

## Module 1 Intro Video

Welcome to the first module. This module lays the foundation for the course, introducing concepts such as quantity and co-variation. Research has shown that when students are faced with new problems, particularly context problems, they do not take the time to meaningfully identify the quantities of the problem situation. Without taking time to meaningfully identify the changing and constant quantities of a problem context, it becomes very difficult for the student to reason about dynamic relationships between these quantities.

One of the over-arching goals of this module is to start to develop the skill of identifying quantities by identifying specific attributes of objects and how they are measured. Students, particularly weaker ones, struggle with this concept and it is important to have them be specific when describing quantities in a situation. This will arise throughout the semester and being able to identify quantities before formalizing relationships between quantities will help them begin to build their own framework for problem solving.

This module also lays the foundation for average rate of change by introducing average speed – a more familiar concept to students. Students will calculate average speed in a variety of contexts and explain the meaning of the average speeds they find. This idea is non-trivial for students. Most, if not all, students struggle with understanding the meaning of average speed. As a teacher, you will need to attend to this and try to bring out that meaning in a variety of contexts and examples.

Lastly, this module introduces the Box Problem as a way to discuss the co-variation of quantities. This problem, which you've likely seen before, is explored using a variety of representations and even utilizes applets to help students describe how the different quantities involved in the problem change together. Again, it will be important to be specific about the quantities identified in the problem. Students will often refer to 'the length' as both the length of the box and the length of the paper. This is a good problem to point out the importance of identifying quantities before starting to look at how they co-vary. In this problem, students are asked to find a box that will give the maximum volume. Remember that it's okay, and even beneficial, for students to struggle when working a novel problem. Students will use a variety of methods to create their boxes. Be sure to push them to explain why they think their box has the maximum possible volume. This will lead to good class discussion and will also begin to challenge students to explain their reasoning – another important skill.

This is the first module in what will likely be a different math experience for most math students. This module will set the tone for what the class will look like and how it will interact throughout the semester.

Have fun!