**[Kevin McMenamin]** - Welcome to this on-demand video that will provide information about the mathematical investigations integrated into the VCE Mathematics Study Design 2023 to 2027. I would like to acknowledge the traditional custodians of the many lands across Victoria on which each of you are living, learning, and working from today. For myself and those of us in the Melbourne Metropolitan area, we acknowledge the traditional custodians of the Kulin Nations. When acknowledging country, we recognise Aboriginal and Torres Strait Islander people's spiritual and cultural connection to country and acknowledge their continued care of the lands and waterways over generations, while celebrating the continuation of a living culture that has a unique role in this region. I would like to pay my respects to Elders past, present, and emerging, for they hold the memories, traditions, culture, and hopes of all Aboriginal and Torres Strait Islander peoples across the nation and hope they will walk with us on our journey.

To support the implementation of the 2023-2027 study design for Mathematics the VCAA have developed a series of short videos, called "information bytes", outlining approaches that teachers may wish to utilise in the classroom. The information presented in these videos has been developed by current VCE teacher, in conjunction with the VCAA, and offer methods of approach without prescribing a course of action. In this particular on-demand video, we will look generally at the investigations, their nature and purpose, the structure, implementation and style, some sample tasks for topics linked to Unit 1 and 2, and the support that you can get from the VCAA.

The investigations themselves allow some work within the Unit 1 and 2 areas, particularly, to be integrated into a learning activity or an investigation, where some of the content can be developed from a student perspective, and this information can then be looked at regarding the three outcomes and be able to form some form of learning by the child rather than direct instruction. In terms of the investigations themselves, they're meant to be of a practical or can be of theoretical context, and can be developed from the areas of study that are applicable to a particular mathematics course. Each investigation that you create will have a natural and effective context, particularly for addressing Outcomes 1 and 2. It will certainly support the computational thinking and experimentation that is integrated into the outcomes, and it can in fact be used as an assessment type for the areas of Unit 1 and 2.

These investigations, of course, do also form a critical component of the Foundation Mathematics Units 3 and 4 course, where three of these would be required. The structure of these particular investigations form three particular areas. There's the formulation, which is really the setting up of the question itself. This might require some research to be done. It might require data to be collected. It may require some conversations to be held so enough information is obtained to be able to go and investigate the question being presented. The exploration, which forms the second part, is then looking at all of this information and then trying to investigate and apply some mathematics to these particular questions. There would also be some analysis involved in the questions presented, maybe some drawing of conclusions, hypothesis, recommendations for future learning in terms of that question that was presented as well. In terms of this exploration, it certainly would involve a technology and certain links to computational thinking that are also mentioned explicitly within the outcomes.

The communication forms the third component of the investigations. And this would then be developed in some particular format so students would have an opportunity to formulate their ideas either in a written, oral, or other means of presentation, so that it can then be communicated to a particular set of recipients or audience members. The information implementation and style of these particular tasks, they can be learning activities, they can be assessment tasks themselves, independently held, or they could be a combination of both. In term of the time meant to be spent on these particular tasks, you may have one longer activity that may be spread across 1 to 2 weeks, you might have two shorter activities, or you might have a series of more, maybe four short tasks over a period of a semester. In terms of each of these tasks, it does need to be linked to a content area and generally more than one. And there would then be an investigation, maybe short activities that could be integrated into this learning so students would then be performing a lot of these tasks independently and then presenting some sort of information to you at the end.

An example for a sample topic could be the idea of weather on selected communities. This could be linked to a statistical investigation, particularly. You might be asked to explore some websites within different regions of Australia, come up with some contrasting or similar weather patterns throughout, maybe the idea of rain or humidity or dry areas, floods, the idea of droughts, how it impacts on agriculture, how it impacts on rural and urban areas alike. And certainly, the development of the task would be the gathering of a great deal of data. That would be the formulation stage. The exploration stage is then gathering all of that data and then deciding how it's best going to be analysed or investigated. This could be through a piece of technology, a spreadsheet, or some other form of technology that might be able to visualise and represent the information in particular displays and also summarise that information with the conclusion or recommendations or some sort of analysis being undertaken to give the client some information regarding the question that was posed in the initial stage. The communication can then be integrated either into a report, maybe it can be presented in an oral fashion. It could be a PowerPoint description.

There are a variety of ways that information can then be conveyed, and of course that would be dependent on the school community at which you are presenting this information. Another sample task or topic could be the information linked to the transformations of graphs, the idea of working out a basic shape and what a set of transformations might do to that shape, whether the transformations are linked to just horizontal and vertical movements, whether there's an integration of other sorts of transformations that might be undertaken across, for example, the line of y equals x. The idea of dynamic graphing technology would certainly be an integral part of this investigation. Part of the formulation would be trying to work out a base set of graphs at which the investigation is going to be undertaken and then what graphing package might actually be used. The exploration phase would then go to look at these graphs, maybe look at a series of transformations that are involved with the graphs, come up with some conclusions or maybe some areas of extra work that could be undertaken to give an idea of what impacts these transformations have on the base functions that were chosen. Again, the communication of this information could be through some sort of a report. It could be through an oral presentation.

It could be via a combination of a PowerPoint description and then an oral presentation, or a variety of other means of presenting this information would also be appropriate. A rubric can certainly be used to mark the particular outcomes that we are referring to in these investigations. This is just a breakdown of the marks that would be linked to a Unit 1 and 2 activity. These are also linked to the Foundation Maths investigation in Unit 3 and 4, but you can manipulate these to your own liking. The three outcomes should be covered in these investigations, and that certainly would be a mandated component of any of these investigations that would be undertaken.

Certainly, Outcomes 2 and 3 would be critical in terms of the assessment. By default, the areas of study and the content are going to be integrated, which would cover the Outcome 1 area as well. In terms of questions that you might have related to investigations, certainly you are encouraged to contact Michael MacNeill at the VCAA, who is the Curriculum Manager for Mathematics. Hopefully, you found this short on-demand video helpful in terms of a little bit of information regarding investigations, and good luck with the introduction of these into your school communities.

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