Module 2 Intro Video

Welcome to the second module. This module introduces and connects the concepts of proportionality, constant rate of change, and linearity. Most students will come into the class with some conception of what each of these topics mean, but lack a deeper understanding of them as well as how they are interconnected. This module aims to develop these understandings by beginning with the meaning of proportionality, tying it to constant rate of change, and then finally linearity.

Many students can use the basic ideas of proportionality to solve problems. They can scale photos correctly and many can even correctly set up ratios and 'cross-multiply' to solve a problem. Most though, cannot tell you why what they did is correct. This is where the module begins – by examining different ways of reasoning proportionally and why these ways of reasoning work.

From here, the module establishes the relationship between proportionality and constant rate of change – that is, that any quantities that are related proportionally have a constant rate of change between them. These ideas are built through the context of the photo problem which uses tables, diagrams, formulas and graphs to formalize the relationships.

After this has been completed, the module focuses specifically on constant speed. The goal is to establish what it means to have a constant rate of change by looking specifically at the changes in the two quantities. Students have some understanding of constant speed in that they can tell you it means to go at a 'constant pace' or some other similar description, but many fail to recognize the 'pace' or 'rate' as being a ratio of the changes in two quantities. As students begin to recognize that they can look at the changes in the two quantities, they can also understand that the changes in the quantities are also proportional to one another. That is, if for every increase in two minutes, a person travels 24 feet, in half the amount of time, or for an increase of one minute, the person would travel half the distance, or 12 feet.

Lastly, this module connects these concepts to the over-arching one of linearity. The final slides should be used in a way that helps students make sense of the situations and reason about them using what they've learned earlier in the module. The teacher should also connect these ways of reasoning and the formulas they create with what students already know about linearity – $y = mx + b$. Most, if not all, students know this formula. But many don't understand the connection between it and constant rate of change. As a teacher, you should help students make these connections and help them to make sense of this formula that many already know but don't attach much meaning to.

Good luck and enjoy teaching.