the term 'fights' in their answer which was not credit worthy.
- (d) This question led to many types and names of blood vessel being given. Less than half the candidates correctly wrote artery.

# B631/02 Modules B1, B2, B3 (Higher Tier)

## General Comments

The number of candidates entered for this paper was much lower than in previous June sessions, as the specification comes to an end. The majority of candidates found the paper more accessible than some previous papers and scored quite highly. There was, however, a wide spread of marks and some candidates may have been better served by a Foundation Tier entry. Answers to the quantitative questions were quite encouraging and the genetic cross was well understood.

## Comments on Individual Questions

### Question 1

- (a) The word equation for respiration is always a good discriminator and most Higher Tier candidates scored here.
- (b) Many candidates appreciated the concept of repaying the oxygen debt after exercise but a smaller number of candidates did not realise that the high breathing and pulse rate was down to anything more than the need for time to recover.
- (c)
  - (i) This question was often correctly answered, but a variety of spellings were seen.
  - (ii) This question was usually answered correctly.
- (d) (ii) Most candidates knew that glucose would be used up in climbing the hill. However, many saw that as a need for more insulin, showing a lack of understanding of the role of insulin in the body.

### Question 2

- (a) The word recessive was correct in many cases, but the chromosome number was often incorrect.
- (b) Most candidates understood the genetic cross, however, there were a number who completed the diagram correctly, but then gave incorrect final answers eg 50%, or even 75%.

### Question 3

- (a) A surprising number of candidates gave long length as their answer, not reading the question properly.
- (b) This was not understood well by the majority of candidates. Many still think that impulses diffuse across the gap. A significant number knew that the transmitter substance moved across the gap, but omitted 'diffusion'. Very few mentioned 'receptors'.

### Question 4

- (a)
  - (i) Many candidates could not identify proteases.
  - (ii) Candidates coped well with numerical data.

OCR Report to Centres – June 2012

- (b) Candidates coped well with the numerical data.
- (c) Most answers were too vague, including statements such as 'covered in tar'. Only a small proportion mentioned cilia; those who did went on to get the mark.

**Question 5**

- (a) Candidates who failed to score generally gave features that could apply to almost any mammal eg pads on the feet, good eyesight, good sense of hearing or smell, etc. Some candidates just wrote 'white' as an adaptive feature without thinking to include fur in their answer.
- (b) Only a few candidates appeared to have no idea that the graph actually showed a relationship between polar bears and seals. Most had a good understanding of what was happening, although some answers were not well expressed.
- (c) (i) Some candidates are still simply referring to zoos rather than stating that captive breeding can occur.  
(ii) Most candidates gave carbon dioxide as a correct answer.

**Question 6**

- (a) Candidates seemed to handle the numerical data well on the whole.
- (b) Candidates should be encouraged to stick to the basics when answering questions like this. Too often, their answers included ideas for which there was no evidence eg there were more trees in the area she sampled, the area sampled was near a hedge, the area sampled got less light, etc.
- (c) By far, the most common mistake here was for candidates to make statements such as, 'it is light' or 'it is sticky', without stating which part of the flower they are referring to.

**Question 7**

- (a) Very few candidates failed to score here.
- (b) Most candidates had the idea that trees could be re-planted. Part (ii) seemed to present more problems, but there were often sensible ideas included.

**Question 8**

- (a) This question was usually answered correctly.
- (b) (i) Many accurately stated stem cells, but a few wrote a variety of obscure answers.  
(ii) This question was answered well, with the best candidates being able to explain that an increased surface area will increase the rate of oxygen diffusion (not the amount that can be carried).

**Question 9**

- (a) A small number of candidates stated 'positively charged', but many had learnt this and answered correctly.

OCR Report to Centres – June 2012

- (b) Good candidates answered this well and logically. Weaker candidates came up with a variety of odd ideas, but often managed to score a mark for the conditions and sometimes the aseptic technique.
- (c) The majority of candidates managed to select the two correct apples, but many failed to appreciate what needed to be done with them. Good candidates understood the principle.

**Question 10**

- (a) Calculations again, produced good answers.
- (b) Most candidates seemed to understand the term 'anomalous' and could suggest a reason.

**Question 11**

- (a) Most candidates could correctly state the definition of diffusion.
- (b) The placenta was correctly identified in most cases and a condition to increase diffusion given. A small number of candidates did not score the second mark, as they simply stated 'increase the concentrations', rather than the gradient.
- (c) Many candidates gave answers here that confused meiosis and mitosis and therefore, did not score.

# B632/01 Modules B4, B5, B6 (Foundation Tier)

## General Comments

The level of difficulty of the paper appeared to be appropriate for the ability range of the candidates, producing a good distribution of marks, covering almost the whole mark range available. All candidates appeared to have had sufficient time to complete the paper, with the majority attempting most of the questions.

The quality of candidates' spelling, punctuation and grammar was poor in some cases, and there were times when deciphering a candidate's writing posed a serious difficulty.

## Comments on Individual Questions

### Question 1

- (a) The majority of candidates were able to correctly identify the job of the chloroplast, although some just wrote that it made the leaf green. In part (ii) many gave the function of the roots instead of explaining that light could not reach them.
- (b) Few candidates understood that the leaves would turn yellow, but more realised fertilisers would be used.
- (c) Very few candidates answered this correctly. They tended to state that it was simply the organism at the start of the food chain and not that it was able to make its own food.

### Question 2

- (a) Very few candidates gained all three marks. Descriptions tended to be about what transpiration was, rather than how the apparatus could be used to investigate the effect of light intensity on the rate of transpiration.
- (b) Only the more able candidates understood the difference between translocation and transpiration.

### Question 3

- (a) Candidates tended to subtract numbers or they used the wrong values in their calculation. About half the candidates were able to give one example of where energy was lost. Some incorrect ideas included the idea that the energy was used for growth.
- (b) Most candidates realised the shrews would have less food and in part (ii) they understood that organic farmers do not use chemicals.

### Question 4

- (a) Most candidates were able to gain at least one mark. However, a number still think water enters leaves through pores.
- (b) Incorrect answers tended to be pest control or organic control.
- (c) Candidates often gave the answer canning, as they had learnt this as an example. Unfortunately, they had not applied their knowledge to the home situation, where canning was not an option.

**Question 5**

- (a) Most candidates described the pattern correctly.
- (b) The majority of candidates correctly identified the ovaries. In part (ii) many candidates did not make it clear that the sperm had joined or fused with the egg, only that they had met.
- (c) Just over half the candidates correctly identified Joanna.

**Question 6**

- (a) Many candidates answered part (i) and part (ii) correctly. Few candidates knew that ligaments held bone together, with cartilage being a common wrong answer.
- (b) Most candidates interpreted the table correctly.
- (c) Candidates often gave the correct answer of surgery, but failed to draw lines on the graph. In part (ii) many candidates did not make a comparison and simply wrote 'reduce risk'.

**Question 7**

- (a) The majority of candidates correctly identified the lungs in part (i). However, in part (ii) only the more able could explain the difference between breathing and respiration. The most common misconception is that breathing inhales oxygen and exhales carbon dioxide.
- (b) Most candidates were able to identify the kidney. The most common wrong answer being the liver.
- (c) The majority of candidates gave one correct condition. Some candidates described causes, such as smoking.

**Question 8**

- (a) Many candidates gained one mark, normally for linking the animal to the way it exchanges gases.
- (b) Very few candidates could identify the pulmonary artery. In part (ii) most knew the wall was made of muscle.
- (c) Over half the candidates were able to describe one difference.

**Question 9**

- (a) Most candidates identified X as the wall. The few that were incorrect mainly stated membrane. About half the candidates answered part (ii) correctly. In part (iii) most knew the answer as nucleus.
- (b) Few candidates showed an understanding of bacterial diseases. There was no real pattern to the incorrect answers being given. Very few candidates could calculate the number of bacteria, with 300 being a common error.
- (c) Just fewer than half the candidates correctly referred to decay or decomposition. In part (ii), the incorrect answer of worms was seen as often as the correct answer of plants.

**Question 10**

- (a) Candidates frequently forgot to make a comparison and just stated that it was the wrong temperature. The more able candidates mentioned enzymes for the second mark.
- (b) Most candidates knew you had to add something to the urine that changed colour, but few could use the correct terms such as reagent strip. Many just thought the urine changed colour. Part (ii) proved to be too difficult for the majority of candidates. Many thought cells were transferred instead of DNA.

**Question 11**

- (a) Few candidates gained both marks in part (i), as they found it difficult to draw a curve. In part (ii), candidates failed to realise that the curve of the graph results in an optimum above 30°C. Part (iii) was not answered well. Many candidates failed to realise the energy needed to keep the reaction at 35°C would increase the cost.
- (b) Most candidates answered part (i) correctly, but failed to identify glucose in part (ii); ethanol and carbon dioxide being more common answers.

# B632/02 Modules B4, B5, B6 (Higher Tier)

## General Comments

Although there will be a legacy session in January 2013, this was the last time this paper for the current specification will be taken by a full cohort. The level of difficulty of the paper was appropriate for the ability range of the candidates, producing a normal distribution of marks, covering virtually the whole mark range available; marks were awarded from 1 to 59. Candidates appeared to have had sufficient time to complete the paper, with most attempting the majority, if not all, of the questions. The quality of candidates' spelling, punctuation and grammar was good overall and there were only a few cases where it was very difficult to interpret a candidate's writing.

## Comments on Individual Questions

### Question 1

- (a) About half the candidates correctly explained that palisade cells have more chloroplasts than spongy mesophyll cells, as they absorb more light or photosynthesise more. A common reason for not gaining the mark was failing to give a comparative answer. So an answer such as 'palisade cells absorb lots of light' did not gain credit.
- (b) Two thirds of candidates correctly gave yellow leaves as a sign of magnesium deficiency. A less specific answer, such as 'discoloured leaves', was not awarded the mark.
- (c) The question was targeted at high demand and the specific answers required were that phosphorus is needed to make DNA and cell membranes. More vague answers such as 'for growth' were therefore not accepted. A third of candidates gained at least a mark.
- (d) About half the candidates appreciated that active transport needs to be used because movement is against the concentration gradient. It was not enough to simply say that there were low concentrations of phosphate in the soil, rather a comparison was needed, ie that the concentration in the soil was lower than in the plant.

### Question 2

- (a) Three quarters of candidates gained at least a mark, and total marks ranged up to four, although most gained one or two. Candidates could gain full marks by giving a full explanation involving the air bubble moving less because the plastic bag increased humidity or decreased air movement. Allowance was also made to award full marks if they thought the air bubble would move more because the bag would increase the temperature inside. Most candidates went with the first route. Those who didn't get full marks often did so because they didn't include reference to evaporation or diffusion in their explanation. Some candidates thought that the clear plastic bag would block light and so slow down photosynthesis.
- (b) Marks were evenly split with roughly a third gaining each of zero, one or two marks. Marks were commonly given for the statements that translocation moves food or sugar, that it happens in phloem, and that movement can be up or down the plant. Candidates who made contrasting statements concerning transpiration were awarded the marks as long as it was clear which process they were describing.

**Question 3**

(a) (i) The majority of candidates correctly calculated the percentage energy transfer as 5%.

(ii) With a variety of acceptable answers, such as energy being lost through egestion, excretion, respiration and so on, most candidates gained the mark. Indeed some candidates gave more than one valid way that energy is lost from food chains. However, if 'growth' was included in a list then the mark was not awarded, as this negated any correct answers.

(b) The majority of candidates correctly explained that it is unusual to have more than four trophic levels in a food chain because there isn't usually enough energy in the top level to support another. No credit was given for there being 'no energy' left in the food chain, or for the idea that snakes are too dangerous to be eaten by another predator.

(c) Most candidates explained that insecticide passed along the food chain to the snakes, and some said that levels increased along the food chain, but only a third explained why bioaccumulation occurs. Reference to animals at each stage eating lots of animals in the stage below was acceptable, as was an explanation in terms of persistence of the insecticide.

**Question 4**

(a) Around half the candidates made one correct choice, and half chose both correct options, ie that water diffuses out of leaves through stomata, and that water and cell walls are needed for support.

(b) With there being several acceptable reasons why using ladybirds as biological control might not be successful after three weeks, two thirds of candidates gained the mark. The common correct answers were that ladybirds may fly away, eat something else, or be eaten by a predator. No credit was given for the idea that they simply did not eat the greenfly, or that there were too many greenfly.

(c) The majority of candidates appreciated that vinegar preserves tomatoes because the acid in it kills, or prevents the growth of, decomposers such as bacteria. No credit was given for simply saying that it stops decomposers, and some candidates seemed to think that vinegar works by providing a barrier to decomposers, or by somehow stopping oxygen getting to them.

**Question 5**

(a) (i) Most candidates knew that progesterone maintains the lining of the uterus. Non-specific answers, such as it simply 'affects' the uterus lining, were not acceptable for the mark.

(ii) Over half the candidates correctly drew a line peaking at (about) 14 days.

(b) (i) Most candidates correctly identified Joanna.

(ii) Most candidates picked up at least one mark, usually either for the idea that biologically or genetically, the baby would not be Helen's, or for the fact that egg donation is regarded by some as unnatural or unethical. About a quarter gained both marks. No credit was given to financial considerations. There was some confusion between egg donation and surrogacy.

**Question 6**

- (a) The vast majority of candidates were able to explain what a synovial joint is.
- (b) Almost all candidates were able to work out the risk as 15%.
- (c)
  - (i) Most candidates correctly identified that the doctor would advise surgery, though, as they did not always follow the instruction to draw lines on the graph to show how they arrived at their answer, only about three quarters gained the mark.
  - (ii) Over half the candidates used the graph to correctly state that doctors are less likely to suggest surgery, the older the patient. No credit was given to those who incorrectly stated that doctors would stop suggesting surgery altogether and start only advising reducing risk.
  - (iii) Half the candidates gained the mark for explaining that the advice given changes, as surgery becomes more risky as a patient gets older. No credit was given to the not uncommon view that it's not worth performing surgery on older people as they will die soon anyway.

**Question 7**

- (a) Less than half the candidates could identify the pulmonary artery. Common incorrect responses included artery and aorta.
- (b)
  - (i) A third of candidates clearly explained that in a single circulatory system blood goes through the heart once on each complete circuit of the body. Those not gaining the mark often gave vague or imprecise answers such as, 'a single circulatory system contains one circuit'.
  - (ii) Three quarters of candidates gave a correct difference between a fish heart and a human heart. Common answers included the fish heart only containing two chambers, one atrium or one ventricle.

**Question 8**

- (a) A third of candidates gained each of zero, one or two marks. To gain marks, answers had to refer correctly to urea; the usual way of gaining full marks being, to state that it is produced by the liver and excreted by the kidney. Non-committal answers such as 'the kidney controls urea levels' did not score; neither did answers such as, 'the kidney removes waste'.
- (b)
  - (i) Three quarters of candidates correctly chose the kidney as being the organ most affected by ADH.
  - (ii) This proved a difficult question, with only a third of candidates gaining any marks, and very few gaining all three. Many candidates thought that ADH leads to dehydration. Among those that correctly explained that it is the opposite, only a few could explain in terms of kidney action and the corresponding changes to blood and urine. Some wrote about the effects of ecstasy, rather than ADH.
- (c) Most candidates could name a genetic condition affecting the lungs. Cystic fibrosis was the expected answer although asthma was also accepted. Those who did not gain the mark usually named another lung condition such as bronchitis, emphysema or cancer.

**Question 9**

(a) (i) Most candidates knew that flagella allow bacteria to move.

(ii) Most candidates could name a feature found in human cells, but not in bacterial cells; most commonly stating the nucleus.

(b) (i) Most candidates knew that cholera bacteria are transmitted via water.

(ii) Around half the candidates gained one mark, and about a quarter gained both marks, for explaining the delay in appearance in symptoms being due to the bacteria needing time to reproduce and the time it takes for toxins to build up.

(iii) Most candidates knew that cholera is rare in Britain because of the clean water supply. Credit was also given for the rare occurrence of natural disasters such as earthquakes.

(c) A third of candidates correctly matched up all four bacteria with their roles in the nitrogen cycle. The majority gained one mark for correctly matching two. Some candidates only drew two lines.

**Question 10**

(a) (i) Most candidates gained the mark for correctly plotting the points, but not many more than half of these gained the second mark for drawing a smooth curve through all the points. Even though a smooth curve could be drawn through all points, some candidates chose not to do this and drew other lines. Credit was also not given for multiple lines, or very thick lines.

(ii) Two thirds of candidates chose Paul as being correct, thereby losing the mark. What was needed was the recognition that, although of the temperatures chosen, 30°C gave the fastest reaction; the optimum temperature could have been at a temperature that wasn't investigated.

(iii) A quarter of candidates correctly explained that, although not the optimum temperature in terms of reaction rate, 25 °C might be chosen because it uses less energy (and so is cheaper). Despite being told otherwise in the question, many said that 25 °C was the optimum temperature.

(b) (i) Three quarters of candidates knew that distillation is used to make drinks with high alcohol concentrations.

(ii) A quarter of candidates correctly explained that increasing levels of alcohol kill yeast so preventing the production of high alcohol concentrations by fermentation alone.

**Question 11**

(a) (i) As this question was targeted at high demand, it was not sufficient to simply explain that in water-logged soil, the roots could not get enough oxygen; rather it was necessary to explain that the lack of oxygen would inhibit respiration. As a result, only a small number of candidates gained the mark. Many candidates demonstrated the misconception that the plants would take in too much water and therefore their cells would burst.

- (ii) Although nearly a half of candidates gained at least one mark, only a few went beyond that to two or three marks on this difficult question which expected candidates to explain that a high concentration of salt in the soil would lead to the plants losing water by osmosis with the consequence that they would lose turgor. Some candidates thought that the plants would be harmed by taking in salt.
- (b) (i) Two thirds of candidates correctly explained that the genetically engineered crops would be able to be grown in places where previously crops could not be grown.
- (ii) Over half the candidates correctly identified restriction enzymes. Marks were not awarded for 'restrictive' or 'restricting'.

## B635 Can-Do tasks and report on Science in the News

The reports sent for moderation in this, the final year of this specification, were of a similar standard to recent years. Most centres applied the criteria appropriately and as a result the majority of centres had their marks confirmed. There are one or two places where centres consistently applied the criteria generously. Some centres still seem to have ignored the advice given in previous reports about the application of criteria.

There were significantly more arithmetical errors this year and often these were reducing the marks of the candidates. At least one centre, for example, failed to add the Can Do tasks marks to the total.

Centres should be assured that it is the role of moderators to support the marks given by the centre whenever possible. Annotation of the sample, to show clearly where marks are awarded, helps considerably in doing this.

### **Administration**

Centres coped well with the system of selection of candidates, but sometimes the delay in sending in marks to OCR slowed the process. The Jubilee holiday also slowed down the process. As a result, some samples were late getting to moderators. Centres are reminded that completed CCS160 forms are necessary and not sending them also delays the process. Not putting centre and candidate numbers on the work, wastes more time in moderation and increases the risk of candidates being given wrong marks.

### **Supervision of candidates**

Centres are reminded that candidates can only bring in copies of their sources to the supervised session. They must not prepare the reports beforehand and then copy them out. This is tantamount to drafting and redrafting which breaks the rules. Many candidates word process their reports. They should not have access to the Internet when they are writing their reports and should not have their sources electronically. Some candidates paste in large amounts from websites or paste in graphs from websites. Pasting in text alone from websites is of little value and pasted in graphs have no value.

### **Can do tasks**

These were introduced to ensure that candidates entering for Science would have some practical experiences and credit could be given for this. It is disappointing that many candidates, who can score the maximum of 24 marks on Can Do tasks, can do little or nothing on Science in the News. A 3 mark Can Do task was intended to be challenging if done properly.

### **Science in the News**

Every year new tasks have been added, but still centres choose tasks which have been available from Year 1. Some centres say it is because they have marking schemes for these tasks and so they prefer to use them. There should not be marking schemes and the reports should be marked against the criteria. With the new Controlled Assessments, the tasks will change every year and old tasks cannot be used. Marking these against the criteria is essential.

### **Quality A**

This is about researching and continues to be important with Controlled Assessments. It is not about the number of sources, but the way they are used in the report that is important. For 4 marks there must be at least two fully referenced sources which are used in the report. Too many centres, having awarded 4 marks correctly, go on to award 6 marks when there is no real attempt at a balanced report. The aim of a Science in the News task is to get the candidates to look at both sides of a question equally and then by the end of the report come up with a reasoned answer. It is not unusual for the candidate to give the answer in the first sentence or for most of the evidence to point one way. This is not balanced.

### **Quality B**

There is still the problem of candidates not identifying trends and teachers not being able to distinguish a trend from a fact. This will continue to be a problem in Controlled Assessments. Without a trend, irrespective of any attempt at processing, the mark is zero. For 4 marks there must be two trends stated and some basic processing which might involve changing data from one form to another eg table to graph, fraction to percentage etc. Still centres award over 4 marks when there has not been further processing to reveal additional information. Just plotting another graph does not match what is required as it is not finding out further information. Plotting an apparent anomaly on the graph drawn for basic processing again is not creditworthy as further processing to reveal additional information has not been carried out. Candidates should decide for themselves what further processing they should do. They should not be told what to do for further processing.

### **Quality C**

As acknowledged in the recent publication on nomenclature by The Association for Science Education (ASE), the use of the terms reliability and validity within Science in the News does not match the way they are used in scientific investigations. Here it is a more everyday use of the terms. For 2 marks the candidate needs to comment upon the quality of information. However, for 4 marks there must be a comparison of likely reliability of sources which identifies, with some explanation, the most and least reliable. Sometimes candidates refer to usefulness of sources or order of preference of sources. These are not the same as reliability. To go higher there should be a consideration of the reliability and validity of data. With Controlled Assessments candidates do not have to consider the reliability of sources they use for Research.

### **Quality D**

Here candidates consider the social, economic and environmental aspects of the topic. They do not have to consider all three, but there must be some depth in their responses to support high marks. They must also include correct and appropriate Science.

### **Quality E**

This is where the candidate uses all their resources to come to an answer to the question. Without reference to sources, the maximum mark for an answer with a reason is 2. For 3 or 4 marks the candidate must show where the sources have been used. Only if the candidate considers the relative significance of the sources in coming to an answer, can a mark above 4 be considered.

### **Quality F**

It was usually possible to support the marks awarded for this Quality. The only problem comes when the candidate has word processed the report and pasted in sections from sources. Marks can only be given for what the candidate has written themselves. If short sections are pasted in they should be highlighted.

The Skills Assessment associated with Gateway Science was intended to give candidates an opportunity to study a scientific question and with research come to an individual answer to the question. It is pleasing to read the balanced arguments of the better candidates.

# B636 Research Study, Data Task and Practical Skills

## General Comments

This is the final Principal Moderator's report for this specification.

Over the last five years the performance of candidates has steadily improved as Centres came to realise what was required and developed strategies to develop their candidates' performance. It has been a successful mode of assessment some aspects of which are retained in the new Controlled Assessment tasks.

Skills and strategies developed for the Data Task and Research Study still have some validity in the new form of assessment as exemplified below.

Research from identified sources in response to given topics is clearly common to both assessments.

Planning an investigation is also common though significantly more detail is required in the plan for the new Controlled Assessment than was required in the answer to Q5 in the Data Task.

'Interpreting the data' and 'Processing data' have much in common though more is required in the latter in terms of treatment of uncertainty.

'Analysis of the data' and 'Analysing and interpreting' are also similar though again the latter is complicated by the requirement to consider secondary data. This consideration makes assessment of validity easier in the Evaluation section.

Evaluation is common to the two assessment schemes. Though the criteria are not identical, they are very similar.

The sections on conclusions also have their similarities with the addition of a link back to the research in the Controlled Assessment version.

Centres intending to undertake Gateway Controlled Assessment for the first time next year are encouraged to read the Principal Moderator's report for B713.

## Data Task

- A:** Candidates usually showed ability in this quality. Graphs were correctly plotted on axes which were appropriate though sometimes units and titles were missing. The main problem found was graphs which were rather too small either because axes were inappropriately scaled or because the area of the grid covered was too limited.
- B:** Marks of four in this quality were common reflecting the ability of candidates to undertake simple processing such as averaging and to describe the basic pattern observed. Justified marks of more than four were rare as few candidates undertook significant further processing. Where Centres had provided hints as to what might be attempted, this was not often successful as candidates did not appreciate the reason for the processing and, thus, failed to reveal any additional information.

**C:** Candidates still find difficulty in addressing both data and method in this quality. Answers which examined the method in detail without considering the data were not worth much credit. The best way to cope with this quality is to start with the data and proceed to explain how the method affected the data described. There was some improvement in the performance of candidates in this quality.

**D:** Poor conclusions did not link with the data produced during the task and did not adequately use scientific explanations to explain the patterns found. There was also a problem with candidates miss-remembering explanations which they had been given in advance of attempting the task. Good answers were given by candidates who understood the science behind the investigation and who explained it by linking their explanation to results obtained.

**E:** It is important to realise that the experiment described must answer the question posed. Alternative experiments scored few marks. In order to score four marks the experiment must be described in sufficient detail to allow it to be performed by a third party. The variables and how they will be controlled/measured must be there as must a range of values to be used. Without a sufficient plan, answers to the second part of the question could be given no marks.

### **Research Study**

**A :** Over the years, candidates have become better at scoring marks for this quality. In many Centres most candidates scored well with answers to all five questions clearly referenced with their sources. The sources were referenced either with a full URL or with sufficient details of a book and author.

**B:** Again the performance of candidates seems to have improved over the life of the specification. Candidates are including some science in their answers and even where this is copied or paraphrased from a source it is worth some credit if it is relevant. The best answers were where candidates had internalised the science and then used it to explain their answers to the questions.

**C:** Similarly candidates were, for the most part, able to relate their answers to the topic of the study through exploring areas on the specification in more depth or in explaining links to connected everyday topics. Again the best answers were those in the candidate's own words making use of information gleaned from sources.

**D:** Centres were usually quite accurate in awarding marks for this quality and it was quite rare to have to change them. Where this did prove necessary it was because there were many 'quotes' from sources which were not in the candidate's own words. Only the candidate's own work can be given credit for QWC.

**OCR (Oxford Cambridge and RSA Examinations)**  
1 Hills Road  
Cambridge  
CB1 2EU

**OCR Customer Contact Centre**

**Education and Learning**

Telephone: 01223 553998  
Facsimile: 01223 552627  
Email: general.qualifications@ocr.org.uk

**www.ocr.org.uk**

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

**Oxford Cambridge and RSA Examinations**  
is a Company Limited by Guarantee  
Registered in England  
Registered Office: 1 Hills Road, Cambridge, CB1 2EU  
Registered Company Number: 3484466  
OCR is an exempt Charity

**OCR (Oxford Cambridge and RSA Examinations)**  
Head office  
Telephone: 01223 552552  
Facsimile: 01223 552553

© OCR 2012

