

Going Strong

2

Comparing Ratios to Solve Problems

WARM UP

Use reasoning to compare each pair of fractions.

1. $\frac{6}{7}$ and $\frac{8}{9}$
2. $\frac{7}{13}$ and $\frac{5}{11}$
3. $\frac{4}{5}$ and $\frac{4}{3}$

LEARNING GOALS

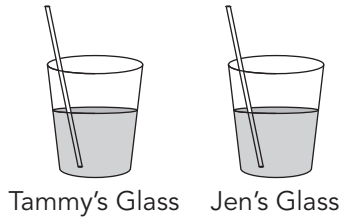
- Apply qualitative ratio reasoning to compare ratios in real-world and mathematical problems.
- Apply quantitative ratio reasoning to compare ratios in real-world and mathematical problems.
- Compare and order part-to-part and part-to-whole ratios represented verbally, pictorially, and numerically.

You know how to write a ratio as a comparison of two quantities. How can you compare two ratios to make decisions in real-world situations?

Getting Started

Lemony-er Lemonade

Tammy's glass of lemonade has a weaker tasting lemon flavor than Jen's glass of lemonade. The shaded portion in each glass represents an amount of lemonade.



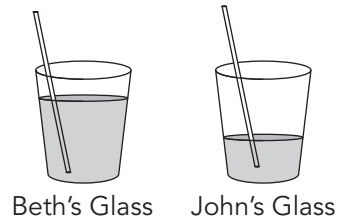
1. If one teaspoon of lemon mix is added to both Jen's and Tammy's glasses, which glass will contain the lemonade with the stronger lemon flavor? Explain your reasoning.



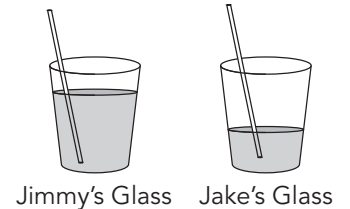
In this activity you will compare ratios without measuring or counting quantities. When you reason like this, it is called qualitative reasoning.

1. The shaded portion in each glass represents an amount of lemonade. Answer each question and explain your reasoning.

- a. Beth's glass of lemonade has a weaker tasting lemon flavor than John's glass of lemonade. If two ounces of water is added to Beth's glass and one teaspoon of lemon mix is added to John's glass, which glass will contain the lemonade with the stronger lemon flavor?



- b. Jimmy and Jake have glasses of lemonade that taste the same. If one teaspoon of lemon mix is added to each glass, which glass will contain the lemonade with the stronger lemon flavor?



- c. Jack's glass of lemonade has a stronger tasting lemon flavor than Karen's glass of lemonade. If one teaspoon of lemon mix is added to Karen's glass and one ounce of water is added to Jack's glass, which glass will contain the lemonade with the stronger lemon flavor?



2. Choose the correct statement to complete each sentence and explain your reasoning. If the answer cannot be determined, explain why not.

a. If Luke plans to use four more tablespoons of orange mix today than what he used yesterday to make the same amount of orange drink, his orange drink today would have:

- a stronger tasting orange flavor.
- a weaker tasting orange flavor.
- a mix that has the same strength of orange taste as yesterday.

b. Dave and Sandy each made a pitcher of orange drink. Sandy's pitcher is larger than Dave's pitcher. Sandy used more orange mix than Dave. Dave's orange drink has:

- a stronger tasting orange flavor.
- a weaker tasting orange flavor.
- a mix that has the same strength of orange taste as Sandy's drink.

c. If a race car travels more laps in less time than it did yesterday, its speed would be:

- slower.
- exactly the same.
- faster.

ACTIVITY
2.2

Comparing Comparisons



The 6th grade students are making hot chocolate to sell at the Winter Carnival. Each homeroom suggested a different recipe.

HR 6A

2 cups milk
3 T cocoa powder

HR 6B

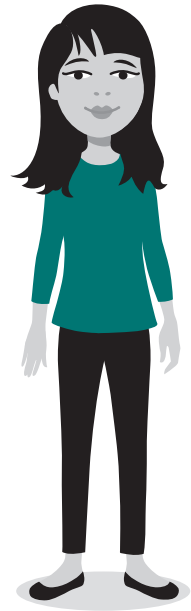
5 cups milk
8 T cocoa powder

HR 6C

3 cups milk
4 T cocoa powder

HR 6D

4 cups milk
7 T cocoa powder



1. Consider the given recipes to answer each question.

- Use reasoning to determine which recipe has the strongest chocolate taste and which recipe has the weakest chocolate taste.
- Show how you used ratio reasoning to order the recipes. Identify the ratios that you used as part-to-part or part-to-whole.
- Create a poster to explain your answer and strategies to the class. Prepare to share!

ACTIVITY
2.3

Ordering Part-to-Part and Part-to-Whole Ratios



Suppose your class is in charge of providing punch at the upcoming open house. The Parent-Teacher Association bought lemon-lime soda and pineapple juice to combine for the punch, but they did not tell your class how much of each to use. Your classmates submitted suggestions for how to make the tastiest punch.

Cut out the punch ratio cards at the end of the lesson. Order the cards from the least lemon-lime concentration to the most lemon-lime concentration. If you think more than one card describes the same ratio of lemon-lime soda and pineapple juice, group those cards together.

The shading, or lack of shading, of each cup represents the difference in the type of concentration.



lemon-lime soda



pineapple juice

1. Describe the strategies you used to sort and order the cards.

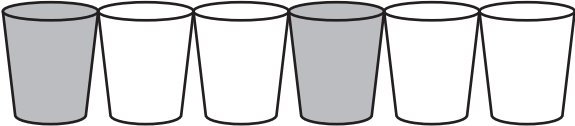
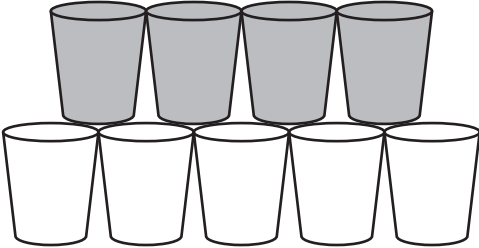
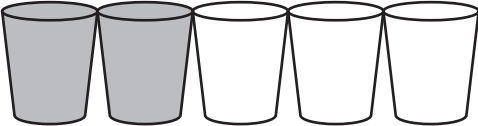
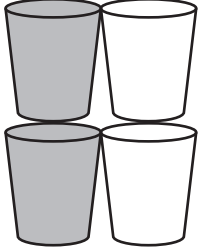
TALK the TALK

Put Me In, Coach

A soccer team has been awarded a penalty shot at the end of a tie game. If they make the penalty shot, they will win the league championship. The coach is considering three players to take the penalty. Amber has taken 4 penalty shots this season and has made 3 of them. Lindsay has taken 6 penalty shots and made 4. Li has taken 3 penalty shots and made 2.

1. Which player would you recommend take the penalty shot? Why?

Punch Ratio Cards

<p>A</p> <p>For every lemon-lime soda, there is a pineapple juice.</p>	<p>B</p> 
<p>B</p> <p>One-fourth of the punch is lemon-lime soda.</p>	<p>D</p> 
<p>E</p> <p>Half of the mixture is pineapple juice.</p>	<p>F</p> 
<p>G</p> <p>Lemon-lime soda : Pineapple juice = 4 : 5</p>	<p>H</p> 
<p>I</p> <p>For every lemon-lime soda, there are two pineapple juices.</p>	<p>J</p> <p>For every lemon-lime soda, there are $1\frac{1}{2}$ pineapple juices.</p>
<p>K</p> <p>Pineapple juice : lemon-lime soda = 3 : 1</p>	<p>L</p> <p>Three-fifths of the punch is pineapple juice.</p>

Assignment

Write

Write two recipes for hot chocolate, each with a different ratio of chocolate mix to water or milk. Describe how the two recipes are similar and different.

Remember

One ratio can be less than, greater than, or equal to another ratio.

Practice

Megan is making fruit punch using fruit juice and ginger ale. She tries different combinations to get the mixture just right. If the ratio of fruit juice to ginger ale is too high, the punch is too fruity; if the ratio is too low, the punch is too gingery.

For each attempt, write a ratio Megan can try next time.

1. She tried 16 cups of fruit juice and 4 cups of ginger ale. That was too fruity.
2. She tried 10 cups of fruit juice and 8 cups of ginger ale. That was too gingery.
3. She tried 10 cups of fruit juice and 1 cup of ginger ale. That was too fruity.
4. She tried 8 cups of fruit juice and 4 cups of ginger ale. That was a little too gingery.
5. Based on Megan's attempts in Questions 1-4, what might be a good ratio of fruit punch to ginger ale? Explain your thinking.

Stretch

Which of the given recipes will make cookies with the most chocolate chips per cookie? Order the recipes from the least chocolate chips per cookie to the most chocolate chips per cookies. Explain your answer.

Recipe 1: $1\frac{3}{4}$ cups of chips for a batch of 2 dozen cookies

Recipe 2: 1 cup of chips for a batch of 18 cookies

Recipe 3: $\frac{3}{4}$ cup of chips for a batch of 12 cookies

Review

1. During the spring sports season, students at Hillbrook Middle School have the opportunity to either play baseball, run outdoor track, or play lacrosse. Of the 75 students at Hillbrook who play a spring sport, 30 run track, 25 play baseball, and 20 play lacrosse. Write the ratios and determine whether a part-to-part or part-to-whole relationship exists.
 - a. track runners to baseball players
 - b. track runners to total number of athletes
2. Determine the area of each face of a cube with the given surface area.
 - a. 306.6 m^2
 - b. 450 in.^2
3. Determine each sum.
 - a. $\frac{1}{6} + \frac{2}{3}$
 - b. $\frac{5}{8} + \frac{1}{2}$