Readiness Engagement Mastery

Lesson 1

Chapter Opener (page 97)

20 minutes

In Chapter 4, students are introduced to ratio. The picture provides a familiar context for students to explore the concept of ratio through a real-world example.

- Display the picture. Invite students to share what they see.
  picnic; mixing orange punch
- Group students in pairs or small groups to discuss the picture and the questions on the page.
- You may facilitate discussions with these questions. Observe student discussions and pay attention to the language they use.

  What are the girl and boy trying to figure out? which orange punch has the strongest orange flavor **How can you determine which mix will have the strongest flavor? What do you need to find?** which mix has more orange juice than water **Is there another way to solve the problem? When was a time you have made a recipe or mix?**
- Have students work together to find the solution then share their methods.
- Extend the task by having students find which two mixes would produce the same result.
  B and D

English Language Support

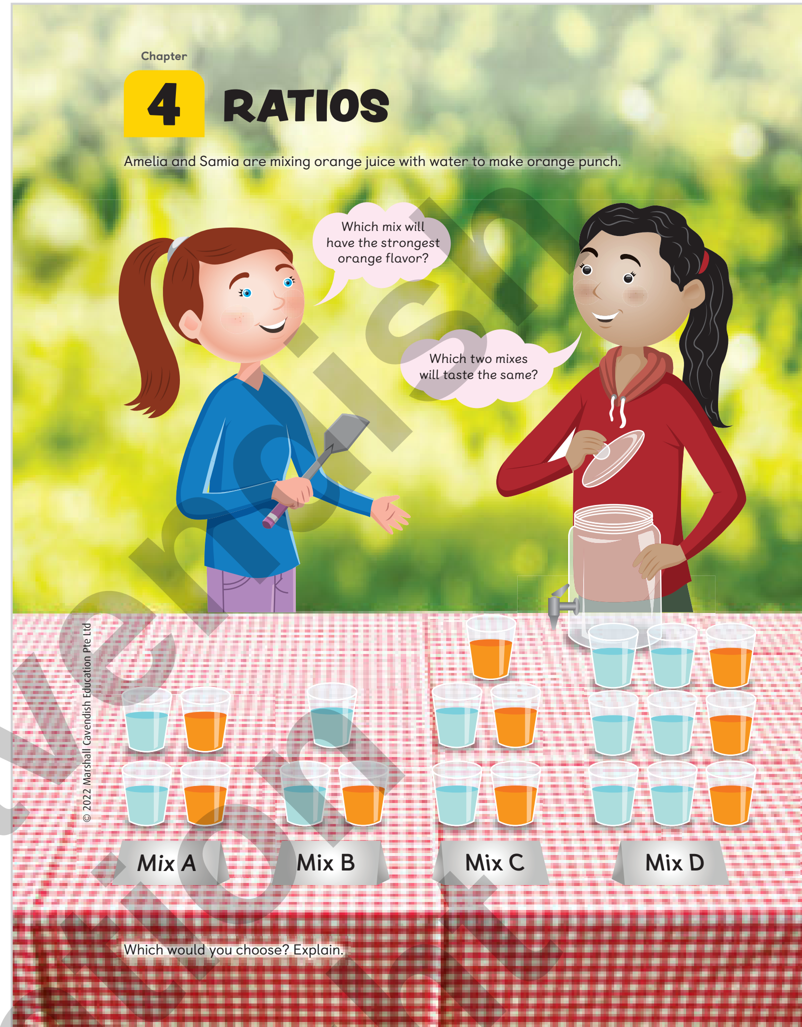
Guide students by pre-teaching vocabulary and showing the relationship between the terms, "flavor," "mix," and "parts." Explain that each mix has different flavors depending on how many parts of water and juice are combined.

Encourage students to use these sentence frames to scaffold discussion.

Mix ____ has ____ parts of water and ____ parts of juice.
A; 2; 2

Mix ____ makes the strongest flavor. C

Mix ____ and Mix ____ have the same flavor. B; D



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Promoting Growth

Present students with cups, a pitcher of water, and food coloring. Have students recreate each mix using water and colored water. Have them observe the results and write down their observations.

Ask students to create a Mix E that would be stronger than all the other mixes and a Mix F that would be weaker than all the other mixes. Ask them to create a graphic to explain their thinking.

Readiness **Engagement** Mastery

Lesson 2

4A Introducing Ratios (1)

Focus Question

How does a ratio help you compare quantities?

I CAN

- I can use ratio language.
- I can write a ratio to compare two given numbers/quantities/mixtures.
- I can model a ratio using drawing/objects/tables.

Mathematical Practice(s)

- 2 Reason

Vocabulary

- ratio

Material(s)

- sticky notes
- 2 sets of colored counters per pair or small group

RATIO CONCEPT AND LANGUAGE (pages 99 to 102)

Lesson Opener

Task (page 99) 10 minutes

- Group students in pairs or small groups.
- Provide students with colored counters. Have students work on the task. Observe student discussions.
- After students have attempted the task, use the following prompts to facilitate a class discussion. Pay attention to the language students use.

How can you use the counters to model the situation? for each red counter, I need 4 yellow counters. **How many cars can you build for every 4 wheels?** 1 car **How many could you build with 8 wheels?** 2 cars


Name: ____________ Date: ____________

4A Introducing Ratio

Learn

We can build 1 car for every 4 wheels.

The ratio of the number of cars to the number of wheels is 1 to 4.

We write it as 1 : 4.

The ratio of the number of wheels to the number of cars is 4 to 1.

We write it as 4 : 1.

4 : 1 is not the same as 1 : 4.
The order of the numbers in a ratio is important.

We use a ratio to compare two quantities.
The ratio shows a relationship between two quantities.

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4A Introducing Ratio 99

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Lesson Development

Learn (page 99) 10 minutes

- Encourage students to represent the problem using connecting cubes.

How might you describe the number of cars to the number of wheels in words? 1 to 4

- Write the word ratio on the board. Explain that a ratio is a comparison between two quantities.
- Write 1 : 4 on the board. Explain that we use the symbol ":" to represent the word 'to' in a ratio.

If we are describing the ratio of cars to wheels, how would we write the ratio? 1 : 4 **What if we were writing the ratio of wheels to cars?** 4 : 1 **Why is the order that we write the ratio important?** because the order needs to match the quantity we are describing

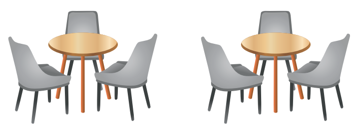
Learn Together

1. Alexis is studying aviation. She is trying to figure out how many wheels each plane needs to be able to land. Use a ratio to show the relationship between the number of wheels and the number of model planes.

There are 6 wheels for every 1 plane.

The ratio of the number of wheels to the number of planes is 6 : 1.

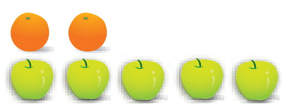
2. Each table has 3 chairs.



There is 1 table for every 3 chairs.

The ratio of the number of tables to the number of chairs is 1 : 3.

3. (a) There is some fruit.



The ratio of the number of apples to the number of oranges is 5 : 2.

(b) Partition the bars to show the ratio.

oranges

apples

Student Book Page 100

Name: ______________ Date: ______________

4. There are some beans in a bag. The ratio of the number of red beans to white beans is 4 : 3. Draw a bar model to show the ratio.

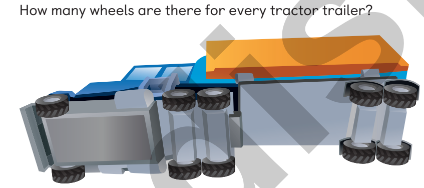
white beans

red beans

What does 3 : 4 mean?

Practice on Your Own

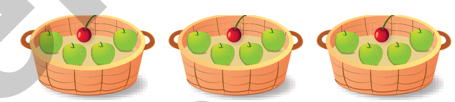
1. How many wheels are there for every tractor trailer?



There are 10 wheels for every 1 tractor trailer.

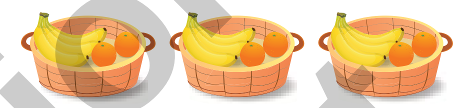
The ratio of the number of wheels to the number of tractor trailers is 10 : 1.

2. Write the ratios.



(a) There is 1 cherry for every 4 apples.

The ratio of cherries to apples is 1 : 4.



(b) There are 3 bananas for every 2 oranges.

The ratio of bananas to oranges is 3 : 2.

Student Book Page 101

Learn Together (pages 100 and 101) 10 minutes

- Group students in pairs or small groups to answer Questions 1 to 4.
- **QUESTION 1** requires students to compare two quantities by writing a ratio.

What is Alexis trying to figure out? how many wheels there are for each plane

- Have students use the two-colored counters to model the situation.

What is the ratio of wheels to planes? 6 : 1 **Why would it not be correct to write the ratio as 1 : 6?** that would be the ratio of planes to wheels

- **QUESTION 2** require students to compare two quantities by writing a ratio.

How many tables are there? 2 **How many chairs are there?** 6 **How many tables are there for each set of 3 chairs?** 1 **What is the ratio of tables to chairs?** 1 : 3

- **QUESTION 3** requires students to compare two quantities by writing a ratio and then model the ratio using a bar model when the relative length of the bar is given.

How can you compare the number of apples to the number of oranges? There are 5 apples to 2 oranges. **How do you write the ratio of the number of apples to the number of oranges?** 5 : 2 **What do you notice about the bars given to represent the oranges and the apples?** The bar for the oranges is shorter. The bar for the apples is longer. **How could you use equal units and the bars to show the 5 : 2 relationship between the types of fruit?** I could divide the orange bar into 2 equal parts and the apple bar into 5 equal parts.

- **QUESTION 4** requires students to model a ratio using a bar model.

How could you use equal units and the bars to show the ratio of red beans to yellow beans? I could draw two bars. The yellow one would have 3 units and the red one would have 4 units. **How did you know which bar should have 3 units and which bar should have 4 units?** The ratio of 4 : 3 is red to yellow so there are 4 units for red and 3 units for yellow.

Invite students to discuss the Math Talk with a partner then have them share their thinking.

What does 3 : 4 mean? It would mean that you were comparing yellow to red.

Best Practice

Encourage students to use sticky notes to represent the ratios before drawing the bar model representation. The transition between the concrete and pictorial model helps students to visualize the ratio.

Readiness **Engagement** Mastery

Lesson 4

4B Equivalent Ratios (1)

Focus Question

How can you determine if two ratios are equivalent?

I CAN

- I can recognize and interpret equivalent ratios.
- I can express the ratio of two quantities in simplest form.
- I can generate equivalent ratios using ratio tables and double number lines.

Vocabulary

- equivalent ratios
- simplest form
- double number line diagram

Mathematical Practice(s)

- 2 Reason

Material(s)

- 2 sets of colored counters per pair or small group

INTERPRET AND WRITE EQUIVALENT RATIOS
(pages 107 to 110)

Lesson Opener

C P A

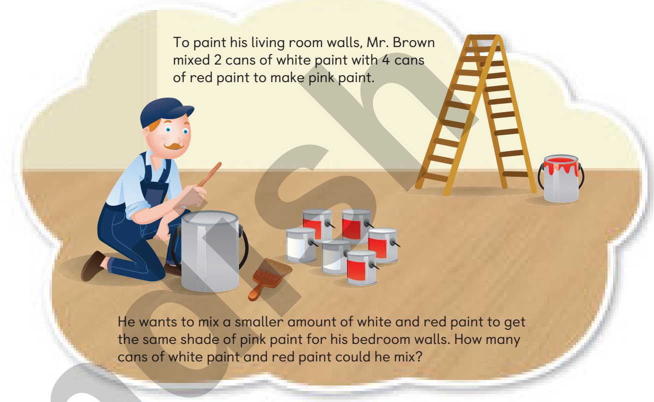
Task (page 107) 10 minutes

- Group students in pairs or small groups. Provide them with connecting cubes.
- Have students work on the task. Observe student discussions.
- After students have attempted the task, use the following prompts to facilitate a class discussion. Pay attention to the language students use.

What does Mr. Brown want to do? He wants to paint the walls of the bedroom. **How much paint did he use for his living room walls?** He used 2 cans of white paint and 4 cans of red paint. **What is the ratio of white paint to red paint?** 2 : 4 **Why might Mr. Brown want to use a smaller amount of paint for his bedroom?** Answers will vary. Possible answers: The room might be smaller than he thought. He doesn't want to waste paint.

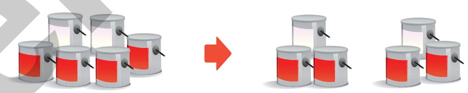
Name: ______ Date: ______

4B Equivalent Ratios



Learn

To get pink paint, Mr. Brown mixed white paint and red paint in the ratio 2 : 4.



2 cans of white paint for every 4 cans of red paint.

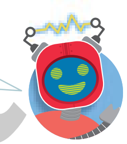
1 can of white paint for every 2 cans of red paint.

2 : 4 is the same as 1 : 2.

Mr. Brown could mix 1 can of white paint with 2 cans of red paint to get the same shade of pink.

2 : 4 and 1 : 2 are **equivalent ratios**.

The two numbers in the ratio 1 : 2 do not have a common factor. So, 1 : 2 is a ratio in ***simplest form****.*



Student Book Page 107

Lesson Development

C P A

Learn (page 107) 10 minutes

- Provide students with 2 colored counters.

How could you use the counters to show the ratio of white to red paint? I could show 2 white counters and 4 red counters. **If he uses 4 cans of red paint for every 2 cans of white paint, is there another way he could get the same color by using less paint?** He could mix 1 can of white paint and 2 cans of red paint. **How do you know that would produce the same color of paint?** 2 : 4 is the same as 1 : 2 as each part is cut into half. We divide both quantities by 2. **Why might we call this creating an equivalent ratio?** Because 2 : 4 and 1 : 2 have the same value.

Extension

Ask students to find how many cans of red paint would be needed if Mr. Brown used $\frac{1}{2}$ of a can of white paint.

Lesson Debrief

- Conclude the lesson and facilitate students' reflection by asking students to answer the **Focus Question** and share their thinking.

? Focus Question

How can you determine if two ratios are equivalent?

- Extend the discussion by posing the following questions.

What are three different methods of finding equivalent ratios?

Promoting Growth

To encourage and support students to persevere in problem solving and maintain a learning mindset:

- *Allow students time to reflect on what they have learned and to ask questions about what they may be unsure of.*
- *Encourage students to share how they overcome a difficulty in the process of learning.*
- *Provide students with these prompts: How do you know if two ratios are equivalent? Give a real-world example to explain.*
- *Have them write a journal entry.*

- Display this lesson's **I CAN** statement(s) for students to reflect on their learning.
  - o I can recognize and interpret equivalent ratios.
  - o I can express the ratio of two quantities in its simplest term.
  - o I can generate equivalent ratios using ratio tables and double number lines.

4. Express the ratios in simplest form.

(a) 40 : 24 = 5 : 3

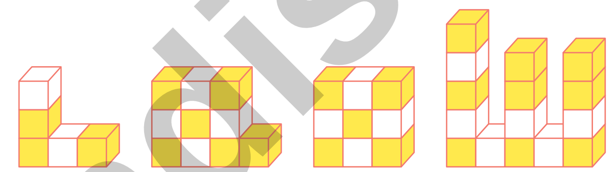
(b) 72 : 81 = 8 : 9

(c) 13 : 39 = 1 : 3

(d) 14 : 35 = 2 : 5

Think!

5. REASON The following solid figures are made from yellow cubes and white cubes. Which figure does not belong? Explain.



A B C D

The ratio of the number of yellow cubes to the number of white cubes in Solid A is 3 : 2.
The ratio of the number of yellow cubes to the number of white cubes in Solid B is 6 : 4.
The ratio of the number of yellow cubes to the number of white cubes in Solid D is 9 : 6.
3 : 2 = 6 : 4 = 9 : 6
Solid C does not belong as the ratio of yellow cubes to white cubes in Solid C is 5 : 4, which is not equivalent to 3 : 2.

Student Book Page 110

Practice On Your Own (pages 109 and 110) 15 minutes

If you would like the questions to be auto-graded, refer students to online **Practice On Your Own** as a lesson check. If you want students to show their work, have them do so in the Student Book.

- **QUESTION 1** assesses students' ability to write a ratio in simplest form.
- **QUESTION 2** assesses students' ability to recognize equivalent ratios using a bar model.
- **QUESTION 3** assesses students' ability to use double number lines to find equivalent ratios.
- **QUESTION 4** assesses students' ability to express ratios in simplest form.
- **QUESTION 5** assesses students' ability to apply ratio reasoning to determine a pattern among geometric figures.

Refer to **Differentiated Instruction** to provide students with additional support, on-level practice, or extension.

Differentiated Instruction

Additional Support

Material(s): 2 colored counters

- Show 10 white counters and 5 red counters
- Have each student represent the ratio of white to red counters.
- Ask students to use counters to find an equivalent ratio to 10 : 5 by doubling each part.
- Ask students to find the simplest form of 20 : 10 by forming groups of 10. Repeat the activity by having them form groups of 5.

On-Level Practice

- Encourage students to summarize their learning and make connections to what they have previously learned. Invite them to give examples to show their thinking.
- Help them begin by asking the following questions.

How can you use multiplication to find equivalent ratios? How can you use division?

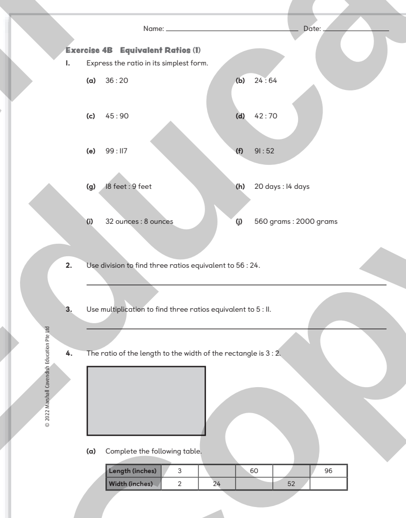
- If time permits, encourage students to discuss their work and share their ideas.
- Assign **Additional Practice 6A Exercise 4B (1)** as appropriate to each student.

Extension

- Encourage students to summarize their learning, make connections to what they have previously learned, and challenge them to ask questions regarding what they want to learn more about.

What are real-world examples of why it might be important to use simplest form?

- If time permits, encourage students to discuss their work and share their ideas.



Name: ______________ Date: ______________

Exercise 4B Equivalent Ratios (1)

1. Express the ratio in its simplest form.

(a) 36 : 20 (b) 24 : 64

(c) 45 : 90 (d) 42 : 70

(e) 99 : 117 (f) 91 : 52

(g) 18 feet : 9 feet (h) 20 days : 14 days

(i) 32 ounces : 8 ounces (j) 560 grams : 2000 grams

2. Use division to find three ratios equivalent to 56 : 24.

____

3. Use multiplication to find three ratios equivalent to 5 : 11.

____

4. The ratio of the length to the width of the rectangle is 3 : 2.

(a) Complete the following table.

Length (inches)	3		60		96
Width (inches)	2	24		52	

Additional Practice Grade 6A 4B Equivalent Ratios (1) 49