OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology B J643

Gateway Science Suite

General Certificate of Secondary Education

Reports on the Units

June 2010

J643/R/10

Oxford Cambridge and RSA Examinations

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General Certificate of Secondary Education

Biology B Gateway (J643)

REPORTS ON THE UNITS

Chief Examiner's Report

General Comments

The examination entries for this June session followed a similar pattern to previous years, with B631 attracting approximately the same number of entries as B632. The entries for B632 tended to be year 11 candidates who were also aggregating. Entries for B631 comprised of candidates from a mixture of school years. The total number of candidates aggregating has continued to increase.
The papers all produced good spreads of marks and when distributions were plotted they formed appropriate bell shaped graphs. The mean marks on three of the four papers were very similar, with B632/1 proving to be less accessible than the other three.

The Principal Examiner reports which follow will indicate weaknesses and strengths on particular questions and part questions. It is worth noting the following general comments:

- candidates graphical skills seem to be improving
- knowledge and understanding of certain areas of the specification have improved, such as water transport in plants and respiration.
- there remains an inability in many candidates to correctly use the term mitosis and knowledge of kidney function was poor, in all but the most able candidates.

B631/01 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. Questions targeted at grades C and D allowed the more able candidates taking the paper to demonstrate what they knew and understood, whilst questions targeted at grades E, F and G allowed all candidates access to the paper.

All candidates appeared to have had sufficient time to complete the paper, with the majority attempting most of the questions.

Comments on Individual Questions

Question No.1

(a) The majority of candidates matched the sense organ to the correct stimulus.
(b) Very few candidates correctly identified the lens. The most common answer seen was pupil.
(c) Many candidates were unable to identify the type of response as a reflex.
(d) Most candidates realised that genes were involved in the control of the colour. However a few candidates misunderstood the question and gave light as the answer.
(e) Candidates were not awarded the mark for simply stating 'from his parents', they should be encouraged to use the term inherited or refer to genes.

Question No.2

(a) The majority of candidates gained a mark for mouth or under the arm.
(b) Most candidates correctly gave sweating as one way of losing heat. However a number of candidates lost the mark because they gave a part of the body and not a process.
(c) Candidates were able to explain that immunisation protects the child from infection in part (i). However few candidates were able to describe how white blood cells destroy pathogens. Although many candidates mentioned antibodies some candidates thought antibodies engulfed the pathogens. Candidates should be encouraged to describe white blood cells engulfing pathogens and not killing or fighting them.

Question No.3

(a) The majority of candidates gained a mark for identifying diet C.
(b) Although many candidates identified diet A they lost the second mark because they mentioned all the food types, not just protein.

Question No.4

(a) The majority of candidates gained a mark for identifying the two lifestyle factors.
(b) The majority of candidates correctly identified Neil as overweight. However many candidates incorrectly calculated his BMI. Many of the incorrect answers were due to candidates multiplying height by 2 instead of squaring height.

(c) Most candidates gained at least one mark by correctly explaining fitness. The second mark tended to be lost because they linked health to diet and did not say free from disease.

Question No.5

(a) The majority of candidates gained a mark for identifying the camel as a vertebrate and a mammal.
(b) About half the candidates correctly referred to water loss in their answer. The most common error was the idea that not sweating would reduce heat loss.
(c) Very few candidates knew that the relationship was called mutualism.
(d) Most candidates were able to place the gases in the correct order in part (i). In part (ii) it was not enough to simply say population has increased. Candidates needed to answer in terms of increased demand for energy such as the burning of **more** fossil fuels or **more** cars.

Question No.6

(a) The majority of candidates gained a mark for identifying disappearing habitats as the cause of bumble bee decline.
(b) The majority of candidates were able to successfully define the term extinct.
(c) Candidates who lost the mark tended to refer to habitat protection. This was mentioned in the question and therefore was not awarded a mark. Candidates should be encouraged to use the term 'captive breeding programs' instead of simply say 'breed them' or 'keep them in zoos'.
(d) The majority of candidates correctly identified the endangered and extinct animals.

Question No.7

(a) The few candidates that lost this mark tended to do so because they said 'teeth' or 'large teeth' not 'sharp teeth'.
(b) The majority of candidates correctly identified one resource such as food.
(c) The majority of candidates correctly identified 50 as the answer. The most common error was the use of the incorrect scale resulting in an answer of 2500. Two thirds of candidates correctly identified 1980; the most common error was 1982. Part (iii) was an overlap question and proved to be a good discriminator. The better candidates gained both marks and the majority of the rest described the effect but were unable to give a reason. A common error was to think the disease had killed the moose.

Question No.8

(a) The majority of candidates gave the correct answer of oxygen. A large percentage of the rest thought it was carbon dioxide.
(b) Only about half the candidates gave glucose as an answer. Many candidates simply put food, which was not sufficient to gain the mark at this level.
(c) Candidates needed to make a comparison in their answer. The answer 'there is light for photosynthesis' was insufficient. To score, an answer such as 'there is **more** light for **more** photosynthesis' was needed. Candidates should be encouraged to refer to light not Sun.

Question No.9

(a) The majority of candidates gave the correct answer of nucleus.
(b) Many candidates thought the diagram showed one plant cell instead of a group of cells. This resulted in incorrect answers such as plant cells have 'epidermal cells' or 'stomatal pores'.
(c) Very few candidates mentioned evaporation or diffusion. About a third of the candidates simply left this question out.
(d) Many candidates thought photosynthesis was involved instead of cell division.

Question No.10

(a) The majority of candidates gave the correct answer of food and oxygen.
(b) Most candidates gained a mark in both part (i) and part (ii).
(c) Only the more able candidates scored on this question. Many candidates simply described the job of the red blood cells or described how they move around the body, i.e. in blood vessels. Some candidates lost the mark because they thought the blood cells only had a dent on one side. They should be encouraged to use terms such as biconcave instead of 'they have a dent'.

Question No.11

(a) Most candidates gained at least one mark for C and D in the correct order. Many lost a mark for placing the dish inside the box first.
(b) A number of candidates simply missed this question out. Those that drew the shoots incorrectly tended to draw larger shoots near the hole instead of bending the shoots towards the hole.
(c) Many candidates thought James was correct. However the experiment was about light not gravity. This was all they needed to say for a correct answer.

Question No.12

(a) The majority of candidates gave the correct answer of 'Frenso' in part (i). About half the candidates were able to calculate the average mass. Incorrect answers included simply giving a total mass instead of an average. Candidates should be encouraged to show their working.
(b) Very few candidates successfully described asexual reproduction in plants. Terms such as runners and plantlets were rarely seen. Many candidates described how to take a cutting or simply said the plant makes a clone. About two thirds of the candidates correctly used the term clone in part (ii). Some candidates referred to twins or the process of cloning. Both these answers were insufficient for a mark.

B631/02 Higher 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 and covering almost the whole mark range available. Questions targeted at grades A*, A and B allowed the more able candidates taking the paper to demonstrate what they knew and understood, whilst questions targeted at grades C and D allowed all candidates access to the paper. Candidates appeared to have had sufficient time to complete the paper, with most attempting most, 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

Q 1 **(a)** Most candidates correctly linked the parts of the eye to their jobs.

(b)(i) Some candidates did give clear and full descriptions of accommodation, explaining that to look at a close object the ciliary muscles contract, the suspensory ligaments slacken and the lens becomes more convex. However many others, whilst attempting to explain in terms of ligaments or muscles, became very confused. Candidates should not use terms such as contract or relax with reference to ligaments. Nor should they describe muscles as tightening or loosening. Weaker candidates often tried to include roles for the cornea, pupil or iris.

(b)(ii) Just over half the candidates knew that a concave lens can be used to correct short-sight.

Q 2 **(a)** Most candidates gained the mark by correctly choosing 'high amount of salt in diet' and 'excessive alcohol consumption' as the two factors contributing to high blood pressure.

(b)(i) Almost all candidates correctly described Neil as overweight.

(b)(ii) Most candidates correctly calculated Neil's BMI as 28.09, 28.1 or 28, thereby gaining two marks. However if candidates incorrectly rounded their answer, eg by giving 28.0 or 28.08, they could only get a maximum of one mark.

(c) Most candidates were able to explain the difference between fitness (eg being able to perform physical tasks) and health (being free from disease). No marks were given for saying simply that if you are healthy there is 'nothing wrong with you' or that fitness means being 'physically fit'.

Q 3 **(a)** Most candidates correctly chose 'homeostasis'. The usual incorrect answer was 'homozygous'.

(b) Unfortunately, (since this point seems to be constantly hammered away at in revision guides and text books) a surprisingly noticeable minority of candidates still think that blood vessels can move up and down in the skin. Any candidate who said that vasoconstriction means that blood vessels get further away from the skin lost any mark they may have gained for correctly saying that blood vessels narrow. There was also a mark available for explaining that the skin gets paler because there is less blood flowing through the skin (surface). However candidates needed to be careful how they phrased their answers, as some simply gave statements, such as 'blood flows away from the skin', which on their own were too ambiguous. A minority gained both marks and over half the candidates scored nothing.

Q 4 **(a)** Most candidates correctly explained that blood sugar levels could be controlled by diet, with better answers making a link between diet and exercise.

(b)(i) Around two thirds of the candidates knew that the DNA base code consists of four different bases, with some also giving their letters. The most common incorrect answers, perhaps unsurprisingly, were '3' followed by '46'.

(b)(ii) Most candidates suggested that cells other than those in the pancreas do not make insulin either because 'it's not their job' or because they 'do not have the gene / code'. Around a third were able to correctly explain that although the cells have the gene, it has been switched off.

Q 5 Most candidates gained at least one mark and around two thirds gained both marks. The most commonly given advantages were that it would allow the parents to plan care for the child, seek early treatment or give them the choice of abortion. The most commonly given disadvantages were that it may cause stress to the parents or lead to an abortion. Usually when candidates did not gain marks it was because they had misread the question and tried to give advantages or disadvantages of having a baby with an inherited disorder whereas the question was about the advantages and disadvantages of them knowing in advance of the disorder. Candidates should also be aware that if they give the same answer twice in a question (in this case some gave the possibility of abortion as both an advantage and a disadvantage) they are unlikely to gain two marks.

Q 6 **(a)** Most candidates gave hair or fur as the mammalian characteristic shown in the picture, although some simply gave characteristics of camels, eg 'have four legs'.

(b) Most candidates correctly explained that not sweating means that camels don't lose (so much) water although some explained in other terms such as 'they do not have to drink so much / as often' which were perfectly valid. Only a few thought it was an adaptation to avoid losing too much heat.

(c) About two thirds of candidates correctly identified the relationship as mutualistic. As in previous years, there were many non-scoring answers which did not use scientific terms, such as 'mutually beneficial' or 'friendly'.

(d) Most candidates gained at least one mark and nearly half gained both marks for explaining why there are similarities between camels and llamas. Only a few candidates misread the question and described the similarities.

(e)(i) Around half the candidates gained the mark either for saying that the scientific names show the genus and species, or that they show that the two animals are from different species. Some candidates seemed to have the idea but could not be awarded the mark because of either vague answers (eg 'they have different classifications') or precise but incorrect answers (eg 'the names show they are in different families / classes').

(e)(ii) Although many candidates gained one mark (either for stating that hybrids are infertile or that they have a mixture of characteristics from two species) relatively few (around a quarter) gained both marks. Many candidates just reworded the question without adding to it, giving answers such as 'hybrids are a cross between two species'. This kind of answer, on its own, did not gain any credit.

Q 7 **(a)(i)** Most candidates gained the mark by explaining that the (human) population is increasing.

(a)(ii) Since the question had already stated that bumblebees can be protected by protecting where they live, no credit could be given to answers giving the same idea, albeit in different words, eg 'set up reserves'. However a majority of candidates did gain a mark, usually for the idea of (captive) breeding, though other acceptable answers, such as legal protection or education programmes, were also regularly seen.

(b)(i) Most candidates knew that insects prove useful to farmers because of their role in pollination.

(b)(ii) Most candidates gained the mark for suggesting that clover attracts insects with its scent. Fewer gave the other expected answer of nectar. Some were familiar with insect pollination but were confused as to what actually attracts the insects, with 'sticky pollen' being a commonly seen incorrect response.

(c) There were lots of non-scoring answers such as 'nutrients', 'nitrogen', 'sugar' and 'water'. A minority knew that nitrogen-fixing bacteria provide plants with nitrogen compounds such as nitrates.

Q 8 **(a)** Surprisingly few candidates seemed able to correctly choose 'population' as the description of a group of animals such as wolves. The most common incorrect choices were 'community' and 'niche'.

(b)(i) Most candidates correctly read the highest number of wolves as 50. Those who didn't usually read from the wrong axis and gave 2500.

(b)(ii) Most candidates correctly stated that the number of moose would increase and the majority of these went on to get the second mark by explaining that this would happen because fewer moose would be eaten by wolves. Fewer candidates than in similar questions in previous years seemed to make the mistake of writing that none of the moose would be eaten or that there would be no wolves left to eat the moose.

(c) This three mark question discriminated well with all marks from zero to three being regularly seen. Weaker, non-scoring answers simply stated that the wolves would evolve, or become adapted, forming a new species. The best answers clearly described the stages of natural selection: variation, survival of the fittest, inheritance of successful genes.

Q 9 **(a)** Most candidates gave at least one valid way in which plant cells are different from animal cells, and around two thirds gave two. The presence of a cell wall, (large) vacuole and chloroplasts all appeared regularly as did the ability to photosynthesize, all credit-worthy answers. Non-scoring answers often picked non-cellular plant features, eg stomata or guard cells.

(b) Many candidates correctly named diffusion, although evaporation and transpiration were also seen and given credit. The most common non-scoring answer was, perhaps predictably, osmosis.

(c) This proved to be a difficult question with myriad incorrect answers and only a minority of candidates able to correctly draw the chromosomes at the end of mitosis. Many showed the chromatids still joined.

Q 10 **(a)** Most candidates correctly chose the third statement. A minority lost the mark by ticking more than one statement.

(b)(i) Around two thirds of candidates correctly named arteries as the type of vessel taking blood from the foetal heart to the umbilical cord. The question specifically asked for the name of the 'type' of vessel so candidates naming specific vessels usually lost the mark as they were incorrect, eg pulmonary artery or coronary artery. The only exception to this was the aorta which was credited.

(b)(ii) Most candidates knew that valves prevent backflow although they may have phrased this in a variety of (acceptable) ways, eg they ensure blood flows in the right direction. The mark was not given for the vague statement that they control blood flow or for the incorrect statement that they pump blood.

(c) Over half the candidates gave two valid adaptations of a red blood cell with a range of correct answers regularly seen: no nucleus, haemoglobin, small size, flexible shape, large surface area, biconcave shape. The last point was probably the most problematic and marks were not given for some alternative wordings such as 'dented' or 'concave'. There was also a mark available for them having a permeable (or thin) membrane but usually candidates attempting this point said that the cells have a permeable (or thin) wall and so could not be credited.

Q11 (a) A majority of candidates knew that James was not correct and gave a valid reason, eg that the shoots showed positive phototropism or that positive geotropism would have meant the shoots growing downwards. A significant minority however said he was correct in which case no mark could be gained.

(b)(i) The majority of candidates correctly named auxin.

(b)(ii) This question was a good discriminator at the top end of the grade range. Although many candidates attempted to explain why the shoots bend (eg because they need to get light), answers only gained a mark if they correctly explained that auxin accumulates on the shaded side of the shoots (so increasing growth on that side). Only very good answers explained the increased growth in terms of cell elongation, thus gaining the second mark.

Q12 **(a)** Many candidates gave a valid description of the results, eg that 'as temperature increased, the time for the reaction decreased then increased again'. Many others were not credited with the mark because they either only described how one variable changed (eg 'the time goes down then up', or because they did not describe the trend, but rather just referred to specific values, eg 'at 20^{o}C and 60^{o}C the time was long but at 40^{o}C the time was short'.

(b) Most candidates gained the mark for identifying 40^{o}C as the optimum temperature, although any answer in the range 31^{o}C – 49^{o}C would have been acceptable.

(c) A majority of candidates got the mark for explaining that the enzyme stopped working because it was denatured. Marks were not given for simply saying that it was 'damaged' or 'broken', nor for the thankfully rare 'it's been killed'. Pleasingly, there were also some higher level correct responses describing changes to the shape of the active site.

Q13 **(a)** A majority of candidates correctly chose 'insertion', although all of the other choices were seen.

(b) Only a minority of candidates were able to explain that the two genes needed to be joined so that AAT would be produced with the milk.

(c) This question was another good discriminator for the higher grades. A minority of candidates gained two marks for describing how the nucleus from the udder cell is placed into an egg cell which has had its own nucleus removed. Weaker answers described putting the udder cell into another cell but were not clear what kind of cell that would be. The weakest answers included sperm cells and fertilisation in the process. There were also marks available for other valid points, such as giving an electric shock or the modified egg cell dividing to form an embryo, although these were not often given.

B632/01 Foundation Tier

General Comments

This paper elicited a range of marks from the candidates and allowed most candidates to demonstrate what they knew about the topics. There were few marks right at the top end of the distribution, perhaps indicating that most candidates were entered at the correct tier.
It was good to see some improvement in problem areas such as the difference between respiration and breathing and also the passage of water through a plant. Graphical skills are also improving.

There are still problems with candidates failing to give comparative answers, such as the factors that increase transpiration. The technical terms of chitin, mitosis and flagella were seldom used and kidney function was poorly understood.

Comments on Individual Questions

Q1(a) Many candidates were tempted by the carbon dioxide distracter.

(b)(i) Although most candidates could give one correct method, a significant number thought that wrapping in foil or putting food in a sealed container was adequate to achieve preservation.

(b)(ii) This part question was quite well answered with many candidates appreciating the need to prevent the entry of oxygen or microbes.

Q2(a) This was well answered.

(b) There were a number of specific answers here but a number of candidates failed to score marks as they relied on generalisations such as references to cruelty / life style / taste of food.

(c) The spread of answers here indicated that very few candidates could recall the action of this mineral.

Q3(a) The role of cell walls was poorly understood in some cases, with many candidates just stating protection.

(b) This was a good discriminator. Some candidates only gained one mark for water entering the roots. Others could correctly describe the route, via the xylem, and the mechanism, transpiration.

(c) The usual mistake (failure to make an explicit comparison) occurred again here, with many candidates just stating temperature or wind rather than increase in temperature or more wind.

(d) Although a good number of candidates scored, many of the candidates who scored high marks were tempted by the more complex distracters.

Q4(a) A number of candidates did not score here as they used the word consume in their definition.

(b) The main error here was giving a list of energy sources such as sunlight and the soil.

(c) It was pleasing to see that many candidates could plot the pyramid although some found the scale for the birds rather difficult.

(d) Generally well answered.

Q5(a)(i) The concept of an average was well understood by most candidates and could be used in part (ii).

(iii) A number of candidates lost marks by giving answers along the lines of 'blood being pushed round the body', without mentioning the beating of the heart.

(b) An amazing number of candidates transposed the identification of the red and white blood cells. Most, however, could identify the plasma.

6(a) Very few candidates knew of chitin.

(b)(i) More candidates are appreciating the difference between breathing and respiration but wrong answers were still quite common.

(ii)(iii) A number of candidates lost a mark by referring to the insect's exoskeleton as a shell but many understood how gaseous exchange occurs in the earthworm.

(c) Part (i) was generally correct but candidates found the two graphs harder to compare and mitosis was not appreciated by most candidates at this level.

Q7(a) Probably the worst answered question on the paper. Very few candidates seemed to have any idea about renal function.

(b) This scored more marks with many candidates concentrating on problems of rejection. Very few scored in part (ii) as they failed to appreciate the size of a renal dialysis machine.

Q8(a) Answers seemed to be split equally between bacteria and fungus.

(b)(i) Again, oxygen was a powerful distracter but most could state apples or pears in part (ii).

(c) (i) Few candidates new the composition of gasohol.

(ii) A good discriminator with some candidates appreciating the action of the bacteria on the waste but others seemingly linking the words at random.

Q9(a) The understanding of this topic seemed to vary widely between candidates.

(b) This question about food chains and the function of earthworms was better answered than part (a) by most candidates.

Q10(a) Many candidates were tempted by the smallest of the four measurements.

(b) The use of the word tail was not credited and was the most common answer at this level.

(c) Most candidates could state antibiotics.

(d) Again, well answered although there were some non natural disasters stated.

Q11(a) Well answered by most.

(b) (i) Many students scored marks here, having given correct trends, although they were often rather muddled.

(ii) (ii) The use of the graph here was beyond many of the candidates at this level and answers to part (ii) often seemed to be guesswork.

B632/02 Higher Tier

General Comments

- In general the paper was balanced and accessible to all candidates.
- Very few candidates failed to complete the paper.
- Overall candidates performed reasonably well on this paper with marks ranging from the low twenties to near the maximum.
- Very few candidates had been entered for the wrong tier.
- Weaker candidates were able to recall knowledge and describe how amniotic fluid is removed during amniocentesis. Stronger candidates were able to describe extra-cellular digestion in saprophytes, agglutination in blood that doesn't match and had an excellent understanding of the functioning of the kidney nephron.
- Candidates need to be more aware of the need to make comparisons to avoid losing marks.

Comments on Individual Questions

Question 1

(a) Generally a well answered question that eased candidates into the paper.

(b) This question required a high level of response but even more able candidates did not express their ideas clearly and often failed to gain both marks. Even those who had the correct reference to external / extra-cellular digestion would often lose the absorption mark through poor expression. The majority of candidates did not refer to external digestion. A common error was to state that after secreting enzymes on the food it was the enzymes which were absorbed without reference to digested food being absorbed. Careless use of 'bits' and 'pieces' as opposed to food / materials / molecules etc was seen too often and no credit was given as it links to mechanical breakdown.

(c) This was well answered by all candidates.

Question 2

(a) Candidates either didn't read or ignored 'other than cost' in the question resulting in no creditworthy responses for a significant number of candidates.

For the advantage, the most common correct idea was that pigs are free to move around. The most common error was giving vague references to a better quality of life.
For the disadvantage, most of the alternative correct answers were seen with the exception of predation. The most common error after cost was that it took longer or that the animals grew more slowly.

(b) All combinations were seen but it was generally well answered.

(c)(i) Generally well known, a small number of candidates responded 'brown' or 'purple'.

(c)(ii) Generally well answered. The answer 'chloroplasts' was seen occasionally.

Question 3

(a)(i) Well known.

(a)(ii) The stronger candidates fully understood the structure often giving a very complete description including several marking points. The most common errors were 'dead' cells alone or giving incomplete answers such as 'open ends' or 'cylindrical'.

(b) Not well answered despite being cued into the comparative idea by 'increasing light intensity' in the question. Stronger candidates gave a comparative answer but too many gave unqualified answers such as temperature, heat or wind. Another common error was answering 'increased humidity'.

(c)(i) Spongy mesophyll was well known but weaker candidates gave all combinations from mesophyll layer and spongy layer to palisade, epidermis and even stomata.

(c)(ii) This was not well answered. Stronger candidates gained a mark for a correct reference to large surface area. There were many references to air spaces but most were linked with easier movement of gases or simply 'gas exchange' and few links to diffusion. The idea of being moist was not seen.

Question 4

(a) This was quite well answered by the stronger candidates who tried to draw bars ½ square wide, 5 high or even had different combinations lower than 5 high for the bird. The most common error was 5 squares high and 1 wide but most candidates gained a mark for the correct labels. A very small number of candidates drew incorrect bars for the crickets and the birds.

(b) Universally a well answered question.

(c) The stronger candidates calculated this successfully. The most common error was 60% where candidates had used the 120kJ lost in their calculation rather than working out the energy used for growth.

(d)(i) Well answered. A common error was 'carbon cycle'.

(d)(ii) Acid often linked with rain; heating and volcanic eruptions were the most common correct answers. Responses based on burning, eroding or dissolving were the most common errors.

Question 5

(a) There were excellent responses from stronger candidates. These featured very clear, well sequenced explanations. Most candidates tended to concentrate on the filtration / reabsorption function with the most common error being the substitution of vague references to the body for the blood. Ultrafiltration was cited mainly by the more able candidates. A small number of candidates wrote solely about the water regulation function with a number making reference to the role of ADH.

(b)(i) This part of the question was well answered with many candidates gaining both marks. All marking points were seen. Many candidates only gained one mark, usually the first marking point, which they rephrased in two or three ways, a typical example being 'same

blood type, same DNA and would not be rejected'. The most common error was to refer to similar blood / tissue type.

(b)(ii) The idea of the kidney machines being too big was seen but it was not the most common answer. There were many incorrect references to kidneys being too complicated, too difficult to connect to the blood supply, needing a power source, causing blood clots and being rejected.

Question 6

(a) Stronger candidates had no problem with this. Many candidates were able to gain two marks for correctly calculating the tidal volume and vital capacity but they then went on subtract the tidal volume from the vital capacity. There was some concern that a number of candidates did not use a calculator as the final answer was wrong despite correct working on a number of occasions. Weaker candidates had no idea and produced a wide variety of answers.

(b) Many answers were correct but all possible combinations were seen.

(c)(i) The majority of candidates gained this mark for a correct reference to calcium, usually linked with phosphates, but the actual process of replacement was not well understood. There were many vague descriptions of calcium turning or hardening cartilage into bone.

(c)(ii) Generally well answered with 'stronger' and 'better protection' seen equally often.

(c)(iii) The most common answers here referred to reducing friction or shock absorption. A number were coupled with ideas of moving or breathing and could be awarded a mark for the overall response. Growing was less frequently seen.

Question 7

(a)(i) This was quite well answered but the most common errors were cloning and asexual reproduction. Meiosis was not often seen.

(a)(ii) Well answered.

(a)(iii) Generally well answered. Harming the foetus and miscarriage were the most common correct responses. Quite a few candidates did consider the future if abnormalities were found.

(b)(i) This was a high demand question that was well answered overall. Those candidates choosing double circulation were more likely to give a correct explanation, often referring to some blood going to the lungs or the heart having four chambers. Candidates who chose single circulation found it more difficult to express their explanation clearly, often relating the idea of blood going through the heart once but omitting 'for each full circulation'. They often referred to circulations being linked rather than two sides of the heart and weaker candidates confused this idea with the problem of a hole in the heart.

(b)(ii) The stronger candidates usually gained a mark here, not always referring to the placenta or umbilical cord but usually 'oxygen from the mother's blood'. With others, too often the incomplete answer of 'get oxygen from the mother' was seen. Weaker candidates concentrated on the idea that the foetus does not use its lungs and made no reference to oxygen in their answers.

(c)(i) This part question was reasonably well answered but again many combinations were seen. A common error was the correct answer reversed for Heidi and the foetus.

(c)(ii) This part of the question discriminated very effectively. Only a handful of correct answers were seen, restricted to the more able candidates. The most common answers referred to clotting and clumping of blood or antibodies attacking antigens. No references to blood pressure were seen.

Question 8

(a) Generally well known.

(b) Usually correct.

(c)(i) Stating that the "leaves would rot" or "to release minerals" was insufficient as a comparative, such as 'faster', was required. This resulted in very few candidates at any level gaining this mark. Many referred to helping the leaves decompose or adding minerals to the soil but lost the mark because their answers were not comparative.

(c)(ii) Candidates answered this reasonably well. The most common differences were either 'no rhododendron pulled by the middle' or 'most rhododendron were pulled by the stalk'. Candidates found many ways to express the correct idea that the rhododendron leaf is too long and wide to pull from the middle but can be dragged by the stalk due to its tapered outline. There were also reasonable explanations linked to the lime tip. Marks were lost for non-comparative answers or unrelated explanations linked to leaves curling up, surface area or fragile stalks.

Question 9

(a)(i) Candidates answered this question reasonably well with many candidates gaining both marks. The most common answers hit the first two marking points but all four marking points were seen. Although a number of the weaker candidates had the right idea poor expression let them down and vague references to 'they all' or steepness did not score marks. A few candidates incorrectly compared the whole world with developing or developed countries.

(a)(ii) Stronger candidates were able to explain this quite clearly. It was fairly difficult to get an accurate reading from the graph as the diamonds and triangles obscured the grid, but quite a number of candidates were able to give results within the acceptable range. A common correct answer was simply to write that the value was higher than the total for developing countries. The most common errors were '58 million hectares is on the line of developed countries' or 'developed countries reached 60 million which is almost 58 million'.

(b) Stronger candidates knew both of these; transgenic was more often correct than restriction. Ligase was a common error given in place of restriction.

Question 10

(a) This was not well known, with those who answered correctly often added many and varied names with it. The most common error was *E. coli*.

(b) Stronger candidates did know flagellum but spelt it in many different ways. Weaker candidates did not know it and the most commonly answered 'tail'.

(c) Generally well answered with the majority gaining two marks for 'sewage contaminating water supplies'. Disruption to health services and transport were seen quite often. Vague references to clean/dirty water and pollution missed the point.

Question 11

(a) Well answered, usually for the idea of rapid growth.

(b) Well known by the better candidates. Nitrates were quite often seen and ammonium was a common error. For the weaker candidates all the incorrect bacteria from the nitrogen cycle were seen. *Nitrobacter* was seen rarely and *Nitrosomonas* was never seen.

(c) There were some very clear and concise answers that gained all 3 marks. The two possible correct routes through the explanation were seen in similar numbers. A common erroneous idea was that the algae use up all the oxygen, this prevents the plants photosynthesising and therefore the plants do not produce enough oxygen for the animals. A simpler error was to state that the plants die and the animals have no food. Imprecise terms like 'bacteria feeding on plants / algae', 'fish suffocating' or 'fish unable to breathe' were insufficient and many candidates did not score marks as a result of this.

Biology B635

General Comments

By now, this system of Skills Assessment involving Can-Do tasks and Science in the News has had time to become established. Although many centres can now do this well, there are still some centres that are having problems. The problems are the ones reported previously in these reports in 2008 and 2009. Centre should use the information in these reports, the support of training events and advice available from OCR.

It is pleasing to report that, as last year, there are many candidates who now produce good considerations of the topic, looking for and against and then using their research to come to a considered decision. Unfortunately there are still many who seem to regard this aspect of the specification as irrelevant and go through the motions. This often involves giving Science in the News tasks without preparing the students with the necessary skills.

A total of 13065 candidates, from 274 centres, entered candidates Biology (B635).

It is possible that candidates use the same piece of SinN for more than one specification. However, each specification is moderated separately so, if the same piece of work is used, it must be photocopied each time it is used. Marks cannot be just transferred from one specification to another. Some centres continue to ignore this important point. Failure to do this makes the Moderator's job more difficult and could lead to unnecessary errors.

Centres are reminded that if a piece of work is resubmitted in a following year the Science in the News report cannot be added to. If the Science in the News report is not considered to represent the true standard of the candidate a **new** and **different** Science in the News should be attempted.

Administration matters

Administration matters - general

Teachers are required to supply, for each of the candidates chosen in the sample, a breakdown of the marks awarded for the Can-Do tasks together with the marks awarded for each of the six Qualities in the Science in the News Task which had been chosen for assessment. It is noticeable that in many centres all, or a vast majority of candidates, score 24/24 for Can Do tasks. It is not uncommon for candidates to score 24 and produce nothing for SinN. Despite the column on the form, dates are not essential.

In a separate science (eg Biology) all the Can Do tasks must be from the separate science (eg Biology) list.

Administration matters – selecting tasks for Science in the News

One of the strengths of Gateway Skills Assessment is that all of the materials which are required for each of the Science in the News tasks are provided by OCR and are available on the secure Interchange website. Some centres have not realised that new tasks have been added each year. It is disappointing that the vast majority of centres choose tasks from the original list eg whaling; cannabis etc when new tasks have been added to Interchange each year.

The tasks available for 2010 are shown below. New tasks have been added for June 2011. No further tasks will be added.

Module	Title
B1	Should the use of cannabis be legalised?
B1	Should old people be allowed to drive?
B1	Should the UK drink-driving limit be zero?
B2	Should whale hunting be banned?
B2	Should farmers be allowed to use polytunnels?
B5	Is there a bright future for children born with heart defects?
B5	Cosmetic Surgery – a life saver or image makeover?
B6	Should we worry about Bird Flu affecting humans in the UK?

A task set for Chemistry or Physics, e.g. 'Should we spend time in the sun?' cannot be used for Biology.

Some centres still use unapproved and unsuitable tasks, especially if they used them for Entry Level. If they don't match fully the requirements of a task candidate marks will suffer.
One centre produced its own Science in the News task which was submitted and approved for use in the centre. However, in the end it did not figure in the moderation sample.

Administration matters - Supervision of Skills Assessment

One of the strengths of Gateway Skills Assessment is that the assessed work in under the direct control of the teacher.

All SinN are written under controlled conditions where the teacher can sign the Centre Authentication Form (CSS160) with confidence.

The teacher should give the candidates the OCR stimulus material for a task after the topic has been studied so that they are fully equipped with the background to the task. The teacher may read through the stimulus material and explain any scientific words but they must not give any opinion.

OCR provides a writing frame which should only be used with lower-attaining candidates. Centres are allowed to use their own writing frames providing they are generic i.e. not specific to the task and the same writing frame for all tasks. There are still a few centres trying to use non-generic writing frames or giving too much direction to candidates.

There is considerable evidence that candidates do their best when they are given independence to study the topic and look at both sides of the argument. It is common, in some centres, for candidates to be provided with a list of suitable sources. Even if they are fully referenced this does not automatically give the candidates 4 marks. Sources must be used and not just quoted. It is not unusual to see 10 or more sources listed. This is totally unnecessary as no candidate can use all of these adequately in the report. Telling them which are for and which are against the argument is going too far.

Administration matters – research time

Each Topic requires the candidates to undertake some research for themselves in a period of approximately one week. This research could be done in school, either in the laboratory or a computer facility or it could be done at home, and it is emphasised that the candidates do not need to be supervised during this preliminary research and they do not necessarily need to work on their own. If the preliminary research is done in school, teachers can provide some materials to get the candidates started with their task. However, it was felt that in some centres the candidates had been provided with a complete list of source material for use and the necessary element of choice and selection on the part of the candidate for relevant aspects had therefore been removed. The best reports came where candidates had the freedom to investigate the question set.

Where there are a large number of candidates in the sample it is reasonable to expect

- Different source materials to be used,
- Different processing to be done and, for example, not all candidates having the same bar chart display,
- Candidates answering the question in different ways.

It was not unusual for a centre with over 100 candidates to use the same topic with all candidates and, to make it worse, it to be the same topic as in previous years. Candidates in that centre may finish the course believing there is only one scientific question worth discussing. In the best organised centres a range of tasks were used. Some centres use the same task because they have developed a marking scheme for it which will ensure internal standardisation. Mark schemes are not advised and reports should be marked using the criteria and not a mark scheme.

Administration matters – supervised session

When the preliminary research has been completed, the SinN tasks are written up under controlled conditions in the classroom/laboratory. Candidates are required to work independently and, although a time of 1 hour is suggested, the centre may use more or less time as required. If it extends beyond one lesson, the work should be collected in between the sessions and stored securely.
A limit of 400-800 words is also suggested in the specification.

Candidates can bring into the session completed charts/graphs that they have done together with a completed bibliography. This will prevent time being wasted during the session.

Some candidates are using word processors to produce their reports.

Centres are reminded this is acceptable providing the centre can ensure

- that no complete or largely complete report is brought into the writing session on a USB storage pen or in any other electronic format.
- no competed report is taken out or e-mailed to another person.
- the candidate cannot access websites electronically either from storage devices or the Internet. The Internet should be ‘off’ during the writing up session.

If these conditions cannot be guaranteed, it is not possible for the teacher to sign the Centre Authentication Form, and hand-written reports should be used.

It was an increasing trend, this year, to see word processed reports where almost the whole report had been pasted in electronically from websites without any acknowledgement as if it was

the writing of the candidate. Awarding Quality F marks when this is done is very difficult because it is not the work of the candidate.

Under no circumstances should any Science in the News tasks be drafted and subsequently redrafted. What is produced at the end of the supervised writing session is what has to be submitted. If there are deficiencies, this should be reported to students and they should be told to avoid these when they do their **next** SinN. There was still clear evidence that drafting and redrafting went on in a very small minority of Centres or teachers advising candidates to make additions. This is totally **unacceptable.**

Evidence of drafting and redrafting of candidates' reports or too much coaching leads to the work not being accepted for moderation but instead being reported to the Malpractice Committee.

Can-Do tasks

Can-Do tasks are an important part of the Gateway Science specification. They are motivational for students at all attainment levels. The tasks ensure that practical Science is an important aspect of the specification, and they can also ensure that ICT is used appropriately.
They are not expected to differentiate well for candidates at Grade C and above.
These tasks must be credited for individual work and not for a group of candidates collectively completing a task. All aspects of a task must be completed before credit is given and it is not possible to award 1 or 2 marks for a 3 mark task.

Centres are not expected to provide any evidence for the moderator to support the awarding of marks for Can-Do tasks.

Science in the News

Approach

Since Can-Do tasks will not differentiate well at Grade C and above, it is essential that the necessary differentiation between the levels of attainment of candidates is obtained using Science in the News.

The mark descriptors must be applied hierarchically. They can only be awarded when the whole statement is fully matched. There are still some centres trying to use a 'best-fit' principle. For example the word 'anomaly' appearing anywhere can, in the view of some teachers automatically lead to the award of 6 marks in Quality B.

It has always been OCR policy to encourage teachers to annotate Coursework. As candidates may attempt several SinN this represents a burden on teachers when, in reality, very little of the work will be seen by a moderator. In fact, in line with the sample size in other GCSE subjects with OCR, sample sizes for larger centres were significantly reduced. It is recommended that the emphasis should be given to reporting back to students so they can improve in the future. When the sample is requested by the moderator, a little time should be spent annotating the reports that have to be sent. In particular annotation should concentrate on why intermediate marks (i.e. 1, 3 and 5) have been awarded. The aim of annotation is to provide evidence that the moderator is able to use to support the marks awarded by the centre.

It is important that internal standardisation is carried out and the moderator informed of the way in which it has been done. Several centres had clearly not internally standardised the marks and consequently the rank order was not valid. In such cases the sample or parts of it had to be

returned to the centre for remarking. Where this was done the remarking was done graciously and centres realised moderators were trying to do their best for the candidates.

It does happen that all the marks of a centre are reduced by one or two teachers over-marking and internal standardisation not recognising this.

Quality A (Approach to the Task)

Candidates who do not undertake any research of their own cannot be awarded a mark in Quality A since the use of the OCR source material does not count for research purposes. However, candidates who do not do any research for themselves are able to gain marks in the other five Qualities.

For 2 marks candidates only need to use one source - from a book, newspaper, Internet etc. The source does not have to be referenced.

For 4 marks, however a candidate must fully reference and **use** more than one source. Two sources are sufficient and it helps later in their report if one source is for and one source is against the question posed.

Without detailed referencing it is very difficult to support a match to 4 marks. A long list of sources, even if fully referenced, does not mean the award of 4 marks unless they are used.

For an award of 6 marks it has to be clear that the sources have been used correctly to produce a structured and balanced report. The candidate is expected to have looked at both sides of the issue. Centres are reminded that 6 marks are awarded for the quality of the research **and** how it is used to produce a balanced report, rather than the quantity of research which has been done. Centres awarded 6 marks routinely even when there was insufficient balance in the report. Again it is important to say that little credit can be given where large amounts from a website have just been pasted in but not used even if the work is fully referenced.

It is recommended that candidates attach their preliminary research to the back of the report which has been produced during the supervised session. This will assist the teacher in marking the report since it will save having to go back to the sources to check the information. This preliminary work does not have to be sent to the moderator.

Quality B (Analysis of the data)

The award of marks for this quality is dependent on the candidates actually processing the information/data which they have collected.

For 2 marks the candidate needs to identify a simple trend or pattern eg *'….more women get skin cancer than men…'*. It is not sufficient to quote just a fact eg *'…7000 women in England get skin cancer…'*. Trends can come from the OCR source material or from the candidate's research. There are always ample trends and/or patterns within the OCR source material. The trends quoted must be correct.

There are still many centres who cannot distinguish a trend or pattern from a fact.
There are many examples of candidates carrying out processing, even quite advanced processing, without identifying any trend. This is still not even 2 marks as the mark descriptors are hierarchical.

For 4 marks there must be evidence for at least two trends, although which is the main trend may not be obvious, and some processing done by the candidate, at a standard approximating

to GCSE grade C level. This could be by drawing a graph, pie chart or bar chart from the data, calculating averages or percentages, or extracting and using data from a graph etc. It is important that the processing is correct. A poorly drawn graph with incorrect scales or incorrect average calculations should not be given credit. Teachers are reminded that, for the sort of data obtained, bar charts are often more appropriate than line graphs.

Few candidates progressed beyond 4 marks. This is not surprising considering the hierarchical nature of the mark descriptors. It is not sufficient just to pick out an apparent anomaly in data. To secure above 4 marks the candidate must do some **further** processing to identify some new information or to identify anomalies. In a few cases it was apparent that a candidate was told to take a particular approach to get 6 marks but did not fully understand what they were trying to do. This is an increasing and unwanted trend where teachers are pushing candidates to do things they don't understand. This was reported on last year but it still persists.

The moderator does expect to see different approaches to the same Task from different candidates within the Centre. Some examples were identified where several candidates completed the same incorrect processing and where the centre gave some candidates credit and others not. This sort of thing should be picked up in internal standardisation.

Quality C (Evaluation of the data)

The accuracy, reliability and validity of data are important aspects of Science National Criteria and they are assessed in Science through SinN. There are still some reports, but fewer than in previous years, where these are totally ignored and so a mark of zero has to be awarded.
For 2 marks the candidate needs to make some comment about the quality of the sources used or the data within them. This can be a very simple statement.

For 4 marks the candidate must compare the likely reliability of different sources and explain why one source is likely to be more reliable than another. To go above 4 marks the candidate's judgement about reliability of sources must be sensible and supported. They must also consider the validity of the sources.

Quality D (Relating Data to the issues)

Again social, economic and environmental aspects of the topic are an important part of Science National Criteria and which some centres did not develop sufficiently with their candidates during the teaching process.

Often these social, economic and environmental aspects were diffused throughout reports rather than in a separate section. It is clear that the candidates rather than planning to include them as an important aspect of the report, have stumbled across them accidentally.

Different SinN tasks provide different opportunities for consideration of social, economic and environmental aspects, and it is difficult to link all three of them in some tasks. Teachers should remember that the 2, 4 and 6 mark descriptors are loosely linked to performance at F, C and A respectively. So when awarding 2 marks teachers should ask whether the response matches the expectation from an F grade candidate. Similarly, performance at C and A can be the evidence for awarding 4 and 6 marks. It is not necessary to cover all three aspects even at 6 marks providing the approach to these aspects is at a suitably high level.

Quality E (Justifying a conclusion)

All of the tasks are posed as questions and therefore need an answer. Almost all candidates gave an answer to the question but often the answer was not derived from the work they had done but from some preconceived ideas. For example, of course whaling should be banned because it is cruel.

For 2 marks the candidate needs to decide *'yes'* or *'no'* and then give a reason. The use of the word *'….because…..'* in the candidate's response is useful but not essential. For a match to 4 marks the candidate does need to link clearly their choice to two particular sources. For 6 marks a candidate needs to decide which source is more significant. Few candidates are doing this. It is here that researching sources with different viewpoints becomes helpful.

Quality F (Quality of written communication)

Most Centres were quite good assessing this Quality. However, the use of a scribe to write the report for the candidate could limit the mark that can be awarded.

For 2 marks there could be many mistakes but it would still be possible to read the report.

For 4 marks there should start to be the use of scientific vocabulary correctly used.

For 6 marks there are few errors and a good use of scientific words.

Probably, the most common error was to award 6 marks for a report with little scientific vocabulary. High marks cannot be given when work is just pasted in or copied from a source. Some reports had been word-processed and a spell-checker obviously used. There is nothing wrong with this providing the spell-checker is used correctly.

Summary Comments

The moderator tries to support the marks awarded by the centre. Providing the average marking is within plus or minus 4 marks no change is made as the centre is deemed to be 'within tolerance'. Where the marks are outside tolerance and adjustments have to be made, the work is considered by at least two moderators. Where a centre is outside tolerance the marks of all candidates are changed even if, perhaps only a few candidates are outside tolerance.

Moderators were encouraged to provide useful reports for Centres. Too often centres do not take sufficient notice of these reports. If the report suggests the marking is generous but within tolerance, it is important the centre addresses this because next year it might be just outside tolerance.

The moderation was accomplished efficiently and effectively, with experienced moderators. Much of the success was due to the work of Team leaders in co-ordinating their teams.

The importance of cluster group meetings, attendance at OCR INSET meetings and meetings arranged in-house all provided centres with an appropriate awareness and understanding of the new framework. Centres should have copies of the Science Support booklet (which is also available on Interchange).

Many Centres have used the free OCR Coursework Consultancy service. Each year a Centre can submit good quality photocopies of three marked SinN reports to OCR. They will then receive a written report from a senior moderator on the quality of the marking. This means centres can then enter candidates for moderation with some confidence.

Biology B636

General Comments

This was the third year for the skills assessment in this specification and, as expected, the majority of centres produced well organised samples of work which did not require scaling.

On behalf of all this year's moderators I would like to thank those centres.

It is the job of a moderator, where possible to support the decisions made by centres. Centres which complete the paperwork correctly and which add helpful annotations to the candidates' work make that task much more straightforward.

Administration

Some centres made administrative errors which delayed the moderation process.

Some of the errors encountered were:

- Failing to include a Centre Authentication Form for each specification entered. This can result in marks being withheld.
- Failing to attach the 'Skills Assessment Record' to the front of the candidates work. This means that the moderator cannot be sure of the candidate's practical skills mark.
- Wrongly transferring marks from the record card to the MS1 sheet.
- Wrongly adding together the three marks on the record card.
- Failing to include a copy of the MS1, this problem usually arose with centres with small numbers of candidates who sent in all the work completed.
- Using tasks from modules 5 or 6 for 'Additional Science'.
- Entering candidates for the wrong skills unit in separate sciences.

Supervision of Candidates

Centres are reminded that, although close supervision is not necessary in the research phase of the Research Study or during the practical part of the Data Task, it is obligatory for the sessions where the written work is done.

Centres have to fill in a 'Centre Authentication Form'. By filling this form a centre certifies that candidates have been supervised as instructed in the board's regulations and that they are satisfied that the work is the candidates' own.

There has been more than one occasion, this year, where two identical pieces of work have been present in the sample requested. There were also a good number of cases where different pieces of work had similarities which seemed to be beyond what could have occurred by coincidence.

Where this occurs and plagiarism has clearly taken place, neither candidate's work should be credited.

If candidates are supervised properly, according to the board's regulations, this should not occur. Please note:

- Candidates are NOT allowed access to the internet during either of the supervised sessions.
- Candidates may not bring any electronic media into a supervised session.

- In the Research Study session candidates may have access to their rough notes and print outs of their research but nothing else.
- In the Data Task session candidates should have access only to their results and the instruction and question sheet for the task.
- Redrafting (producing a second version of the work after teacher correction) is strictly prohibited.

Comments on the assessment of the different qualities

The comments listed by quality below are aimed chiefly at centres which were wayward in the use of the marking criteria. There are, however, hints as to how candidates may gain higher marks in each quality.

Research Studies

These are RESEARCH studies. It is not intended that the content should be taught. Work done 'in class' does not count as research and candidates who approach the task in this way rarely score the highest marks.

Most centres correctly instructed candidates to answer the five questions as the best way to complete a Research Study. An essay type answer does receive credit but it is much harder for candidates to ensure that they answer all the questions fully.

There were a couple of instances of candidates taking the title of the study and then writing their own version of it. This often resulted in poor marks as the questions were not answered.

Quality A: Collecting Information

Two marks can be awarded if sufficient research has been done to allow the questions to be answered, even if no references are given.

For marks of four and above full URLs or the equivalent must be given. It is not sufficient for a teacher to endorse the work saying that the research has been seen, the references must be physically present in the written work.

Higher marks involve the references being linked to the information they have provided. If they are merely linked to questions 5 marks is appropriate. For six, the references must be linked to the information within the answer.

Quality B: Interpreting Information

It should be noted that this quality involves the interpretation of information not merely of data. Answers, in some studies, which involve the drawing of graphs may provide evidence of this skill at a low level but to score higher marks candidates must demonstrate that they understand the science which they use in the study.

Work copied directly from sources can receive credit if it is directly relevant to the question posed. However, to score the highest marks, candidates must have ownership of the information to show that they fully understand it. Their own words are best but at least a comment or analysis of the information copied from the sources must be present.

Quality C: Developing and using Scientific Ideas

The criteria for six marks asks candidates to "demonstrate a clear and detailed understanding of the interaction between scientific ideas and their context".

The context is sometimes a topical issue in science and sometimes an extension of the science in the specification into an area which it does not cover.

Marks can be awarded by considering how well the candidate has linked the science they have researched to the 'context' and how well understood it is.

The same caution should be used about teaching the context. If a candidate does no research it is difficult for them to show their understanding of it.

As above, text copied from a source can only be given limited credit.

Quality D: Quality of Written Communication

This was usually marked accurately. The one exception being centres which gave credit for the written English copied from the internet (or other source). It is the candidate's own English which is relevant. The extensive and correct use of technical and scientific vocabulary is more important than absolute grammatical accuracy.

Data Tasks

It is expected that most centres will actually carry out the Data Tasks. The 'fall back' data are provided for use if a candidate is absent when the practical part of the task is carried out or for use if a candidate's own data is not of sufficient quality to enable the questions to be attempted.

It was worrying to see so many centres not even attempting the practical work. This practice disadvantages candidate in answering the questions linked to qualities B and E in particular.

It is recommended that if a candidate has poor data that they use the 'fall back data' to answer questions 1, 2 and 4 but their own data to answer question 3.

It is important that candidates include their results with their Data Task even if they have used the fall back data. The simple processing (usually averaging) has to be checked as has the accuracy of the plotting in the graph. If the raw data are missing then the maximum mark available for both question 1 and question 2 is three.

Quality A: Interpreting the Data

Graphs were usually well plotted and drawn. Marks lower than four were rare. For the highest marks the graph should be large (at least half an A4 sheet) the axes should be labelled with quantity and unit and be linear.
Plotting should be perfect (or almost) and the points should be joined by a 'best fit' line or curve as appropriate.
An inappropriate line was the most common reason for marks being reduced.

Not all graphs go through the origin.

Quality B: Analysis of the Data

Simple processing and a description of the trend observed were usually accomplished.

References to 'positive correlation' should be discouraged and if there is no statement as to what the correlation is between, the candidates should receive no credit.

A mark for describing the trend can be awarded if it appears in answer to question 4 even if it does not appear in the answer to question 2.

A genuine mark above four was rare.
To gain higher marks additional/further processing must be undertaken. It is not sufficient merely to find a gradient or do some other thing with the data. The processing must reveal something which was not evident before the processing had taken place.

The most common way of achieving this aim was to show that the data was not valid by showing that it did not do what it was supposed to do.

The revealing of an anomalous result would also count. However, it is not sufficient to spot a result which is not on the 'best fit' line. It must be an anomaly which was revealed by the additional processing.

Centres which told candidates what additional processing to do were giving too much help to their candidates. However, it rarely did any good as the candidates did not realise why they were doing it and so received little credit.

Quality C: Evaluation of the Data

Reliability and validity are the key words. Reliability usually has to do with the comparability of repeats but can be addressed through proximity to a 'best fit' line.

It was disturbing to find so many candidates who thought that repeating made data more reliable. It MAY make the average more reliable if the errors are random but not the raw data.

Validity is best addressed by comparing two data sets or be using the data to calculate a known value and comparing the two.

Quality D: Justifying a Conclusion

This was often well answered and was usually accurately marked. In some centres, however, little if any reference was made to the data obtained. Candidates merely regurgitated an explanation which had been taught before the investigation was undertaken. Such answers were rarely worth many marks.

It is essential that the explanation relates to the candidates data and fully explains it.

For the higher marks it is also important that candidates fully understands the science being used.

Quality E: Planning further Work

It is intended that the investigation to be planned will be an extension of the work already done. The same apparatus can usually be used with only the variables and the means of controlling them being different.

A 'detailed' method must include:

- Variables; which are held constant, which varied and which measured.
- Control; how, practically, the variables are to be controlled and varied.
- Range; what range of values are to be used for the controlled variable.

V C R could be a useful mnemonic.

Practical Skills

It was pleasing to see, in some centres, a use of marks other than 6 for practical skills.
It was surprising to see, on a number of occasions, centres awarding 6 marks throughout for practical skills but where all candidates used the 'fall back' data in the Data Task.

Separate Sciences

It was pleasing to note that more of tasks specifically linked to modules 5 and 6 were used this year. Indeed some proved so attractive that they were even (mistakenly) used for Additional Science.
This is, of course, not allowed.
The problems encountered by centres and their candidates were similar to those detailed above though, because of the different spread of abilities in the candidature the marks tended to be higher.

Internal Moderation

Internal moderation by centres is essential and is required by the board. Only in the case of a single teacher marking all of the work is it rendered unnecessary.

The moderator is required to judge whether a centre is marking according to the same standards as others. A moderator cannot change the rank order of the candidates in the centre. This means that, if one group has been marked very leniently and scaling needs to be applied, candidates who have been marked accurately also have their marks reduced. This is not fair to the candidates or the centre.

If such inconsistency is detected in a centre's marking it can result in a request for the whole of a centres work to be remarked.

Other Matters

Where it is necessary to adjust the marks of a centre the work is looked at by at least two moderators.

If the adjustment is large it is looked at by at least three including the Principal Moderator.

Further guidance on assessment of skills can be found in the Additional Science Support Booklet which was sent to all centres and which is also available on Interchange and at www.gcse-science.com .

Next year a series of training courses will take place in different parts of the country, details of these have been sent to centres and is also available on www.ocr.org.uk .

Centres can be part of a cluster. Cluster co-ordinators conduct meetings where centres can exchange ideas and experiences as well as receiving training.

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