

Mathematics in this Lesson

Lesson 1: Changing One Quantity at a Time

Lesson Description

Kate and Christopher begin to make sense of proportional reasoning in a speed context. They use an applet called Races to explore how to make one car go slower or faster than another car.

Math Content

CCSS.M.6.RP.A.3: *Use ratio and rate reasoning to solve real-world and mathematical problems.*

In this lesson, students explore how the quantities of time and distance relate to a car's speed—a quantity that will be measured by forming a ratio in later lessons. They investigate the following relationships in a racing context:

- When two cars travel the same distance:
 - the car that travels for less time is the faster car
 - the car that travels for more time is the slower car
- When two cars travel for the same amount of time:
 - the car that covers more distance is the faster car
 - the car that covers less distance is the slower car

Math Practices

CCSS.MATH.PRACTICE.MP2: *Reason abstractly and quantitatively.*

According to the Common Core's description of Math Practice 2, mathematically proficient students are able to reason quantitatively as they “make sense of quantities and their relationships in problem situations” while “flexibly using different properties of operations and objects.” Kate and Christopher use a simulation of a two-car race and reason quantitatively in three different ways about the quantities of time, distance, and speed. First, they see relative speed in the arrows that mark the position of each car in the race, where faster speed is captured by an arrow pulling ahead [**2:18 in Episode 1**]. Second, they enter the same amount of distance for two cars into speed simulation software and reason that giving one car more time than the other car will make it slower [**1:56 in Episode 2**]. This is a quantitative relationship that Christopher later expresses in a general written statement at **2:15 in Episode 3**. Finally, they use hand races to quantify an embodied sense of motion as faster or slower speed. When their hands travel different quantities of distance in the same amount of time, they feel that the hand traveling a greater amount of distance needs to move faster than the other hand [**0:23 in Episode 6**].

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