

## Mathematics in this Lesson

### Lesson 4: Using Diagrams to Iterate Ratios

#### Lesson Description

Kate and Christopher discover a way to solve proportional reasoning problems in a speed context, by drawing diagrams and repeating (iterating) a ratio of distance and time.

#### Math Content

[CCSS.Math.Content.6.RP.A.3](#). *Use ratio and rate reasoning to solve real-world and mathematical problems.*

In this lesson, students create a diagram to solve a real-world problem. They find the time it should take a car to travel a certain distance, so that it is going the same speed as a car traveling 12 miles in 9 minutes. The students iterate a trip of 12 miles in 9 minutes until the diagram shows a journey of 48 miles. The students can then see that a car traveling at the same speed as a car traveling 12 miles in 9 minutes must travel 36 minutes to go 48 miles. The students notice that there are four copies of smaller identical trips that make up a journey of 48 miles in 36 minutes. Each little trip is represented in the diagram by both the miles traveled and the time it took to travel those miles. The diagram reinforces the idea that quantities of time and distance are joined together to form a ratio that represents the speed of the car.

#### Math Practices

[CCSS.MATH.PRACTICE.MP6](#): *Attend to precision.*

According to the Common Core's description of Math Practice 6, mathematically proficient students “try to communicate precisely with others” while they “examine claims and make explicit use of definitions.” In this lesson, as Kate and Christopher begin to create diagrams to solve more challenging same speed problems, they attend to precision in two ways. First, they attend to the precise meaning of a car going at the same speed as another car **[3:06 in Episode 1]**. Christopher’s language becomes more precise when he says, “They (the two cars) are going at the same speed, but they will arrive at different times.” Second, they attend to the key details in their diagram with precision. When Kate and Christopher redraw their diagram to find the time it should take a car to travel 60 miles so that it goes the same speed as a car traveling 12 miles in 9 minutes, they no longer include images of people or houses. They also alter their diagram so that the size of each representation of a little trip of 12 miles in 9 minutes is about the same size **[3:15 in Episode 2]**.

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