

Ways of Comparing: Ratios and Proportions

Surveys are used to determine people's preferences for many things. You may have seen surveys about food, cars, consumer products, or political candidates. From survey results, it can be easy to determine popular choices. Explaining how much more popular one choice is than another may not be as easy. In this Investigation, you will explore strategies for comparing numbers in accurate and useful ways.

1.1 Surveying Opinions

Analyzing Comparison Statements

Companies that sell soft drinks often report survey results about customers' preferences.



Common Core State Standards

- 7.RP.A.3** Use proportional relationships to solve multistep ratio and percent problems.
- 7.RP.A.2** Recognize and represent proportional relationships between quantities.
- 7.EE.B.4** Use variables to represent quantities in a real-world or a mathematical problem and construct simple equations and inequalities to solve problems by reasoning about quantities.

Also 7.RP.A.2a and 7.RP.A.2c, essential for 7.RP.A.1 and 7.RP.A.2b

Mathematical Reflections

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In this Investigation, you used ratios to make comparisons. You also used ratios and developed proportions to solve mixture problems. You used scaling techniques to solve proportions and determine relationships between known and unknown quantities. The questions below will help you summarize what you learned.

Think about your answers to these questions, and discuss your ideas with other students and your teacher. Then write a summary of your findings in your notebook.

1. **a.** In this Investigation you have used ratios, percents, fractions, and differences to make comparison statements. **How** have you found these ideas helpful?
- b.** Give examples to explain how part-to-part ratios are different from, but related to, part-to-whole ratios.
2. **How** can you use scaling or equivalent ratios
 - a.** to solve a proportion? Give an example.
 - b.** to make a decision? Give an example.

Common Core Mathematical Practices

As you worked on the Problems in this Investigation, you used prior knowledge to make sense of them. You also applied Mathematical Practices to solve the Problems. Think back over your work, the ways you thought about the Problems and how you used Mathematical Practices.

Jayden described his thoughts in the following way:

In our class there were many different strategies for solving Problem 1.2. Our group scaled down each recipe to find how much water is needed for 1 cup of concentrate.

For A, we need 1 cup concentrate for $\frac{3}{2}$ cups of water.

For B, we need 1 cup concentrate for $\frac{9}{5}$ cups of water.

For C, we need 1 cup concentrate for 2 cups of water.

For D, we need 1 cup concentrate for $\frac{5}{3}$ cups of water.

The recipe with the least amount of water for 1 cup of concentrate is the most orangey. It is recipe A.

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Common Core Standards for Mathematical Practice

MP2 Reason abstractly and quantitatively



- What other Mathematical Practices can you identify in Jayden's reasoning?
- Describe a Mathematical Practice that you and your classmates used to solve a different Problem in this Investigation.