

GCSE

Additional Applied Science

Gateway Science Suite

General Certificate of Secondary Education **J251**

OCR Report to Centres June 2014

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

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

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

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A191/01 Science in Society (Foundation Tier)

General Comments:

Most candidates were well prepared for this paper and made a very good attempt at answering all of the questions.

The trend for candidates to write outside the allocated area continues. Too often candidates write in any white space that they can find. This is nearly always caused as a result of the candidate failing to think the answer through before commencing to write. It is common to see most of the lines allocated filled with a repeat of the question, before the candidate even begins to answer it. This is a very dangerous practice. It cannot be stressed too strongly that candidates should attempt to contain their answer in the space provided.

The paper included three, six mark questions. Centres that scrutinise the mark scheme for this paper will notice that the marking of these questions is more structured and the mark scheme allows credit for what the candidates know and can do. The majority of candidates made an excellent attempt at answering these questions and were well prepared as to how to structure their responses.

The paper was suitably challenging and discriminated well between candidates. Very few sections were unanswered suggesting that the paper was accessible to most candidates. There was no evidence that any of the candidates ran out of time.

Comments on Individual Questions:

Question No. 1

- (a) Most candidates managed to score at least one of these two marks. Usually the first line was drawn correctly. However many candidates failed to score the second marking point. A few candidates failed to realise that the two points were linked and selected a different box from which to start their second line.
- (b) Most candidates managed to correctly identify lungs as the required response to this question.
- (c) Most candidates managed to score one of these two marks. It was however rarer for both marks to be awarded. Common errors included carbon dioxide and lactic acid.

Question No. 2

This was the first of the six mark level of response questions. The question was targeted at grades up to grade E.

Examiners were looking for three areas in which to award marks. Good answers included how the samples were collected, why the samples were collected and what then happened to the samples. Candidates were allowed to give a wide range of examples in their answer. However some candidates failed to realise what was being asked of them and gave answers that referred to peer review or how an experiment should be carried out. These answers were not credited.

Question No. 3

- (a) Most candidates scored one or two marks, but only the most able went on to score all three. Good answers referred to triaging or describing how the nurse would sort the three patients in order of the seriousness of their injuries. They then went on to place them in their correct order of patient A, then C and then B.
- (b) (i) Many candidates scored one or two marks for this question. Answers referred to their medical history and the fact that this would be difficult to obtain due to the fact that the patient was unconscious. Few candidates went on to state that the patient's lifestyle was also of relevance to the doctor.
- (ii) Many candidates confused this question with the previous question and did not realise that the answer required information as to why the doctor would need to talk to the patient's relatives. Answers that referred to the previous question were not credited. Good answers included informing the patients of the risks involved, the state of the patient, and to get consent to carry out surgery.

Question No. 4

- (a) Candidates who realised that this was about getting accurate data scored well on this question. Those candidates, who thought it was all about dieting, did not. Good answers referred to calibration and keeping variables constant. These included not wearing much clothing, wearing the same clothing or measure at the same time each week.
- (b) (i) Few candidates answered this question well. Credit was given to candidates wherever possible and those candidates who realised that determining that 5kg mass had been lost were awarded one mark. Credit was also given for dividing 5 by 120 x 100, even if the final calculation was in error. Candidates who rounded up or down correctly were also credited with full marks.
- (ii) This question was answered well with most candidates scoring both marks. The most common errors were to use incorrect units, such as pounds or stones. This resulted in one of the two marks not being awarded. Those candidates who did not supply units were credited in full.
- (iii) The most common correct answer given for this question was exercise. Candidates, who simply stated going to the gym, were not credited unless exercise was also stated or a specific example of exercise was given.

Question No. 5

- (a) Most candidates were awarded this mark for correctly stating that Jason had normal blood pressure. Some candidates went on to state that it was close to high blood pressure but the mark scheme and paper did not allow for this additional information to be credited.
- (b) Candidates were credited for correctly drawing the bar within the correct range provided it was less than half way between the top and bottom of the range. A significant number of candidates failed to realise that each division on the vertical axis had a value of four, and drew the bars towards the top of the range. Clearly this is a skill that needs to be practiced.

- (c) This question was answered well by most candidates. Good answers referred to the fact that Jason was almost in the high blood pressure range and that his blood pressure had been increasing year on year. The most common error was that some candidates failed to distinguish between systolic and diastolic readings and thought that his blood pressure had been rising and falling over the years.

Question No. 6

This was the second of the six marks, level of response question and assessed candidates up to grade C.

Examiners were looking to credit what assessment the physiotherapist carried out, what treatment was performed, and finally evidence of good practice. Although the first two areas of assessment and treatment were well covered by most candidates, evidence of good practice was only given in answers from the most able candidates. Another common error was to confuse the role of the physiotherapist with the role of the surgeon. Candidates, who attempted to explain how the surgeon carried out the operation, were not credited.

Question No. 7

- (a) Only the most able candidates were able to identify electrophoresis as the correct answer. The most common incorrect answer given was chromatography.
- (b) Most candidates were able to evaluate the scientist's conclusion stating that he was wrong and that D was the correct answer. However, very few went on to explain why the scientist was wrong. Any reasoned description of why suspect A did not match the sample was credited for this second mark.
- (c) Most candidates performed well on this question and scored two marks for three correct responses.

Question No. 8

This was the third six mark level of response question. It was targeted up to Grade C and was overlap with the foundation tier paper.

Any candidate who could write something sensible about chromatography managed to score at least one mark on this question. Those candidates who wrote only about pH testing or using litmus or universal indicator paper, did not score.

Any credible account that would work was awarded level 2. The most common error was to perform the experiment with the dye spots below the level of the liquid being used as the solvent. This resulted in a maximum of three marks being awarded. Good answers referred to how the dyes would be compared to determine whether the banned dye was present or not. Equal credit was given to either diagrams or a written account unless one was contradictory to the other.

A191/02 Science in Society (Higher Tier)

General Comments:

The paper produced a good spread of marks although few achieved the highest mark. There was no evidence that candidates struggled to complete it on time and most candidates attempted all the questions.

Candidates have become more confident in tackling the six-mark extended-writing questions and more are trying to structure their answers. There are still many that do not address the question, just writing anything they know that might be relevant in order to fill the space. This means that they do not tackle all the aspects required in the question and so limit the level they can achieve. In order to access the higher marks they need to include more details and scientific points in their responses, ensuring that they have included something about all the parts asked for.

The interpretation of graphs and charts was also often done well although sometimes it was done in less detail than was expected.

Many candidates are still hampered by lack of knowledge of practical techniques and so are unable to apply this to experimental methods asked for. It is difficult to give any credit when the wrong experiment is described, however good the detail.

Most candidates had only a sketchy understanding of the range of scientific terms required for this specification.

Comments on Individual Questions:

Question No. 1

In 1(a), many candidates successfully linked both the drawing of a component of blood with its name and the name of the component with its function. The naming of components was the less well known than the functions with both the incorrect names for each component appearing with similar regularity to the correct ones.

In 1(b), there were some good descriptions of how the body prevents its temperature from rising too much. Most chose to describe how sweating allows the body to lose heat rather than the effect how the blood system works. Some candidates did explain how vasodilation causes heat lost. Many thought that this was due to the capillaries moving towards the surface of the skin rather than opening to allow more blood to flow through them.

Question No. 2

There were some good descriptions of the process that a fitness trainer goes through with a client. Most candidates described the initial assessments in good detail and many gave sensible reasons why these assessments are necessary in terms of prevention of injury, the production of an appropriate fitness programme and the identification of goals. Some did not explain the reasons for the testing and others did not go on to outline the rest of the process such as the production of a suitable programme and the need to monitor and follow up as the programme unfolds. There were few references to examples of good practice.

Question No. 3

Most candidates could use the table of observations given in **3(a)(i)** to correctly calculate the baby's APGAR score and to show that the score for 'grimace' had originally been made incorrectly. Some thought that 'activity' had also been scored incorrectly and so produced an APGAR score of 7.

In **3(b)(ii)**, almost all candidates could use the table to choose the condition appropriate to the APGAR score they had calculated. Some of those who had calculated a score of 7 incorrectly chose the condition relevant to scores greater than 7.

Some candidates correctly used the graph given in **3(b)** to show that the baby's condition was improving, with the best answers commenting on the baby's condition in terms of weight at both 2 and 22 weeks, including comments on the appropriate percentile or comparison with the weight of an average baby. Many candidates just referred to 'good progress' or commented that the baby's weight was increasing.

Question No. 4

Most candidates recalled some advantages and disadvantages of both light and electron microscopes and there were a few excellent answers that used scientific terms such as resolution, magnification and depth of field. Some did not attempt to explain the advantages and disadvantages as asked and others used simpler terms such as zoom. A few did not refer to the microscopes at all but just described the two photographs.

Question No. 5

Many candidates correctly chose the comment appropriate to accuracy in **5(a)(i)**. Significant numbers chose comments applicable to precision or repeatability instead.

Responses to **5(a)(ii)** showed that reproducibility was the best understood of the terms used in **5(a)**. Most incorrect answers were those which chose the comment applicable to repeatability.

In **5(a)(iii)**, responses showed that precision was the least well understood of these terms. It was most commonly confused with the comment applicable to accuracy.

Many showed they understood the term repeatability for **5(a)(iv)**. Many others chose the comment applicable to precision.

In **5(b)**, a few candidates gave good responses showing an awareness that errors would occur in the measurement of both sides and that the error would increase when the values were multiplied together. Some answers concentrated on why the measurements might be wrong and others thought there might be a fault in the method of calculating the area.

In **5(c)**, a few candidates realised that any error in the measurement of the string would produce a systematic error and that random errors would occur when taking the measurements. Candidates often found this difficult to explain and a few gave definitions of the terms without relating them to the method described in the question. Many thought that the main error was in not supplying enough tape measures and others guessed from common meanings of the words eg systematic errors being due to a fault in a computer or calculator.

Question No. 6

Almost all candidates used the graph correctly to choose the appropriate description of the given blood pressure in **6(a)** and most drew in the correct bars in the bar chart of blood pressure readings for **6(b)**. The most common error was to misinterpret the scale and to draw the bars too high.

In **6(c)**, most used the chart in part a to explain that his blood pressure was close to being high or the bar chart in part b to describe the rise in blood pressure over the years, with many doing both. Some only looked at one of the charts and others described the blood pressure as going up and down showing a lack of understanding that blood pressure readings are taken in pairs.

Question No. 7

There were some excellent descriptions of paper chromatography with some going on to explain how it is used to identify the presence of a banned food dye. Some responses did not make it clear that the solvent must start below the level of the dyes and others confused their descriptions with references to ink. Many candidates confused the method with using indicator papers and just dipped the paper into the fruit juice, some expecting the colours in the fruit juice to then separate on the way up and others expecting the paper to change colour like an indicator.

Question No. 8

In **8(a)**, some candidates understood that colourimetry works by absorption of light and there were some good partial descriptions of the procedure, including use of water to zero the colorimeter or the use of known concentrations to produce a calibration graph. Most candidates had little recollection of a colourimetry experiment. Responses seen frequently included dipping the colourimeter into the fruit juice, the use of pH scales, colour matching by eye and descriptions of chromatography. Others thought that you put the sample in and then read off the concentration.

Many candidates showed, in **8(b)**, that they understood that colourimetry is a quantitative technique. The most common errors were the choice of qualitative or semi-qualitative.

Question No. 9

Almost all candidates identified correctly that the drawing did not include the nucleus or the chloroplasts in their response to **9(a)**.

In **9(b)**, a few candidates realised that the drawing was the same size as the photograph and so the scale used must be X 1 or 1:1. Some compared the drawing or photograph with the size of the original leaf and others thought that the lack of detail made the drawing a different scale to the photograph. A few thought they were giving a grade for the quality of the drawing.

A192/01 Science of Materials and Production (Foundation Tier)

General Comments:

It was good to see that many candidates were not afraid to tackle all of the questions, providing full answers to the three six mark extended response questions.

The weakest area of science for most candidates was Chemistry. The responses to the first extended answer question suggests that many candidates have had little direct experience of exploring the factors involved in determining the rate of a reaction.

Many candidates lost marks through incomplete answers. When asked to suggest actions, they would often write at length describing a single action, ignoring the mark allocation of [2] which suggests that at least two actions (or one with an explanation) are required.

The use of data question was poorly answered by most candidates, suggesting a serious lack of practice in the use of data from tables and graphs to come to a conclusion.

Comments on Individual Questions:

- 1 This question was about controlling sound in a shopping mall. Although few candidates could suggest a realistic strategy for reducing the sound level from the shoppers (most wanted to install double glazing to keep out sound from outside), a pleasing number were able to use the word absorb to explain their strategy. Most candidates appeared to be guessing the change of loudness caused by a fall of 10 dB, but fared somewhat better in their linking of a sound level to its description. The majority of candidates were able to complete the block diagram for a PA system correctly.
- 2 This question was about the preparation of iron tablets. Although about half of the candidates were able to write out the reactants for the word equation, very few knew that hydrogen was going to be a product. Surprisingly, few candidates elected to filter out the unreacted iron, and only a minority of those explained that the iron was left on the filter paper but the iron sulphate solution passed through it. The first part of the calculation was easy for about half of the candidates, but only a few managed to complete the second part correctly.
- 3 This was the second chemistry question of the paper. It was expected that most candidates would be able to suggest at least one practical strategy, but the majority were unable to do even that, suggesting that they had never done practical work comparing rates of reaction. Most candidates suggested adding more of the reactants, using a larger container or doing a different reaction altogether. Even the brightest candidates who suggested at least a couple of strategies which would work often locked themselves out of full marks by suggesting others that wouldn't.
- 4 It was good to find that the majority of candidates were able to use the formula provided to show that the plank was not stiff enough; too many candidates lost a mark by explicitly comparing their calculated stiffness (4 N/mm) with the target stiffness (5 N/mm). Similarly, although most candidates identified that a thicker plank would be stiffer, only half appreciated that a different material could do this as well. The majority of candidates knew that the presence of the kitemark meant that the samples had been tested, but too many candidates omitted to suggest what the tests were for.

- 5 This was the second extended writing question of the paper. It was good to find that most candidates were able to describe advantages and disadvantages of sunlight as the light source for a video, with a substantial minority able to do this for artificial lighting as well. However, it was disquieting to find so many candidates suggesting UV light sources or lasers, neither of which are very appropriate for practical use in making a video.
- 6 This question was about a bioreactor for making food. Most candidates were able to take readings off the temperature-time graph correctly. It was good to find that many candidates could correctly complete the word equation for aerobic fermentation; many weak candidates associated alcohol with fermentation, usually losing one mark. About half of the candidates realised that the bioreactor was cleaned out regularly to stop the food getting contaminated, only a few added that this would be by bacteria or other fungi.
- 7 This question was about growing wheat. Whole grain wheat was a popular incorrect answer for a type of wheat which could be sown, as was summer wheat. Winter wheat was only suggested by a minority of candidates. Many candidates came up with one useful suggestion for preparing the land for sowing, but only a minority followed it up with a second or provided an explanation for the first. The final part of the question about using data to form a conclusion also appeared on the Higher Tier paper, so it was expected to be hard for the majority of candidates on the Lower Tier paper. Most candidates earned no marks at all, many offering a conclusion without any evidence of calculations at all.
- 8 This last question was about how to care for calves so that they gain weight. It also appeared on the Higher Tier paper. Most candidates were able to suggest some useful strategies, but often failed to provide adequate explanations. Too many weak candidates thought that this question was about selective breeding and discussed the process of selecting suitable parents for the calves.

A192/02 Science of Materials and Production (Higher Tier)

General Comments:

A full range of ability was seen in this paper and there were a significant number of candidates for whom Foundation tier of entry would have been more accessible.

An important message that Centres must pass back to their students is to emphasise the importance of clear handwriting and to follow the guidance about writing within the framework of the paper (or using additional sheets).

At this level, in a Higher tier paper, candidates need to be able to write using scientific terminology and to be precise in their answers. There were a number of instances where candidates wrote everything they knew about the topic covered in the question but failed to gain marks as they had not answered the question set. It is vital that the candidate reads each question carefully and looks at the mark allocation, before attempting an answer. It is not good practice to repeat the question as the introduction to an answer.

Comments on Individual Questions:

Question No

Question One

Q1a: Candidates generally understood and were able to write about the effect of cold temperature and less light availability on the yield of a crop.

Q1b: Few candidates understood the role of ploughing a field and ignored this part of the question. Most were, therefore, restricted to 1 mark. A common misconception seen was that of fertilisers acting as pesticides.

Q1c: Few candidates gained full marks on this question. A common error was the inability to read the axes on the graph carefully. Many misinterpreted/misunderstood the % germination data.

Question Two

A full range of responses were seen in candidates' answers to this overlap question. Good candidates were able to link a number of relevant activities with suitable explanations and so gain high marks. Weaker candidates gave very general answers i.e. look after and feed cows so they grow big with no scientific links. A significant number introduced selective breeding into their answers but gained no marks as this was not part of the question.

Centres should practice 6 mark Level of Response questions by encouraging candidates to make links in their answers rather than a series of unrelated statements i.e. this happens because or this is done because

Question Three

Q3a: Many candidates gained the first of the 2 marks available by correctly writing the formulae for iron and sulphuric acid. However the majority then went on to identify (incorrectly) water as the second product.

Q3b: Responses to this question indicated that many students had not done this particular type of practical, which is disappointing as this course has a large practical element. Candidates scoring any marks did so by correctly identifying the need to evaporate water to achieve iron sulphate crystals.

Q3c: A pleasing number of candidates were able to correctly carry out the calculation required here. Again, careful reading of the question is vital here.

Question Four

Q4: This question was a good discriminator and is asking why Ken needs to use artificial light sources so information beyond daylight not being sufficient is required. Many candidates were able to achieve a level 1 or level 2 response but few were able to clearly explain several benefits of artificial light sources compared to natural light.

Question Five

Q5a: A common error here was to confuse low frequency and high pitch. Many made links to hearing being damaged or it being uncomfortable for shoppers due to pain being caused.

Q5b: Very few candidates could correctly answer how much loudness is reduced by acoustic tiles.

Q5c: A straightforward recall question but few gained the mark.

Q5d: The question was well answered by candidates who understood the relationship between the microphone, amplifier and speakers. Some candidates unfortunately incorrectly linked howling to customers' children in the shopping centre or wind blowing through gaps in the centre's walls.

Question Six

Q6a: This was well answered.

Q6b: Increase the thickness of the wood was the most common correct answer seen. Few candidates scored a second mark.

Q6c: A well answered question with many candidates understanding the role of the standards laboratory.

Question Seven

Q7a: The main error here was a failure to read the question carefully. The candidate is asked to explain the actions of the computer not describe the pattern of data in the graph. Consequently very few gained any marks.

Q7b. Few candidates linked the term aerobic to the need for oxygen to appear on the left hand side of the equation.

A number of candidates understood that aerobic fermentation is aerobic respiration and were able to complete the equation correctly.

Q7c: Candidates who understood the term 'genetically modified' were able to correctly respond with the addition of a new gene/DNA allowing a new protein to be made.

Question Eight

Q8: This was a generally well answered level of response question with many candidates able to achieve level 2 by describing two of the categories from research, testing and development with reference to cost. Candidates showing depth and clarity of discussion of the cost issues of all three gained the full six marks available for a level 3 answer.

A193 OCR Repository

General comments:

This is the second assessment session for the work-related portfolio for the specification A193. The work related portfolio consists of three elements worth a total of 120 marks. The guidance for the tasks are provided by OCR and taken under the stated controlled assessment conditions. The elements are assessed using the set marking criteria for this specification. The work-related portfolio consists of three sections:

- Standard procedures x 4 marks out of 24
- Suitability test x1 marks out of 48
- Work-related report marks out of 48

Overall assessment this session was much improved from last year and generally centres were assessing each strand within the accepted tolerances. The standard procedures were possibly still over marked by some centres, with some giving 5-6 marks for work which is not reflective of higher grade work.

Many candidates produced a good quality portfolio which was well presented and suitably assessed. Interesting work related research was seen, however centres need to ensure that they clearly understand the difference between primary and secondary sources. The interest and enthusiasm of many candidates has been portrayed by highly detailed and often original portfolio work. Well done to these candidates.

The samples for moderation were selected electronically and moderators found that the majority of samples were returned efficiently. There were however a number of centres who had not completed the applied record card and only given a total mark for each element. This makes it extremely difficult for moderators to check the individual marks for each strand. It is essential that the record card is fully completed and attached to the candidates' work.

Fewer clerical errors where the marks sent to OCR were not the same as the marks on the Applied Record Card were seen. This is possibly due to centres using the electronic record cards which averages and adds all the marks for the portfolio work, this is recommended. Centres are also asked to ensure that candidate numbers are written on all work presented for moderation. The use of treasury tags and not plastic wallets is also recommended as this allows moderators to easily read and locate the work. Annotation of candidates' work in the form e.g. Aa 6 (i.e. the marking criteria reference) is also useful.

To support centres with their candidates' portfolio assessment, OCR offers a free coursework consultancy service where up to three full or part completed portfolios will be moderated and the centre issued with a report on the assessment decisions completed by the centre. Where a centre's decisions were not in agreement with those of the moderators, centres are encouraged to use this service for future submissions.

Comments on Individual Elements

Element 1 Set of Standard Procedures:

Candidates need to submit four standard procedures from a choice of eight which are posted on the OCR website. Each standard procedure is marked out of 6 marks giving a total of 24 marks for this element.

Each standard procedure is assessed under three strands:

- Collect primary data
- Process primary data
- Manage risks when carrying out standard procedures.

Centres are advised to give clear instructions to their candidates based on the task information provided by OCR. Centres need to ensure that the instructions given to their candidates suitably allow them full access to the marking criteria.

For strand a candidates do not need to devise their own format for the recording of their results, but they need to ensure that accuracy is confirmed and a suitable range of data is provided to support top mark bands. It is recommended that either repeats are completed where appropriate or evidence of some comparison of candidates' class data or staff values are recorded for comparison. For 5-6 marks there should be no errors or inaccuracies in recording, units need to be correct and evidence of consistency of significant figures should be evident. The recording of one or two measurements or weighings does not suitably reflect a demonstration of 'full range' of data.

For strand b it is important that the instructions given to the candidates for the standard procedure does suitably direct them to take and record quantitative measurements. Procedures involving changes in variables e.g. time, length, mass, are required to allow strand b to be assessed. Candidates can plot graphs or display data as bar charts, but both need to be well drawn with suitable scales and fully labelled axes. Bar charts were often poorly drawn and labelled. Means, ranges, percentage errors etc., from class as well as individual data can be used to give candidates opportunities to demonstrate their mathematical skills.

For strand c risk assessments were provided in most scripts seen, however a risk assessment alone does not support an evaluation of how risks were managed during the procedure. Good practice was seen from centres where detailed but usable risk assessments were provided by candidates, which in addition was supported by evaluative comments on the outcomes of the way the risks were managed during the session. Candidates just recording how they followed the risk assessment and what happened during the practical should not be credited with full marks.

All eight procedures were seen and moderated this session. Good practice was seen where the instructions given by the centre clearly were suitably directed to access the requirements of the marking criteria.

Element 2 Suitability Test

Candidates are required to complete one suitability test from a choice of three which are posted on the OCR website. The Suitability Test is assessed through six strands, each with a mark 0 to 8, giving a total of 48 marks for this element.

- Strand A Researching the purpose of the test
- Strand B Planning and risk assessment
- Strand C Collecting data
- Strand D Processing and analysing data
- Strand E Evaluating
- Strand F Justifying a conclusion

Centres are encouraged to focus on more than one experimental procedure for this element. It is necessary to find the suitability of the material /device or procedure chosen and this cannot be fully achieved by focusing on only one specific property, no matter how complex it may be. Centres also need to ensure that the high level candidates are given

the opportunity to do individual work and planning so they are able to demonstrate independent thought.

Candidates for **strand A** need to collect and process secondary information which gives a description of the purpose of the material device or process and its relevance in the workplace. Candidates' class notes just inserted into their reports are not sufficient. The work presented needs to be researched by the candidate and evidence provided which shows candidates use of the collected, researched material whether it is from the internet, science text books or notes taken. References of sources used was seen as good practice for higher marked candidates, as was limited 'cut and paste' material. A lot of irrelevant information was included for this section. Work reflective of 7-8 marks needs to show suitable selection with detail which is specific. Work assessed up to 5-6 marks tended to reflect some relevant research and a description of the required properties or characteristics. Assessment tended to be generous where candidates had just listed properties and completed minimal explanations of two or more. The level of detail and explanation for the higher mark bands needs to show suitable scientific understanding and a higher level of reasoning. Just coverage of more than one property does not automatically give the candidate 7-8 marks. Candidates also need to ensure that they focus their research on more than one property or test. The focus is on the suitability of material/device or procedure for the use required. Full marks cannot be awarded therefore where candidates have only looked at one aspect of suitability.

The aim of **strand B** is to assess how candidates can manage the risks for their experimental work and show their ability to plan and organise their procedures for the suitability of their chosen material /device etc. Lengthy risk assessments containing generic and repetitive information are not reflective of higher marks. Risk assessments need to be suitably detailed and be usable documents which focus entirely on the hazards of the procedures being investigated. General laboratory rules which are common safe practice are not needed in full. A statement of their coverage is sufficient. Candidates just writing one method however complex cannot be awarded 7-8 marks. Candidates need to be demonstrating how they are planning to show suitability of the chosen material etc. and this cannot be shown by completing only one experimental method. Good practice was seen where centres allowed candidates the opportunity to plan their own experimental work or put together different suggested ideas and complete a variety of different tasks. Higher level candidates could be encouraged to use their own quantities or variables and not merely focus on repetition as a means to increase reliability of conclusions. The quality of written communication for this strand is based on how the plan is written and understood, alongside the science content involved in the planning.

Candidates for **strand C** need to collect and record sufficient data to support experimental procedures to demonstrate the suitability of their chosen material, device or procedure. 6 marks was commonly awarded and although annotation was indicating candidates had devised their own format this was not always justified by the quality and range of data collected. Centres are encouraged to ensure that for this strand candidates are fully covering the directive laid down in the criteria. As there is only one strand to this skill, generous assessment can easily lead to lowering of this mark. For 8 marks centres need to ensure that data has a high level of precision and reliability and that it is linked with the requirements of strand A. Several candidates were not referring back to all of the criteria they referred to at the start. One set of data from one experimental procedure is insufficient to support higher level data collection.

For **strand D** candidates need to demonstrate that they can process and analyse the data they have collected and link it to the purpose of their tests. It is therefore essential that sufficient data is collected both from researched e.g costs, ease of use, appearance etc and experimental work to enable them to produce high quality graphs or charts or process it using suitable mathematical techniques. Graphs assessed at 5 marks or above should

be well-produced with minimal errors. For 7-8 marks a quantitative indication of the uncertainty of the data is needed. Analysis of data collected needs to include a range which will support the suitability of the material etc. Again one set of repeated data and one test is insufficient to support the higher marks. Candidates need to take care that even for 3-4 marks they link their outcomes to the purpose of the test. All trends and patterns need to be interpreted and supported quantitatively for the higher marks. Assessment up to 5-6 marks tended to be supported and few candidates were given 1-2 marks.

Strand E expects candidates to evaluate the methods used, the quality of the data and the management of the risks. In addition assessment is linked to how the candidates have structured their information for this strand and how they have used relevant scientific terminology. Centres need to note that the marking criteria has been structured to challenge the higher level candidates. Centres need to be aware of the **key words** given in the marking criteria i.e. 3-4 marks 'comments', 5-6 marks 'discuss', 7-8marks 'evaluate'. As in the previous assessment series candidates were only describing methods and stating improvements. For 7-8 marks evaluation with explanations are needed for both methods and data. Candidates may link any variation or quality of data to relevant limitations of the experimental techniques and with the suitability of the material, device or procedure. Both discussion of procedural methodology and flaws in the experimental design should be included. For Ec many centres awarded 8 marks to candidates for managing risks successfully. Again for the higher marks the safe running of the experimental work needs to be supported by a high quality risk assessment. Although moderators aim to support centres on their assessment for Ec assessment was generous with many candidates gaining 7-8 marks. Full marks were reduced where candidates were not supporting managing the risks successfully by the use of an appropriate risk assessment having been produced.

The aim of **strand F** is for candidates to show their ability to use their data collected and their scientific knowledge to conclude the suitability of their chosen material, device or procedure. Centres need to be aware that when writing conclusions candidates need to use the range of the results gathered in their tests and clearly link it to the suitability of the purpose. Final conclusions are needed rather than brief endings to the separate practicals completed. This was seen in many scripts. In addition for 7-8 marks, a discussion of any limitations, such as a range over which the suitability is applicable. Simple statements were seen but not the depth needed to support the higher mark bands. For the quality of scientific communication assessed in this strand centres again need to be aware of the key words given in the marking criteria e.g. limited, adequate, full and effective in addition to the non-persuasive and persuasive manner of the presentation. Care needs to be taken that candidates do not automatically gain 6 marks. For 8 marks the information should reflect a high quality piece of writing that is well presented and structured and can support full and effective use of relevant scientific terminology. The key to a high level conclusion is that it is suitably persuasive and fully suits the purpose. There was again considerable amount of generous assessment this session for this strand.

Good practice was seen where centres had clearly recorded the marks for each sub strand and shown in the scripts where evidence could be located. Comments on reasons for their assessment decisions are also supportive of the awarding of the various mark bands. Evidence of internal moderation is again to be encouraged to ensure all teachers are making consistent decisions. Centres need to appreciate that work assessed at 7-8 marks should be reflective of A/A* GCSE work. The level of coverage of the criteria needs to be such that the work demonstrates high level scientific understanding and independent thought and decision making.

Element 3 Work-related Report

Candidates are required to complete one work-related report which is posted on the OCR website. The work-related report is assessed through five strands each with a mark 0 to 8, giving a total of 48 marks for this element.

- Strand A Collecting primary data (information)
- Strand B The work carried out
- Strand D Skills used in the work place
- Strand E Scientific knowledge applied in the workplace
- Strand F Quality of the presentation

Centres continued to endorse this applied qualification by giving candidates the opportunity to use a wide range of professionals and visiting speakers, and to go on visits, which supported the importance of science in the work place for this work-related report. Centres however still need to be aware of the descriptors used in the marking criteria for strands C, D and E. The marking depends on how the candidates have used their information i.e. 1-2 marks is a relevant statement, 3-4 marks candidates are identifying, 5-6 marks explaining and 7-8 marks analysing. The higher level descriptors are challenging and candidates need to take care that they are not just increasing the quantity of descriptions and explanations rather than analysing the relevant factors involved. Candidates need to appreciate that the use of their own words are preferred to excessive downloaded information. Where information is taken directly from websites it is good practice that candidates include references directly beneath this extracted data.

The aim of **strand A and strand B** is to demonstrate that candidates can collect and suitably select the required information from both primary and secondary sources and reference these sources correctly and accurately. Primary information is that which is collected by the candidate directly from their own observations and experiences. The understanding of the use of primary sources was better this session and nearly all reports moderated indicated access of such sources. This was good to see. Good practice was seen by centres who had organised site visits where candidates were given the opportunity to gain information from various people. However, many reports were lacking in the identification of these sources and suitably referencing them. Where professionals have been accessed details of their qualification / place of work /date of interview is required. More than one reference is also needed where higher marks are awarded. Secondary information is information that has already been collected and presented by someone else for some other reason than to use for this work-related report. There is a wide range of secondary information that can be accessed from published material e.g. books, policies, market research results etc., as well as material on the internet and candidates 'own notes. Detailed referencing should show ISBN numbers for books, full web site addresses and dates of internet access for online sources and details of the source/date/any further relevant details for primary sources. A fully detailed reference should allow the reader to be able to access the information used, directly from the reference quoted, a bibliography here also supports good practice.

Centres still need to ensure that for both strands A & B candidates show suitable selection of their collected information throughout their report. 7-8 marks for strand A cannot be awarded where details of an interview is just attached to the back of a report. Many candidates are still just referencing several websites but this is insufficient for full marks. References need to be accurately recorded or identified throughout the text. Assessment was often generous for these strands. Many centres were awarding 7-8 marks where the overall quality of the report was of a low level, although Ab and Bb may be reflective of higher marks evidence of the selection of an appropriate range of valid data needs to be evident throughout the report.

The aim of **strand C** is to assess how candidates use their research to report on the organisation or work place chosen, the purpose and implementation of the work taking place as well as factors influencing the location and effect on society. As stated in the introduction the correct assessment is dependent on the candidates producing work reflective of the key words identify/explain/analyse given in the marking criteria. Candidates need to ensure that firstly they look at the structure of the organisation chosen, these did vary from small sporting health clubs to an overview of the NHS, and then for 5-6 marks they need to explain how the roles of the employees contribute. Many candidates just gave a generic description of a job role and were awarded 5-6 marks. There was some generous assessment here. Care also needs to be taken that where candidates have focused on a particular job role that they do sufficient research in order to obtain information to support Cb and Cc. As well as the purpose of the work candidates need to include how the work fits into the wider picture. Again for Cc just the inclusion of a map showing the location of the chosen organisation is insufficient to support 5 marks. In addition both the reason for the location and an effect on society is needed even for the lower mark bands. Several omissions were seen.

Strand D assesses how candidates use their research skills from both primary and secondary sources and their scientific understanding to find out about technical skills, expertise, qualifications and personal qualities used in the workplace. Overall this was much better this session. The use of visual material did help to support explanations of technical skills and some good work for Ea was seen for 7-8 marks where candidates had suitably addressed the criteria and had focused on particular examples by fully explaining, discussing why these were useful and how they linked into the job role. Work reflective for 7-8 marks for Db was not quite as good, why and how expertise is needed as well as explanations of the relevance of the personal qualities and qualifications needed in the job roles. Many scripts seen did show that candidates were now using their researched information on qualifications to support 5-6 marks. The work on the expertise of the professionals was more supportive of the higher marks when taken from interviews rather than extracted from careers websites.

The aim of **strand E** is to assess how candidates use their research skills to understand how the scientific knowledge is applied in their chosen job role. In addition candidates need to recognise how different factors affect the work done in organisations that use science. Again many candidates were linking their scientific knowledge to the work involved. Good practice was seen where the level of scientific knowledge was explained by the candidate and work was not just cut and paste and placed in a report. Centres still need to watch that quantity of science information isn't been awarded with higher marks, although a range needs to be discussed, the quality of the work needs to reflect A/A* level where 7-8 marks are to be awarded. Again please note explanations rather than descriptions are necessary for 5-6 marks with lengthy descriptions not always indicative of 6 marks. Higher grade candidates should be showing suitable selection and focused detail. Health and safety continues to be a useful regulatory factor, however again the impact of this on the work still needs to be focused on. There was still evidence however that in some candidates' work the financial and regulatory factors were merely identified and there was no clear link to the 'impact' on the work described. Also two relevant examples are required even for 3-4 marks, this was not always evident. This meant that marks awarded to candidates in some instances for strand Eb were not upheld.

Strand F assesses how candidates can organise and write a scientific report using relevant scientific or technical vocabulary and suitable visual material. Generally marks were upheld for this strand, however some higher level work from a number of centres had no visual material within their reports. This meant that Fb was not covered.

The key areas for 5 marks and above for Fa are: relevance, organisation, structure, suitability for purpose, as well as contents and numbering. Candidates should not

automatically gain 6 marks if a contents and numbering of pages is included. Where there was generous assessment it was where candidates had listed a contents, but it was not usable and therefore work could not always be located in the report.

Care still needs to be taken when awarding 8 marks for Fb in that the visual material is suitably 'informative' and used appropriately; suitable labelling and related notes written by the candidates could support the higher marks. Graphs and charts can be used to convey information. Again, when awarding 8 marks the candidates need to be showing full and effective use of the relevant scientific terminology. Spelling, punctuation and grammar should be almost faultless. Candidates gaining high marks need to be producing accurate scientific reports written to a high standard.

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