



Pearson

Modertors' Report

Principal Moderator Feedback

Summer 2017

Pearson Edexcel GCSE In 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'.

Controlled assessment tasks are available approximately one year in advance of each examination series, but tasks are only valid for that particular series. It was extremely rare for moderators to receive work from a previous series, as centres are now familiar with the administrative procedures for this specification suite.

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. For Further Additional Science marks can be drawn from B3, C3 and P3. 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.

The most common tasks completed in this series for both the Additional and the separate sciences were B2, C2 and P2. The least used was P3.

The majority of work seen was in the range of 20 – 45 marks. Very few samples seen where the mark was less than 20. Most candidates did best in sections A and B often scoring nearly full marks, particularly in section B.

General comments

The Principal Moderators are pleased to report that much of the work submitted for moderation was of a high standard. There was close agreement with the marks awarded by many centres. The majority of centres had taken care to set up, manage and assess the controlled assessment tasks in a professional manner. It was pleasing to see that centres adhered to advice provided by the Pearson science team, in addition to the assessment criteria and specific marking guidance.

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

The Pearson controlled assessment workbook was widely used, at least in part. The sub-sections of the workbook provide candidates with a suitable format in which to organise and present their work. 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 may be provided with the workbook sub-section headings for each part of the controlled assessment (available to download from the Pearson website).

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 some candidates may gain an unfair advantage over other candidates in different centres, because they have been provided with too much scaffolding. It is pleasing to report that there were relatively few instances of candidates being provided with unsuitable workbooks, such as those containing additional prompts, in the summer 2017 series.

Most centres submitted marks for a single controlled assessment, but some candidates had their overall mark resulting from more than one task, particularly in Additional Science. For the separate science subjects, the B2, C2 and P2 controlled assessment tasks were seen most frequently.

A few centres adapted the experimental details of the tasks in such a way that they no longer met the specification point(s) identified in the Student Brief. Centres are reminded that the 'Ask the Expert' service can be contacted for advice on how to manage any of the controlled assessment tasks.

Some excellent annotation was seen on candidates' work. This demonstrated to moderators that, in the main, 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 were 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 codes from the generic assessment criteria, such as 1-2a or 3-4 b, accompanied by brief comments.

Evidence to support a mark may be found 'out of place' in different parts of the same section of a candidate's work. 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*.

It is encouraging that many centres use the specific marking guidance for each controlled assessment task to aid their assessment decisions. However, centres are reminded that this is just guidance, and not a mark scheme. The specific marking guidance provides examples of the type of response which may be representative of a particular mark level. 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' work. This lack of internal standardisation gave rise to inconsistent marking against the generic assessment criteria for different groups in some centres. 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. 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 the 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. As in previous series, candidates tended to do best in sections A and B with maximum marks often achieved. Part C was the least well done and this discriminated between candidates across the ability range.

The main areas where teachers had been lenient in their marking were: Risks 3-4(a) and (b), Overall Plan 3-4(a) and (b), Secondary Evidence (second mark), Quality of Evidence 3-4(a), Conclusions based on Evidence 5-6(a) and (b), Evaluation of conclusion 3-4(a) and (b) and Evaluation of Method 5-6(a) and (b). This was in line with previous examination series.

Part A – Planning

The majority of candidates could formulate at least a basic hypothesis. They could also discuss relevant scientific knowledge, but the ability to link this knowledge to the hypothesis was weak in many cases. Some centres seemed to encourage the recall of scientific theory rather than encourage candidates' understanding of the relevant scientific principles involved and ability to link them to the hypothesis proposed.

The weakest candidates did little other than to repeat the information given in the student brief, which gained little or no credit.

Candidates usually scored full marks for the Equipment section, although it is important to remember that to gain two marks they should give clear explanations of why the equipment was selected. That said, some candidates went into unnecessarily detailed descriptions to gain two marks.

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. 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.

Achievement in the Risks sections often appears to be centre-dependent, in terms of the advice given to candidates about how to tackle it. There is still a tendency to award full credit for identifying and managing risks which are essentially generic in nature and fall within the remit of good laboratory practice rather than being specific to the investigation under consideration. Examples include tidying away bags, dropping equipment and dealing with spillages broken glassware. Full marks should not be awarded for discussing hazards; there needs to be a relevant risk associated with the hazard.

Not enough attention has been given to the recommendation (as stated in the 2016 report and some Specific Marking Guidance) that for a task with very little associated risk, full credit can be given for stating this and justifying the statement. The P2 cup cake case investigation comes into this category.

Management strategies were often generalised, with statements such as 'be careful with' or 'take care', rather than explaining specifically how to manage the risks.

The majority of candidates could access two marks in the Overall Plan section, but gaining three or four marks proved to be more of a challenge. This section was marked generously by many centres; candidates often evade the criteria for 3-4(a) and (b) because their comments are too brief, yet they are still awarded full marks. It is important that appropriate explanations are given if 3-4(a) and (b) are to be awarded. A simple comment such as 'and this will test my hypothesis' at the end of the overall plan does not meet the requirements of 3-4(a). Similarly for 3-4(b), candidates have to choose a range to test the hypothesis and explain why the range was chosen.

Part B - Observations

The Primary Evidence component was usually marked accurately and the majority of candidates achieved full marks. Most candidates could draw 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 situation, a mark of three may be appropriate. Some centres deducted marks from candidates if they had calculated averages incorrectly. That skill is processing evidence, which is assessed in Part C, not Part B.

The award of marks for the Secondary Evidence section was a little more accurate than in previous series. Virtually every candidate presented appropriate secondary evidence; this tended to be a set of observations from the class, a teacher or a technician. The second of the two marks was frequently awarded by centres, even though in many cases there was no appropriate comment about the quality of the source of this evidence. This continues to be a perennial problem. Comments such as 'the data must be reliable as they did the experiment the same way as me' are not creditworthy as there is no comment about the source. Unfortunately, these comments were seen frequently, even though this issue was highlighted in the 2016 report. However, it is pleasing to note the type of comment which is acceptable, such as the relative level of skill and qualification of the person who collected the secondary evidence, was certainly more common this year.

Part C - Conclusions

This Part of the controlled assessment continues to be a good discriminator between lower and higher attaining candidates. Candidates usually did well if the hypothesis and underlying scientific knowledge from Parts A and B were detailed.

Processing Evidence – Although some poor graphs were seen, the majority of candidates processed data correctly and drew suitable graphs. Axes were usually scaled and labelled appropriately. It was noted that some candidates are not provided with suitable paper on which to draw graphs; millimetre squared graph paper is usually best. Paper with 5 mm squares makes it difficult for candidates to produce suitable scales or to plot data points accurately. It is important that teachers check calculations, the scaling of graph axes and plotting accuracy. It was evident that some candidates had been awarded full marks for graphs without correctly scaled axes, poor plotting and unsuitable lines-of-best-fit. Some centres penalised candidates for not giving their graph a title; this is not a requirement of the assessment criteria. A small number of centres marked this section rather severely,

because they only assessed graphs and didn't take into account correct processing such as calculating averages, evidence for which can usually be found in results tables.

Quality of Evidence - The standard of response produced by candidates has improved during the lifetime of this suite of specifications. However, a large number of candidates still find this section difficult to access and often simply state whether they have or do not have anomalies. It is also apparent that many candidates do not look carefully at their evidence and fail to provide detailed explanation for choosing to include or exclude the anomalies. Statements such as 'there are no anomalies in my evidence' are often too readily accepted by centres, when even a cursory examination of the corresponding graph or table of data would have shown this to be false. Supporting centre marks was usually difficult in such instances. In order to score 3 or 4 marks there must be clear comments relating to both the primary and the secondary evidence.

Conclusions Based on Evidence – Although many candidates could present clear well-reasoned conclusions, their work was marked very leniently by some centres. 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. Candidates were generally good at considering the evidence and the hypothesis but were not as good at using mathematical relationships in their answers. Many candidates were frequently awarded five or six marks for responses with no mathematical relationships and no explanations using scientific ideas. Many candidates did not use the shape of their graph as evidence for a mathematical relationship. It was common for candidates to state that there was a proportional or directly proportional relationship between the variables, without illustrating or justifying that claim; in fact, sometimes the data collected did not show such a relationship at all.

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. Students who had collected secondary data that was not numerical struggled to integrate the information into their conclusions. This made it problematic for assessors to award marks correctly.

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. However, it is pleasing to note that candidates have generally improved in the Evaluation of Method section series on series.

Evaluation of Conclusion – Much of the mark-yielding evidence for this section was often seen in the Evaluation of Method section, since candidates find it difficult to distinguish between the two areas. This in itself is not an issue, but it is important that work is annotated accordingly. Some candidates lost marks because they did not discuss adequately how to improve and extend their collected evidence to provide stronger support for the conclusion. Many centres also awarded full marks for this section, even when candidates didn't refer to relevant scientific ideas, thus not achieving 3-4 (a). It is a pity that this particular criterion has been continually overlooked.

Evaluation of Method – It was noted that marks in this section were far more accessible to candidates of all abilities. The majority of candidates accessed 3-4(a) for identifying strengths or weaknesses, but sometimes failed to relate improvements to the collection of better quality evidence. Furthermore, 5-6(a) and (b) were often awarded by centres when no reference to the hypothesis, no reasons for anomalies, and no suggestions of how to improve the method were given. Many candidates discussed anomalies in the Quality of Evidence section, but forgot about them here. This aspect of the assessment criteria seems to be disregarded in many cases.

Improvements to the method were not always explained very clearly nor were they sometimes particularly relevant to the task. Many weaker candidates continue to discuss how well they have written their method or followed their method, rather than describe 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' or 'I worked hard' do not meet the assessment criteria. Only the most able candidates could make relevant suggestions of how to improve their method and explain why this would produce better quality evidence. Comments such as 'use better equipment' tended to be the domain of candidates who did not have a grasp of the concept of evaluating a method.

Administration

The 15th May deadline for arrival of work with the allocated moderator has been embedded in most centres for a number of years, together with the requirement of sending the work of candidates with the highest and lowest marks in the cohort, even though they may not have been part of the initial random sample. The vast majority of centres met these requirements which helped the moderation process to run smoothly.

Work was generally well-organised with suitable record sheets appended to scripts. Addition errors and mistakes transferring marks from Record Sheets to EDI caused problems in a small number of centres. A small number of centres submitted a mark of zero for candidates who were not actually entered for this part of the examination. In some cases this caused problems for moderators because work with a mark of zero means that there should be some physical evidence available for the moderator to see.

The practice of sticking additional pieces of paper to workbooks has increased during the lifetime of the specification and tends to make the moderators' job difficult. It would be preferable to have all additional work on full A4 sheets of paper with clear section headings.

A very small number of centres submitted all assessed work for candidates in the sample, which is not a requirement. Just the work contributing to the final total mark is needed by the moderator.

