

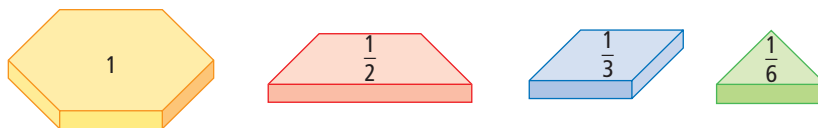
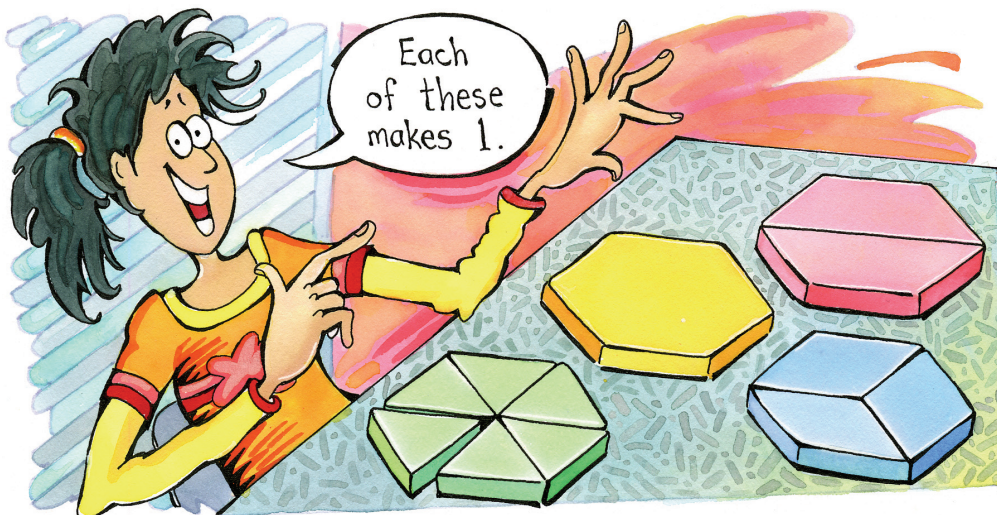
# 6.2

## Add Fractions With Like Denominators

### Focus on...

After this lesson, you will be able to...

- add fractions with like denominators using models, diagrams, and addition statements



Kendra used pattern blocks to show 1 in several different ways. How can she use pattern blocks to add fractions?

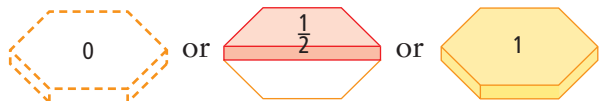
### Explore the Math

#### Materials

- pattern blocks 

#### How can you use pattern blocks to estimate sums and add fractions?

- Use pattern blocks to show  $\frac{1}{3} + \frac{1}{3}$ .
- Compare the blocks that show  $\frac{1}{3} + \frac{1}{3}$  to 0,  $\frac{1}{2}$ , and 1.
  - Estimate whether  $\frac{1}{3} + \frac{1}{3}$  is closest to



- What is the answer to  $\frac{1}{3} + \frac{1}{3}$ ?

To compare, use the pattern blocks that represent  $\frac{1}{2}$  and 1.

## Reflect on Your Findings

4. a) How do models such as pattern blocks help you to estimate sums of fractions?  
 b) How do models such as pattern blocks help you to add fractions?

### Example 1: Add Fractions Using Models

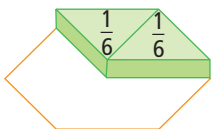
Add using models. Write the answer in lowest terms.

$$\frac{1}{6} + \frac{1}{6}$$

#### Solution

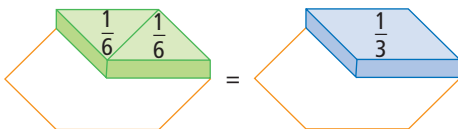
*Method 1: Use Pattern Blocks*


$$\frac{1}{6} + \frac{1}{6} = \frac{2}{6}$$





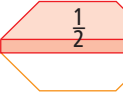
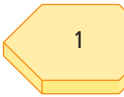
Write  $\frac{2}{6}$  in lowest terms.

$$\frac{2}{6} = \frac{1}{3}$$



You can estimate the answer.  **M E**

Is  closest to

 or  or  ?

It is closest to  $\frac{1}{2}$ .

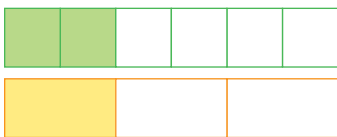
*Method 2: Use Fraction Strips*

$$\frac{1}{6} + \frac{1}{6} = \frac{2}{6}$$



Write  $\frac{2}{6}$  in lowest terms.

$$\frac{2}{6} = \frac{1}{3}$$



Each time you write a fraction in lowest terms, you are writing an equivalent fraction.

### Show You Know

Add using models. Write your answer in lowest terms.

a)  $\frac{1}{4} + \frac{1}{4}$

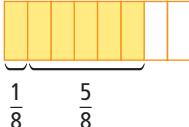
b)  $\frac{2}{3} + \frac{1}{3}$

## Example 2: Add Fractions Using a Diagram

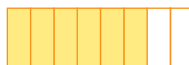
Add using a diagram. Write the answer in lowest terms.

$$\frac{1}{8} + \frac{5}{8}$$

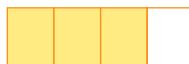
**Solution**

$$\frac{1}{8} + \frac{5}{8} = \frac{6}{8}$$


Write  $\frac{6}{8}$  in lowest terms.



$$\frac{6}{8} = \frac{3}{4}$$



### Show You Know

Add. Write your answer in lowest terms.

a)  $\frac{2}{5} + \frac{1}{5}$

b)  $\frac{1}{10} + \frac{9}{10}$

### Literacy Link

#### Fractions Equivalent to 1

If the numerator and denominator are the same number, the fraction equals 1.

$$\frac{8}{8} = 1$$



## Example 3: Add Fractions Using an Addition Statement

Add. Write the answer in lowest terms.

$$\frac{7}{10} + \frac{1}{10}$$

**Solution**

$$\begin{aligned} \frac{7}{10} + \frac{1}{10} &= \frac{7+1}{10} \\ &= \frac{8}{10} \end{aligned}$$

Write  $\frac{8}{10}$  in lowest terms.

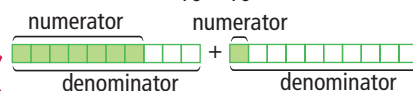
$$\frac{8}{10} = \frac{4}{5}$$

$\div 2$  (above the fraction bar)  
 $\div 2$  (below the fraction bar)

2 is a factor of both 8 and 10.

When you add fractions with like denominators, you add the numerators to get the sum of the parts. The denominator stays the same.

$$\frac{7}{10} + \frac{1}{10}$$



### Show You Know

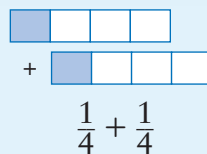
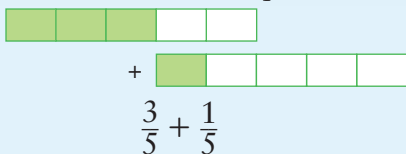
Add. Write your answer in lowest terms.

a)  $\frac{5}{12} + \frac{1}{12}$

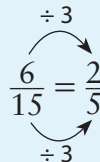
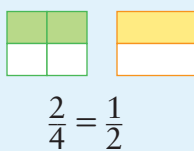
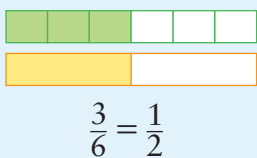
b)  $\frac{4}{9} + \frac{2}{9}$

## Key Ideas

- When adding fractions using models or diagrams, use parts of the whole that are of equal size.



- To estimate the sum of two fractions, compare fractions to 0,  $\frac{1}{2}$ , or 1.
- To add fractions with like denominators, add the numerators. The denominator stays the same.
- You can use models, diagrams, or factors to help you write your answer in lowest terms.



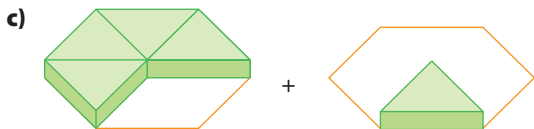
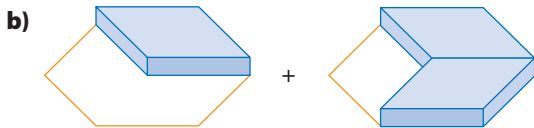
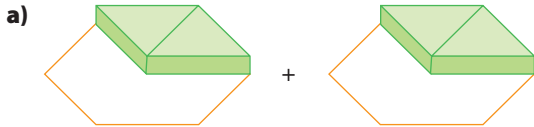
## Communicate the Ideas

- Show how you would model  $\frac{5}{6} + \frac{1}{6}$ .
  - Discuss your model with a partner. Are your models the same? If they are, discuss another model you could have used.
- Add:  $\frac{3}{8} + \frac{1}{8}$ .
  - When you added, what did you do with the numerators of the two fractions?
  - What did you do with the denominators of the two fractions?
  - Explain why you added in this way. Use diagrams as part of your answer.
- How could you write your answer for #2 in lowest terms? Explain what you did.
- Describe a situation when it might be better not to put a fraction in lowest terms.

## Practise

For help with #5 and #6, refer to Example 1 on page 211.

5. Write each addition statement shown by the pattern blocks. Estimate the answer, and then add.

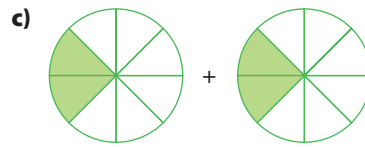
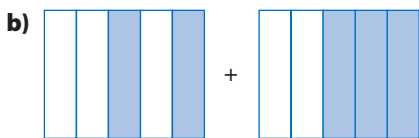


6. Write each addition statement shown by the fraction strips. Estimate the answer, and then add.

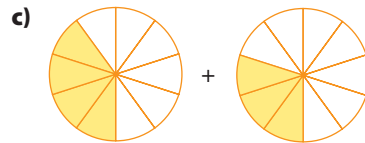
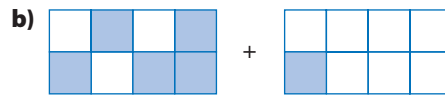
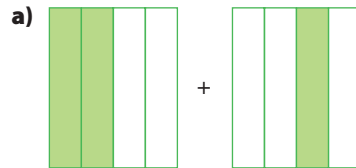


For help with #7 and #8, refer to Example 2 on page 212.

7. Write each addition statement shown by the diagrams. Then add. Write your answer in lowest terms.



8. Write each addition statement shown by the diagrams. Then add. Write your answer in lowest terms.



For help with #9 and #10, refer to Example 3 on page 212.

9. What is the sum of each fraction statement? Write each answer in lowest terms.

a)  $\frac{1}{6} + \frac{1}{6}$

b)  $\frac{1}{4} + \frac{1}{4}$

c)  $\frac{3}{5} + \frac{1}{5}$

d)  $\frac{5}{12} + \frac{1}{12}$

e)  $\frac{3}{10} + \frac{7}{10}$

f)  $\frac{2}{9} + \frac{1}{9}$

10. Determine the sum of each fraction statement. Write each answer in lowest terms.

a)  $\frac{1}{7} + \frac{2}{7}$

b)  $\frac{5}{12} + \frac{5}{12}$

c)  $\frac{1}{3} + \frac{1}{3}$

d)  $\frac{4}{9} + \frac{2}{9}$

e)  $\frac{1}{4} + \frac{3}{4}$

f)  $\frac{7}{15} + \frac{2}{15}$

## Apply

11. Carl and Mark shoveled the snow from Mark's driveway.



Did the boys shovel the whole driveway? Explain how you know.

12. Jamal's answer for  $\frac{1}{6} + \frac{3}{6}$  was  $\frac{4}{6}$ . He used this method to write  $\frac{4}{6}$  in lowest terms:

$$\frac{4}{6} \begin{array}{|c|c|c|c|} \hline \color{green} \blacksquare & \color{green} \blacksquare & \color{green} \blacksquare & \color{green} \blacksquare \\ \hline \end{array}$$

$$= \frac{1}{2} \begin{array}{|c|c|} \hline \color{yellow} \blacksquare & \color{white} \blacksquare \\ \hline \end{array}$$

- a) Was Jamal's method correct? Explain.  
 b) If not, use diagrams to show what Jamal should have done.
13. Suzanne answered  $\frac{1}{10} + \frac{3}{10}$  this way:  

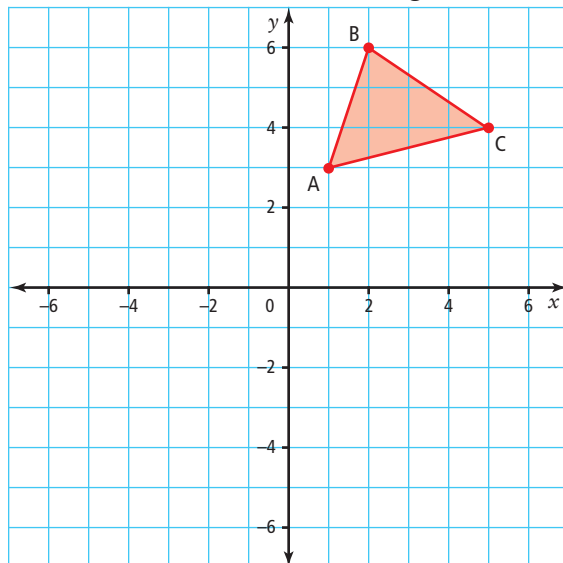
$$\frac{1}{10} + \frac{3}{10} = \frac{4}{20}$$
- a) Is Suzanne correct?  
 b) If not, what is the correct answer?
14. Faith and Lucy made bannock for lunch. Faith cooked  $\frac{5}{8}$  of the batter. Lucy cooked  $\frac{1}{8}$ . Did they use it all up? Show your work.

### Did You Know?

Bannock is a flat, round bread made by Métis and many Western Canadian Aboriginal peoples. It originated in Scotland.

## Extend

15. Draw  $\triangle ABC$  on a coordinate grid.



- a) The triangle is rotated  $\frac{1}{4}$  turn clockwise about the origin. Draw  $\triangle A'B'C'$ .  
 b) The triangle is rotated another  $\frac{1}{4}$  turn clockwise. Draw  $\triangle A''B''C''$ .  
 c) Use an addition statement to show how to determine the total turn.
16. Each performance in the dance recital was  $\frac{1}{4}$  h long. There were 3 performances. How long was the recital? Include a diagram with your answer.
17. a) Draw a diagram to show  $\frac{1}{8} + \frac{1}{8} + \frac{3}{8}$ .  
 b) Draw a diagram to show  $\frac{5}{12} + \frac{1}{12} + \frac{1}{12}$ .  
 c) Which sum is larger? How do you know?

18. Dakota has one bag of beads. She is going to make three different necklaces. For the first necklace, she needs  $\frac{3}{8}$  of a bag of beads. For the second, she needs  $\frac{1}{8}$  of a bag of beads. For the third, she needs  $\frac{5}{8}$  of a bag.
- What fraction of a bag of beads does she need?
  - Does she have enough? Explain.



## MATH LINK

During an average weekday, how many hours do you spend doing all the things you do?

- a) Draw a table and fill it in to show your results. You might begin like this:

Activities	Amount of Time	Fraction of 24-Hour Day
sleeping	■ h	$\frac{\blacksquare}{24}$
going to school	■ h	$\frac{\blacksquare}{24}$
doing after-school activities	■ h	$\frac{\blacksquare}{24}$

- Each activity must be described in hours: 1 h, 2 h, 3 h, and so on. If an activity takes only part of an hour, group it together with other shorter activities. For example, if you watch TV for 30 min, listen to music for 15 min, and talk on the phone for 15 min, this adds up to 60 min, or 1 h.
  - Show each amount of time as a fraction of a 24-h day. For example, if you spend 2 h doing homework out of 24 h, that is  $\frac{2}{24}$ .
- b) Once you are finished, add all of the fractions.
- c) What should the fractions add up to? Why? If the fractions do not add up correctly, look at your list of activities again. See what you might have missed or what times you need to fix.