**Leanne Compton** - Hello, my name is Leanne Compton, and I'm the Curriculum Manager, for Design and Technology, at the Victorian Curriculum and Assessment Authority. With me today, is the outgoing state reviewer for VCE Systems Engineering, Colin Chapman, and the incoming state reviewer for VCE Systems Engineering, Chris Simpson. This video is one of a series of videos that we are developing to support teachers as Systems Engineering. This video, will specifically focus on the School-assessed Task and using criteria to make on-balance judgments to rank student cohort. And particularly we're going to focusing on Criteria 1-3. Over to you. Thanks Colin.

**Colin Chapman** - Thank you, Leanne. So it's important to think clearly about criteria 1-3 and make sure that our students understand the purpose of criteria 1-3. Criteria 1-3, is essentially concerned with the students developing an intention for the major project to satisfy the School-assessed Task, as part of their school based assessment programme. It's important that the student develops an intention in well-documented form, so that they can be rewarded when they have to respond to criteria 4-8. And we'll talk about how that works as we move through.

So the School-assessed Task is concerned with these students developing a Systems Engineering response to a design brief and that response should contain mechanical and electrotechnological integrated and controlled systems as part of it. It needs to be created for this task and it's based on Unit 3, Outcome 1 and Unit 4, Outcome 1. We need to emphasise that this is a response to a design brief. And as we discussed, the design brief we'll make it clear that the students need to develop a brief that allows a breadth of response, so they can demonstrate system engineering evaluative processes.

So criteria 1-3 is concerned about planning, how the students would go about designing, prototyping, planning, scheduling, sourcing equipment, sourcing tools, sourcing components, developing their learning programme, talking about how they might model or simulate their project. And they will need to do some preliminary work on justifying a preferred option from a modelling and prototyping activity to do with three feasible responses to the design brief. The criteria mandated and indicators are guidance. And of course we want to use all of the indicators. Now you can use the indicators to form a judgement in ways that are appropriate to particular students in a particular circumstances in a particular year of the study that you are teaching them in. The way that you may weight and interpret those indicators, will change depending upon the cohort with whom you're working and the circumstances under which you're undertaking the study and access to tools, equipment and other processes.

You need to apply indicators equally to all students in your particular cohort. And we need to remember that this is a personalised response for your cohort for the study in the year that it's being undertaken by the students.

You need to make sure that you encourage the students to tie all of their considerations for the criteria with the systems engineering process. There is a clear graphic in the study design, that illustrates a systems engineering process and how the elements of that process interact with each other. And students need to map the system engineering process to the criteria. It should be also understood that the system engineering process is iterative, in that, the project is not a 'one-shot' project. When the students develop their intentions through criteria 1-3, it's fully expected that the plan, won't go to plan and that students will record how they've noticed things going in a way that's perhaps different to what they anticipated, or they recognise that there are some aspects of their planning that they needed to do differently. Or perhaps there were some things that they weren't aware they I needed to plan for.

So, iteration process allows the students to revisit the planning documents that they've developed and continue to make commentary on those plans as they change them. We do expect students will notice how the plan hasn't gone to plan re-plan, carry out the plan. If I do that, then they should be able to use their work for criteria 1-3, to score well in criteria 7-8. It is important that they use the same indicators interpreted in the same way for each of the students in your particular class, so that you can be fair with respect to how you're going to arrive at a judgement. And you need to be transparent with that and document those decisions. Indicators are quite broad, and your interpretation will change depending on your cohort and the unique circumstances. And again, this is part of the conversation that is part of your learning and teaching programme for the year. Students need to understand how you're going to arrive at a judgement, and that process needs to be applied equally to everybody. So we want students to develop their intention.

So let's look in detail. So for Unit 3, Outcome 1, and Unit Outcome 1, you can see the distinction between the two there. In outcome 1, for Unit 3, we want to investigate, analyse, and apply concepts and principles and use components to design plan and commence production of an integrated and controlled of mechanical and electrotechnological system using the systems engineering process. It is important, that we foreground the idea of keeping a record of the process itself. Students should record everything they do using video, audio, still image and other processes, so that they can use that, to present evidence of achievement with regards to developing their intention. There is a provision also for preliminary production work, but it should be clear that we expect the majority of production work to be completed during Unit 4.

So here is the assessment criteria and criterion 1, investigation of a problem, situation, opportunity need and develop a design break for an integrated control system, including evaluation criteria. The key verb here is investigation. So we're looking for evidence of there being an investigation and developing a response to a design brief. The indicators there, they are five, identifying a problem, situation, opportunity, need. We need to be aware that the student should not be electing the actual final product as the focus of their project. They need to identify the problem, situation, opportunity, need and to respond to that. They need to develop a design brief for an integrated controlled system. They need to respond to that design brief. They need to develop evaluation criteria, which will be broad in as far as there'll be both qualitative and quantitative measures of how closely the response, responds effectively to the design brief itself. They need to also reference factors that influence the creation and use of the system.

And if we go through the criteria at the high end, you can see that there's a low order skill there, of identifying the problem, situation, opportunity, need. And then we have the higher order skill of explaining it's context, constraints, and considerations. So that explanation process is important for the students to be able to score well here. They need to develop evaluation criteria and note the verb here, justifies how the evaluation criteria relate to the requirements of the design brief. The evaluation criteria is the student's opportunity to provide evidence of an effective response to a design brief. Justification of the evaluation criteria allows us to understand how well the student has delved into the needs of the design brief.

In criterion 2, we've got the assessment criterion 2, we've got researching devising, designing, and modelling design options. This modelling process is very important. We reward students in criteria 7 and 8 for their critique of the modelling process. The indicators talk about conducting research, including modelling of components, subsystems, and systems that modelling is broad. Modelling can include calculations. It can include virtual modelling through programme, such as Mathematica and others. It allows students to do prototyping and scale modelling. It allows them to do full-scale modelling of aspects of their response. They need to model feasible responses to design brief, not just the one that has been selected.

And this is important because it allows our students to compare the proposed responses through modelling activities and to pick one that makes most sense. Need to generate design ideas, produce feasible design options, and then show an effective and consistent process for selecting the preferred option. If you look the high end, it's talking about undertaking research, including modelling of components, subsystems, generate design ideas, using diagrams and technical data. And again, we have that key verb justify feasible options, and the preferred options. Justification of a feasible option becomes more compelling when we have effective and intense modelling of the design responses for the design brief.

So we are expecting to see combinations of different types of modelling, and that allows the students to have a rich basis upon which to use the criteria from 7-8 to be rewarded for when modelling doesn't quite show us what the final result looks like exactly. Criterion 3, assessment criteria, and this is rewarded again, in criterion 7, so that's why it's important to get this right, right at the beginning. It's looking at the planning aspect of the response to the design brief.

So they're expected to devise a work plan, which includes a timeline, a sequence of steps, not just the list of steps and needs to talk about the associated equipment, components, materials, and processes. Now, we expect that that sequence won't go according to what is detailed in this criteria. We expect things to change because access to tools and machinery change in choice of how one might respond throughout the duration of the project will occur. We want the students to produce a work plan at the very beginning, so they can critique the way that work plans are developed as part of their response.

So it's not just about making the product, it's about also planning how they might go about responding to a design brief. And we expect the students to reflect upon how that goes throughout the whole process. We need to reference materials, components and processes and describe safety and risk assessment, for materials, components, and processes. You will note that the safety and risk assessment can be scaffolded using tools that the teacher provides. What is important however, is that the students go beyond the safety and risk assessment and talk about how they will deal with hazards and risks and safety.

So at the high end, we expect students to develop a work plan by identifying a sequence of steps and a timeline they need to analyse that's the key verb here how materials, components, and processes, and tools will be used for the creation of the preferred option, as well as describing safety and risk assessment. This analysis process is very important because if the students make different decisions as they're going along, we're going to noticed that the materials, components and processes and tools are not driving the project in a direction that they think is going to be most effective. They can change their minds and they simply need to then refer back to their analysis and talk about how that could be a much richer experience.

There will be a Q&A webinar, and those dates will be promoted through the usual channels from the VCAA in the February Bulletin and they will include details on how to register.

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