## CPAC Pen portraits

These exemplars are designed to exemplify the application of the standard for each of the CPAC criteria.
A pen portrait has been written to clarify what is meant by 'not achieved', 'achieved' and achieved at a level of competence exceeding the CPAC standard

| CPAC | Not achieved | Achieved | Exceeds standard |
|---|---|---|---|
| 1. Follows written instructions | **Context**<br>Year one GCE A level (y12) chemistry<br>Preparation of a soluble salt using a titration.<br>**Observed**<br>The teacher demonstrated how to use titration apparatus.<br>A learner attempts to follow detailed written instructions but the teacher intervenes on a number of occasions to correct the learner.<br>The learner did not work independently to follow written instructions as demonstrated by teacher intervention | **Context**<br>Year one (y12) GCE A level Biology<br>Extraction of DNA from living material.<br>**Observed**<br>The class opened with a discussion about the principles of extraction of DNA. The specific detail of the method to be followed by learners was not discussed other than a reminder about safety issues.<br>Learners worked individually to complete the task.<br>The learner followed the written procedure carefully, confidently and without intervention by teacher. | **Context**<br>Year two (y13) GCE A level Chemistry<br>Estimation of copper(II) salts<br>**Observation**<br>The learner read the instructions through prior to starting the practical. He weighed accurately using 'weighing-by-difference' the mass of copper(II) sulfate and was able to use good technique to accurately make up the standard solution. At all points he worked efficiently and was able to complete the practical with minimal viewing of the instruction sheet.<br>The learner was able to interpret instructions and use good techniques to meet their demand.<br>The learner shows advanced skills in being able to interpret simple instructions by 'adding flesh to the bones'. He was able to correctly interpret where mass readings needed to be accurate (weighing copper sulfate) and approx. (weighing potassium iodide) and needed no prompting to use appropriate weighing techniques. |

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| 2. Applies investigative approaches and methods when using instruments and equipment | **Context**<br>Year two GCE A level (y13) biology<br>Investigation into the abundance and distribution of plants in a habitat.<br>**Observed**<br>The learners were asked to work in groups of three to plan and carry out the investigation.<br>One of the learners appeared to have more input into the groups plan while the other two appeared to be more easily distracted and allowed the first candidate to lead. They were clearly distracted and consequently worked less methodically than they could have. Appropriate equipment was used by the members of the group although they demonstrated a somewhat cavalier approach to collecting the information. There was also some confusion over recording information.<br>One learner in the group was able to give a rationale for the way in which they completed the investigation but the other two seemed less clear.<br>It was difficult to be certain who contributed what to the investigation. One learner clearly took the lead but the group work was poorly managed which lead to some failures in the 'doing' of the activity.<br>While group work may be allowable under certain circumstances, it is important that the contribution of each learner is clearly identifiable and that the learners can evidence the key aspects of the CPAC2 skills. In this case, the best that can be said is that one learner was working towards aspects of the assessment criteria while the other two showed little evidence. | **Context**<br>Year two GCE A level (y13) chemistry<br>Planning a sequence of tests to identify organic compounds<br>**Observed**<br>A learner devised a suitable testing sequence that would allow for the identification of the compounds in relatively few steps. He was able to follow the steps, choosing appropriate reagents for each of the identified tests with minimal assistance. He recognised that one of the steps in his sequence was not necessary when testing compound 'V' – (benzenecarbaldehyde) and he modified his testing sequence accordingly. He was able to give reasons for his testing sequence and understood what he was doing. | **Context**<br>Year two GCE A level (y13) physics<br>Measurement of $g$ with a pendulum<br>**Observed**<br>The learners were given a box of equipment and asked to device a method to measure $g$ using only equipment from the box.<br>A learner illustrated the method that she would follow by drawing a simple diagram and by outlining the steps she proposed to follow.<br>The learner first chose to make two trial runs to measure the time of a period for both the longest and shortest length in order to check the range of values and also to determine whether the shortest length could be measured without significant error. She decided to increase the length of the pendulum of her shortest run in the light of her experience.<br>The learner understood what she was doing and could give clear reasoning for the method she proposed.<br>The learner recognised the need to take multiple readings for each period of the pendulum and could give reasons for variations in the period for each length. |

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| 3. Safely uses a range of practical equipment and materials | **Context**<br>Year one GCE A level (y12) chemistry<br>Indirect determination of an enthalpy change of reaction<br>**Observed**<br>A learner broke a mercury thermometer in the course of an experiment and was seen putting the broken thermometer in a draw. No attempt was made to deal with any spilt mercury. The learner continued with his work and did not report the incident to class teacher. The incident is mentioned to the teacher who intervenes.<br>The learner failed to minimise risk of harm to himself and others in the class. | **Context**<br>Year two GCE A level (y13) physics<br>Measurement of the specific heat capacity for a solid by the method of heat transfer<br>**Observed**<br>A learner produced a risk assessment identifying the significant hazards and risks with suitable control measures. (3(a))<br><br>His practical work space was well organised. He worked safely and handled equipment confidently and competently. The practical period was completed without incident. (3(b)) | **Context**<br>Year two GCE A level (y13) chemistry<br>Planning a sequence of tests to identify organic compounds<br>**Observed**<br>A learner prepared a detailed risk assessment covering all aspects of the practical work. (3(a))<br><br>The learner completed the investigation safely in accordance with laboratory requirements and risk assessment. At all times she worked confidently and without need of intervention.<br>Her workspace was well organised. She spilt a small amount of ethanamide in the fume cupboard but warned those working near her and then reported this to the teacher (laboratory rules specify that spills are to be reported to teacher who deals with situation). (3(b))<br><br>. |

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| 4. Makes and records observations | **Context**<br>Year one GCE A level (y12) biology<br>Preparation and scientific drawing of onion cells including calibration of actual size and magnification of drawing.<br><br>**Observed**<br>Three cells were drawn but these appeared out of proportion with cells viewed by candidate. Very little observation of the image was made by the learner who appeared to draw what she thought should be present. The learner was clearly distracted from the task by chatting to her neighbour. No indication of length in eye piece units was given. The candidate forgot to record the magnification of the drawing. | **Context**<br>Year one GCE A level (y12) chemistry<br>Back titration - determination of calcium carbonate in limestone.<br>**Observed**<br>A learner accurately recorded data from the titration. He determined the mass weighed by difference.<br><br>He recorded all readings at the time of taking them. His readings were recorded in suitable tables to an appropriate number of decimal places taking into account the resolution of the apparatus (e.g. burette readings were to 2dp with second figure as '0' or '5'). On one titre reading he omitted to write down '0'. This appeared to be an oversight by the candidate who recognised his error when his attention was brought to it. | **Context**<br>Year two GCE A level (y13) physics<br>Measurement of $g$ with a pendulum<br>**Observed**<br>She made two trial runs to measure the time of a period for the longest and shortest length she proposed to use in order to check the range of values and also determine whether the shortest length could be made measured without significant error. She increased the length of the pendulum of her shortest run in the light of her experience. The candidate then made multiple readings of the period of the pendulum at a total of six lengths approximately evenly spaced over the range she determined. She took period readings for six different lengths. She recorded all information immediately into suitable table to an appropriate precision with units correctly recorded. Her tables also facilitated the recording of processed data.<br><br>This was a capable candidate who displays the full range of making observations and recording skills in one procedure. It is possible that different aspects of these skills could have been demonstrated in more than one experiment.<br>It is not necessary to record processed data – only raw data- in an appropriate table so this candidate has exceeded the standard. |

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| 5. Researches, references and reports | **Context**<br>Year one GCE A level (y12) chemistry<br>Determination of an enthalpy change of combustion<br>**Observed**<br>The learners were asked to report their findings. The learner observed had some difficulties calculating the enthalpy change and needed assistance from the teacher. The final report was brief and contained some significant processing errors.<br>There was no evidence of research (e.g. checking literature values for enthalpy changes). | **Context**<br>Year one GCE A level (y12) biology<br>Investigation into the effect of temperature on enzyme activity<br>**Observed**<br>The learners were asked to write a report on their findings.<br><br>The learner observed was able to:<br>• process results to obtain an appropriate graph of rate $^{1}/_{time}$ against temperature.<br>• comment on the significance of the findings in his report which was in his own words<br>• research information from two websites which were referenced.<br>(5(a))<br><br>The URLs of the two websites used were given in full with the date accessed. ((5(b)) | **Context**<br>Year one GCE A level (y12) physics<br>Determination of $h$ using LEDs<br><br>**Observed**<br>The learner completed:<br>• a formal and detailed report of his findings using his own words.<br>• The learner correctly used a calculator to find relevant values. The report also contained suitable graphs plotted using Excel to correctly determine $h$.<br>• The report also contained references to critically chosen websites and a textbook. (5(a))<br><br>The references were recorded using Harvard system. (5(b))<br><br>There is no requirement to use the Harvard System or to formally write-up experiment findings and therefore the learner's work exceeds requirements. |