**Maria James** - Good afternoon, everyone, and welcome to the VCE Implementation webinar. It's regards Units 1 and 2, and we'll be looking at knowledge, skills and assessment. The VCAA respectfully acknowledges the Traditional Owners of Country throughout Victoria and pays respects to the ongoing living cultures of First Peoples.

The purpose of this session is to respond to your submitted webinar questions. They mainly relate to the review of the major study design changes, and we're providing some examples of Aboriginal and Torres Strait applications as well as the main focus being on providing assessment examples. I'll also respond to other questions arising during the webinar, and I'm very lucky today to be supported by Karen Reid. So, Karen will be monitoring the questions. Just to let you know that you can submit questions by typing into the section there, and that you should note that not everybody can see a question, so it's only the panellists that can see the questions, that is Karen and I, and what I'll be doing is that - with those questions - Karen will be asking them and then I'll respond to them so that everybody can hear them. Just a reminder that we've got staged implementation.

So next year we have Units 1 and 2 starting, and the following year will be Units 3 and 4, so that a group of students will be exposed to the new study design in subsequent years. One of the questions that was asked in our survey was for me to highlight the changes between study designs to explain what's new, what's changed and what's been deleted. I'll start with the key science skills. So, we've tweaked the general key science skills and I've got the changes in red, so there's not much of a change there, but you will notice some changes for Chemistry in the 'contextualised skills' section.

So, we've talked about formulating hypotheses and predicting possible outcomes of investigations. We've talked about determining appropriate investigation methodologies, and we have got eight specified methodologies in the new study design. We've talked about using risk assessments... they're informed by safety data sheets, and demonstrating ethical conduct in reporting results, particularly, so that students should be reporting what they find, not what they think they should find or not what they think are ideal results. We've included databases and reputable online data sources as being a skill that students should develop as well as organising and presenting data in useful and meaningful ways. We've specified how significant figures will be treated in the new VCE course, and we've got some new terms: repeatability; reproducibility; and resolution.

Also looking at evaluating investigation methods and suggesting ways to improve precision and to reduce the likelihood of errors. Distinguishing between opinion and evidence, and between scientific and non-scientific ideas, and that will be particularly relevant to the Unit 1 Area of Study 3 options. Applying sustainability concepts to analyse particular scenarios, and to explain decisions that are based not solely on scientific evidence. Resolution is a new term that we've introduced, and this is particularly interesting because there's been a confusion between resolution and precision.

So, I thought that the diagram of the two gas syringes give a good illustration of what resolution actually is... so we are looking at it in terms of the instrument measurement. So, the bottom gas syringe you can see has got more graduations than the top syringe, so it measures smaller changes, and we say, therefore, that the bottom syringe has a higher resolution than the top syringe. Precision is used in reference to repeated measurement values, so it doesn't relate to measurement instruments and should not be confused with resolution. With the key skills across the VCE sciences, I had a question about how consistent is the science inquiry terminology... so terms like 'validity', 'reproducibility' across the sciences... and are students going to be confused if they study multiple sciences that have different expectations?

So, the answer to that is that there are slight variations across the sciences, and we've tried to maintain consistency, but there are some differences that are specific to the disciplines. So, for example, 'resolution' only applies to the quantitative sciences. 'Reliability' is actually a term that applies to psychology, but it does not apply... we're not using it for chemistry because it's not used in the standard metrology texts, that is the GUM and the VIM. 'Repeatability' and 'reproducibility' are defined in those texts, and I think that they're much more useful for students in terms of evaluating their results, so talking about whether they can repeat the results themselves, or whether other students can reproduce their results if they undertake a similar experiment. We've also included the terms 'true value', 'accuracy', 'precision' and 'measurement result' because they've also been defined in GUM and VIM. 'Validity' can be applied to both the validity of the methodology or the method, and also the validity of the data... and significant figures relate only to VCE Chem and Physics.

So, we have specified how they'll be treated, and they are treated in the same way for both of those studies. So hopefully there'll be very minimal confusion for students. There was a question about how strict are we in adhering to the minimum of 17 hours of class time for pracs and investigations in Units 1 and 2. The study design used the word should, so you can interpret that as being that we recommend that, but the reality is that chemistry is a practical-based study, and most concepts can be taught through practical work. So given the broad definition of practical work, so that is, activities that include lab experiments, field work, simulations, modelling... I think the time guidelines do reflect current teaching practise and they're not going to be too onerous.

There is a section in the administrative handbook that talks about each VCE unit being 50 hours of scheduled class time, and that it's expected that students also undertake 50 hours of self-directed learning for each unit, but in the 50 hours of scheduled class time per unit saying that we've got 17 hours across Units 1 and 2 for each of Units 1 and 2 I think is a realistic expectation. Just to unpack that... and I think if you look at the different sections in the Areas of Study... so what you can see on the screen there are the different sections highlighted in bold. So, for Units 1 and 2, Areas of Study 1 and 2, you can see that we've got... what is it, about 12 or so different headings. And what I've got is an example of the types of experiments that you might do. And you can see for each of the sections that we've got in each unit that it does lend itself to practical activities. And I've listed two for each of those sections. And if you actually did all of that, then you've covered all the practical work very easily, and many teachers do much more than those particular activities.

With the changes to Unit 1 Area of Study 1, you can see that what's new relates to the critical elements, metal recycling, the formulas and names of ionic compounds... so we've moved that from Unit 2... and there's a new section on the separation and identification of components of mixtures. What's been modified is that we've shifted any quantification into Unit 1 Area of Study 2; the review panel felt that having numerical calculations too early in the course was disengaging for many students, so we've shifted it so that you have a bit more time to work out where students are at in terms of their numerical skills, and that you can adjust your programmes to be able to accommodate that. We've also shifted solubility tables and precipitation reactions from Unit 2 Area of Study 1 into Unit 1 Area of Study 1, and then we've specified the covalent substances, and the shapes of molecules that are to be studied.

We've deleted things because the course in Unit 1 particularly was really heavy. So, we've eliminated... I've listed them there... so things like the absolute size of particles, Bohr model, Schrodinger model, limitations of models, nanomaterials, crystal formation. That's not to say that you can't do those. So even though we've deleted them, if those things are going to fit your programme and if they match the outcome statement - because for each area of study, you need to suit or you need to deliver the outcome statement - if they match what the outcome statement is, then you'll certainly able to include them. And of course, that's going to be dependent on time as well.

With the Unit 1 Area of Study 2 changes, we've introduced haloalkanes because they do link to polymers. And we've got plant-based biomass. We've looked at everyday organic compounds and their benefits and health and/or environmental hazards... condensation reactions, and some of the new plastics... so categorisation of different plastics and innovations in polymer manufacture. What's been modified is that we've included the quantification of atoms and compounds from Unit 1 Area of Study 2. We've listed names and structures of organic compounds only up to C8 and C5 for structural isomers, and we've modified the advantages and disadvantages of the use of polymer materials. We've talked about it, as you can see, in the 'what's new' in that last point there. And we've deleted origin crude oil, esters because we've got those in Unit 4. And linear polymers in terms of percentage crystalline areas, and addition of plasticizers.

Unit 2 Area of Study 1 changes... is that we've introduced the density of solid ice compared with liquid water... types of antacids... calculation of pH using the ionic product of water... accuracy and precision in measurements - and that's through a comparison of pH when you measure it using natural and commercial indicators, and also pH metres. So, I think that gives a nice way to be able to teach about accuracy and precision in a meaningful context. What's been modified? We've shifted the comment about distribution and proportion of available drinking water. We've modified the statements about cause and effects of a selected issue related to acid-base chemistry or redox. We've shifted the comparison of solution processes into Unit 1 Area of Study 1, and we've shifted dilutions of solutions into Unit 2 Area of Study 2 to link with titrations. We've deleted the melting point trends in Group 16 hydrides and latent heat.

In Unit 2 Area of Study 2... The changes there are that we've introduced the precipitation reactions to remove impurities from water. We've brought in the ideal gas equation, pV equals nRT, and we've talked about the major gases that contribute to the natural and enhanced greenhouse effect. SLC conditions, the unit conversions, gas stoichiometry and calculations of molar volume. What's been modified? We've shifted distribution and proportion of available drinking water. We've shifted the molar ratio of water of hydration, also. What's been deleted is sampling protocols... definitions and examples of chemical contaminants. We've reduced the number of solution concentration measurements. We've deleted atomic absorption spectroscopy and HPLC because the latter is included in Unit 4, and sources of acids and bases found in water.

For Unit 2 Area of Study 3 changes... What we've done is that we've got some sub-heading sections now so that the investigation is broken down into looking at the investigation design, scientific evidence, and science communication. Looking at primary data characteristics, distinguishing between aim, a hypothesis, a model, a theory and a law. And as I said earlier, we've introduced repeatability, reproducibility, and resolution. Talked about logbook as an authentication of primary data, and the implications of students' selected scientific investigations. We've modified some of the dot points to talk about the distinction between a methodology and a method. And as I said earlier, we have specified eight methodologies in the study design, but we've modified how we talk about the limitations of methods and methodologies, and of data generation and/or analysis. We've deleted reliability, sources of uncertainty, nature of evidence that supports or refutes a hypothesis, model or theory, and options, strategies or solutions to issues related to water quality. So that's very specific changes there.

There was a question that came from a teacher about what's the difference between the key knowledge required regarding solubility tables and precipitation reactions in Unit 1, and the 'measuring solubility and concentrations' in Unit 2. So, the short answer to that is that Unit 1 is really a qualitative approach, whereas Unit 2 looks at it from a quantitative approach. So, we do measurements, unit conversions... so the difference is in that level of complexity there. So, we introduce it at Unit 1, and we look at equations there as well, building their capacity to write equations, and then taking the numerical calculations into Unit 2.

There was a question about to what extent should the new components in the study design be covered? And I think it's similar talking more about the dot points about environmental concerns. So, the specific knowledge required in terms of the new content, particularly in relation to sustainability, has actually been embedded in the dot points so that you can teach it, I guess in a controlled manner. So, you can't be using sustainability principles for every single dot point, it's going to be an overkill. So, we have specified or given examples of where you're going to be using that. So, the metal recycling example I think is good to look at because that talks about a circular economy.

So, we have tried to limit the amounts but still giving students understanding that sustainability is important when you're making products or using products in society, so that we've limited to once or twice across Units 1 and 2, and also once or twice across Unit 3, so that it's manageable and that it's scaffolded. The best thing to do is to have a look at the outcome statement. You always go back to the outcome statement in terms of what you need to teach. So that gives you a scoping for how sustainability fits into the chemical concepts.

There was a question about what excursion opportunities are provided or how can we incorporate excursions into the new study design. Some in the table there... I've just listed a few examples that you might consider. Excursions have been limited in recent years, so you need to be careful about what you want to do. Of course, if you can it would be good to link into local opportunities for excursions. So, when you're looking at the water unit, looking at a local source of water supply that you might want to investigate in terms of the quality of water there. In terms of Unit 1 and 2, you might have a look at particular industries in your local area. So, thinking about, 'is there someone that's manufacturing something?' Because most industries do have a triple bottom line policy in terms of how they deal with sustainability, and I think it's good for students to have a look and see how that's happening. And also thinking about local laboratories, local universities, local scientific facilities... we've got the specialist science centres that you can link into. We've got the technical schools, different online virtual tours. for example. So, there are lots of opportunities for including excursions.

I had a question about what the VCAA expectation is for Unit 1 Area of Study 3. So, you would hopefully have seen that that has been significantly changed. We now have four areas of choice that students can have. The outcome itself talk... and again, I talk about going back to outcome... the outcome talks about the student being able to investigate and explain how chemical knowledge is used to create a more sustainable future in relation to the production or use of a selected material. So, the outcome applies to all four investigation topics... it applies to any question that students may generate from those topics so that student-generated topics have to relate to that particular outcome.

You are encouraged to offer all four investigation topics to support student agency. To do that, you can think about using a flipped classroom approach or a Socratic seminar delivery mode and we've got an example of a Socratic seminar approach in our support materials, which we hope to publish online very soon. The investigation topics can be introduced to students through a number of ways and that is by providing a list early in the year for students to think about. So, you can say, well when we get to Unit 1 Outcome 3, this is the topic that you need to be thinking about. You'll be doing something, investigating it independently or in small groups, and you might want to consider topics. You can also provide 'tasters' of the options by embedding some of the key knowledge into the core.

So, for example, looking at investigation topic 1 and the question that we specified there, 'why is helium classified as a critical element?' That links really nicely into the critical elements section as well as the bonding section. We have listed topics under each of those four investigation questions. That's not to limit you to those, students can create their own questions. Those examples are exactly that. They are just examples and hopefully stimulate students to think of their own questions of interest. So, with the Unit 1 options, the question was, if I offer different investigation topics and research questions to my students, how can I make sure that my assessment is equitable? So, as I said earlier, the outcome statement and the set of key knowledge points on pages 29 and 30 of the study design, apply to all investigation topics. So those key knowledge points can be used as a basis of an assessment. For example, by taking the key ideas from the key knowledge as a basis of criteria for a rubric, a set of key science skills should also be referred to when you're developing assessment schemes, and especially the scientific communication section of the key knowledge.

I did have a question about how do you assess key skills with key knowledge. So, I'll show you an example of a rubric shortly. And certainly, when you're assessing a topic like this, you'd be assessing both key knowledge as well as scientific skills. It's good to be able to provide students with this sort of topic with an assessment rubric prior to them undertaking their task, so they know exactly what's expected of them because the topics are generally fairly broad, and if students are doing something different, there needs to be some commonality about how they are going to be assessed and compared, and what you would be looking for in terms of meeting the outcome. You do need to check your students questions to make sure they're comparable to other questions in terms of the level of complexity, time involved in researching it, and relevance to the study design.

**Karen Reid** - There was a question on where they can find the key science skills planners.

**Maria James** - All of those will be put up on our website. But again, if there's anything that you'd like that hasn't been published on our website, please contact me and I can help you with that.

**Karen Reid** - And there's been a question that's far more specific, it's, will significant figures be in line with maths now?

**Maria James** - I don't know what maths does and I think maths goes into... they talk about decimal places rather than significant figures. So, I don't know... we've just gone with what physics and chemistry are doing internationally.

**Karen Reid** - Yes. Yeah, and that was another question about what GUM and VIM stand for and they're just names of particular associations that are part of the Standard Metrology References material that how-

**Maria James** - I think GUM is something like Guidelines to Understanding Measurement. If you just Google GUM or VIM, and VIM-

**Karen Reid** - You're more likely to get-

**Maria James** - I think it's Validity in Measurement or something like that. But if you google GUM and VIM, and you can even be more specific and say, 'GUM validity', 'GUM precision', 'GUM resolution'... they'll give you the definitions as they appear in the standard text.

**Karen Reid** - And another one about the Data Book. Well, yes, of course the Data Book will be up updated, but it's going to be updated and probably available at the start of '24 when the Year 12 starts to be implemented.

**Maria James** - The data book will be-

**Karen Reid** - Yeah

**Maria James** - updated and thank you, too... we had a lot of responses to our survey about the exam and what the Data Book should include. So, we'll be taking that on board. We'll be publishing the examination materials after students have sat their Year 12 exam next year because there's a problem, an issue, with having a confusion of Data Book forms. I'm thinking that the next Data Book's going to be significantly different. We've had lots of fantastic suggestions from people, so that will look different, and what we are hoping is that it will be published at the start of the year because often the Data Books are published midyear, so we're looking at timelines so that they're accessible to teachers and students at the start of the academic year, because we are anticipating that they can be used by Year 11s as well as Year 12s.

**Karen Reid** - So apart from that, I think I've covered it all.

**Maria James** - Great, thanks Karen. And as I said, please keep putting the questions in and if we don't get through them, I'll certainly respond to them after the webinar. So, I had questions about how do the Units 1 and 2 assessment tasks link to the Units 3 and 4 assessment tasks? And what are some examples of the new assessment tasks? So, these questions probably formed 75% of the queries that we had through our application to submit questions. So, what I've done is that I've listed all of the Unit 3 and 4 tasks one by one. So, one of the tasks is the comparison and evaluation of chemical concepts, methodologies and methods and findings from at least two practical activities.

So, what I've listed on the left side in that left column are the Unit 1 tasks that relate to that. So, if we are going to be delivering the new assessment tasks for Units 3 and 4 in 2024, next year in 2023, with the Units 1 and 2 tasks, you can actually scaffold students to be able to deal with those Unit 3 and 4 tasks in 2024. So, the types of tasks that link to that comparison, are ones that, I've got some examples there... So, the comparison and evaluation of chemical concepts, it's almost the same wording - and findings from at least two student practical activities. The reflective annotations of one or more practical activities also relate to, or develop, those sorts of skills. The summary report of selected practical investigations also develops those skills, and the analysis and evaluation of generated primary and/or collated secondary data linked to it as long as you refer to more than one practical activity or set of practical results.

The infographics and the scientific poster are really presentation modes, and they can apply to almost anything, but they do... you can present your comparison as an infographic or a scientific poster. A sample task, and for each of the - I think there are 13 - tasks that we've listed in the Unit 1 and 2 studies, and you're not limited to those, you can do your own. So, a comparison evaluation of two practical activities. This is an example where we are looking at students generating data about metal reactivity from two different experiments, and then they compare the data obtained and draw relevant conclusions.

So, the first method is looking at an experiment where students look at the reactivity of metals in water and acid. And then the second activity is that they look at the displacement of chemical reactions. So, they'll do a comparison report, and a report can take any form: it can be oral, it can be written, it can be a poster, it can be a set of PowerPoint slides that they go through. So, the formats are completely up to you. So, you might ask an open question such as 'how do the two methods compare in terms of determining a reactivity series of metals?' And those open questions, as I said, can be assessed using rubrics. And for most of these activities we've also got some pre-assessment discussion suggestions. So, looking at providing students with stimulus material relating to the task. And this will be part of the teaching as well.

So, looking at different metals rusting at different rates - and students would have examples of rusting type experiences - so looking at the rate of rusting, and talking about how it's going to be dependent on environmental conditions, and discussing factors that may affect the rate of rusting... So, you can elicit some of the responses from students, and then do some testing, and have this as an assessment task. Think also about maybe using assessment tasks not just as a summative task but for formative purposes. So, looking at delivering a task midway and seeing where students are at and then perhaps having some follow-up activities, that reinforce some of the concepts that they weren't so clear about. So, you can scaffold assessment tasks.

So, the metal reactivity assessment task... you could actually use a marking scheme. So, it might be something like they've done the two pracs, and then they can comment, and in a session that you supervise, it might be asking to determine ranking of the metal reactivity from both experiments, comparing the rankings, referring to the periodic table to explain the rankings, writing balanced equations, drawing conclusions, justifying a preferred method, and suggesting how the experiments could be improved. So, coming up with a set of questions like that, it doesn't need to be long, but I think a set of short questions like that do enable you to see where students are at in terms of understanding redox concepts. Another of the assessment tasks that we've got is looking at the analysis and evaluation of primary and/or secondary data, including identified assumptions or data limitations and conclusions.

So, the types of activities listed in Units 1 and 2 that relate to that are the analysis and evaluation of generated primary and/or collated secondary data. The report of a lab or fieldwork activity, including the generation of primary data, the use of modelling or a simulation activity as long as it includes data. And again, we've got a presentation mode of an infographic or scientific poster. So not always thinking necessarily of having a test or a set of structured questions, trying to elicit different ways for students to be able to explain what they know about the chemistry. In terms of an infographic, I've mentioned that a few times - it's a new task format that we've specified or suggested. There are free templates available online and good examples to show your students are the infographics that the United Nations has produced in relation to their sustainable development goals.

And we have specified particular goals that relate to VCE chemistry. I think, publishing those and putting those up in the classroom, are really good ways to show students how you can communicate information about chemistry using few words and using more visual images. So again, this is an important technique in chemical communication, scientific communication, to be able to communicate clearly so that a wide audience can relate to what is being presented. Another of the tasks is problem-solving, including calculations, using chemistry concepts and skills applied to real-world contexts.

So, some of the tasks that we've nominated that can link into that is the problem-solving involving chemical concepts, skills, and or issues... the report of an application of chemical concepts to a real-world context... critique of an experimental design, process or apparatus... and an analysis and evaluation of an innovation or a case study or something that is going to involve the analysis of sustainability. So green chemistry principles, sustainable development, and or the transition to a circular economy. So that's how we define sustainability for chemistry. And you know that one of the tasks, or at least one of the tasks for Units 3 and 4, does need to include reference to sustainability. So, this is an opportunity for students to develop that particular skill in talking about sustainability. Some of the examples that we've got, so a critique of an experimental design is something that would be new.

We've suggested that you might set up a galvanic cell that is deficient or malfunctioning or there's something wrong with it. So set up a galvanic cell, and then students will record the voltage that it produces so that you deliberately construct something that is not going to perform very well and doesn't produce a useful voltage. So, then students are going to be asked to set up a cell and to record its voltage, critique the cell, and they might have to use the electrochemical series to work out why things are happening or not happening. And then for them to justify the changes, then recommending and to set up a redesigned cell that incorporates suggestions, and they might record their voltage and talk about why it was an improvement. So that would be a critique that would fit into this type of task.

Another problem-solving type activity that we've got relates to students looking at formulating an effective antacid formulation - and antacids are a new aspect of the course. So, we've got some background data that compares the different ingredients of different antacids, and that lists the different bases that are used. So, we are asking students to pick two of the bases or to select two, and we've listed what their advantages are, their disadvantages in the human body, how they react chemically. So, students select two, they produce different formulations of them, different proportions of them... so 50-50, and might be 10-90, et cetera. We're suggesting five different formulations, their effectiveness in neutralising the acid, and reporting on that.

So again, problem-solving and using numerical calculations. It might be set up by a pre-assessment task where students look at commercial antacids and investigate the use of universal indicator paper in determining pH. You can neutralise those, you can prepare for it in many different ways. We also have a task at Units 3 and 4 relating to the analysis and evaluation of a chemical innovation, a research study, a case study, socio-scientific issue or a media communication. So, a few of the tasks relate to that. So, we've got one specifically about a chemical innovation, research study, et cetera. We've got a critique of an experiment design that also relates to this particular type of task. A report of an application of chemical concepts to a real-world application, and many media analysis or responses can apply to this type of task as well.

So, a sample task we've got looks at the sustainability of a product. And this is a partial - I couldn't put the whole thing up on a PowerPoint slide because it would be absolutely minuscule - it would take, I think, about four different slides. So, we've looked at green chemistry considerations and how you might unpack that. We've got the example there of Lego moving towards the circular economy by making building bricks from recycled plastic bottles. So again, you can use different examples, and there are, as I said, many examples in the media where you can have a look at that. We've got our teaching and learning activities that will be published. So again, there'll be lots of ideas there about what you can use. So again, thinking about some kind of product that has some sustainability aspect to it. Another example of the assessment task that we've got, and again, this is where we look at student agency.

So, this was a... the photograph on the left there... was a display board in Kings Park which talked about the Indigenous people of the area, looking at glues, forming a local glue. So, a student was interested in that, and you can use that sort of thing to support student agency and to get them to actually connect with chemistry. So, with this particular one, they actually looked at a comparison. And this can also apply to the comparison task where you compare different things, comparing an epoxy resin glue with a native glue or Indigenous glue. So, you notice that they have similar components. A lot of the chemistry actually, particularly of the tree resin monomers, is not really well known. So, for some of the topics that students might choose, you need to be wary that not much information may be necessarily available to them. So, they need to be careful with what topics they choose.

For a media analysis task, again, it doesn't matter what task you use, you might have this sort of a framework that students have to evaluate their media articles with. So, looking at the article itself... so identify what the main points are, are the scientific ideas correctly used? looking at the nature of evidence, looking at the authority of the source, looking at the comments. And a lot of those media analysis are... or a lot of media articles... if you scroll down to the bottom, there are lots of comments that people make. And some of those comments are actually really interesting to evaluate because that's where you get your notion about scientific, non-scientific arguments. The difference between an opinion, a fact, an idea, a comment; eliciting some of those in terms of what are in the media articles is a really useful exercise for students. And particularly getting them to think about what is their view about that? What is the evidence that they're using to support their view about a particular issue? In terms of sample assessment task for a media analysis, often media analysis relates to one article.

This example that was interesting because it's got two articles, but they both relate to the same innovation. So having students being given two perspectives about the same type of issue. So, giving students an idea of what they need to do. So, in this case, they'd have a week to review the articles before they complete the assessment task. So, for, especially extensive articles, giving students time to actually look at them, you might want to spend some time in class discussing the articles before you set the assessment task. But the assessment task and using media articles does give some relevance and some really nice contemporary examples of chemistry that are easily embedded into your teaching. The student-designed and conducted investigation, I don't think needs much to be said about, because that is very similar to what you currently do, or what we currently do it even at Unit 4 Area of Study 3.

The difference is that we've now made it as a 600-word poster presentation. And that is so that students don't just try and cram everything that they've found about their experiment into a poster format because you can't read it. And the point of a scientific poster is that it's meant to be an engaging communication. And in the PowerPoint and the webinar prior to this one, there was a link for you to have a look at... a description of why it's actually important to have fewer words, rather than more words, into a poster. What that does mean, though, is that you can't fit everything onto a poster, so how do you assess a student's in-depth analysis of what they've been doing? You can use their logbooks. So, you can assess their logbook entries in terms of the data generation and reporting, how they present it, how they evaluate it. So, the use of logbooks has been extended, not just for recording purposes, but also for allowing students to work on unpacking what their findings are and thinking about how they explain their findings.

So, then my contact details there, I'm very happy to take questions following the webinar. Well, I hope that answered your questions about Units 1 and 2. As I said, most of them related to what the changes were and some examples of SAC tasks. So, I hope I've given you a broad idea of what that can look like and that you feel a bit more confident in being able to start thinking about delivering Unit 1 and 2 for next year. Thanks everyone.

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