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Moderators' Report/ Principal Moderator Feedback

Summer 2014

Pearson Edexcel GCSE Science 2014 (5SC04)

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Summer 2014
Publications Code UG039965

Overview

The controlled assessment unit comprises 25% of the GCSE science 2011 specification. Controlled assessments are based on specification statements or 'further suggestions for practical work'.
There are three parts to the controlled assessments: A, B and C. Part A is a planning task, Part B is an observations task and Part C is a conclusions task. A candidate must submit one mark from each part and these may come from a single controlled assessment task or a combination of more than one task. If using more than one task then best marks from each section can be amalgamated. For example, Part A from Biology, Part B from Chemistry and Part C from Physics, or any other combination of subjects. However, each controlled assessment task (CAT) must be completed even if the intention is to only submit a mark for one part. Controlled assessment tasks must not be set as single sections, i.e. planning for the purpose of submitting part marks. All work for a controlled assessment 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 (CATs) 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. A few centres submitted CATs valid for June 2013 and then had to redo/resubmit the correct assessments. The next moderation window will be June 2015; tasks seen this year will not be available for submission in 2015.

General comments

The Principal Moderators are pleased to report that centres have for the most part interpreted the assessment criteria appropriately. There were some new centres that submitted work for moderation for the first time in this moderation window. There was generally good agreement with the marks awarded by many centres and this clearly reflected the time and effort taken by teachers who attended Pearson Edexcel training events and

familiarised themselves with the assessment criteria. Where marks did not agree this was usually through lack of standardisation across departments and between teachers. Where standardisation was explicit, and shown to be a professional dialogue between all staff involved with assessment, the marking was usually more accurate and related specifically to the criteria.

Most centres undertook the task as set in the student brief. However, there were a few centres that changed the variable that was being investigated. For example, in the P1 task the variable to be investigated was the number of coils, keeping the drop height the same. A few centres altered this to changing the drop height and keeping the number of coils the same. Centres must not change variables. If difficulties are encountered in preparing for a controlled assessment advice should be sought in advance from the 'Ask the Expert' service

The majority of centres used the workbook provided by Pearson, at least in part. The sub-sections of the workbook provide structure for candidates in line with marking criteria for each section.
Some centres adapted the workbooks to provide candidates with more space for responses, but importantly, kept the wording the same; this is acceptable practice. Centres are reminded that the only workbook that can be used for the CATs is the one on the Pearson website. Using other published workbooks or changing the wording to provide extra scaffolding may result in the work being refused and another CAT being requested. Some excellent detailed work was also submitted on loose-leaf A4 paper, although moderators commented that in some instances work in this format lacked structure and focus and was not always annotated adequately. Where centres use lined paper they are reminded that Pearson also produces a 'brief', which gives these candidates the same support as those using the workbook. Again, however, this is the only form of structuring that is allowed and centres should not be adapting this to give more detail.

It should be noted that evidence to support a mark may be found 'out of place' but that this can only be credited within the same overall section, e.g. information about equipment or controls could be written in the plan and

should be credited accordingly. Candidates cannot be credited in part C for work they have completed in parts A and B. Careful annotation is essential for moderators in these situations.

All three tasks were seen and most centres submitted marks for a single task. Submitting a combination of marks from different controlled assessments was less common and where this happened, it tended to be from just two subjects.

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 uniformly widespread across all centres. The work received from some centres had either no or minimal annotation, or was just ticked in various places. This was particularly unhelpful where candidates submitted their responses on A4 paper where it was unclear which aspects of the criteria were being addressed in a particular paragraph. It should be noted that annotation is a JCQ requirement, which not only aids moderation but, more importantly, enables accurate assessments to be achieved. The most useful annotation seen used the coding's from the generic mark scheme assessment criteria, e.g. i.e. 1-2a, 3-4 b.

Centres continue to use the specific marking guidance for each controlled assessment task to aid their assessment decisions. The specific marking guidance only provides examples of responses that can achieve particular marks. There are other ways that candidates can meet the generic criteria and it is therefore important that the generic criteria are used to make holistic judgements about a candidate; overall performance. Some centres used the specific mark guidance as a mark scheme and therefore penalised acceptable answers purely because they were not the example given in the guidance.

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

In general, Parts A and B gave candidates across the ability range the opportunity to demonstrate positive achievement. 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

Candidates are supplied with a hypothesis but it is good practise for them to be asked to write it in their workbooks as this helps to remind them of what they are trying to investigate. It also allows them to refer back and make sure that what they write in the following sections is pertinent and relevant.

The equipment section was well answered and many candidates gained all four marks here, with useful diagrams often supporting the mark awarded. However, some candidates missed out the key items. Weaker candidates found it difficult to explain the reasons for their choice of equipment.

The majority of candidates were able to identify some relevant variables to control and could describe how this would be achieved. Fewer candidates could develop their ideas and explain how to control the variables. In some cases candidates were awarded overly high marks for simple responses such as ‘keeping things all the same’ or ‘keep it a fair test’. Some centres, via the annotation, are asking candidates to say why these controls are required, this is good practice but it is not required by the generic assessment criteria,

Some good responses relating to risks were seen. However, many candidates found it difficult to achieve high marks here. This was mainly because they failed to identify the specific risks of an investigation, although most mentioned the generic laboratory risks. Centres should guard against awarding high marks for generic comments such as ‘risks from breaking glass’ or ‘put all bags and stools under benches’. It is important that the risks identified are relevant and specific to the task and that there is a

specific way of managing the risk to minimise its impact. Some candidates wrote “be careful” or “work safely”, which are not specific enough. Others gave detail about what they would do if an accident happened, i.e. sweeping up broken glass, administering first aid for burns and telling the teacher an accident had happened. These are not ways of managing the risks; rather they are dealing with the effects of poorly managed risks and therefore are not creditworthy within the generic assessment criteria. Candidates can be credited for saying there are no risks or little risk provided they give detailed explanations of why they consider this to be the case. The explanation should show they have a good understanding of the term risk.

The majority of candidates could write an ordered method that would produce results and hence gain two marks. To gain the marks for 3 – 4 (a) and (b), candidates must explain why their method would test the hypothesis and explain why a particular range of measurements was chosen; this last aspect was not done particularly well and remains a problem for candidates and centres alike. Responses like “I will do 5 different beakers because this tests my hypothesis’ are not sufficient as they do not say why this will test the hypothesis. This lack of clarity meant that a number of centres were generous with marks in this section. Candidates did, however, score the 3 - 4 (b) mark more often than in the previous series. A number of candidates were hampered by being given a range, e.g. of beakers, and therefore could not really say why they had chosen the range.

Part B Observations

Candidates performed well in this section of the controlled assessment. In most cases 3 or 4 marks were scored for 'Primary evidence and recording', even when candidates found other areas of the assessment difficult to access. Tables tended to be well drawn with good headings and units included. Many candidates also include processed evidence, e.g. averages, with their primary evidence, which is a logical thing to do. However, centres should remember to assess averaging and other mathematical processing in Part C.

If candidates lost marks in this section it was usually because they failed to include a piece of secondary evidence or more commonly did not discuss the reliability of the source of the evidence they collected. The generic assessment criteria state that secondary evidence should be collected and recorded. 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 or factual information. In some cases candidates discussed secondary evidence but did not send it, therefore it was not possible to award a mark for recording. It is acceptable for centres to provide a range of sources of information from which candidates can select the material they consider to be the most appropriate. Comments must be made about the quality of the sources of secondary evidence to gain two marks for this section; however comments about the quality of the sources were often quite weak, missing altogether or were about the quality of the data and not the source. Many of the scripts seen had discussions based on the reliability and accuracy of the data, rather than how reliable and trustworthy the source of the evidence was. Comments like 'the sources results follow the same pattern as my own' and 'produced the same conclusion as me so means they are reliable' are about the data not the source. To achieve the mark candidates should look at where their data is coming from, i.e. a university website or Wikipedia could lead to comments like 'I think the University of …website is a reliable source because the university has a reputation to uphold and therefore is very careful about what is published on its site' or 'Wikipedia can be updated by members of the public therefore the information is not always checked or reliable'.

Generally candidates find it difficult to discuss the source when evidence is from classmates as it is difficult not to talk about results being similar to their own etc., which then becomes about the data. Where the secondary source is, for instance, a technician or teacher they are more able to discuss the source, i.e. the technician is a qualified scientist with lots of training and so this must be a reliable source.
It is often easier for candidates to use secondary evidence in Part C if it is quantitative, but, of course, this is not essential.

Part C Conclusions

This section discriminated well between candidates of different abilities. The Conclusions section was one in which weaker candidates gained the fewest marks, especially when workbooks were not used. A large number of candidates demonstrated that they were able to process and present evidence well. In many cases processing requires little more than averaging collected data or reordering data to show a clear trend. Centres should, however, check that processing has been done correctly, as there were a number of cases where candidate averages were wrong, yet had been credited.
Line graphs and bar charts were frequently drawn correctly even by weaker candidates. In some instances, however, full credit was given even when there were obvious errors in scaling and labelling axes, or plotting points. There were fewer examples of candidates choosing to draw the wrong type of graph, e.g. a line graph for a discrete variable. There were also a few centres where candidates had not processed the evidence at all and had erroneously been awarded four marks.

The quality of evidence section was challenging for weaker candidates, particularly 3-4 (a). It was apparent that many candidates had clearly not looked at their evidence with sufficient care, and made sweeping comments about anomalies. Obvious anomalies were sometimes ignored, yet the text claimed that they had been dealt with. It was also apparent that some candidates did not know how to deal with anomalies appropriately and this is a broad issue that needs to be addressed. Other candidates gave a

textbook explanation of how they would deal with anomalies but then didn't or said there where none when there were. Centres are reminded that the 1 – 2 mark (b) statement requires candidates to comment on the quality of their secondary evidence, but this aspect was not always addressed particularly well, with full marks awarded without reference to this

criterion. This is difficult when the secondary evidence does not include data. Many candidates had used their secondary evidence to process and plot alongside their primary data. This enabled them to see and deal with anomalies in the secondary data to gain 3-4(b) far more easily. Candidates who had used data from technicians or other candidates usually performed better in this section, as they understood the data they were discussing. Where the data was from a website they were not always as able to discuss this in the context of quality and many had data, that although related, was different enough to make it difficult for them to discuss with understanding.

Some excellent conclusions were seen where there was a detailed discussion of relevant scientific ideas and the hypothesis had been referred to appropriately. However, moderators felt, in some instances, that assessments were generous because responses were brief and clearly lacked the detail needed to match the criteria for 5 and 6 marks. Some were just a repeat of a sentence from a book, which showed that the candidate clearly did not understand in the context of their data. In particular for 5 -6 (a) and (b) the use of scientific ideas needs to be present to explain the conclusion. This is an area where centres need to give time in formative work prior to taking the task, to practise the points already mentioned. Candidates should be encouraged to look carefully at their evidence for mathematical relationships. At a low level this could include a comparison of quantitative evidence or at 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 doubled*', or reference to the gradient of a graph. Many candidates were able to score 3 or 4 marks. The biggest area of challenge for candidates was in identifying the mathematical relationships in the data and therefore getting beyond 3-4 (b) in the 'b' strand of conclusions.

The evaluation of the conclusion section was probably the one that candidates found the most difficult. Only the most able candidates scored well on this, so evaluation remains a real discriminator of ability. It is important that candidates use all the evidence available to them when writing about the conclusion, i.e. both primary and secondary. Comments were often very simplistic, particularly when suggesting how the evidence could be improved. When candidates used the workbook they often wrote some creditworthy comments as a result of having the guidance provided at the top of the section in the booklet. Statements such as 'do the experiment better', 'do more repeats' or 'do the experiment more accurately' were not uncommon and such stock answers do not show that the candidates understands the issues related to the particular task in question.

Indeed, some candidates who suggested further repeats had already carried out a suitable number of repetitions. Some candidates felt that 'getting more information from the internet' would be useful but did not say what sort of information and why it was necessary. It is important that candidates are not getting credit for 'stock' answers as these highlight their lack of understanding of the section and often their specific data. In some instances these low-level comments had been awarded high marks. References to scientific ideas are needed for the 3 – 4 (a) mark and for 3 – 4 (b) candidates need to suggest how to improve and extend their evidence. It was noted that where the workbook had not been used, weaker candidates scored poorly here. Again, there were a number of stock answers like 'do more repeats' and 'do more results' that did not add to the discussion as it was not clear why these would be useful. The structure provided by the workbook helped candidates in structuring their response and they were more likely to score at least one mark, if not two.

Some candidates and occasionally teachers still seem to be confused about the difference between evaluating the conclusion and evaluating the method and for good measure wrote the same thing in both sections and had it awarded in both sections.

There is usually greater opportunity for weaker candidates to gain marks when evaluating their method. The emphasis of this section is an evaluation of the method in terms of the equipment used and the procedure. In some cases candidates and centres interpreted this as another opportunity to discuss the evaluation of the conclusion. Many candidates could state a strength or weakness in their method and suggest how to improve it. This section proved to be more accessible; however some candidates wandered off the point and gave examples of strengths/weaknesses that were irrelevant to the task. Some said ‘it was easy’ or ‘I enjoyed it’, as strengths. These are clearly not strengths of the method. Candidates found it easier to identify weaknesses. Candidates should be discouraged from making comments such as ‘use better equipment’ or ‘use a computer’ when discussing possible improvements to a method. Improvements should relate to the method used and should be justified. Few candidates specifically discussed how their method could have produced anomalies and how changes to that method would minimise anomalies and improve the quality of the evidence. Very few candidates scored either 5 -6 (a) or 5-6 (b) as the quality of their discussions was too weak to merit this.

Administration

The deadline for the submission of work to the moderators was 15th May 2014 and it was pleasing that the majority of centres sent their samples of work by the deadline. However, some centres were considerably late in submitting samples to moderators. It was frustrating in some cases to have work arrive by the correct date, but for the moderator to then find the sample was incorrect. 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. There were also some samples where asterisked candidates had been withdrawn and the work of the next available candidates had not been sent so the sample was short. This causes delays in the moderation process. This meant that moderators had to email centres to request the missing work. Most centres were then very good at getting this work to the moderators. However, there was a small minority of centres who ignored this request.

The national deadline for the June 2015 examination is 15th May 2015.

The moderators' work was made difficult in cases where there were no record sheets to identify the marks awarded for each part and section of the controlled assessment tasks, particularly when more than one task contributed to the final mark. A suitable example of a record sheet can be found in Appendix 5 of the specification and this also includes a declaration of authentication.
A small number of centres failed to identify on the record sheet which subject the marks were being submitted from. This was not a problem where only once piece of work was submitted. However, if the marks were from two pieces of work, it was difficult for the moderator to know which marks came from where.

Centres should note 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. However, if a centre is submitting part C for assessment, part B will also need to be provided, so that the processing of and anomalies in the results may be seen.

Further support

There are a number of ways that centres can access further support to help with both the setting up and the assessment of CATS.

Consultancy

Science Subject Advisor

Ask The Expert

Training events

Sample controlled assessments

Assessment guide

Details for all of these can be found on the Pearson Edexcel website.

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