**Maria James** - Hello and welcome to this on-demand recording to introduce the new study design for physics for implementation beginning in 2023. I'm Maria James and I'm the Science Curriculum Manager at the VCAA. I'm pleased to step you through the main features of the study design so that you can begin your familiarisation with it and start to think about how you'll work with it to present to your students. The purpose of this presentation is to support you in delivering the new study design. I'll outline the VCAA resources that you can use in planning your teaching assessment programme, and then I'll explain the main features of the study design including an overview of the content. We'll also look at assessment. A further webinar related to the implementation of Units 1 and 2 will be offered in August. Support for delivery of Units 3 and 4 will be offered in 2023 due to the staged implementation of the study design.

Both the VCE and VCAL Administrative Handbook and the VCE Physics study design are mandated and should be the first place you go to for planning and to find any answers about administration. Whilst the study design has staged accreditation across Units 1 to 4 for 2023 to 2027, it is important that you refer to the VCE and VCAL Administrative Handbook for the year in which you're delivering VCE Physics. So for 2023 you will need to access the VCE and VCAL Administrative Handbook 2023. As well as the VCE and VCAL Administrative Handbook and the VCE Physics study design, a range of resources are available as part of an updated VCE Physics study page on the VCAA website. This web page will include planning advice, teaching and learning activities, assessment advice, examination specifications, and a sample examination.

Resources will be added and updated as appropriate. Units 1 and 2 of the new study design will be delivered in 2023, while Units 3 and 4 will be delivered for the first time in 2024. The study design is underpinned by the scope of the study and the rationale and the aims of the study. Spending time to understand these will allow you and your students to maximise the learning outcomes for each unit. We've updated the cross study specifications and have included two new sections: 'Characteristics of this study', and 'Terms used in the study', to explain how VCE Physics deals with particular terminology and key science skills. We have four units, 11 areas of study with key knowledge to which you can apply relevant key science skills as suits your programme, and assessment information relating to both internal and external assessment. Each unit includes specific content contained within an area of study and is designed to achieve a set of outcomes for that unit.

Each outcome is described in terms of key knowledge which is complemented by relevant VCE Physics Units 1 to 4 key science skills that are included under the cross-study specifications at the front of the study design. It's also important that you take the time to understand the safety requirements that are included on pages eight and nine of the study design. In terms of the overview of key science skills and changes there, there are some new inclusions, particularly in relation to significant figures, the treatment of uncertainty, and the nomination of eight scientific methodologies. Note that repeatability and reproducibility have replaced reliability, and that students should extrapolate as well as be able to construct linearised graphs.

Error bars now only need to be constructed from provided information so that students should understand a term such as 25 plus or minus two metres per second squared, what that means and know how to represent it on a graph. In terms of new inclusions, we have the cross-study specifications with new sections there, the characteristics of the study, the use of verbs in key knowledge, and we've got a cognitive triangle. Treatment of data, so looking at how students are meant to represent tables and how they are meant to draw graphs for VCE Physics purposes.

We've also included terms used in this study that are specific to VCE Physics, such as terms for force and new sections on measurement terms, measurement errors, uncertainty, significant figures, and outliers. In terms of the overview of changes to content for Units 1 to 4 we've tried to streamline content. Unit 1 in particular has been reduced. So although we've included some of the Unit 4 light in the current design, we've put a lot of the content through as options so that teachers have a choice as to how they integrate it. And we've also increased the cohesion of relativity in placing it in Unit 4 to link with light and matter. The key changes really are to Units 1 and 2 assessments. We have sixteen suggested tasks there, although others are possible. And Units 3 and 4 assessment has been reduced to five set tasks. I've posted the two aims of the study design which you can keep in mind throughout this presentation. The focus on both qualitative and quantitative analysis and the evaluation and explanation of physics phenomena are important aspects of this study design.

The key science skills are a core component of VCE physics and apply across Units 1 to 4 in all areas of study. In designing your teaching and learning programmes for each unit, and in assessing student learning for each outcome, you should ensure that students are given the opportunity to develop, use, and demonstrate these skills in a variety of contexts. Revisiting these skills across Units 1 to 4 allow students to build understanding of how science knowledge is built on the application of these skills. Thinking about integrating key knowledge and key science skills, you can look at the set of key science skills and think 'Wow, that's a lot of skills to cover', but many are explicitly included in the key knowledge, such as the one related to linearising graphs, which can be developed across all units, as seen in the examples in the table. It's up to you to work out what skill you want to teach in association with which key knowledge. Your teaching plan should account for all key science skills.

To help you, we've published planners for each of Units 1 and 2 and Units 3 and 4. In terms of scientific investigation, three key points underpin investigations no matter what methodology you may use - asking questions, testing ideas, and using evidence. Eight methodologies have been outlined in the study design and further information will be available in the support materials on our website. Some examples of scientific methodologies are shown in the slide. The learning activities on the website have been tagged with the relevant methodology to help with your planning. Practical activities can be used to introduce and consolidate understanding of a physics concept and to develop scientific skills. Practical activities may also be used to develop assessment tasks such as the production of a scientific report, or a poster based on logbook records, reflective annotations from a logbook of practical activities, and the analysis of data. The new study design has slightly increased the time allocated for practical activities as you can see in the slide. With logbooks, for the purposes of VCE Physics we've extended the use of logbooks from just being a record of students' primary data to include note taking by students related to the collation of secondary data as well as supporting you to authenticate and assess student work. Logbooks can contain things like qualitative and quantitative data, results of guided activities, planning notes for experiments, results of investigations, or notes taken from field work.

It might be simple observations, it might be calculations from spreadsheets, digital records, anything that students are working with in terms of data and recording. In particular, any work completed by students outside of class should be recorded in the logbook so that you can actually check on them in terms of authentication. With the formula sheet, currently that's being reviewed along with the examination specifications for the new study design, and we'll be publishing that in December 2023 after the 2023 VCE Physics examination has been sat by students. That is to avoid any confusion about which formula sheet belongs to which year and to which study design. Students should be encouraged to become familiar with the formula sheet as part of regular classes. The development of the students' A3 pre-written notes has been really well supported by students and teachers in our consultation so it's likely that that will be retained for the new study design. Across Units 1 to 4, units and areas of study are structured as a series of curriculum framing questions that reflect the inquiry nature of physics.

Schools can offer either Unit 1 or Unit 2 in semester one, so there's choice there. Areas of study and key knowledge within a unit may be sequenced to meet the individual situations, resources, and needs of schools. As well as being a standalone area of study the content of the Unit 2 options can be used across Unit 1 and 2 core components of the study design by providing real-world examples and applications as well as a taster of the Unit 2 options for students. As you can see in the table, there are some examples of how you might achieve that integration. With the Unit 3 and 4 structure, Unit 3 must be undertaken before Unit 4. So unlike Units 1 and 2 where you can switch them, in this case you must do Unit 3 before Unit 4. Unit 4 only has two areas of study to decrease the assessment load for students and teachers. Whilst reported in VASS as part of Unit 4 the Unit 4 Outcome 2 student-designed scientific investigation can be undertaken in either Unit 3 or Unit 4 or across both Units 3 and 4.

The investigation involves the generation of primary data relating to fields, motion, or light. Because each school is different, because students have different strengths and talents, and there are different available resources, schools have flexibility in designing curriculum programmes that meet the needs of their cohort. To assist you in planning we've provided some planning templates. And you can see, although they're used for new schools delivering VCE studies, they're really useful for all teachers in planning their programmes. We've got some sample teaching plans on the website that will show you how you might structure a course, especially if you're new. And you can use the QR code to access the template. With Units 1 to 4 school-based assessment, there are two components to it. First of all, satisfactory completion of an outcome. So you need to report, for each of your students, an S or an N for all of the outcomes for Units 1 to 4. In terms of the actual levels of achievement by students, that determination is school-based for Units 1 and 2 but for Units 3 and 4 schools and students need to undertake School-assessed Coursework which then gets moderated against the external examination.

So there are two different ways of reporting levels of achievement across Units 1 to 4. Integrity is really important in terms of assessment. You need to, in terms of your schools, build a culture of integrity and authentication. And your school should have processes as to how that's actually achieved. In terms of the VCE assessment principles, these four principles must be followed. All assessment across Units 1 to 4 must be valid and reasonable, it must be equitable, it must be balanced, and it must be efficient. What does all that mean? In essence, in terms of talking about validity, it has to be fair and reasonable. It has to be one of the designated task types particularly for Units 3 and 4. It needs to be conducted under fair conditions for all students, and you need to include clear instructions. When we talk about equity, what that means is that the assessment tasks have to be accessible to all students that it doesn't privilege one student or another student, and that if you are setting alternative tasks then they have to be comparable in scope and demand. In terms of balance, what that means is that there are a variety of task types used.

Commonly, if you are only going to use something like an exam-mimic task it's not going to be balanced - you need to have considered a variety of tasks. You need to think about a variety of conditions and you need to allow students to be able to demonstrate their achievement by using different ways of assessment. So you can use criteria, descriptors, rubrics, marking schemes. We do provide, for Units 3 and 4, performance descriptors, but they're not mandated. You need to include in your assessment representative parts of the outcomes, key knowledge and key science skills. Talking about efficiency, what that means is having a minimum number of assessments so that you can grade your students. It's a notion of precision versus efficiency, so minimising undue workload and stress on students and on you. It should be part of the regular teaching and learning programme.

You should try and avoid over-assessment, and should be able to authenticate tasks. Completing it mainly in class time and within a limited time framework makes things much easier. For Units 1 and 2 assessment, they're underpinned by those assessment principles. With assessment, as I said earlier, all Unit 1 and 2 assessment is school-based and we have a list of 16 selected tasks for Outcomes 1 and 2 for Units 1 and 2. You can use them or not use them, it's going to be up to you, but again keep in mind those assessment principles of balance, efficiency, et cetera. What we do say is that you can't use the same task more than once across Outcomes 1 and 2 within a unit. And that Unit 2 Outcome 3 needs to be a report of a practical investigation. So you've got some choice in that. I've got some examples of Units 1 and 2 assessment tasks there and you can see examples on our website, because we've got particularly some newer type tasks, for example the real world physics applications, the designing, building, testing, and evaluating the device. We've got lots of activities to show you in terms of how you might structure a task and how you might manage that task, too. Please refer to our website to have a look at that.

For Units 3 and 4 assessment, the weightings have changed and we've got a changed balance. We've got 30% for Unit 3 20% for Unit 4 and then we've got 50% now for our external examination, so that has actually changed, too. Each task has been allocated a particular time limit so that it meets the assessment principle of efficiency. And then for Unit 4 Outcome 2 we've got the poster task that applies to any content across Units 3 and 4. In terms of the revised assessment tasks you will see there that we've got across Unit 3 and 4 we've got four assessment tasks that you need to allocate. You can only choose each of these assessment tasks once. Just to show you some examples of how teachers might allocate those tasks, I've got here two teachers who have allocated different areas of study to each of those different tasks. It is feasible that any outcome can be matched to any of those assessment tasks. It's going to be up to you as to how you allocate those.

So that's going to be, for Units 3 and 4, your first determination. Which of those assessment tasks in that left column am I going to apply to each of the outcomes across Units 3 and 4? Again, let me reiterate that you can't use the same task twice. A new aspect of the course is a scientific poster, and it's been streamlined so that students focus on communicating science. You can use logbook entries in assessing the outcome. For example, assessing students' more detailed data analysis, or discussion of results that won't appear on the poster, you can assess it from their logbooks. You can use a QR code for a short video that explains the importance of succinct communication in scientific posters. Here's an example of one that relates to Unit one area of study 1. It's not a full student poster but you can see that what we're looking at in particular is student's ability to summarise what their investigation was about. This was a new aspect of the scientific poster after we saw many students' posters that could only be described as a 'scientific-report- cut-into-pieces-and-presented-as-a-poster'. The focus is on science communication.

The poster might only form a very small proportion of the assessment for this outcome, so you might focus on logbook entries for the detailed analysis, the reporting of results, and the discussion of results. What proportion you allocate to the actual poster and the logbook entries is totally up to you. All of these resources provide advice for teachers. Some are available on the VCAA website, while some are available as part of your school policies and procedures. If you haven't already subscribed to the VCAA Bulletin you can do so via the QR code that's included there. We've planned some Q and A sessions focusing on assessment for Units 1 and 2 in 2022 and Units 3 and 4 in 2023. But please contact me if you've got any questions in the meantime. My contact details are on the slide. Many thanks for your preparation for the implementation of the new study design beginning in 2023.

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