Moderators' Report/ Principal Moderator Feedback

Summer 2015

Pearson Edexcel in GCSE Science (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 based on a hypothesis that the candidate produces 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 2015 series a few centres inadvertently submitted controlled assessment tasks which were not valid for this particular moderation window. The next moderation window will be June 2016. Centres will need to submit the moderation sample to arrive with the assigned moderator by 15th May 2016.

General comments

The Principal Moderators are pleased to report that in most cases centres carried out controlled assessments in the manner in which they were intended and interpreted the assessment criteria appropriately and to the correct standard. 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.

The majority of centres used the 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 in the booklet is kept the same; otherwise candidates in some centres may gain an unfair advantage in terms of being provided with 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 parts of the same section 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*.

A few centres went well beyond the allowable additions to the work book by adding text that gave extra guidance or by inserting blank tables for candidates to fill in. Quite clearly such centres were unaware that they should not have done this because they made no attempt hide it
Almost all centres sent their samples by the due date. Very few failed to include the highest and/or lowest if these candidates were not 'starred' on

the OPTEMS. This was usually very easily resolved by a phone call to the Exams Officer.

The accompanying paperwork was almost always complete and the samples usually well presented.

A number of students' marks had been incorrectly totalled and so there were a few incidences where the mark on the Candidate Record Forms was different to the OPTEMS (especially if the marks had only been submitted electronically). Centres have been advised in feedback on their moderation about totalling the students' marks and transferring these from the Student Workbook onto the Candidate Record Form accurately.

In situations where students gain their overall mark from different controlled assessments, it is important that the Candidate Record Form indicates clearly where each mark has come from. This was not the case in some of the samples seen.

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. A very few centres adapted the experimental details in such a way that they no longer met the task set. If centres do find difficulty with the experimental details of a task advice should be sought on how to proceed from 'Ask the Expert'. A small number of centres used the Science controlled Assessment, which was marked out of 48 and required candidates not to make a hypothesis as this was already

given. Centres must take steps to ensure that their candidates are taking the correct assessment for the specification they are entered for.

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. Some moderation samples received from centres was either not annotated or had minimal unhelpful annotation on the scripts. 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 which 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.

Internal standardisation was not always evident in centres where the numbers of candidates indicated that there was more than one teacher involved in assessing candidates. There was evidence in this series that this lack of internal moderation gave rise to inconsistent assessment against the criteria for different groups in the centre. In some cases these differences were quite large. All centres in which there is more than one teacher involved in preparing candidates for controlled assessments should have in place a process by which the staff can be internally standardised. This could

include cross marking of work across the team using work from each group or using materials from training meetings to arrive at a consensus on the standard to be applied. Teaching staff new to the specification need to have a clear idea of the standard expected for each of the tasks. This would avoid issues with internal standardisation. Internal standardisation should not only focus on the marks awarded but also on annotation and other administrative issues such as completing record sheets and checking addition of marks.

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 appeared comfortable with the production of a hypothesis. For the majority of students, scientific knowledge could be discussed but the ability to link this knowledge to the hypothesis was weak in many cases. The weakest candidates did little else than repeat the information given in the student guidance which gained little or no credit. Some centres were generous in awarding high marks for what were little more than attempts at formulating a hypothesis. For example in the C2 controlled assessment the action of catalysts was not discussed sufficiently or with correct science to give the 3-4b mark. Statements such as ‘it gives the particles energy’ when considering the scientific ideas relating to the hypothesis are insufficient and not at all clear.

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 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. For example in the B2 controlled assessment some candidates mentioned the pond water as ‘dirty water’ which did not spell out what the risks were. If a controlled assessment task has few genuine risks associated with it, then candidates should be realistic when discussing these matters. If there are no real risks, then candidates should have the confidence to state this and give a reason for doing so. Some candidates were given credit for describing hazards rather than risks. Candidates need to be aware of the difference and be able to describe the hazard in terms of managing the risk. Full marks cannot be awarded for discussing hazards, there needs to be a relevant risk associated with the hazard.

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 this section well whereas others had not and this was not always picked up during internal standardisation. A simple

comment along the lines of ‘and this will test my hypothesis’ tagged onto the end of the overall plan does not meet the requirements of 3-4a. An explanation is required. Similarly for 3-4b the candidate has to choose a range to test the hypothesis and then explain why the range was chose. This needs to be rather more than ‘this range will test my hypothesis’.

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. Four marks cannot be awarded if tables lack units or have poor headings even if data is repeated. In this event a mark of three would be appropriate. Some centres reduced marks in this section if candidates had not calculated averages correctly. Averaging is processing evidence, which is assessed in Part C, not Part B.

The second mark for the secondary evidence section was often not gained, despite being awarded by centres because the evidence and not the source was commented upon. This continues to be a widespread problem for both centres and candidates. Most centres use a set of observations from the class or a teacher/technician, citing that it is the same experiment carried out in the same way as the comment on the source of the evidence.

Part C - Conclusions

Part C seems to be a discriminator between lower and higher attaining candidates. Candidates excelled if the hypothesis and underlying scientific knowledge from Parts A and B were detailed. Where candidates did not gain full marks they had usually failed to include enough detail.

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. A number of centres awarded full marks for graphs without correctly scaled axes or

suitable lines-of-best-fit. A number of centres had punished students for not placing titles on the graph, this is not a requirement of the criteria and penalising this is being unduly harsh on candidates. 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 in part B.

Quality of Evidence

The standard of responses by candidates is improving. In many centres candidates produce a graph for both primary and secondary evidence. There is still some confusion between anomalies that occur in the raw data and how these should be treated and anomalies that appear when a graph is drawn and then the candidate has to determine if a particular point is an anomaly or not. The correct identification of anomalous results seems to cause difficulty, candidates reported anomalies when there were none and vice versa.

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. It was rare to see the mathematical requirements achieved fully in candidates

work. There was often little discussion about the graphs in any candidate's work, although more able candidates normally referred to directly proportionality or made some comment on linear results. There was also some confusion about how data should be used as part of the conclusions. Students who had found secondary data that was not numerical, struggled to integrate the information into their conclusions, making it problematic for assessors to correctly award marks.

The final two sections of part C remain the biggest discriminators of ability and also are responsible for the greatest loss of marks in a controlled assessment. Centres would be advised to prior to starting controlled assessments to give opportunity for candidates to consider the requirements for these two sections through formative assessments focusing on the skills needed to access the criteria.

Evaluation of Conclusion

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 for 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.

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. 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 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' do not meet the assessment criteria. 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

The 15th May deadline for arrival of work with the allocated moderator is now well embedded in most centres together with the requirements of sending the work of candidates with the highest and lowest marks in the sample, even though the OPTEMS may not have initially identified them. Where this work was not sent it led to delays in the moderation process. 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 moderators' 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 B2 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

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