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GCSE

Chemistry B J644

Gateway Science Suite

General Certificate of Secondary Education

Report on the Units

June 2010

J644/R/10

Oxford Cambridge and RSA Examinations

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

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

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REPORT ON THE UNITS

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Chief Examiner's Report

The rise in the number of candidates aggregating for GCSE Chemistry has continued this year. This rise in candidates is due to increasing numbers of candidates taking the separate sciences in secondary comprehensive schools since the number of candidates from selective secondary and from the independent sector has remained almost constant.

In terms of the two coursework units a far greater proportion of candidates completed B645 rather than B646.

All the examination components discriminated well with a large range of marks obtained. Centres are to be congratulated because only a very small proportion of candidates were entered for the wrong tier of entry. Almost all of the candidates attempted most of the questions and the proportion of no responses was very small. It is evident that Centres have used the mark schemes and reports to Centres from past sessions to inform candidates.

The steady improvement in the quality of extended answers provided by candidates has continued but Centres still need to emphasise the need for precision and accuracy. In particular candidates must use the terms atoms, ions, molecules, element, mixture and compound in the correct context.

Candidates in both Tiers find the construction of word equations straight forward but Centres need to remind candidates that if formulae are used instead of names then the formula needs to be correct. There has been an improvement in the construction of balanced symbol equations, including electrode reactions, but there are still problems when candidates cannot recall simple formulae. The most common misconceptions have concerned the diatomic molecules, N_2, O_2 and H_2 which were often written as monatomic. Some candidates need to be advised not to include heat or a catalyst in an equation. Other candidates need to take more care when writing subscripts, superscripts, upper and lower case to ensure that formulae are correct.

There has been an improvement in the standard of quantitative answers but Centres should advise candidates to show more of their working out so that it is possible to reward error carried forward where appropriate. Most candidates were able to interpret and evaluate data from tables and graphs.

More specific comments about individual questions are written in the next section.

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B641/01 Foundation Tier

General Comments

The paper produced a wide range of marks. Few candidates scored more than 47 marks or less than 20, suggesting that centres have the correct entry policy. The mean mark was 31.3 marks, approximately 4 marks below the mean for the equivalent paper in June 2009. The paper gave candidates the opportunity to show what they know, understand and can do. The paper was set at an appropriate level of difficulty. Most candidates could access the paper and very few questions were omitted. There was no evidence of lack of time. The paper differentiated well.

Comments on Individual Questions

1 (a) This question was correctly answered by almost all candidates, revealing an ability to interpret simple data.

1 (b) This was very poorly answered. Candidates do not appear to understand how to interpret a food label. The fact that ingredients are listed in order of mass was not appreciated by over 80% of candidates.

1 (c) This question was generally well answered with most candidates understanding that baking powder enables cakes to rise.

1 (d) Again, this question was well answered by three quarters of candidates.

1 (e) Only about a half of candidates could give the test for carbon dioxide. A few mentioned the use of acid-base indicators and failed to score.

2 (a) Only about half of candidates understood that nylon is not breathable or that Gore-Tex is breathable. Many answers referred to nylon not being hard wearing or waterproof.

2 (b) This question was generally well answered.

2 (c) In part (i), polymerisation was stated by less than 20% of candidates. Common incorrect answers mentioned ‘polythene’. Given the degree of prompting, it was surprising that only about half of candidates scored the mark in part (ii). ‘Polystyrene’ was often repeated as the answer. ‘Polyethane’ was written by a small proportion of candidates.

2 (d) This was well answered with a range of answers including packaging, insulation and, most commonly, protection.

3 (a) Most candidates could correctly identify a hydrocarbon.

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3 **(b)** Only about a third of candidates identified methane as an alkane, perhaps because they had written 'methane' in part (a) and did not think that it could be the correct answer a second time. 'Ethene' was a common incorrect response.

3 **(c)** Nearly two thirds of candidates could interpret the displayed formula of ethanol to identify the total number of atoms. A range of incorrect numbers was seen.

4 **(a)** Fewer than half the candidates correctly identified petrol. The most common incorrect response was bitumen.

4 **(b)** This part was better answered, although a number of candidates placed the cross either above liquid A or in the tube being heated.

4 **(c)** Just under a fifth of candidates omitted this question entirely. The question discriminated well across the ability range with the best candidates gaining 3 marks. The majority of candidates who attempted the question gained 1 mark. Frequently candidates referred to petrol without recognising that more petrol is the important factor. The conditions required and the fact that large hydrocarbon molecules are broken down were frequently quoted.

5 **(a)** The vast majority of candidates correctly noted that magnesium takes 10 seconds to collect 100cm^3 hydrogen.

5 **(b)** This was also well answered with the majority of candidates stating that iron takes the longest time to collect 100cm^3 hydrogen.

5 **(c)** In this question and also part (e), candidates confused the time taken for a reaction with the rate of reaction. Answers such as 'quicker time' did not score. The quality of explanations was generally poor. Many candidates stated 'more particles' which was insufficient to score. The idea of more particles in the same volume was required or a reference to more collisions.

5 **(d)** Only a third of candidates scored both marks on this question. Vague answers referred to 'particles moving around more' or 'particles vibrate more' which did not score. The mark scheme required reference to particles moving faster or particles having more energy

5 **(e)** Again the confusion between rate and time was problematic for a number of candidates. References to surface area were rare in the explanation.

6 **(a)** Just over a third of candidates could identify another gas that is found in the air. Many candidates merely gave a gas which was mentioned in the question and failed to score.

6 **(b)** Quite frequently candidates either knew the answer to all three parts of the question or none of them. Process B (photosynthesis) was the best answered in part (ii).

6 **(c)** About a quarter of candidates scored 1 mark on this question. The mark scheme required reference to photochemical smog or acid rain. Many candidates referred to the ozone layer or global warming and failed to score.

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7 **(a/b)** Just over a half of candidates correctly identified the mantle in part (a) and a similar proportion identified 'iron' in part (b).

7 **(c)** This question was well answered with most candidates naming 'volcanoes'.

7 **(d)** In part (i), half of candidates identified 'igneous' as the correct response. The other distracters all featured with broadly equal frequency. In part (ii) a significant number of candidates equated larger crystals with rapid cooling or smaller crystals with slow cooling and failed to score.

7 **(e)** Both parts were generally well answered. Most candidates recognised that glass is made from sand and could name a sensible construction material.

8 Parts (a), (b) and (c) were generally well answered, although a significant number of candidates thought that chlorine is used to sterilise cuts and wounds. Parts (d) and (e) (graded at C and D) scored less well. 'Helium' or 'oxygen' were common incorrect responses in part (d).

9 **(a)** Less than half of candidates scored both marks in part (a). The colour of bromine was frequently quoted as 'blue' or 'green'. The mark scheme accepted any combination of red, brown or orange eg red/brown.

9 **(b)** Only a third of candidates knew that fluorine was the most reactive halogen. Astatine was the most frequent incorrect answer.

9 **(c)** About a quarter of candidates stated a correct use for sodium chloride. The most common incorrect answer was 'bleach' presumably since chlorine was mentioned in the question.

10 **(a/b)** Part (i) was well answered by the vast majority of candidates, but only half of them correctly selected 'negative' as the charge on an electron in part (ii). Even fewer could identify the charge on the nucleus. 'Neutral' was a popular incorrect response.

10 **(c)** This question discriminated well at grade C with only the best candidates stating that oxygen has two occupied electron shells or orbits.

11 **(a)** Three quarters of candidates correctly wrote the word equation, showing a clear grasp of the principles involved.

11 **(b)** The test for hydrogen was not known by a significant proportion of candidates. A number confused it with the test for carbon dioxide or oxygen. Answers which did not involve a lighted splint or its equivalent did not score.

11 **(c)** This question was well answered by a clear majority of candidates. Where full marks were not gained, candidates had usually confused the anode and the cathode.

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12 **(a)** The understanding of thermal decomposition has improved this year with half of the candidates scoring the mark.

12 **(b)** Over half the candidates noted that there were three elements in copper carbonate. Some candidates confused it with the total number of atoms and wrote ‘5’. Candidates should be taught to take special note of words in bold type.

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B641/02 Higher Tier

General Comments

There was a significant increase in the entry for this June paper compared to previous years. Few candidates scored less than 15 marks suggesting that most candidates had been entered for the appropriate tier.

The paper differentiated well and performance across the three sections of the paper appeared to be fairly even. A significant number of candidates scored in excess of 50 marks.

Candidates are increasingly able to balance equations as demonstrated by their answers to question 1c. Candidates were less successful with questions 5d and 12c(i). A number of candidates lost marks in 5d by writing H rather than H_2 for hydrogen gas. Centres need to remind candidates that they will lose marks if they do not use subscripts when indicating the numbers of atoms in a formula.

The calculation on energy change was very well answered by most candidates. Candidates should continue to be reminded that calculators are needed in Chemistry examinations.

The questions on rates of reactions (5a, 5b, and 5c) were well answered with candidates confidently using the term more collisions correctly. Some candidates thought that a more concentrated solution had a smaller surface area. A few candidates thought 'faster collisions' was equivalent to 'more frequent collisions'.

Few candidates could describe what is meant by the lithosphere. Many candidates assumed that iodine is a liquid at room temperature.

It was pleasing to note that over half the candidates were able to draw correct ionic structures for a sodium ion and a chloride ion and assign the correct charges.

Comments on Individual Questions

1 Most candidates were able to score 6 marks for this question. In part (d) a few candidates thought limewater was calcium carbonate so scored no marks.

2 **(a)** There were lots of non-scoring responses in terms of waterproof and durability.

(b) **(i)** Common 'dropped marks' were due to lack of reference to hole size, use of the word 'particles' when referring to not letting water in and 'sweat' being allowed to escape. Candidates struggled with the vocabulary here; droplets, particles and molecules were used almost interchangeably.

(ii) Not too many marks scored. Non-scoring answers often referred to the PTFE adding 'breathability' to the useful properties of nylon. The durability and waterproof properties of nylon were also common non-scoring answers. Lots of answers referred to combining the properties of both materials without being specific.

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3 **(a)** A well answered question with a few incorrect answers of C_2H_4 and a number of subscript errors.

(b) Not well answered. Many candidates simply stated that the alkane had 'no double bond' or had 'single bonds' which was close but not sufficient. The required answer was 'single bonds only'.

(c) Many candidates confused 'goes colourless' with clear and discolours.

(d) Many candidates were able to score at least 2 marks on this question. A few candidates confused cracking with fractional distillation and did not score.

4 **(a)** There were many ways of getting an answer so candidates scored highly. A few candidates failed to qualify their answer with 'same' and hence lost the mark.

(b) The calculation was really well done with the removal of the mass of fuel avoiding any errors.

(c) The most popular, and correct, answer was 'more population'. A number of vague answers like 'more demand' did not score.

5 **(a)** **(i)** Most candidates, correctly, gave a time of less than 55 seconds.

(ii) A significant number of candidates did not address the fact that this was a question about the effect of concentration; comments on energy and surface area were more common than would be expected

(b) This was better answered than (a)(ii) with lots of candidates scoring 2 marks for 'more successful collisions'.

(c) Answers given in terms of time rather than rate cost a significant number of candidates the first mark. Many explanations were given as the reverse argument, in terms of 'powder having a larger surface area'.

(d) Again a high scoring A/A* question. Those that failed to get any marks generally did not show hydrogen as a diatomic molecule.

6 **(a)** The percentage of nitrogen in air was not well known.

(b) There were many vague answers about polluting or dangerous gases and the use of the catalytic converter. Part (ii) was not well understood.

7 **(a)** This question produced many vague answers such as 'can't see it', 'hot' or discussions about seismic waves.

(b) The lithosphere was not well known with many answers about the atmosphere or the part between the mantle and the crust; occasionally candidates wrote about lithium.

Parts (c), (d) and (e) were better answered although a surprising number thought that fast cooling produces large crystals and limestone is use to make glass.

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8 **(a)** The word equation was answered well in 8a with only a few candidates giving iron(III) or 'steel' as a reactant or missing 'hydrated'.

(b) The first mark was lost by many candidates who put 'it is lighter' or 'lightweight'. The second mark was given far more often although there were still some who wrote about the car going faster or being more efficient. Despite asking for another advantage some discussed corrosion and others malleability and accident protection.

9 This question was quite well answered, though a few put helium for (a) and oxygen for (b). Part (c) was answered well.

10 **(a)** The colour of bromine was generally given correctly however iodine was commonly stated to be a liquid.

(b) The temperatures given revealed some lack of understanding of the relationship between melting and boiling points.

(c) The percentage of correct responses was higher than in previous years. Many fewer incorrect covalent structures were given.

11 All parts were well answered with many candidates demonstrating a good understanding of atomic structure and the periodic table.

12 Parts (a) and (b) were well done. In part (a) a number of candidates made the question more difficult by writing balanced symbol equations rather than the expected word equation.

(c) **(i) (ii)** These A/A* questions discriminated well. The common errors in part (i) included missed charges, incorrect charges, unnecessary charges and balancing errors - most commonly a single H^+ ion on the left hand side. Many incorrect answers to part (ii) were given in terms of oxygen.

13 **(a)** Milky limewater was often given to earn the first mark but the second mark was rarely scored, despite there being three acceptable answers for it. Many thought the copper carbonate would turn blue or wrote about 'black soot' being formed.

(b) 'Thermal decomposition' often given as an incorrect answer, perhaps because of the reaction in part (a).

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B642/01 Foundation Tier

General Comments

The paper differentiated well. There were few no responses with most questions being attempted to the best of the candidates' ability. The marks achieved suggest that Centres entered their candidates for the appropriate paper.

The responses to a couple of questions were disappointing suggesting that Centres had not given their candidates the opportunity to do the appropriate practical work.

Question 3(a) asked candidates to describe how chemicals such as digitalis can be extracted from a plant. Very few candidates described chromatography, distillation, use of a solvent or even making a solution. A mark was most commonly obtained by describing the crushing of the plant.

Very few candidates knew that litmus paper turned red in acid solutions. Even fewer candidates knew what a gas syringe was, suggesting that they had not seen one in use collecting a gas.

The answers to question 8(a) suggest that few candidates at this level have attempted a titration.

More candidates were able to write molecular formulae correctly than in previous years. The percentage yield calculation was answered correctly by about half the candidates.

Centres need to continue to remind their candidates that the addition of a catalyst or heat after a + in a word equation is wrong. These words may, if appropriate, be placed above the arrow.

Comments on Individual Questions

1 (a) A good starter question, though some candidates wrote chloride and sulphate as wrong answers.

1 (a) (ii) Halide was not well known; the most common erroneous answer was sulphate.

1 (b) Few candidates knew that barium chloride is used to test for sulphate ions.

1 (c) (i) Most candidates knew that the water was alkaline.

1 (c) (ii) Most gained the mark for universal indicator but many found explaining how it worked difficult. There were many references to acid and alkali rather than pH.

2 (a) This part of the question was well answered with many candidates gaining 2 marks. Some comments on shrinkage and damage to clothes were not credited in the mark scheme.

2 (b) (i) The mark here was rarely awarded. Common answers concerned restoring or maintaining the brightness of colours

2 (b) (ii) Many candidates knew that bleach is used to remove stains.

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3 (a) The mark for crushing the plant was often scored but the marks for dissolving in solvent and chromatography were rarely awarded. Candidates produced a number of very good answers, but significant minority obviously had not done this practical. A typical response worth one mark was 'crush the plant and extract the liquid with a syringe'.

3 (b) (i) This part of the question differentiated well with better candidates either writing about production on demand or about a batch process not being continuous.

3 (b) (ii) This was very well answered with most candidates able to score at least one mark, usually for writing about the cost of testing.

4 (a) Significant numbers of candidates confused fertilisers and pesticides but this question was otherwise well answered.

4 (b) About half the candidates were able to identify nitrogen and hydrogen as the gases needed to make ammonia.

4 (c) This grade C percentage yield calculation was correctly carried out by about half the candidates. There were very few arithmetic errors.

4 (d) Many candidates gave the correct answer '2'; a significant number answered '7'.

5 (a) (i) This was very well answered with most candidates able to identify the number of elements in the weak acid.

5 (a) (ii) Over half the candidates were able to correctly write the molecular formula of the weak acid as $C_2H_2O_4$. A few candidates lost marks for incorrect use of subscripts.

5 (b) (i) Fewer candidates than expected knew that litmus paper is red in acids.

5 (b) (ii) This grade C question was answered poorly with few candidates choosing H^+ as the ion released by the weak acid. Common incorrect answers were H_2^+ and HCO_3^-.

5 (c) It was disappointing that only about half the candidates were able to identify the (gas) syringe.

5 (d) Both part (i) and part (ii) were well answered.

5 (d) (iii) A number of candidates could not explain why the reaction had stopped. These candidates incorrectly stated that the magnesium had dissolved or had stopped reacting without further clarification.

6 (a) A very well answered question with candidates able to calculate the amount of oxygen as 0.32. Some candidates lost the mark by writing 32.

6 (b) A more difficult question than part (a) with some candidates calculating the mass of copper as 5.12. Many answered 5.44 incorrectly.

6 (c) Excellent to see many candidates able to calculate molecular masses correctly. The correct answer was 44.

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7 (a) (i) It was disappointing that less than half the candidates were able to identify H_2O as a molecule.

7 (a) (ii) More than half the candidates were able to select H^+ as an ion attracted to the negative electrode.

7 (b) A large majority of candidates scored 2 or 0 and only a very few scored 1.

8 (a) Some candidates obviously had very little experience of titrations. Poor answers often showed confusion about which solution is titrated, and into what. Permutations included titrating the acid and the alkali in the burette into a flask of phenolphthalein and mixing the acid and alkali in the flask before adding the indicator from the burette. Candidates demonstrated little awareness of the importance of measuring the volume of the reactants, other than taking readings from the burette.

8 (b) The most common incorrect alternative to water was 'add alkali'.

8 (c) Most candidates gave the correct strong acid.

9 (a) (i) The majority of candidates answered correctly but some substituted chlorides and fluorides for chlorine and fluorine.

9 (a) (ii) About half of the candidates were able to count the number of atoms in the molecule correctly.

9 (b) (i) Most candidates found the correct answer from the pie-chart.

9 (b) (ii) This part of the question was poorly answered. Many answers suggested ways of replacing aerosols completely, rather than replacement gases to use in aerosols.

9 (c) A wide range of responses were generated by this question, many of which were correct and some of which were not medical. Cancer alone was a common answer but was insufficient for a mark. Skin cancer was an acceptable answer.

10 (a) Several candidates suggested 'catalyst' as a water softener.

10 (b) This question differentiated well. Most candidates scored at least one mark but few achieved all three. A common mistake was to refer to scum not lather or soap bubbles.

11 (a) (i) The majority of answers were correct but a significant number of candidates included +heat or +catalyst or drew several arrows.

11 (a) (ii) Few candidates knew that hydration was the process used to make ethanol from ethene.

11 (a) (iii) The most common error was to substitute 'high pressure' for 'catalyst'.

11 (b) This part was not well answered and it appears most candidates guessed.

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12 **(a)** Most candidates scored a mark for paint but fewer were able to describe a second method for preventing iron rusting.

12 **(b)** Many candidates were able to put the metals in the correct order of reactivity.

13 **(a)** Few candidates gained a mark for chlorine with the most common error being 'oxygen'.

13 **(b)** **(i)** Candidates seemed reluctant to state that water is not a pollutant, or that only water is given off. Vague answers about the lack of pollution did not score.

13 **(b)** **(ii)** Few candidates knew that a fuel cell produces electrical energy. Most thought that heat and kinetic energy are produced.

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B642/02 Higher Tier

General Comments

The steady increase in the number of candidates for this component continued. The average mark for this examination paper was 36, and the marks obtained covered the whole mark range. As in the June 2009 session, a small but significant number of candidates obtained marks which suggested they would have been better suited to the Foundation Tier examination paper rather than the Higher Tier.

All three sections of the examination papers differentiated well and allowed candidates to demonstrate their knowledge and understanding of GCSE Chemistry. Candidates performed equally well in all three sections.

Comments on Individual Questions

Question 1

This question focussed on the ions found in sea-water.

Only a small proportion of the candidates could write the formula for potassium sulfate in (a). Common errors included KSO4 and KSO4-. A much larger proportion of candidates recognised precipitation in (b), with the most common incorrect answer being neutralisation. Most of the candidates could complete the word equation in (c).

In (d), although many candidates referred to the use of universal indicator a much smaller number of candidates described how the colour obtained is linked to the pH. Only a small proportion of candidates used litmus rather than universal indicator.

Question 2

This question on washing clothes was the least demanding question in section A.

In (a) many candidates could give two advantages. The most common answers referred to the use of less energy, less damage to clothes or that the enzyme will not be denatured. Vague answers such as ‘it is more environmental friendly’ were not given credit unless they were fully qualified.

In (b) most candidates could define the terms hydrophilic and hydrophobic. Candidates found hydrophobic much more difficult to define since the mark scheme did not allow reference to fats or oils or that it repels water.

Question 3

This question focussed on the manufacture and extraction of pharmaceutical chemicals. This was the most demanding question in Section A.

In (a) many candidates did not give an organised answer and a number of candidates did not attempt it. Candidates were most likely to be awarded marks for reference to crushing the plant, making up a solution or using chromatography. Only a small proportion of candidates referred to the use of a mortar and pestle or distillation.

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Many candidates just repeated information in the stem of (b) and focused on testing of the chemicals. Candidates were most likely to be awarded marks for referring to the use of a specialist labour force or a rare raw material.

Question 4

This question focused on the Haber process and the manufacture of ammonium nitrate.

In (a) only a small proportion of candidates could write the balanced equation. A common error was to write hydrogen as H and nitrogen as N. Another common error was to write the equation as $N_2 + 2H_3 \rightarrow 2NH_3$. A small but significant proportion of the candidates wrote the equation to make ammonium nitrate.

Many candidates were able to explain why a high pressure is used in the Haber process in (b)(i) but fewer could explain the compromise temperature in (ii). Candidates often focused on rate in (ii) rather than on both percentage yield and rate.

A very high proportion of the candidates were able to calculate the percentage yield in (c). [correct answer = 75%]

In (d) most candidates could calculate the relative formula mass but a significant proportion of the candidates did not know how to calculate the percentage by mass. An error carried forward was allowed for candidates who calculated an incorrect relative formula mass. [correct answer = 35%]

Question 5

This question focussed on the reactions of a weak acid. This was the least demanding question in section B.

Many candidates were able to deduce the molecular formula in (a), although a small proportion of candidates gave the empirical formula instead.

In (b) many candidates recognised the H^+, the most common errors being CO_3^{2-} or HCO_3^-.

Most candidates could interpret the graph in (c)(i) and (ii) but the candidates found it more difficult to explain why the reaction stopped in (iii). Candidates had to explain it was the limiting reagent or the acid that had run out to be awarded the mark in (iii). [correct answer for (i) = 56 cm^3 and for (ii) = 37 sec]

In (d) only the most able candidates could calculate the volume of hydrogen. Incorrect answers included 1.44 and 400. [correct answer = 0.0025 mole].

Question 6

This question involved calculations related to the reduction of copper oxide by methane.

In (a)(i) many candidates could calculate the amount of copper but fewer candidates could calculate the amount of oxygen in (ii) because they did not calculate the mass of oxygen in the copper oxide sample. Only the most able candidates could deduce the empirical formula in (iii) but an error carried forward was allowed from incorrect answers to (i) and (ii). A common misconception was to quote an empirical formula that did not involve integers. [correct answer for (i) = 0.04, for (ii) = 0.02 and for (iii) = Cu_2O]

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In (b) the majority of candidates appreciated that you should get double the amount of copper, although only a small proportion of candidates actually showed any working out. [correct answer = 5.12g].

Question 7

This question focused on the electrolysis of aqueous copper(II) sulfate and molten potassium chloride.

Many candidates were able to recall the correct changes in mass in (a).

Good answers to (b) referred to the lack of movement of ions in solid copper(II) sulfate. The most common error was to refer to electrons rather than ions.

In (c) many candidates could write the correct equation but a common error was to write K2 for potassium rather than K.

Question 8

This was the most demanding question in section B and some candidates did not attempt all parts of the question.

In (a), although some candidates appreciated that at equilibrium the rate of the forward reaction equals the rate of the backward reaction few candidates were able to explain that at the start the rate of the forward reaction decreases and the rate of the backward reaction increases. Only an extremely small number of candidates referred to a closed system.

Some candidates in (b) did not make a comparison between the concentrations of sulfur dioxide and sulfur trioxide and so were not awarded a mark. A small proportion of candidates muddled the left and right hand side of the reaction. A common misconception was that the concentrations were equal.

In (c) it was well known that a catalyst has no effect on the position of equilibrium. Many candidates also mentioned that equilibrium would have been reached in a shorter time but there was no mark for this comment.

Although some candidates could write the balanced equation in (d) other candidates gave the incorrect formula for sulfuric acid despite it being given in the stem.

Question 9

This question was about ethanol.

Many candidates could construct the word equation in (a)(i) although a small proportion of candidates included the catalyst or heat in the equation. A significantly smaller proportion of the candidates were unable to give the correct conditions for the reverse reaction in (ii).

The importance of fermentation in (b) was not well known by all candidates. Evaporation, filtering and pasteurisation were all common incorrect answers.

Most candidates could use the general formula for alcohols to write the formula for butanol in (c).

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Question 10

This question was about rusting and rust prevention.

In (a) most candidates got a mark for referring to the zinc coating acting as a barrier to oxygen and water. Many candidates also realised that zinc acts as a sacrificial metal. Any mention of zinc rusting negated the mark for sacrificial protection.

Candidates had to use OIL RIG and refer specifically to each equation to be awarded a mark. Many candidates just mentioned that one equation involved electron loss and the other electron gain but this was not sufficient for the mark.

Question 11

This question on hardness in water was the most demanding question in section C.

In part (a) candidates tended to use one of two experimental approaches, both of which could score full marks. In the first approach a fixed amount of soap solution is used and the hardest water sample gives the least lather. In the second approach soap solution is added until a lather is made and the hardest water sample needs the most soap solution. A common misconception relating to the first approach was that you measure how long the lather lasts or how much scum is produced.

Many answers were not sufficiently precise to be awarded full marks in (b). Candidates had to state that calcium ions react with carbonate ions; it was not sufficient to state that calcium reacts with sodium carbonate. A correct ionic equation scored two marks because it also gave the name of the product formed in the reaction. Some answers described an ion exchange and were not given credit.

Question 12

This question was about the energy changes that take place during the reaction between hydrogen and oxygen.

In (a) many candidates scored at least one mark for the balanced equation.

In (b)(i) candidates had to clearly indicate that the energy of the products was less than that of the reactants. Many candidates were not very clear and just referred to the difference in energy. The term exothermic was well known in (ii) but a small proportion of candidates quoted examples of exothermic reactions such as combustion or redox.

Question 13

This question about unsaturated compounds was the least demanding question in Section C.

Many candidates could recognise C as the unsaturated compound in (a) and correctly answered bromine water in (b).

Many candidates could name hydrogen in (c)(i) and state a condition in (ii).

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Chemistry B645

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 10271 candidates, from 274 centres, entered candidates for Chemistry (B645)

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 (e.g. Chemistry) all the Can Do tasks must be from the separate science (e.g. Chemistry) 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.

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

Module	Title
C1	Should we stop giving crisps and chips to young children?
C1	Are supermarkets green enough?
C1	Are we making the best use of crude oil?
C2	Are congestion zones a good idea?
C2	Should we recycle the copper from mobile phones?
C5	Should we ban salt from all processed food?
C6	Is aspirin still a wonder drug or is it over-rated?
C6	Should we use more bio fuels?

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

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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

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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.

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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.

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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

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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.

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Chemistry B646

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:

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- 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

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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.

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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.

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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.

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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 has 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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