

LESSON 1

Objective

Add fractions with unlike denominators.

Common Core State Standards

- **5.NF.1** Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $a/b + c/d = (ad + bc)/bd$.)*
- **5.NF.2** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$, by observing that $\frac{3}{7} < \frac{1}{2}$.*

Number and Operations—Fractions

Add Fractions with Unlike Denominators

Students build on their knowledge of fractions as they use models to add fractions with unlike denominators. They may use different approaches, such as number sense or reasoning, to find the solution to a problem. In this activity, students follow the standard algorithm using their knowledge of equivalent fractions.

Try It! Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- **Ask:** *Why do we need common denominators?*
- Have students explain how they know which fractions to rename when they find the sum.
- **Ask:** *How do you use your knowledge of equivalent fractions to add fractions with unlike denominators?*

Solve It

Reread the problem with students. Have students draw a possible map of Emilio's ride and label the distances between destinations. Then have them explain how they found the total distance Emilio rode to school that morning.

More Ideas

For other ways to teach adding fractions—

- Use Fraction Tower® Equivalency Cubes to model the problems.
- Use the Fraction Measurement Ring from a set of Rainbow Fraction Circle Rings along with the Deluxe Rainbow Fraction® Circles to model the problem. Students can place fraction pieces showing each addend inside the ring to find the sum. Make sure students understand why the denominator in the sum differs from the denominator in one or both of the addends.

Formative Assessment

Have students try the following problem.

Deon grows carrots in $\frac{1}{6}$ of his garden. He grows potatoes in another $\frac{1}{4}$ of the garden. The rest of the garden is planted with flowers. What fraction of Deon's garden is used to grow vegetables?

- A. $\frac{1}{10}$ B. $\frac{2}{12}$ C. $\frac{2}{10}$ D. $\frac{5}{12}$

Try It! 15 minutes | Groups of 4

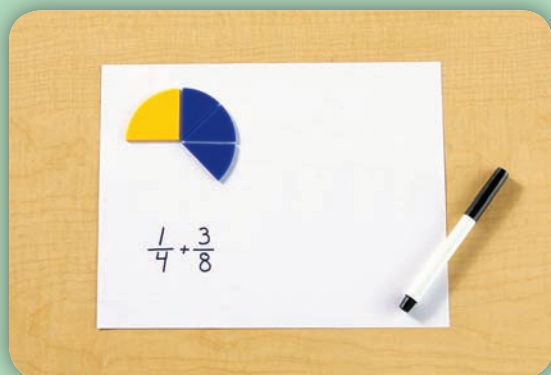
Here is a problem about adding fractions with unlike denominators.

Emilio rides $\frac{1}{4}$ mile from his house to his friend Jake's house. Together they ride $\frac{3}{8}$ mile to school. How far does Emilio ride to school that day?

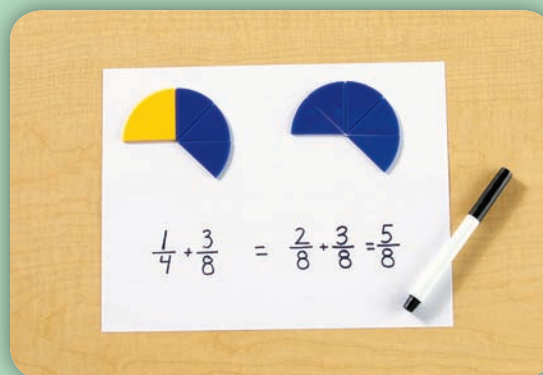
Introduce the problem. Then have students do the activity to solve the problem. Distribute Fraction Circles, paper, and pencils to students.

Materials

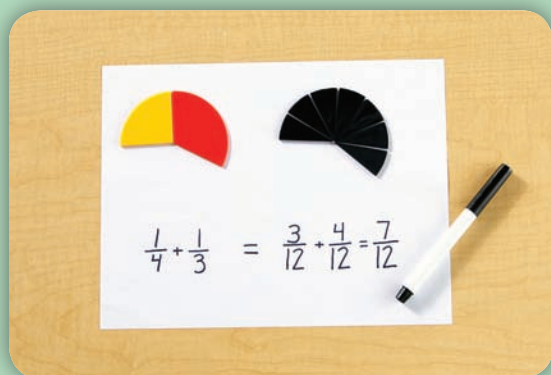
- Deluxe Rainbow Fraction® Circles (1 set per group)
- paper (1 sheet per group)
- pencils (1 per group)



- 1. Ask:** How do you know what operation to use to solve the problem? Write $\frac{1}{4} + \frac{3}{8}$ on the board. Have students model each fraction. **Ask:** How can you rename one fraction so that both have the same denominator?



- 2.** Have students substitute $\frac{2}{8}$ for $\frac{1}{4}$. **Ask:** How do you find the sum of two fractions when the denominators are the same? Have students complete the number sentence.



- 3. Ask:** How would your method change if Jake lived $\frac{1}{3}$ mile from school? Write $\frac{1}{4} + \frac{1}{3}$ on the board. Have students model $\frac{1}{4} + \frac{1}{3}$ to see that both denominators must be changed before adding. Then have them write an equation for the model.

Look Out!

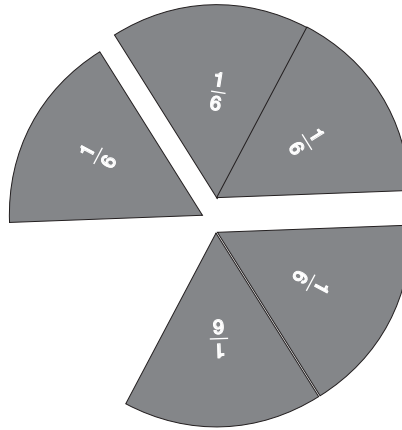
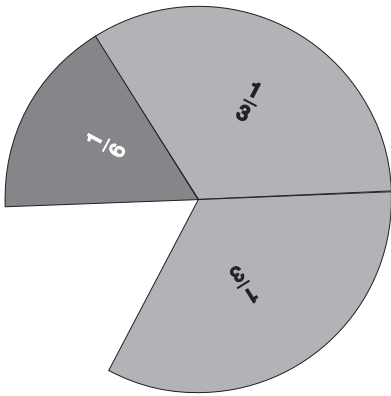
Some students may not find a common denominator before adding. These students may add the numerators and then add the denominators. Suggest that they check their solution by using fraction pieces to show the sum, and then place those pieces over the tops of the models for the addends to verify they are an exact match. If they are not an exact match, suggest that students use other same-size fraction pieces to discover a combination that does fit. Students also may need to fit pieces over the original model to find equivalent fractions.



Use Fraction Circles to model the fractions shown.
Write the addition sentences modeled.

(Check students' work.)

1.



$$\frac{1}{6} + \frac{2}{3} = \frac{1}{6} + \frac{4}{6} = \frac{5}{6}$$

Using Fraction Circles, model the fractions to find the sum. Sketch the models.
Write an addition sentence to show the sum.

(Check students' models.)

2. $\frac{2}{5} + \frac{3}{10}$

$$\frac{2}{5} + \frac{3}{10} = \frac{4}{10} + \frac{3}{10} = \frac{7}{10}$$

Find each sum. Simplify.

3. $\frac{1}{3} + \frac{5}{12} = \frac{3}{4}$

4. $\frac{5}{6} + \frac{1}{3} = \frac{7}{6} = 1\frac{1}{6}$

5. $\frac{3}{4} + \frac{1}{12} = \frac{5}{6}$

6. $\frac{3}{5} + \frac{7}{10} = \frac{13}{10} = 1\frac{3}{10}$

7. $\frac{2}{5} + \frac{7}{10} = \frac{11}{10} = 1\frac{1}{10}$

8. $\frac{1}{4} + \frac{5}{8} = \frac{7}{8}$

Answer Key

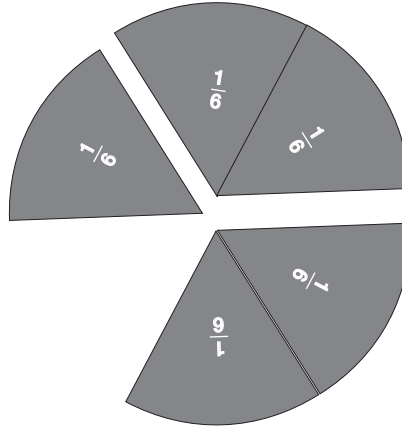
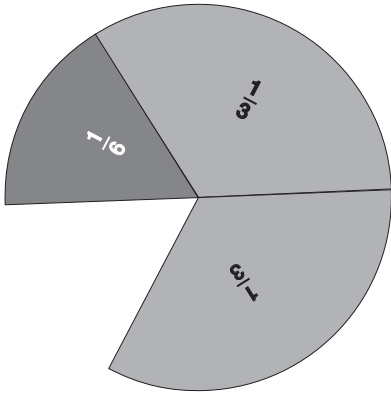
Challenge! Write instructions for how to find the sum in Problem 8.

Challenge: (Sample) Exchange the Fraction Circle for $\frac{1}{4}$ for two $\frac{1}{8}$ sections. That gives seven $\frac{1}{8}$ sections. So, the sum is $\frac{7}{8}$.

[illegible]

Use Fraction Circles to model the fractions shown.
Write the addition sentences modeled.

1.



Using Fraction Circles, model the fractions to find the sum. Sketch the models.
Write an addition sentence to show the sum.

2. $\frac{2}{5} + \frac{3}{10}$

Find each sum. Simplify.

3. $\frac{1}{3} + \frac{5}{12} =$ _____

4. $\frac{5}{6} + \frac{1}{3} =$ _____

5. $\frac{3}{4} + \frac{1}{12} =$ _____

6. $\frac{3}{5} + \frac{7}{10} =$ _____

7. $\frac{2}{5} + \frac{7}{10} =$ _____

8. $\frac{1}{4} + \frac{5}{8} =$ _____

Name _____

Challenge! Write instructions for how to find the sum in Problem 8.

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