

Summary of Developmental Workshop Minutes

Most meetings were requesting

- Useable samples of finished products for investigations
- a rubric for the investigations
- a template for the poster
- a place for teachers to upload good examples of scientific digital posters

Answers are provided to these questions below. My answers have been edited by Maria James at the VCAA.

Suggested answers to these questions:

- At their sessions in Term 2 the VCAA provided a detailed rubric that could be simplified and adapted for each investigation and a template for the poster. Please find copies of them attached. Updated rubrics for Unit 3 and 4 assessment tasks will be provided in the Units 3 and 4 *Advice for Teachers*. The Units 1 and 2 *Advice for Teachers* will not contain assessment advice since assessment at these levels is school-based.
- The VCAA is working on providing a template for posters.
- The VCAA advises that teachers should be aware of the changes in assessment over time and that, with the move from CATs to SACs, internal assessment is now moderated against examinations. The poster assessment for Units 3/4 is therefore school-dependent: teachers should use assessment criteria that enable a ranking of student work from highest to lowest. A "C" grade poster at one school, therefore, could be different from a "C" grade poster at another school. It is intended that the *Advice for Teachers* documents in the future will have increased electronic facility to enable samples of posters to be placed online. Teachers within and/or across schools may be interested in working together to assess posters.
- On the CEA website under *VCE Chemistry/New Study Design* materials which can be shared are uploaded. Teachers can email their examples for sharing to the CEA project officer who will upload them in this space.

There is greater flexibility in course delivery and assessment for Units 1 and 2. It is teacher /school dependant. The Unit 1 and 2 investigations could be useful for developing the skills needed for the final assessment in Units 3 and 4. The research investigation assists the development of skills required for critical thinking, evaluation and presentation, while the practical investigation provides skill development in areas such as writing a viable question and hypothesis, developing appropriate practical activities, further analysis and evaluation as well as referencing skills.

The requirement of log books will assist with authentication. You can't stop students talking out of class but what they write and how they explain their results should be individual. As you do now, you would need to look out for plagiarism: either copies of material from elsewhere or copies of another student's work. In the second case, you can make it clear that **both** students would be penalised if it occurs. This will reduce the chance of a good student being prepared to share.

Taking different angles to similar topics is possibly another way to help to make the outcomes different.

Because the topics for the Research Investigation are not dependent on content taught in class, you can position this according to your own timetable. Teachers should work with science leaders and laboratory staff to schedule research investigations for all sciences so that workloads for staff and students are manageable. Whether you complete it in one week or over several weeks is entirely your decision.

Questions

1. Could a *Style Guide* be produced by the VCAA for writing up the investigations?
2. If we decide to do a Unit 3 poster for the investigation SAC, when do we enter the results - wait until Unit 4?
3. Is there a publication that has research tasks written at a level similar to what we're looking for? That would help to scaffold the task for students. Doesn't necessarily need to be Chemistry, just Science writing and analysis.
4. What is meant by assessing the students' annotations? Their observations? Their ability to discuss the concepts? Are Discussion questions that link such tasks together appropriate enough?
5. How to authenticate prac reports? Does the log book stay at school only or can it be sighted and signed off so students can complete discussion/questions at home? Does it depend on whether it is a SAC or normal prac report?
6. What form does the logbook need to be in? What should it contain? VCAA guidelines would be helpful? Options include a carbon copy duplicate book, a binder book with prac sheets stuck in or a bound 'prac book' with prac sheets for the year.
7. What is the purpose of the log book? Is it to contribute to S/N or is it just for auditing purposes to ensure students are doing prac work?
8. Suggestion that data book should have ALL relevant formula listed (similar to physics) as focus is now on application of concepts rather than on rote learning.
9. How do these investigations impact EAL students or students with literacy needs?

I am hoping that these questions will be answered in time by the VCAA. To a large degree, some ideas and solutions are provided in the following sections which are helpful as possible solutions to some of these problems.

Ideas

Year 11 Research Investigation

1. Suggestion: teach skills in Years 7-10.
2. Suggestion: position in the two weeks before Unit 1 Exam in late May/June. This could mean it is after the practical investigation! Another suggestion is the last week in Term 1 before the holidays.
3. In Part 1, students develop their research question, hypothesis and methodology and this is assessed before Part 2 – the development of the topic.
4. Because of the nature of research, teachers could consider implementing little research tasks/ research throughout the term/semester.
5. Logistic issues:
 - Offering all choices to the students would increase student engagement and prevent teachers having to mark many, very similar, projects.
 - However, this would create too much work as the teacher would need to know some information on each topic to offer guidance.
 - If a fewer number of choices were offered, those leading into Units 2-4 would be the most suitable eg Options 6 (Crude Oil), 8 (Polymers) and 10 (life cycle of a material/chemical).
 - May be too time consuming to allow students to develop their own research question. Scaffolding a student through this process may be beneficial and a valuable exercise but may not be possible due to time constraints.
6. Authentication issues
 - Students to complete a log book of their research to submit as part of assessment.
 - At end of each lesson on the investigation, students to complete a summary sheet that contains any websites visited and any major findings. (This is what should be in the log book)
 - The teacher could interview each student for approximately 5 mins after they have submitted the assignment on the **process** of the information gathering as well as the content.
 - This last point is obviously time-consuming and almost impractical in most classroom situations.
7. *AFL chemistry* has a great activity about molecules in space which has instructions and great pictures and could be used as a launch for the stars topic.
8. Deciding whether to make the rubrics skill or content-based?
 - If skills to be assessed: effective science communication, appropriate use of scientific terminology, data representation, evidence-based conclusions, etc – would allow for choice but common assessment.
 - If content-based assessment: would need to limit topic area – minimise student choice so teachers have good understanding,
9. Suggestions of how to tackle the high literacy demands of this task for EAL or low literacy students:
 - If it doesn't need to be in essay/report form, the text could be supplemented with an annotated diagram.
 - Use subheadings to sign post sections, could be brain stormed by student and teacher to give feedback – to make it more a report rather than essay.
 - Frame as a literature review and that this is something scientists do often to collect and understand current knowledge and theory in a particular field of interest.
10. Suggestion: Possibly supply a list of reliable and reputable sources so students are not just grabbing stuff from google –lessons on validity and reliability of information

Ideas

Year 11 Practical Investigation

11. Easy water analysis tasks include:
 - pH of different water samples
 - titration of an acid to determine concentration
 - solubility of ionic substances and/or gases (O₂ and CO₂) in water.
12. Suggestion: Position in the middle of AOS 2 in Term 2, once they have covered the appropriately related topics.
13. It would be necessary to allow feedback on each student's question, prac method, general outline and timeline, before the prac tasks start.
14. Focus on a limited number of questions and/or methodology. It may not be practical for students to carry out certain investigation depending on resources available to schools.
15. Authentication issues
 - Compared to the Research investigation, most teachers thought authentication would pose less of a problem as it is based on the students' own experimental design and first-hand data rather than second-hand data or information from the internet.
 - A solution to any authentication issue is to use a log book throughout their investigation which is to be submitted as part of assessment.
16. Sourcing of templates for the poster; VCAA suggested website:
http://www.posterpresentations.com/html/free_poster_templates.html
17. Stressed importance of the scientific conventions of report writing and getting Year 11 students to do a poster.
18. Students could select their own investigation within a theme, ie. Water Pollutants, with possible investigations within this theme being Cl⁻ presence and conc., temp variations and associated ion concentrations, precipitates, total dissolved solids, phosphorus levels.
19. Suggestion: To reduce time for the investigations, need to embed training in experimental design and report writing into the lower year levels. This could be done in Year 7 by teaching skills needed for an *Aim and hypothesis*; in Year 8 the skills for *Methods*, etc
20. Suggestion: Keeping detailed notes by the students in their log books, as they complete pracs would be helpful when completing their poster.
21. Suggestion: For the presentation of this work, the school could host an event after school hours so that students can showcase their poster to parents, peers and other teachers.

Satisfaction of outcomes for VCAA in Year 11

To satisfy outcomes, when students achieve less than 40%, one option may be to give them an alternative, open book task so that students can clearly demonstrate satisfactory completion of outcomes. Another option may be to assess the student's completion of homework tasks, worksheets and attendance in class.

Other concerns

Gas laws have been removed and all that is required is the Universal gas equation which is listed in the Study Design in the middle of energy from fuels. Some teachers may decide to teach the gas laws briefly as an introduction or perhaps even consider introducing Boyle's and Charles' laws only in Year 10.