

Proportionally Speaking

Purpose

Students will interpret and use ratios to show the relative sizes of two quantities and will understand and use proportions to solve problems.

Materials

For the teacher: chalkboard, chalk

For each student: math journal, paper, pencil, copy of Black Line Master (BLM) *Proportionally Speaking*

Activity

A. Introduction

1. Tell students they are going to learn to solve problems such as the following: Judy's Circle Club makes \$2.00 for every 8 bags of popcorn they sell at the school carnival. How much did the Circle Club make from selling 24 bags of popcorn?
2. Tell students there is a mathematical way to express the relationship of the bags of popcorn with the amount of money made. This relationship is called a *ratio*.
3. Write on the board: "A ratio is a comparison of two numbers."
4. Tell students that this ratio can be written in three ways: "8 bags/\$2.00" or "8 bags to \$2.00" or "8 bags: \$2.00."
5. Ask students to tell you the ratio of boys to girls in the class, students to teachers in the school, etc.
6. Tell students to find how much the Circle Club made from selling 24 bags of popcorn, they can use a proportion.
7. Write on the board: "A proportion is an equation which states that two ratios are equivalent."
8. Have students write the definitions for ratio and proportion in their math journals.

B. Teacher-Led Activity

1. Write the following on the board:

Money Made	\$2.00	n
Bags Sold	8	24

2. Ask students: "If the Circle Club makes \$2.00 for selling 8 bags of popcorn, how much do they make from selling 24 bags?" Write the proportion " $\frac{2}{8} = \frac{n}{24}$ " on the board. Tell students that they need to find an equivalent ratio for $\frac{2}{8}$.

(continued)

EXTENDING THE ACTIVITY



Have students write some word problems that could be solved using proportion. Have them exchange with another student.

MEETING INDIVIDUAL NEEDS



For students having difficulty with the concept of proportions, provide additional practice with simple proportions. Start with proportions like $\frac{1}{2} = \frac{2}{4}$, $\frac{1}{3} = \frac{2}{6}$, $\frac{3}{4} = \frac{6}{8}$, etc. Then, progress to more difficult problems.

Standards Link
6.3.2

Activity (continued)

3. Review with students how to find equivalent fractions. Remind them that we multiply both the numerator and denominator by the same whole number.
4. Say: “To change $\frac{2}{8}$ to $\frac{1}{24}$, we multiply the denominator by 3. So what should we multiply the numerator by?” [3]
5. Ask students to solve the proportion $\frac{2}{8} = \frac{1}{24}$. [$\frac{2}{8} = \frac{6}{24}$]
6. Give students the following problem to solve using ratio and proportion: Rice requires 6 cups of water per 3 cups of rice. How much water is needed to cook 10 cups of rice?
7. Draw this chart on the board.

Cups of rice	6	10
Cups of water	3	n
8. Ask a student to come to the board to write the proportion.
[$\frac{6}{3} = \frac{10}{n}$]
9. Ask: “Can you think of any whole number that can be multiplied by 6 to give us 10?” [No]
10. Suggest a different procedure for this problem. Ask: “If we know that we use 3 cups of water for every 6 cups of rice, how many cups of rice would be used for 1 cup of water?” [2] Draw a new chart on the board.


Cups of rice	2	10
Cups of water	1	n
11. Ask a student to come to the board to write the new proportion.
[$\frac{2}{1} = \frac{10}{n}$]
12. Ask: “Now, can we find a whole number that can be multiplied by 2 to give us 10?” [5]
13. Ask students to solve the proportion $\frac{2}{1} = \frac{10}{n}$. [$\frac{2}{1} = \frac{10}{5}$]
14. Ask: “How much water is need to cook 10 cups of rice?” [5 cups]


C. Student activity

Have students complete the BLM *Proportionally Speaking*.

Classroom Assessment**Basic Concepts and Processes**

During the activity and when reviewing the BLM, discuss the following questions with your students to gauge their understanding of the Standard Indicators:

 If a car can drive 30 miles on 2 gallons of gas, how many miles can be driven with 5 gallons of gas?

 Show me how you found the solution.

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Use proportions to solve the problems below.
Show your work and label the answers.

1. Brad can ride a bike 28 miles in 4 hours.
How far can Brad ride a bike in 1 hour?



2. If Paul can finish 25 problems in 40 minutes,
how many problems can he finish in 120
minutes?

3. A recipe for spaghetti sauce calls for 4 cups
of tomatoes. This recipe serves 2 people.
If Jill wants to serve 3 people, how many
cups of tomatoes will she need?

4. Two quarts of ice cream can feed 15 people.
How many people will 10 quarts feed?



5. Brad made 2 field goals for a total of 4 points in a basketball game.
Brad had eight shot attempts. Amy attempted 4 shots. If Amy had
the same ratio of field goals to shots made, how many field goals
did Amy have?

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Teacher Directions

Have students use proportions to solve the problems on the BLM.

Answer Key

1. 7 miles
2. 75 problems
3. 6 cups
4. 75 people
5. 1 field goal