

Dear Family,

This week your student is exploring ratio concepts. A **ratio** is a way of comparing quantities. Sometimes ratios compare a **part** and a **part**, and sometimes they compare a **part** and a **whole**.

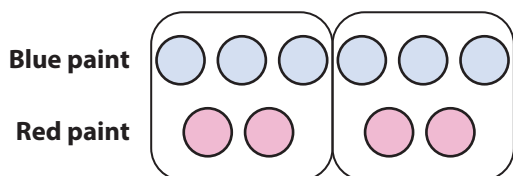
For example, when making a total of 3 cups of lemonade, you might say:

- The ratio of **cups of water** to **cups of lemon juice** is 2 to 1.
- The ratio of **cups of lemon juice** to total **cups of lemonade** is 1 to 3.

Your student will be modeling ratios like the one below.

To make a purple paint, you can use 3 cups of blue paint for every 2 cups of red paint.

- **ONE WAY** to model a ratio relationship is to use a diagram.



- **ANOTHER WAY** is to use ratio language and symbols.

The ratio of cups of blue paint to cups of red paint is

3 to 2 or **3 : 2**

because there are **3 cups of blue paint for every 2 cups of red paint**.

You can also change the order of the parts so that the amount of red paint is the first quantity in the ratio.

The ratio of cups of red paint to cups of blue paint is

2 to 3 or **2 : 3**

because there are **2 cups of red paint for every 3 cups of blue paint**.

Both representations accurately compare the quantities of blue paint and red paint.



Use the next page to start a conversation about ratios.

Activity Describing Ratios

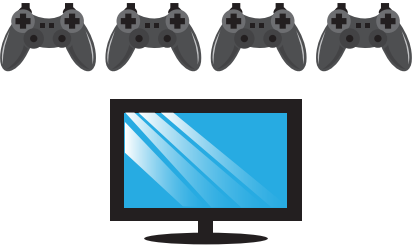
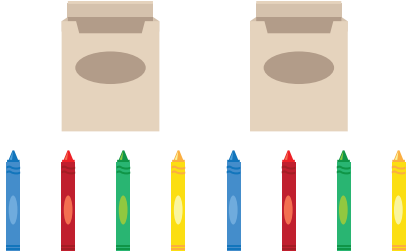
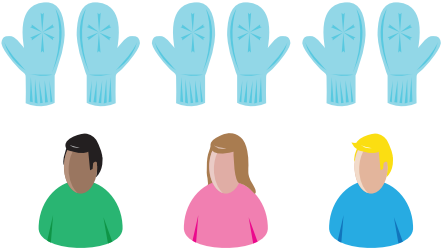
➤ Do this activity together to write sentences that describe ratios relationships.

You can describe ratios using the language *for each* and *for every*.

- There are 2 red tulips *for each* yellow tulip.
- *For every* 1 yellow tulip, there are 2 red tulips.
- *For every* 4 red tulips, there are 2 yellow tulips.

Look at the models representing ratio relationships. Write two sentences using ratio language to describe each model.



RATIO	SENTENCES
	<p>There are 4 game controllers for each screen.</p>
	
	

? Do you notice any similarities or differences between two sentences used to describe a ratio relationship?

? **UNDERSTAND:** How can you use ratios to compare quantities?

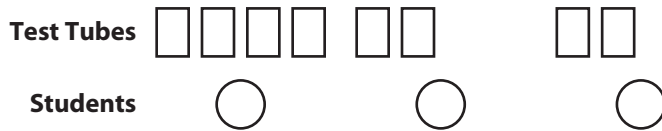
Explore Ratio Concepts

Model It

► Complete the problems about comparing quantities.

1 You can use multiplication as a way to compare two quantities.

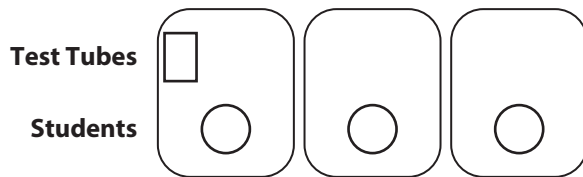
a. In Charles’s lab group, there are 4 times as many test tubes as students. Complete the model to show this comparison. A circle represents a student, and a rectangle represents a test tube.



b. One more student is added to Charles’s group. How many more test tubes do you need to include in the model?

2 You can also use a **ratio** to compare two quantities. One way to describe a ratio relationship is to use the language *for every* or *for each*.

a. In Eldora’s lab group, there are 3 test tubes for every 1 student. Complete the model to show this ratio relationship.

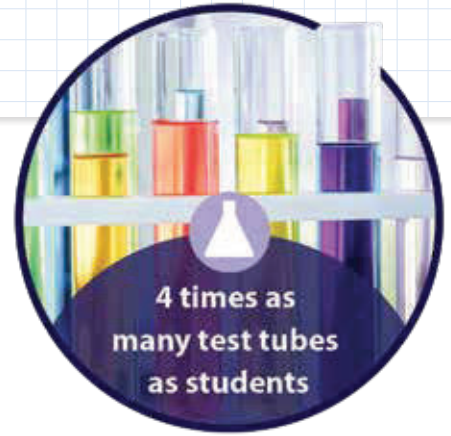


b. Use your model to complete these sentences that use ratio language.

For every 1 student, there are _____ test tubes.

There are _____ test tubes for each _____.

There is _____ student for every _____ test tubes.



DISCUSS IT

Ask: How do your models in problems 1 and 2 help you to compare two quantities?

Share: I could use ratio language to describe my model in problem 1 by saying . . .

Learning Target SMP 2, SMP 3, SMP 7

Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

Model It

► Complete the problems about ratio relationships.

- 3 The Spanish Club is having a party. They plan to serve 6 tacos for every 3 guests.
- a. Complete the model to show this ratio relationship.



- b. Use ratio language to write two different sentences that compare numbers of tacos and guests.
- c. Ju-long says that there will be 2 tacos for every 1 guest. Use your model to help explain why Ju-long is correct.

DISCUSS IT

Ask: How does your model show the ratio relationship between the number of tacos and the number of guests?

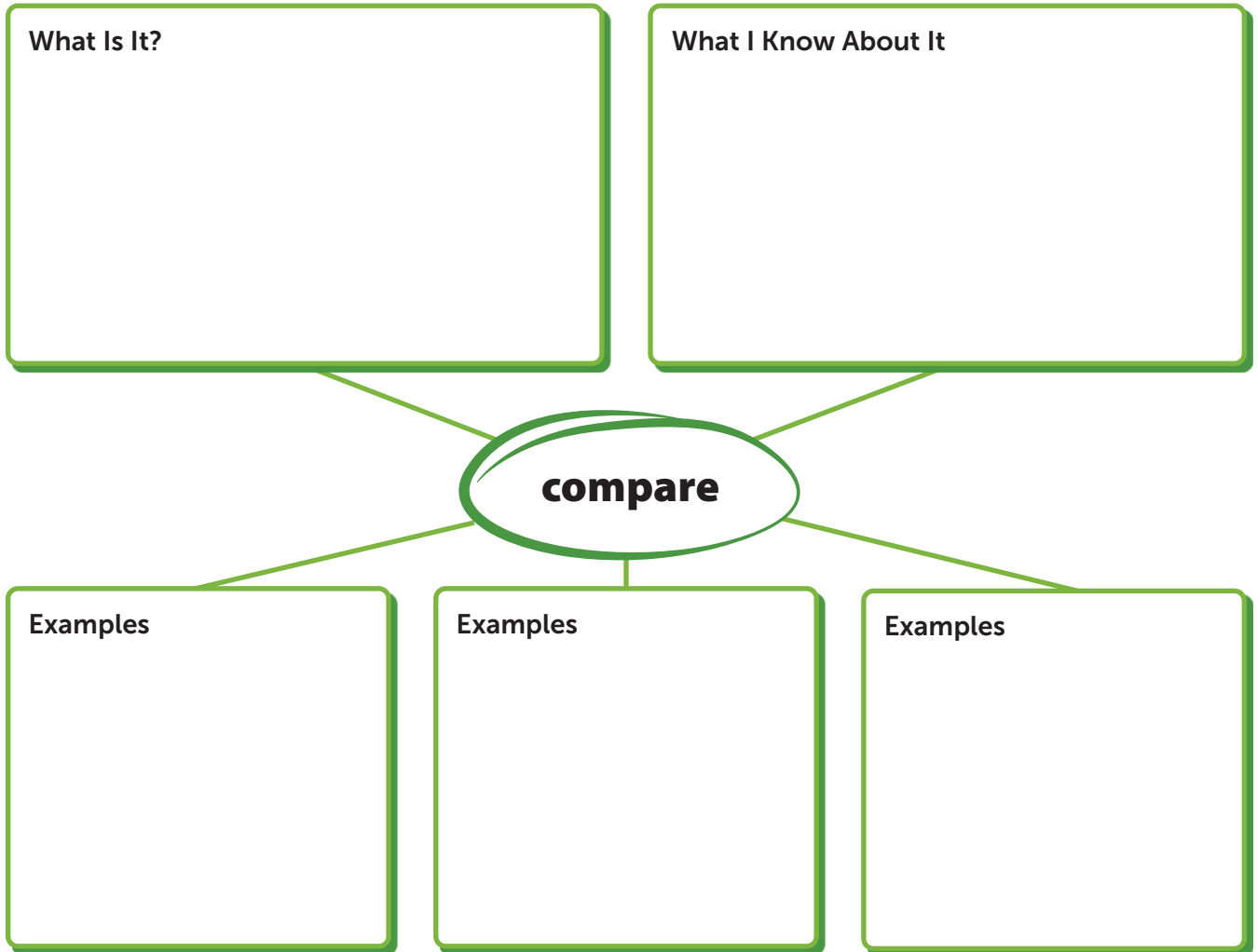
Share: I could use the ratio relationship to find the number of tacos the club needs by . . .

- 4 **Reflect** Explain how the ratios *5 tacos for every 2 guests* and *2 tacos for every 5 guests* are different. Include a model in your explanation.



Prepare for Understanding of Ratio Concepts

- 1 Think about what you know about comparing numbers or quantities. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

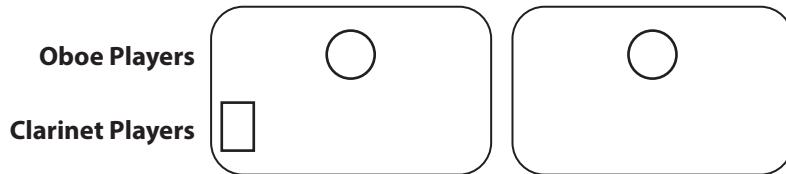


- 2 Write three sentences that compare the values 12 and 3 in different ways.

► Complete problems 3–4.

3 In a school band, there is 1 oboe player for every 6 clarinet players.

a. Complete the model to show this ratio relationship.



b. Use your model to complete these sentences that use ratio language.

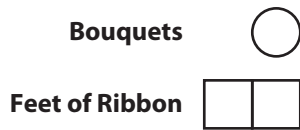
There are _____ clarinet players for each _____ .

For every _____ oboe player, there are _____ clarinet players.

For every _____ clarinet players, there is _____ oboe player.

4 Emma sells flowers. She uses 9 ft of ribbon for every 3 wedding bouquets she sells.

a. Complete the model to show this ratio relationship.



b. Use ratio language to write two different sentences that compare the amount of ribbon and the number of bouquets.

c. Adoncia says that Emma uses 3 ft of ribbon for every 1 bouquet. Use your model to help explain why Adoncia is correct.



Vocabulary

ratio

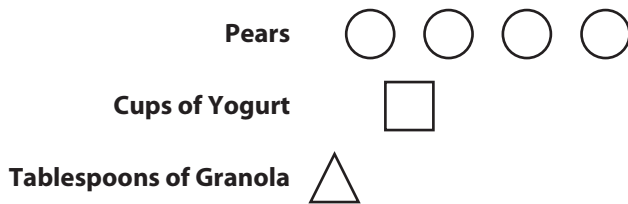
a way to compare two quantities when there are a units of one quantity for every b units of the other quantity.

Develop Understanding of Ratio Concepts

Model It: Compare with Ratios

► Try these three problems involving ratios.

- 1 Carlos is making baked pears. Complete the model to show the ratio relationships for the ingredients in the recipe.



- 2 You can compare two quantities in a ratio by using words or symbols. You can write a ratio using the word *to* or a colon.

There are **4 pears for every 2 cups of yogurt**.

The ratio of **pears to cups of yogurt** is **4 to 2** or **4 : 2**.

Write each ratio two different ways. Use the word *to* and a colon.

- a. the ratio of cups of yogurt to pears
 - b. the ratio of cups of yogurt to tablespoons of granola
 - c. the ratio of tablespoons of granola to cups of yogurt
- 3 Use your model in problem 1 to complete the sentences.

- a. The ratio of _____ to _____
is 4 : 6 because there are 4 _____ for
every 6 _____.
- b. The ratio of _____ to _____
is 6 : 4 because there are 6 _____ for
every 4 _____.



DISCUSS IT

Ask: How did you know which number to put first when writing the ratios?

Share: I noticed that the order of the numbers in a ratio matters because ...


Model It: Parts and Wholes

► Try these ratio problems involving parts of a whole.

- 4 Students record the types of ducks they see on a nature walk in Central Park in New York City. Draw a model to show the ratio of mallards to ruddy ducks.

Mallards

Ruddy Ducks



Type of Duck	Number Seen
Mallard	8
Ruddy Duck	5

- 5 Some ratio relationships involve parts of a larger whole. For these relationships, ratios can compare two parts or a part and a whole.

Parts: mallards and ruddy ducks **Whole:** total number of ducks

- a. What does the ratio 8 to 13 represent?
- b. Circle the type of ratio that 8 : 13 represents.

part to part part to whole whole to part

DISCUSS IT

Ask: How is the ratio 8 to 13 different from the ratio 8 to 5?

Share: I noticed you can find a whole in a ratio relationship by . . .

CONNECT IT

► Complete the problems below.

- 6 Carlos uses 2 cups of yogurt and 6 tablespoons of granola for every 4 pears. Would it make sense to describe this situation with a part-to-whole ratio? Explain.
- 7 The puppies in a litter are either black or brown. The ratio of black puppies to the total number of puppies is 3 : 8. What is the ratio of brown puppies to black puppies? Draw a model to show how you found your answer.

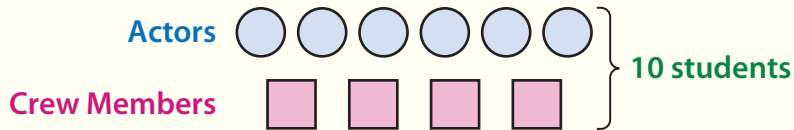
Practice Ratio Concepts

► Study how the Example shows ratio relationships. Then solve problems 1–5.

Example

The students in the drama club are either actors or crew members. For every 6 actors in the club, there are 4 crew members. What is the ratio of actors to students in the drama club?

Draw a model to show 6 actors for every 4 crew members.



The model shows that there are 6 actors for every 10 students in the club.

The ratio of actors to students is 6 to 10, or 6 : 10.

- 1 a. What is the ratio of crew members to actors in the drama club in the Example? Write your answer in two different ways. Use the word *to* and a colon.
- b. In your answer to problem 1a, why is the order of the numbers important?

- 2 Last season, the ratio of the number of soccer games won to the number of soccer games lost was 3 to 2.
- a. Draw a model to represent this ratio relationship.

- b. Tell what each ratio represents in this situation.

2 to 3

3 : 5

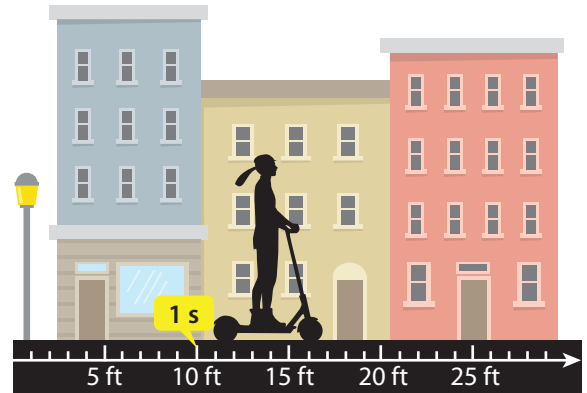
Vocabulary

ratio

a way to compare two quantities when there are a units of one quantity for every b units of the other quantity.

You can write the ratio in symbols as $a : b$ and in words as a to b .

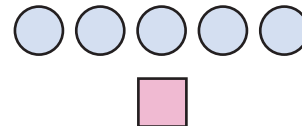
- 3 Paloma rides a scooter. She travels 10 ft for every 1 second.
- a. Hannah says that Paloma’s ratio of seconds traveled to feet traveled is 10 : 1. Is Hannah correct? Use a model to help explain your thinking.



- b. Gaspar also rides a scooter. He travels 2 ft farther for every 1 second than Paloma does. What is Gaspar’s ratio of feet traveled to seconds traveled? Show your work.

SOLUTION _____

- 4 Describe a real-world ratio that the model could represent.



- 5 A hair stylist has three colors of hair dye. She has 4 bottles of chestnut, 7 bottles of blond, and 8 bottles of cherry. What does the ratio 8 : 19 represent in this situation? Explain your reasoning. Include a model in your explanation.



Refine Ideas About Ratio Concepts

Apply It

► Complete problems 1–5.

1 Apply When Akiko rides her bike to school, she travels 1 mi for every 6 min. Does this ratio mean that it takes Akiko 6 min to get to school? Explain.

2 Analyze A store sells variety packs of granola bars. The table shows the types of bars in each pack. Mason says that for every 7 bars in a pack, there is 1 cinnamon bar. Do you agree? Explain.

Type	Number of Bars
Cinnamon	1
Honey	4
Peanut Butter	3

3 Evaluate Bridget is filling welcome bags for several new students. Each bag gets 1 magnet. The ratio of magnets to pencils in each bag is 1 : 6, and the ratio of erasers to magnets is 2 : 1. Which statement below must be true? Use a model to help explain your thinking.

- Bridget needs 4 more pencils than erasers.
- Bridget needs 3 times as many pencils as erasers.



- 4 A national park has two types of bears: grizzly bears and black bears. A scientist reports that 9 out of the 12 bears she tagged are black bears.

PART A Draw a model that compares the number of black bears tagged to the number of grizzly bears tagged.

PART B Use your model to explain what the ratio 9 : 3 represents in this situation.

PART C Jelani says that for every 1 tagged grizzly bear, there are 3 tagged black bears. Use your model to explain why Jelani is correct.

- 5 **Math Journal** A store sells 1 smartwatch for every 8 smartphones. How can you use ratios to compare these quantities? Include a model in your explanation.

✓ End of Lesson Checklist

- INTERACTIVE GLOSSARY** Find the entry for *ratio*. Add two important things you learned about ratios in this lesson.