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# Moderators' Report/ Principal Moderator Feedback

## Summer 2013

## GCSE Science 2011 (5SA04) Paper 01

## 2SC01 Science

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Summer 2013
Publications Code UG035283

## Overview

The controlled assessment unit comprises 25% of the total GCSE in each of Additional Science, Biology, Chemistry and Physics. Controlled assessments are based on specification statements or 'further suggestions for practical work'.

Each task consists of **three** parts. Part A is a planning task; Part B is an observations task collecting primary and secondary evidence. Part C consists of conclusions related to the primary and secondary evidence collected in Part B. A candidate must submit one mark from each Part and these may come from a single controlled assessment task. Alternatively, marks from the best of a candidate's work can also be submitted. For example, in Additional Science Part A could come from Biology, Part B from Chemistry and Part C from Physics, or any other combination of these subjects. For Biology, Chemistry and Physics marks can be drawn from the B2/B3, C2/C3 and P2/P3 tasks. However, a candidate must complete full controlled assessment tasks, even if a mark is to be submitted for just one Part. All the work for a task needs to be sent for moderation, rather than just the Part for which the mark is being submitted. This enables moderators to evaluate all three Parts of the controlled assessment tasks within the correct context.

Controlled assessment tasks are available approximately one year in advance of each examination series, but teachers must note that these tasks are only valid for that particular series. The next moderation window will be May 2014. There will no longer be an examination series in November.

## General comments

The Principal Moderators are pleased to report that centres have for the most part carried out the controlled assessments in the manner in which they were intended and have interpreted the assessment criteria appropriately. There was good agreement with the marks awarded by many centres; this clearly reflects the time and effort taken by teachers to familiarise themselves with the assessment criteria, attend training events and share good practice within centres through internal standardisation.

The majority of centres used the Edexcel workbook, at least in part. The sub-sections of the workbook gave candidates a good idea of what they needed to do to address the criteria for a particular part of the controlled assessment.
It is acceptable to adapt the workbook to provide candidates with more space for their responses. However, it is imperative that the wording is kept the same; otherwise candidates in some centres may gain an unfair advantage in terms of being provided with too much scaffolding. Alternatively, candidates may be disadvantaged by not being provided with all the information they require to complete each section correctly.

Some excellent work was also submitted on loose-leaf A4 paper; although moderators commented that in some instances work in this format lacked structure. To help with this, candidates could be provided with the headings, as found in the workbook, for each Part of the controlled assessment.
Evidence to support a mark may be found 'out of place' in different sections of a candidate's workbook, e.g. information about equipment or controls could be written in the plan and they should be credited accordingly. Careful annotation is essential for moderators in these situations.

Most centres submitted marks for a single controlled assessment, but a not insignificant number of candidates did have their overall mark derived from more than one task, particularly in Additional Science, although it was rare for marks to come from three different controlled assessments in this subject. For the separate science subjects the B2, C2 and P2 controlled assessments were seen most frequently.

Some excellent annotation was seen on scripts, demonstrating that some teachers have an excellent grasp of how to interpret and apply the generic assessment criteria. Unfortunately such good practice was not widespread across all centres. The work received from some centres was either not annotated or had minimal unhelpful annotation on the scripts. Simply ticking the work in particular places is not useful to moderators or to other teachers within a centre if the work is being internally standardised. Annotation is a JCQ requirement which not only aids moderation but, more importantly, helps with internal standardisation and enables accurate assessments to be achieved. The most useful annotation seen used the coding from the generic assessment criteria, such as 1-2 (a) or 3-4 (b).
It is encouraging that centres use the specific marking guidance for each controlled assessment task to aid their assessment decisions. However, it is important to recognise that this guidance is not a mark scheme. The specific marking guidance provides examples of responses that can achieve particular marks. It is important that the generic criteria are used to make holistic judgements about a candidate's overall performance.

<u>Comments on the performance of candidates and the application of the assessment criteria</u>

In general, Parts A and B gave candidates across the ability range the opportunity to demonstrate positive achievement in all sections. The Conclusions section discriminated more in terms of the performance of stronger candidates over weaker candidates. More blank sections were seen in Part C of the workbooks compared with Parts A and B.

**Part A Planning**
The equipment section was well answered and many candidates gained the full 2 marks here, with useful diagrams often supporting the mark awarded. Weaker candidates found it difficult to explain the reasons for their choice of equipment. In a small number of cases teachers mistakenly awarded 4 marks for equipment, as per the GCSE Science criteria.
Controls gave some centres difficulties. The award of 6 marks was sometimes generous on the basis of the number of aspects of the task needing to be controlled and how these variables would be controlled. A number of candidates used comments such as "keep everything the same" or stated that things should be the same without describing or explaining how the variable would be controlled. Many centres are not seeing the 3-4 (b) and 5-6(b) statements as offering a real challenge to candidates. The standard of response in the controls section was variable. Some candidates wrote in great detail about what they intended to control, but others were very brief. Marks were sometimes lost because although variables had been listed correctly, there was no explanation of how to control them.

It was apparent that some candidates had been taught how to deal with the hypothesis but in other cases this was not evident and weak justifications to the statements were seen. Some very simple comments were awarded high marks in some centres. Candidates who gave some scientific background to their hypothesis frequently scored full marks.
Most candidates were able to suggest the appropriate risks and so scored full marks. However, it was not uncommon to see a list of generic risks encountered in a laboratory, e.g. tripping over bags, instead of focusing on specific issues such as the dangers associated with sharp knives or hot lamps that are related to the task. The management of risks needs further development; comments often tended to be short clipped sentences rather than explanations.
In general, candidates were able to write logical plans and scored either two or three marks. Few scored full marks, usually because they failed to either include an explanation of why their method would test their hypothesis, or because they made no comment about why the range of readings was chosen. The 3-4(b) criterion was less easy to access. Many centres seem to ignore this criterion and award 4 marks without reference to it. There was evidence that in the light of the experience with 5SC04 candidates showed a good level of achievement. As for 5SC04, Part A contributed the bulk of the controlled assessment mark for weaker candidates.

**Part B Observations**
Part B usually yielded five or six marks for many candidates, although these were not always justified. Candidates frequently scored full marks in the Primary evidence and recording section, which usually generated a table with headings and units. The use of appropriate quantities remains an issue for some candidates though, particularly when the task requires times to be recorded. Some candidates write down what is on the display of a stop clock rather than using an appropriate number of seconds. This leads to a mix of quantities which is not always clear. Centres should note that whilst it is acceptable for candidates to work collaboratively and to collect data in small groups, all candidates within a centre would not usually be expected to have identical sets of results.

Most candidates scored at least one mark for collecting and recording appropriate secondary evidence. Some excellent practice was seen where relevant secondary evidence had been collected in the form of data, e.g. results from other groups of candidates, graphs and factual information. It is appropriate for centres to provide a *range* of sources of information from which candidates can select the material which they consider to be the most suitable. However, centres should note that it is not necessary to include full copies of scientific papers; candidates only need to submit the parts which are relevant to their investigation. It would also be good practice for candidates to state the source of their secondary evidence. The second mark for this section proved to be more elusive; there was often a discussion of the quality of the evidence rather than the quality of the source of the evidence. Comments such as ‘it has been peer reviewed’ need to be develop further to indicate how this relates to the quality of the source of secondary evidence. In some cases candidates discussed secondary evidence, but no supporting information was provided for the moderator to see, thus making it difficult to justify the centre mark awarded. Centres should provide evidence of any secondary data / information used.

**Part C Conclusions**

This section discriminated well between candidates of different abilities. Many candidates scored highly in the processing evidence section. Generally the graphs seen were of a very good quality, but for high marks axes should be correctly scaled and also labelled with the correct units. Centres should check that processing is correct, because there were a number of instances where the candidates' mathematical skills had let them down, yet their work had been marked as being correct. It is important to look for evidence of processing in Part B, because many candidates' record averages alongside raw data as this is a logical thing to do. If candidates have collected numerical secondary evidence, then this should be processed too, since the generic criteria refer to processing '*all collected evidence'*.

The quality of evidence section was perhaps the least well done section. It is important that candidates look carefully at their primary and secondary evidence in addition to processed evidence. Unfortunately it was not uncommon to see sweeping statements about the presence or absence of anomalies without any justification. Candidates should look carefully at their evidence before making comments about its quality. Obvious anomalies were sometimes ignored, yet the text in the section claimed that they had been dealt with. Responses need to be developed further than statements such as 'I had no anomalies', to score a high mark. Candidates who had secondary data usually performed above average in this section as they had data similar to their own and were able to look for and deal with anomalies in the same way as with their primary data.

Many candidates scored at least three or four marks for conclusions based on evidence, but few scored full marks. This was usually because they did not explain their conclusions fully using scientific ideas, or because mathematical relationships were inadequate. It is acknowledged that in some situations it is not possible to describe mathematical relationships, but this does tend to be an aspect of this section which is sometimes overlooked by candidates and by teachers when marking controlled assessments. At a low level this could include a comparison of quantitative evidence or an intermediate level reference could be made to data points. At higher levels this could develop into comments about the impact of one variable on another, such as 'if $x$ is doubled, $y$ is halved', or a discussion about the change in gradient of a graph.

Evaluation remains a real discriminator of ability. Only the most able candidates scored well on the evaluation of conclusion section. It is important that all the available evidence is used when writing about the conclusion. Comments were often very simplistic, particularly when suggesting how the evidence could be improved. Secondary evidence was not always referred to and sometimes the proposed improvements were not relevant as they would not actually provide stronger support for the conclusion. When candidates used the workbook they often managed to write some creditworthy comments due to the basic structure provided. 'Do more repeats' was a common stock answer, but this does not necessarily show that candidates understand the issues related to the task in question. Indeed, some candidates who suggested further repeats had already carried out a suitable number of repetitions. In some instances these low-level comments were awarded high marks by centres. References to scientific ideas were often lacking for 3–4 (a) and 3–4 (b) and it was not uncommon for centres to inflate marks in these areas, particularly 3-4(b).

Evaluation of method still gives some problems in centres. The emphasis of this section is an evaluation of the method in terms of the equipment used and the procedure; many candidates did not look at the method and evaluate the results instead. However, a mark of four was frequently scored in this section. The usual reasons for losing marks were failure to link improvements to the hypothesis or not mentioning reasons for anomalous results. Indeed, this latter point is an area that could be improved in many centres; it would be good to read fluent discussions of how a method may have produced anomalies and how changes to that method would minimise anomalies and improve the quality of the evidence. The strengths and weaknesses suggested were sometimes rather feeble; weaker students often made comments such as "my method was easy to follow" without justifying a specific strength of the method. It is important to note that for 5-6(a) both strengths and weaknesses must be referred to in this evaluation section. The parts relating to improvements tended to be better but in some cases a rather formulaic approach was adopted, with candidates across a centre giving same improvement with little explanation, e.g. 'use a gas syringe' in the C2 task.

Administration

The majority of centres sent samples for moderation by the due date of 15th May, and the organisation of work was generally good. However, in some instances loose sheets of paper randomly slotted into workbooks made the moderators' task more difficult. A number of addition errors were found when moderators checked marks on the record sheets. Centres are politely requested to ensure that the total marks are correct and that these marks have been transcribed onto the OPTEMS correctly. Another point to note is that if a candidate is absent for this unit of the examination they should not be given a mark of zero. Such a mark indicates that an attempt has been made to complete some work, but that it is not creditworthy. There were still a notable number of centres failing to include the work of the highest and lowest scoring candidates in addition to the randomly selected sample of candidates asterisked on the OPTEMS. This meant that moderators had to request the missing work, which resulted in an inevitable delay.

The moderators' work was also made more difficult in cases where there were no record sheets to identify the marks awarded for each Part and sub-section of the controlled assessment tasks. This was particularly irksome in cases where more than one task contributed to the final mark for the unit. A suitable example of a record sheet can be found in Appendix 5 of the specification and this also includes a declaration of authentication.

Centres are also asked to bear in mind that it is not necessary to send any work that does not contribute to the final mark. For example, if B2 does not contribute to the final mark submitted, then it is not necessary to include work for that task with the moderation sample. Complete controlled assessments should be submitted for moderation when more than one task contributes to the overall total.

Further support

Science subject advisor
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Contact us on 0844 576 0037

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Training events
Please check the Edexcel website for full detail of all training events.
www.edexcel.com/resources/training/Pages/default.aspx

Consultancy Service

**GCSE Science 2011 controlled assessment consultancy service**

The consultancy service is designed to support you, with controlled assessment for GCSEs in Science 2011. It's a free online system, available though Edexcel on line. It allows you view and practise marking some exemplar student work and provides you with commentaries from a senior moderator. This helps build your confidence and understanding of how to apply the new assessment criteria before you mark your actually students' work.

The consultancy service will be available from 1 October 2013 until 14 February 2014 for GCSE Science, additional Science and separate Science units (5SC04 5SA04, 5BI04, 5CH04 & 5PH04)

**Grade Boundaries**

Grade boundaries for this, and all other papers, can be found on the website on this link:
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