Creating a "Need to Know"

Essential Question How can you use rates to help show how a country can save valuable natural resources?

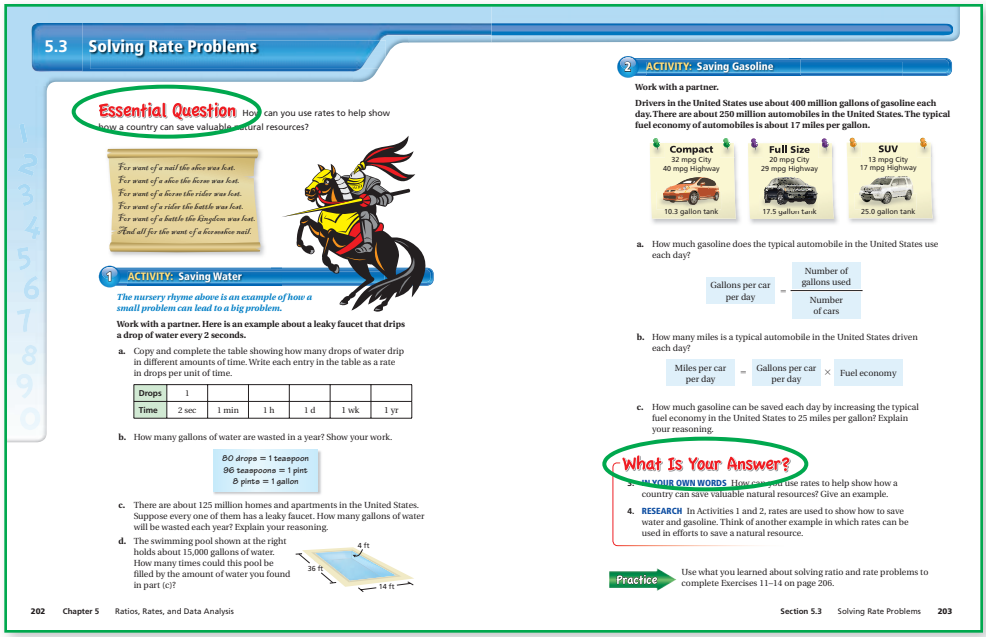
What Is Your Answer?

3. **IN YOUR OWN WORDS** How can you use rates to help show how a country can save valuable natural resources? Give an example.

4. **RESEARCH** In Activities 1 and 2, rates are used to show how to save water and gasoline. Think of another example in which rates can be used in efforts to save a natural resource.

Each section of the program begins with an **Essential Question** that establishes a "Need to Know".

Students work with a partner to develop their answers to the **Essential Question**. Then, they write their conclusions in their own words.



5.3 Solving Rate Problems

Essential Question How can you use rates to help show how a country can save valuable natural resources?

For want of a nail the shoe was lost.
For want of a shoe the horse was lost.
For want of a horse the rider was lost.
For want of a rider the battle was lost.
For want of a battle the kingdom was lost.
And all for the want of a horseshoe nail.

1 ACTIVITY: Saving Water

The nursery rhyme above is an example of how a small problem can lead to a big problem.

Work with a partner. Here is an example about a leaky faucet that drips a drop of water every 2 seconds.

a. Copy and complete the table showing how many drops of water drip in different amounts of time. Write each entry in the table as a rate in drops per unit of time.

Drops	1					
Time	2 sec	1 min	1 h	1 d	1 wk	1 yr

b. How many gallons of water are wasted in a year? Show your work.

80 drops = 1 teaspoon
96 teaspoons = 1 pint
8 pints = 1 gallon

c. There are about 125 million homes and apartments in the United States. Suppose every one of them has a leaky faucet. How many gallons of water will be wasted each year? Explain your reasoning.

d. The swimming pool shown at the right holds about 15,000 gallons of water. How many times could this pool be filled by the amount of water you found in part (c)?

4 ft, 36 ft, 14 ft

2 ACTIVITY: Saving Gasoline

Work with a partner.

Drivers in the United States use about 400 million gallons of gasoline each day. There are about 250 million automobiles in the United States. The typical fuel economy of automobiles is about 17 miles per gallon.

Compact	Full Size	SUV
32 mpg City 40 mpg Highway	20 mpg City 29 mpg Highway	13 mpg City 17 mpg Highway
10.3 gallon tank	17.5 gallon tank	25.0 gallon tank

a. How much gasoline does the typical automobile in the United States use each day?

Gallons per car per day = Number of gallons used / Number of cars

b. How many miles is a typical automobile in the United States driven each day?

Miles per car per day = Gallons per car per day × Fuel economy

c. How much gasoline can be saved each day by increasing the typical fuel economy in the United States to 25 miles per gallon? Explain your reasoning.

What Is Your Answer?

3. **IN YOUR OWN WORDS** How can you use rates to help show how a country can save valuable natural resources? Give an example.

4. **RESEARCH** In Activities 1 and 2, rates are used to show how to save water and gasoline. Think of another example in which rates can be used in efforts to save a natural resource.

Practice Use what you learned about solving ratio and rate problems to complete Exercises 11–14 on page 206.

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