Pearson Edexcel

Science Lead Monitor Pratical Endorsement Report

Summer 2023

Pearson Edexcel GCE Science

Practical Endorsement in

Biology A, Biology B, Chemistry and Physics

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Lead Monitor's Report for the Science Practical Endorsement for Cycle 4 of the monitoring cycle September 2021 – May 2023

This report covers cycle 4 which consisted of two halves. In the first we were still observing social distancing and the visits were made remotely, in the second half we resumed visiting schools in person in the way we did before the pandemic. Our point of focus was to make sure the remote visits and the personal visits were equally fair to all centres.

We were very grateful to all our centres through the pandemic for cooperating with our remote visits and helping us to make them as effective as we could. We were also grateful for the work done in centres by copying student work to send to monitors as this is the most useful evidence. The principal difference between the two formats of the visits is that when remote we were unable to see any students at work and similarly unable to see any assessment going on, this made monitoring the visually assessed criteria a matter of conversation, which was more difficult. This aside we were happy that the remote format was nearly as useful as a visit made in person and we thought both formats were indeed equally fair.

Another feature of cycle 4 was that the visits were mostly in the same subject as the cycle 1 visit. Many centres had made progress since cycle 1 but not always in the appropriate direction. This very new, in 2015, method of assessing students' practical competence took some time to settle down and during that time a number of documents were published on the website as a guide to centres on what monitors would be looking for when they visited. The success of cycle 4 visits depended to a large extent on the way these documents had been used and I would urge centres to look again at the materials available on the CPAC Guidance and Tracking section of the Teaching and Learning Materials section of the Pearson subject websites.

The aim of the visit is to see that you are assessing your students' competence using the CPAC in the same way as other centres, or in other words standardising everyones assessments. Centres with more than one teacher must ensure that their teachers are standardised too, each criterion should be applied by different teachers in the same way to different practicals. The easiest way to do this is by producing Pen Portraits for each criterion in each practical. There is guidance material on the subject websites and the essence is to produce three simple 'can do' statements which describe what teachers look for in a competent student. A pen portrait should be specific to the aspect of the criterion being assessed and specific to that practical in that centre. Compiling these as a departmental activity has been seen as a valuable in-house training opportunity on days set aside for such activity.

When arranging a visit, the monitor sends a Centre Details Form, and we are grateful to centres for their prompt return of this basic information as it helps to plan the timing of the visit. The monitor asks for the spreadsheet on which students' progress against the criteria is recorded, this too helps to form a picture of the centre's assessments. We found that receiving the work of one student makes a terrific difference to the efficiency of the monitoring visit and we are very grateful for the work done by centres in compiling this. We carried this over from the remote visit protocol but greatly reduced the scale.

During the visit the monitor needs to see the records the centre keeps, showing a simple plan for how and when the Practical Endorsement will be delivered and how the students are progressing in their competence as assessed using the criteria. They also need to see some assessment of the criteria taking place in lesson time. Both these aspects produce very few difficulties, and the lesson is a good time to discuss the assessment of the visual criteria. The main problem is in assessing

individual students. They work in pairs a lot of the time and it is essential that each student is properly assessed on their own contribution to the work. This is likely to be very difficult if they work in threes and centres should do what they can to allow students to complete each practical in pairs or alone. This often depends on the nature of the work but providing for individual assessment must be the priority and centres are encouraged to do what they can to ensure sufficient apparatus is available. Whilst assessment can include asking questions it is very difficult to avoid overhearing others' responses, so it is best if the questions are varied, and each criterion can be covered over a number of practicals. The visit usually ends with a discussion between the Lead Teacher and the monitor, and we find that teachers appreciate the feedback which they usually find helpful and supportive.

A review of the way the criteria are applied is shown in the Appendix at the bottom of this document, this does not include all the variations, but the aim here is to show the consensus. Centres should not try to assess every aspect of a criterion every time it is assessed. 2c, 2d and 5a have multiple strands and it is not practicable to assess all of one of these criteria on any occasion, never mind every occasion. Centres will find that pen portraits help them keep track of which aspects are covered in each practical and arrange full coverage of the criterion. I should say that cycle 4 showed us that centres producing the most reliable assessment of their students used pen portraits to state exactly what they were looking for in a competent student. Centres should note that some criteria, 2c, 2d, 3a, 4a, 4b and 5b can be assessed from written work and the others 1a, 2a, 2b and 3b only by observation in the lab. CPAC 2c, 4a and 5a are likely to be more accessible if both types of assessment are used.

The reasons that centres failed a visit are found in the requirements of the scheme. Centre records should be complete, and the spreadsheet should agree with the student work. This is only really possible if the student's work is annotated, for example ✓4b is completely sufficient. This also provides feedback for the student, and it is a good idea if students transfer this annotation to a tracking sheet at the front of their workbook or folder. This helps them develop a sense of ownership of their progress. When students are not awarded a pass, a few words will often suffice to explain what is missing. Few centres failed the visit for failing to keep proper records, but many could improve their use of the spreadsheet by including a student tracking sheet as described here. The most common shortcoming was that they had failed to 'unhide' columns on the summary pages when they changed the criteria assessed for a particular practical. The summary pages give teachers a clear and single view of student progress and success when decisions about awarding are made, and it is vital that a full picture of each student is shown. There are instructions on the subject website on how to unhide columns.

The most common reason for failure is that the criteria are applied inappropriately. This can mean that they are applied in a different way in different practicals or by different teachers. Standardisation is a key aspect and centres must ensure that they can show action taken to standardise assessment. The more successful centres use pen portraits to standardise their assessments across staff and cohorts.

This scheme of assessing practical work has been in place now for four compete cycles, or eight years. It might be considered a very successful way of encouraging centres to use practical work in their teaching, whilst encouraging centres to fund it. By providing a system of competencies assessed by teachers in class there is also a huge flexibility that I would encourage centres to develop in such a way as to personalize their own scheme of assessment. The rules are that a centre must demonstrate that each student has used all of the techniques and apparatus listed in Appendix 5c of the specification and they must assess their students' competence by using the CPAC criteria. These

contribute to the award of the Practical Endorsement. I would encourage centres to develop their own practicals and to use their own mapping of the criteria for practicals so that it more suitably fits the strengths of their centre. Centres might make a start by developing their own mapping of the criteria applied to the current group of 16 (or 18) practicals.

The scheme is about centres developing competencies in their students whilst also assessing that competence; and using the same practicals to do both these things does lead to some tension. The awarding of the Practical Endorsement to each student individually is a holistic one made at the end of the course. Centres might consider using the Y12 practicals to train their students, they need not be competent at this stage but by assessing them properly they are learning about the criteria, and then use the Y13 practicals, omitting any scaffolding, to fully assess their competence.

Finally, could I remind centres that when changing exam board – or making entries for the first time – that you inform the exam board as early as possible, preferably as soon as the decision becomes a firm one. A monitoring visit can then be arranged in good time.

Keith Bridgeman

CPAC Lead Monitor Pearson

Appendix on the interpretation of the criteria:

CPAC 1a – This is a very straightforward criterion and can be considered as a pass if the student can take a reading or make an observation with the apparatus set up as detailed by instructions. This is usually assessed properly by centres.

CPAC 2a must be a development of 1a and is a pass if the apparatus is used correctly and the experiment can be completed. This should be applied across a range of apparatus and techniques. The 'minimum of assistance or prompting' should come in the form of leading questions. Whilst centres are getting the difference between 1a and 2a about right the use of an investigative approach should be more evident in Y13 work as students develop their confidence.

CPAC 2b This varies between subjects and teachers should consider this a development of 2a. It is worth noting that perhaps some practicals are too straightforward to demonstrate such development. Some element of adjustment in process or use of apparatus is expected, such as fine tuning the method to improve accuracy or being able to monitor two instruments at the same time. Centres should take care to differentiate between 2a and 2b

CPAC 2c This has two elements, identifying control variables and then taking action to ensure that control is exerted. Some centres ask students to identify all the variables before starting work either just by stating them or including that identification in a written plan. The second element is distinct from the first and often missed by centres. If a student is following a plan, they can be asked the purpose of a particular action thus giving the opportunity to explain their control of a variable. Such oral assessment is likely to be overheard, so some care is needed when assessing in this way.

CPAC 2d also has two elements but the theme is that students are expected to make decisions about their apparatus and their method. A simple way to assess this is by written plan. Note that these should be completed in controlled conditions as there is plenty of help available online, not least the Pearson worksheets. This is probably the most demanding criterion and there is further advice on this and all the criteria in the 'Guide for Lead Teachers' which is available on the Pearson subject website.

It might be useful to note the ramping up of demand across these five criteria and assessment should reflect this. It is also worth pointing out that 'what' and how' are key aspects of all these criteria and 'why' might be required in a written paper but is not a practical competence.

CPAC 3a & 3b are usually poorly differentiated by centres.
3a is best assessed by writing a risk assessment prior to carrying out the practical work. It is perfectly acceptable for these to be completed on a template such as are produced by CLEAPPS, or on one devised by the centre. Sometimes it is important to consider the disposal of waste in this context and this is often overlooked by centres. The Risk Assessment should identify the hazards, assess the consequent risks and state what mitigation might be used. It is perfectly acceptable if, following scientific analysis, the risks are deemed small, and no mitigation is needed. Many centres award this for incomplete or trivial assessments especially when the work has very small risks. Normal laboratory practice is assumed and need not feature in a Risk Assessment.

3b is for working safely. This can be by following a risk assessment made by the student or one given to them, many reputable sources exist. It can also be by simply working properly but there should be real risk involved and not something trivial. Safety should include that of the student, fellow students and apparatus and environment. These two criteria are frequently confused.

CPAC 4a can be considered a development of 1a and 2a. The key word is 'accurate' and students pass this if they take accurate readings or make accurate observations and produce an accurate result. This is likely to be very different in different practicals and in different subjects and assessment should focus on positive action being taken to ensure accuracy.

CPAC 4b is about recording readings. A table with headings and units should be constructed by the student before work starts – this shows an awareness of planning. The table should be populated by the readings using the resolution of the instruments used – trailing zeroes is a very common fault here. Sufficient readings might be an element of the planning in CPAC 2d or it might be assessed under 4b. Centres should ensure this aspect is not assessed for different criteria and should endeavor to stick with their choice.

CPAC 5a This is underpinned by the opening statement 'Uses appropriate software..'. There then follows three aspects of where this use might be seen. The circumstances vary hugely between practicals and between subjects and is largely governed by the resources of the centre. Assessment should be made taking all this into account and they should be made in the spirit of the student demonstrating competence. Note that there are three elements to see here ie process data, research and report findings. All are needed but not necessarily in the same activity.

CPAC 5b is simply for citing fully the use of external resources to assist planning and conclusions. These resources can be written or online and the citation should enable the assessor to find the reference exactly. Centres often ignore the multiple aspects of this criterion which requires students to engage in planning and concluding.