**Leanne Compton:** Hello, my name is Leanne Compton and I'm the Curriculum Manager of Design and Technologies at the Victorian Curriculum and Assessment Authority. Thank you for joining us today for one of our videos in this series of videos that we are developing for the delivery of the curriculum for VCE systems engineering in 2021. This series of videos includes information about the delivery of the curriculum as well as its assessment. This video is focusing in on the School-assessed Task with a focus on the criteria 1 to 3.

Colin Chapman is the state reviewer for VCE systems engineering and Colin will be taking you through this video today. So I'm going to hand off to you, Colin. Thank you.

**Colin Chapman:** Thank you and thank you for the opportunity to work with teachers across the state to improve their practise and systems engineering. We are focusing in particular in this video on criteria 1 through to 3 for the SAT, the School-assessed Task, one of two school-based assessment activities that we undertake as part of Systems Engineering in Victoria. Criteria 1 to 3 is about students developing intention for their School-assessed Task. This intention is particularly important because we use the intention for the students to compare outcomes within order for us to reward them for undertaking the systems engineering process. Criteria 1 to 3, as we were planning how the students will go about designing, prototyping, planning, scheduling, sourcing equipment, sourcing tools, sourcing components and so on. This plan is particularly important because we find that the plan will not go to plan, that's expected. And the study design rewards students for the plan not going to plan and responding effectively to circumstances as they arise throughout their project.

The criteria for the School-assessed Task are mandated. They must be assessed. However, the indicators are guidance. You can use the indicators to form a judgement in why is it appropriate to the particular students in a particular circumstances in a particular year of the study that you are teaching them in. These circumstances can change depending on what happens with your particular cohorts, whom you know best. Circumstances include such things as the region that you're teaching in, access to tools, equipment and processes. It can also include such things as disasters or other events that may affect your school's participation in the study. You are encouraged to review the indicators with respect to the students that you work with in any particular year. It is important that you tie all of your considerations for assessment against criteria with the systems engineering process. They are very closely related.

The systems engineering process is an iterative process. This means that we really should not be looking at a one-shot type projects. In the study design, we talk about agile processes and agile processes are ones where when we have a problem, circumstance or situation to work with through a design brief, that we develop a response that works as quickly as possible. It doesn't need to be perfect. And then what we do is we iterate that particular response. The more times we can iterate a response going through the planning, doing and evaluating, the better we are able to be able to show evidence of using the systems engineering process and the better we are able to be able to look at reward for students in criteria 7 and 8. It is important that you use the same indicators for each of the students in your particular class, that you can be fair with respect to how you're going to arrive at a judgement . So although you may not use all the indicators for your cohort, those indicators that you use for all of the mandated criteria must be applied to all the students equally. So the way to think about this is what indicators are reasonable to be applied to all students in this particular year and these particular circumstances fairly. Note that the indicators are quite broad and that's because in any ordinary year, your interpretation and utilisation of these indicators will change depending on your cohort and their unique circumstances. And these unique circumstances will include strengths of your cohort. And those strengths should be leveraged to allow your cohort to be able to perform at their best. As well as any circumstances which may affect their ability to respond to the criteria as mandated by the VCAA.

Essentially criteria 1 to 3 are concerned with the student developing an intention for their project. With the aim that as the student undertakes construction of their project, as they respond to the design brief, that things will not go into plan and that they will respond to things not going to plan, redevelop their plan in all aspects and carry out the new plan with justification. We're particularly interested here in Unit 3 Outcome 1, where we're going to investigate, analyse and apply concepts and principles from system engineering both in electronics, electrical, and mechanical concerns. And use components to design plan and commence production of an integrated and controlled mechanical and electrotechnological system. Using the systems engineering process.

The assessment for this includes a record of investigation, design planning and production and preliminary production work to create a mechanical and electrotechnological integrative and control system. We expect a record of evidence to be able to show this work. The record of evidence is quite broad. We recommend that electronic records of evidence are probably the strongest means to collect information about student achievement in this regard. Electronic records of evidence allow the students to include a video, audio, simulations and other materials that allow you to see the students in action, which also aids authentication.

Let's look at the assessment criteria, the indicators and level of performance in detail. So assessment criteria number one. Investigate a problem, of a problem situation, opportunity need and develop a design brief for integrated control system, including evaluation criteria. The indicators are the dot points. So there needs to be evidence of identification of a problem, situation, opportunity, or need. A design brief for an integrated control system should be developed. There should be a response to that design brief. Evaluation criteria should be developed and there should be references to factors that influenced the creation and use of the system. It's important that the design brief is quite broad. Design brief should not be limiting the student into developing one particular response. It should be sufficiently broad that the student can identify a number of responses to the design brief. If we're looking at levels of performance, there are two rows of concern here.

The first row is looking at identification of a problem, situation, opportunity or need and the development of a design brief and integrated control system. That's common across all levels of performance and this identification really needs to be an explicit statement of what is intended to be made. As we move on in that particular descriptor, we can see that the verbs change at the high end. We're looking at explanations of context, constraints, and considerations. This is in contrast to the lower order skill of simply identification or listing. Through to description right through to the explanation. So explanation really should be involved with the students developing an argument for why particular constraints, contexts and considerations exist for their design.

When we look at the second row, we can see that it's about evaluation criteria. So it needs to develop evaluation criteria and justify how the evaluation criteria relate to the requirements of the design brief and factors that influenced the creation and use of the system. So the evaluation criteria are closely related to the response to the design brief. And you can see the key verb here is justify at the higher end. Versus an outline or identification at the lower end. Justification again, is the students making clear exactly how the evaluation criteria allow them to perform a judgement as to how their response to the design brief is appropriate.

When we're looking at assessment criteria too, researching, devising, designing and modelling design options the indicators include conducts research including modelling of components subsystems and systems generates design ideas, produces feasible design options and selects a preferred option. At the higher end, we're looking at undertaking research including modelling of components, subsystems and processes to generate design ideas using diagrams and technical data. That's common across all of the levels of performance descriptors. Where the change is, is in the verb in the second part. At the high end, the students are required to justify feasible options and the preferred options. Again, this is different to the verb at the lower end which is simply identification or listing. So justification is needed, the students need to provide strong evidence as to how the feasible options could be a response to the design brief, and they need to be able to form a judgement that they can argue for the preferred option. The feasible options are important here because they need to be modelled, all of them.

We do recommend three design options for this particular section here and we expect to see modelling of those options. Now this modelling is quite broad. It begins with calculations if a student is looking at showing mechanical advantage in their design, they can do a calculation from mechanical advantage. These calculations on necessarily idealised. The student can also do some modelling activities. And these modelling activities can be done with software such as well, from SystemsModeler or Mathematica or other software offerings. The modelling can be scale modelling. It can also be full-sized modelling of aspects of the project. Modelling can include components, subsystems and the system itself. The reason why modelling is important here is that these models are predicting the response of design options.

When the project is finished, it would be a useful activity for the students then to measure the performance of the project and compare it with what was modelled. If they can give us a strong narrative with respect to how the model was different to what the actual outcome was, with respect to performance and so on, then we're able to reward those sorts of activities in criteria 7 and 8. So modelling is vital here. And the idea of modelling is to show that the final product will not be as modelled. Models tend to be quite idealised.

In criteria 3, we're looking at planning creation of the system. The indicators include devising a work plan which includes a timeline, sequence of steps and associated equipment components, materials, and processes. So we're looking at the sequence of steps, not just being the tasks themselves but also showing strong links to the availability of equipment, materials and processes. It should reference materials, components, and processes of course, and it needs to describe safety risk assessment for materials, components, and processes. The risk assessment can be a proforma task that is mandated by the teacher in a particular circumstance. So we're looking here with respect to levels of performance at the development of a work plan by identifying a sequence of steps and the timeline. And that's common across the descriptors. And the difference here is in this verb analysing. Analysing how materials, components, processes and tools have a use for the creation of the preferred option. As well as describing safety and risk assessment. So we're expecting that the student will talk about materials, components, processes, and tools that will be used for the creation of the preferred option but analysing it with respect to the work plan itself. So although some materials, components, processes and tools may be useful for our response to the design brief itself, in the context of a work plan and time constraints, the students need to analyse how they might make their choices. And in some cases, a non-ideal choice may be the most appropriate given the constraints. Again, we're expecting here that there'll be trying just the plan.

The planning here for criteria 3 will be locked in in the middle of the year when the level of achievement is submitted to the VCAA, with respect to the first three criteria. And what we expect is that the student will be able to, in their record of evidence show iterations of the work plan itself and how the plan has changed according to what has happened in the doing part of the project itself. So we don't expect to see a work plan at the end which is exactly the same as the work plan at the beginning. We do expect to see some versions of the work plan as the student works through their School assessed Task with annotations and justification and analysis of how the plan has had to change.

Thank you for your attention and good luck with the year.

For further information, you can contact the Curriculum Manager for Design and Technologies, Dr Leanne Compton, using the details below.

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