Moderators' Report/
Principal Moderator Feedback

Summer 2014

Pearson Edexcel GCSE Science 2014
(5SA04)

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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 activity and Part B involves collecting primary and secondary evidence. In Part C, candidates have to process and present evidence, draw conclusions and evaluate all aspects of their work.

A candidate must submit one mark for each part of a controlled assessment; these may come from a single controlled assessment task, or from a maximum of three different tasks. 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, candidates must complete full controlled assessment tasks, even if a mark is being submitted for just one part. All the work for a task should be sent for moderation, not 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. In the June 2014 series a few centres inadvertently submitted controlled assessment tasks that were not valid for this particular moderation window. The next moderation window will be May 2015.

General comments

The Principal Moderators are pleased to report that centres have, for the most part, carried out controlled assessments in the manner in which they were intended and have interpreted the assessment criteria appropriately. There was close 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 Pearson Edexcel training events and to share good practice within centres.

The majority of centres used the Pearson Edexcel workbook, at least in part. The sub-sections of the workbook provide candidates with a suitable format in which to organise and present their work.
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 given too much scaffolding.

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 workbook sub-section headings 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. For example, information about equipment or controls could be written in the plan and candidates should be credited accordingly. Careful annotation is essential for moderators in these situations. However, information in Part A would not usually be credited to Part C and *vice versa*.

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. It was clear from the results that

some centres had not tried out the experiments beforehand and had not read the Teacher and Technician Notes supplied. To give candidates the best possible chance of success, it is essential that teachers are familiar with the controlled assessment tasks and that they seek assistance through 'Ask the Expert' should they need advice.

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 is still 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 a moderator, or to other teachers within a centre for internal standardisation purposes. A lack of annotation was particularly unhelpful in cases where candidates submitted their responses on A4 paper, because it was sometimes unclear which aspects of the criteria were being addressed in a particular paragraph. 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 1-2a or 3-4 b, accompanied by brief comments.

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 the type of response that may be representative of a particular mark level. It is important that the generic criteria are used to make holistic judgements about a candidate's overall performance.

Comments on the performance of candidates and the application of the assessment criteria

In general, Parts A, B and C gave candidates across the ability range the opportunity to demonstrate positive achievement in the controlled assessment tasks. Part C was the least well done and discriminated between candidates across the ability range.

Part A - Planning

Candidates usually scored full marks for the equipment section, although it is important to remember that they should give clear explanations of why the equipment was selected to gain two marks. Candidates often also achieved well in the risks section. However, a not insignificant number of candidates were given undue credit for discussing generic risks, such as broken glass and spillages, Management strategies were at times vague, with statements such as 'be careful with' or 'take care when', rather than specifically explaining how to manage the risks. If a controlled assessment task has few genuine risks associated with it, then candidates should be realistic when discussing these matters. For example, the C3 task for 2014 presented less of a risk than the C2 task involving the use of hydrochloric acid and sodium hydroxide solution. If there are no real risks, then candidates should have the confidence to state this and give a reason for doing so.

Most candidates were able to write a hypothesis, which they could at least partially justify. Some of the scientific ideas used to justify the hypothesis were weak and some candidates repeated information from the investigation brief; this meant that centre marks could not always be supported.

In the controls section a number of candidates wrote a good deal about why the variables were controlled rather than how. Although some excellent discussion was seen, no direct credit is awarded by the assessment criteria for such detail. Candidates need to think carefully about relevant variables and their control. It was not uncommon for candidates to write comments such as "keep everything the same" without describing or explaining how the variable would be controlled. The generic assessment criteria for controls cater for different types of investigation through the 'a' and 'b' sub-

sections, but, in either case, to achieve 6 marks there needs to be a range accompanied by explanations.

The Overall Plan section was marked generously by many centres because candidates continue to gloss over the criteria for 3-4 (a) and (b), yet they are still awarded full marks for this section. The majority of candidates could access two marks here, but gaining three or four marks was much more of a challenge. It is important that candidates provide appropriate explanations if 3-4 (a) and (b) are to be awarded. Some assessors had understood the requirements for OP well, whereas others had not and this was not always picked up during internal standardisation.

Part B - Observations

The primary evidence component was generally marked appropriately and the majority of candidates achieved full marks. Most candidates could construct results tables with suitable headings and appropriate units. Vague comments on the source of secondary evidence were frequently credited by centres; it was not uncommon for the second mark in this section to be awarded erroneously for comments on evidence rather than the source. For example, anomalies in results rather than quality of the source. This aspect was not well understood in centres although the few that did often answered this well.

In a small number of cases candidates claimed to have collected secondary evidence and were credited for this, but none was included with the work submitted for moderation.

Part C - Conclusions

Part C seems to be a discriminator between lower and higher attaining candidates.

Processing evidence

The majority of candidates could process data, draw a graph with units and a line of best fit, or an appropriate bar chart. However, it is important that centres check that candidates have processed their data correctly and that they have drawn a suitable line of best fit if appropriate; in the C2 task there was a tendency to draw a straight line through all the points, when

the evidence showed levelling off followed by a decline after the neutralisation point. A number of centres awarded full marks for graphs without correctly scaled axes or suitable lines of best fit.
It was noted that some centres had marked this section rather harshly, because they only assessed the graphs produced and did not take into account correct processing such as calculating averages, evidence for which is often located in results tables.

Quality of evidence
Most candidates were able to identify anomalies in tables of results, however the choice of what constituted an anomalous point was occasionally suspect. When anomalies were referred to, candidates didn't always say what they had done with them and/or why. On graphs, points were sometimes circled as anomalies if they didn't fit the line wanted, rather than looking for a real line of best fit. Unfortunately, some centres awarded marks when anomalies were incorrectly identified in tables of results and graphs. Explanations of adjustments to evidence or decisions not to include evidence were weak at times, but the mark was still awarded. In some cases candidates quoted stock phrases which they applied without any supporting evidence, e.g. "there are no anomalies in my secondary evidence". Supporting centre marks was sometimes difficult in such instances.

Conclusions based on evidence
A large number of candidates were able to score up to four marks in this section, but accessing 5-6 (a) and (b) proved more challenging and only within the scope of the most able. The fact that the assessment criteria explicitly refer to 'all collected evidence' was often overlooked by many centres; many candidates only referred to primary evidence in their discussions, making no use of assiduously collected secondary evidence. Candidates were good at covering the evidence and the hypothesis but were not as good at using mathematical relationships in their answers, such as the effect of grit size on the force needed to pull the block across a sheet of sandpaper. There was often little discussion about the graphs in any

candidate's work, although the better candidates normally referred to directly proportionality or made some comment on linear results.

Evaluation of conclusion

This section discriminated well. Much of the evidence for marks in this section was frequently located in Evaluation of method; this is not an issue, but it is important that centres annotate work accordingly. Some candidates lost marks here because they just gave brief suggestions of how all the collected evidence could have been improved and extended to provide stronger support for the conclusion. Many centres awarded full marks in this section even when candidates did not refer to relevant scientific ideas in order to achieve 3-4 (a). It is important that this particular criterion is not overlooked.

Some candidates have the impression that their results must match the hypothesis. This is clearly not the case. If evidence does not support the hypothesis, then candidates should have the confidence to state this and use evidence to support their argument.

Evaluation of method

Evidence for this section was sometimes located within Evaluation of conclusion and a number of candidates repeated their comments from the former section. As stated already, annotated scripts would help moderators to identify where credit is being given for positive achievement. It was not uncommon for candidates to discuss how well they had written their method, rather than specific procedural aspects that worked well or proved to be weaknesses. Vague statements such as 'I think my experiment was good because I followed my plan and used all the correct equipment properly' did not score well. Stated strengths and weaknesses were sometimes vague and there was often a lack of information about why improvements were needed and how better quality evidence could be collected to test the hypothesis. Some candidates did suggest reasons for the cause of anomalies, but this aspect of the assessment criteria tended to be disregarded in many cases. Weaker candidates were not always able to make relevant suggestions about how their method could be improved and why this would produce better quality evidence; comments such as 'use

better equipment or use a computer to monitor results' were not uncommon in such cases.

Administration

It was pleasing that the majority of centres sent their samples of work to moderators by the 15th May deadline. Unfortunately, there were still a number of centres that failed to include the work of the highest and lowest scoring candidates if they were not included in the randomly selected sample of candidates asterisked on the OPTEMS. This resulted in a delay in the moderation of the work from those centres.

Work was generally well organised with suitable record sheets appended to scripts, although addition errors and mistakes transferring marks from Record Sheets to OPTEMS caused problems in some centres. An example of a record sheet can be found in Appendix 5 of the specification and this also includes a declaration of authentication. The practice of sticking additional pieces of paper to workbooks can make the moderator's job difficult. It would be preferable to have all additional work on full A4 sheets of paper with clear section headings.

Centres are reminded that it is not necessary to send any work that does not contribute to the final mark. For example, if B1 does not contribute to the final mark submitted, then it is not necessary to include work for that task with the moderation sample.

Grade Boundaries

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