In this Video 3, I will discuss how I have developed Part 3 of the modelling and problem-solving task.

I followed the same guided dot points, identify information and sources, state questions of interests and related analysis, identify relevant content. Students have already identified the context through routine questions in Parts 1 and 2 in different scenarios which I have presented in my video 2.

So what's next? In Part 3, is where I put in open-ended questions and/or investigation. So, here we are, Part 3. I hope you like this sphere I have created using the GeoGebra in this slide. It has parametric equations of X, Y, and Z and involved two variables. So at this part, you can see that I have included a number of constraints and conditions.

Let’s read through. Develop and explore a model for a scenario involving a pair of riders where one is looping vertically and the other horizontally with the following conditions. The mesh sphere ball has a diameter between 4 to 6 metres. The speed of the rider is between 15 metres per second to 25 metres per second. The riders performed a 3-minute stunt. The total weight of the rider and the motorcycle is between 160 kilogrammes to 190 kilogrammes. After both riders have entered the Globe of Steel, they could start riding at the same time, or with a delay.

So what I mean by that is if they enter at the bottom of the globe, one probably just ride up to the equator and start going around and around the equator, so, that's horizontally. While the other one, waits down the bottom of the sphere, and then start going vertically, all the way up, so vertically up. So that's what I mean. So the students, the rider obviously is waiting to make sure that it is safe for them to actually join in, part of one of the loop, which is a vertically, and the other one is horizontally.

The model should include a description and the graph of the path of each rider, the calculations of each ride is the speed, the distance each rider has covered and consideration of how collisions are avoided. So after students have read the question they would have realised that the rule in Part 1 was the one that the rider loops vertically. And the rule in Part 2 was the one that the rider loops horizontally at the equator. I guess I could have asked the students to look at a scenario involving three riders where one is looping vertically, the second one, horizontally and the third one, diagonally.

This challenge certainly provides students with the opportunity to demonstrate the full range of key knowledge, key skills, or the outcomes and the highest level of performance to be achieved. So you can see that the inclusion of additional open-ended questions in the task would provide the students with opportunities to engage in the problem-solving elements of creating, exploring, testing, verifying and meeting the constraints and conditions provided in the question.

Now to finish off Part 3, again we can look at indicative content. The topics I'm covering in this part is the Vector Calculus and Calculus with specific dot points from the study design such as sketching the corresponding path, given r in Cartesian or parametric forms. In this case, students have to then come up with their own rule, they need to test it to ensure that works and reflect the scenario described in the question.

So that takes us to the end of video 3. In video 4, I will discuss how to develop tasks in the related rubrics for the assessment criteria using the published VCAA criteria.

[Copyright Victorian Curriculum and Assessment Authority 2021](https://www.vcaa.vic.edu.au/Footer/Pages/Copyright.aspx)