MSTAR INTERVENTION

L9

Lesson 9: Generate Unit Rates

Lesson Objective

- Students will generate unit rates, using a table.

Instructional Materials

Material	Quantity	Description
How Am I Doing? graph	1 per student	
Colored pencils	1 per student	
Display Masters	1 each	• Preview: Key Idea: Generate Unit Rates • Demonstrate: 8 Birds in 4 Nests A • Demonstrate: 8 Birds in 4 Nests B • Demonstrate: 8 Birds in 4 Nests C • Demonstrate: 8 Birds in 4 Nests D • Demonstrate: 8 Birds in 4 Nests E • Demonstrate: 8 Birds in 4 Nests F
Handouts	1 each per student	• Cumulative Review • Unit Rates • Practice 1 • Practice 2 • Independent Practice
Answer Keys	1 each	• Cumulative Review • Practice 1 • Practice 2 • Independent Practice

Cumulative Review

Have students answer the questions on the Cumulative Review handout. Go over the answers. Correct misconceptions. Have students make corrections, as needed, using a colored pencil. Collect student papers to determine who needs additional instruction.

Preview

This lesson will build on students' prior conceptual knowledge of rates. Students will generate unit rates, using a table.

Display and introduce through a brief explanation the key idea for this lesson:

- Unit rates can be generated by using a table.

Use the Key Idea: Generate Unit Rates DM display master as needed.

Engage Prior/Informal Knowledge

To open the lesson, present questions to activate students' background knowledge or preskills related to the content to be taught in this lesson. Ask students questions such as:

- What do you know about rates and unit rates? (Rates compare 2 unlike quantities, and unit rates compare a quantity to 1 unit of another quantity.)
- What is the unit rate for: $\frac{4}{8}, \frac{2}{8}, \frac{6}{12}, \frac{3}{9}, \frac{2}{10}, \frac{3}{12}$? ($\frac{1}{2}, \frac{1}{4}, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}, \frac{1}{4}$)
- Which of the rates above are equivalent? Why? ($\frac{4}{8}$ and $\frac{6}{12}$ are equivalent, and $\frac{2}{8}$ and $\frac{3}{12}$ are equivalent because they simplify to the same rate.)
- How can you determine whether 2 ratios are equivalent? (They must simplify to the same ratio.) State whether the following pairs of rates are equivalent:

  $\frac{2}{6}$ and $\frac{4}{12}$ (yes) $\frac{6}{8}$ and $\frac{9}{12}$ (yes)
  $\frac{2}{5}$ and $\frac{5}{15}$ (no) $\frac{1}{2}$ and $\frac{12}{24}$ (yes)
- How can you find equivalent ratios? (Multiply the top and bottom by the same value.)

If students cannot answer these questions, stop and explicitly teach the material. Refer to Lesson 6 for additional instructional support.

Demonstrate

1. Set up the problem in the table.

Distribute the Unit Rates handout. Have students complete the birds and nests example in the table along with you.

Use the 8 Birds in 4 Nests A DM display master.

Say: *Today, we will generate unit rates, using division.*

Say: *Let's start with a rate of 8 birds in 4 nests.*

Say: *What are we comparing in this problem? (birds and nests)*

Write "birds" and "nests" in the 2 rows of the Unit column.

Use the 8 Birds in 4 Nests B DM display master as needed.

2. Set up the first rate.

Say: *How many birds do we have? (8) How many nests do we have? (4)*

Say: *Write "8" in the top box of the Given Rate column and "4" in the bottom box.*

Use the 8 Birds in 4 Nests C DM display master as needed. 1

Say: *What is the rate of birds to nests? (8 to 4)*

Say: *To find the unit rate, I need to find the number of birds in*

1 **TEACHER NOTE**
If needed, remind students that when comparing 2 things, the numbers of the units need to stay in the same order. This concept is scaffolded through the table.

1 nest, so I write "1" in the bottom part of the Unit Rate column.

Use the 8 Birds in 4 Nests D DM display master as needed.

3. Use division to find the equivalent unit rate.

Say: *What operation do I use to get from 4 to 1? (divide by 4)*

Say: *Because I want to divide by a fraction equivalent to 1 so that the relationship between birds and nests stays the same, I have to divide the top by 4 as well. 8 divided by 4 equals 2.*

Use the 8 Birds in 4 Nests E DM display master as needed.

Say: *The equivalent unit rate for 8 birds in 4 nests is 2 birds in 1 nest. The common way to say this is 2 birds per nest.*

Use the 8 Birds in 4 Nests F DM display master as needed.

Practice

For each practice activity, provide detailed feedback to students, highlighting what was done correctly and what needs improvement. Provide opportunities for students to correct their errors. Collect student work to review and monitor student progress.

Activity 1: Have students use the tables on the Practice 1 handout to practice calculating unit rates. The following are examples of rate scenarios that could be used.

1. $\frac{90 \text{ miles}}{3 \text{ gallons}}$
2. $\frac{15 \text{ servings of soup}}{5 \text{ guests}}$
3. $\frac{42 \text{ bananas}}{6 \text{ loaves of bread}}$

Activity 2: Have students work in pairs to complete the activity on the Practice 2 handout. Have students verbalize their reasoning and each step in the process to their partners.

Independent Practice

1. Have students work independently to complete the activity on the Independent Practice handout.

2. Go over the answers (students self-check and correct, using a colored pencil).

3. Have students record the number correct in the box and complete their How Am I Doing? graph.

4. Collect the papers to review student progress.

Closure

Review the key idea. Have students provide examples from the lesson.

Have students discuss their answer to the following questions.

- What are the steps for finding a unit rate?
- What operation do you use to find a unit rate? Can you think of a time when you might use a different operation?

Clear up any misconceptions. Students who struggle to generate unit rates need additional instruction.