

Connecting Proportionality to Constant Speed (Slides 26-41)

Resource Video 4

The purpose of these next two worksheets is to develop students' understanding of constant speed building on the concept of proportionality. For example, if a car were to travel at a constant speed of 60 miles in one hour, students should understand that if the car travels some fraction of that amount of time, they would travel that same fraction of the distance. That is, if the car traveled $\frac{2}{5}$ of one hour, they would travel $\frac{2}{5}$ of 60 miles, or 24 miles. The first few slides in this section can be used to help visualize this concept using number lines and by holding a discussion about scaling.

For students to understand this idea well, they must begin to think of speed as being a ratio of the changes in two quantities. Students who continue using words like 'speed' and 'rate' will have difficulty, because they will likely be thinking about this one quantity instead of recognizing the two involved. Be sure to push students to reason about distance and time as opposed to speed.

The rest of this worksheet continues to solidify this reasoning. Students are asked to use number lines to make arguments for their answers. They are also asked to formalize the relationship between distance traveled and time using formulas and graphs. Lastly, they are asked to reason about the co-variation in the quantities – where students are asked to look specifically at the changes in distance and how they relate to the changes in time.

The second of these worksheets continues the discussion about constant speed by implementing CBRs in the classroom. Students are asked to create different liner graphs by using the CBRs to record their distance away from the receiver as time elapses. Students explain to one another, using the quantities of distance and time, how one must walk in order to create the graph. Again, you should push students to talk about these two quantities when they bring up descriptions relating to speed. Force them to speak with meaning and to be specific about how they are telling one another to walk.

The last question regarding driving from Phoenix to L.A. has students begin to examine quantitatively about a situation with a constant rate of change where the initial value is not zero. This will lead will into the final discussion on linearity.