Mathematics in this Lesson
Lesson 3: Creating Diagrams to Represent Ratios

Lesson Description

Kate and Christopher create a diagram to explain why the distance and time values for two cars make them go the same speed. In the process, they form a ratio by joining the distance and time values for one car into a unit or "little trip," which can be repeated (iterated) or split apart (partitioned) to solve proportional reasoning problems.

Math Content

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

In this lesson, students create a diagram to explain why two cars, one traveling 20 miles in 8 minutes and the other traveling 10 miles in 4 minutes, are going at the same speed. The diagram shows how the two quantities of distance and time are joined together to form a ratio that represents speed. The students iterate the 10 miles in 4 minutes trip to show how a journey of 20 miles in 8 minutes is made up of two identical trips of 10 miles in 4 minutes. They also create a new diagram by partitioning a journey of 10 miles in 4 minutes into two identical trips of 5 miles in 2 minutes. Their final diagram shows that a journey of 15 miles in 6 minutes is made up of 3 identical trips of 5 miles in 2 minutes.

Math Practices

CCSS.MATH.PRACTICE.MP3: *Construct viable arguments and critique the reasoning of others.*

According to the Common Core's description of Math Practice 3, mathematically proficient students are able to "make conjectures and build a logical progression of statements to explore the truth of their conjecture." In this lesson, Kate and Christopher look for patterns in their list of amounts of distance and time that make the red car go at the same speed as the blue car, which travels 10 miles in 4 minutes. After naming some patterns that work, Christopher suggests a pattern that does not work and explains the reasoning behind his new conjecture **[0:32 in Episode 2].** When Kate expresses doubt and suggests some evidence that contradicts Christopher's conjecture, Christopher responds by admitting that he is now unsure about his idea. They then test the conjecture to find that it does not work. Christopher then begins to notice a flaw in his argument **[1:06 in Episode 2]** and later explains what it is **[1:48 in Episode 2]**. In **Episode 3,** Kate and Christopher continue this progression of suggesting, checking, consulting, adjusting, and then defending their approach to building a diagram that explains why the pattern of doubling works.

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