

LESSON 2

Objective

Subtract 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

Subtract Fractions with Unlike Denominators

Students model the subtraction of fractions with unlike denominators as the first step toward using an algorithm to subtract. Many students will use prior experience with finding equivalent fractions to find common denominators before subtracting. Students also may use number sense or reasoning to find the solution to a problem.

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

Talk About It

Discuss the Try It! activity.

- **Ask:** When finding the difference between two fractions, why can you subtract the numerators of two fractions with the same denominator, but cannot subtract the numerators of two fractions with unlike denominators?
- **Ask:** Which fraction or fractions would you rename to find $\frac{9}{10} - \frac{2}{5}$?
- Have students compare addition and subtraction of fractions with unlike denominators. **Ask:** How can you use addition to check your answer to a subtraction problem?

Solve It

Reread the problem with students. Have students explain in writing why they needed to subtract to find the solution. Then have them describe how they found the quantity of milk needed from the second carton.

More Ideas

For other ways to teach subtracting fractions with unlike denominators—

- Have students use Deluxe Rainbow Fraction® Circles or Fraction Tower® Equivalency Cubes to model subtraction problems.
- Have students use the hexagon, blue rhombus, trapezoid, and triangle from a set of Pattern Blocks to model subtraction. Let the hexagon represent one whole; the blue rhombus, $\frac{1}{3}$; the trapezoid, $\frac{1}{2}$; and the triangle, $\frac{1}{6}$. Have students write as many subtraction sentences as they can, using these fractions. Suggest that students fit pieces over larger pieces to help them find each difference.

Formative Assessment

Have students try the following problem.

Jordan and Mark are painting opposite sides of a fence. Mark has painted $\frac{7}{10}$ of his side. Jordan has painted $\frac{1}{2}$ of his side. How much more has Mark painted than Jordan?

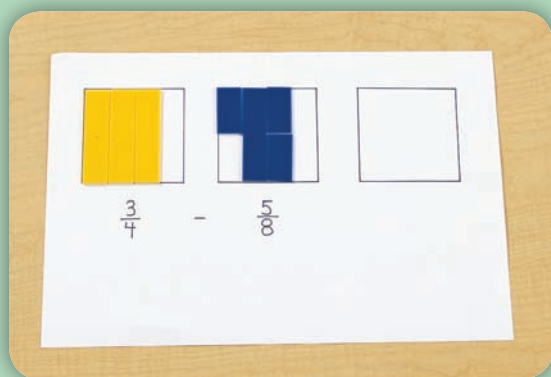
Try It!

15 minutes | Groups of 4

Here is a problem about subtracting fractions with unlike denominators.

A cornbread recipe calls for $\frac{3}{4}$ cup of milk. Rachel uses the last $\frac{5}{8}$ cup of milk in one carton. She opens another carton and pours the remaining amount needed. How much milk does Rachel use from the newly opened carton?

Introduce the problem. Then have students do the activity to solve the problem. Distribute Fraction Squares, paper, and pencils to students. Have students trace 3 whole squares in a row on the paper.



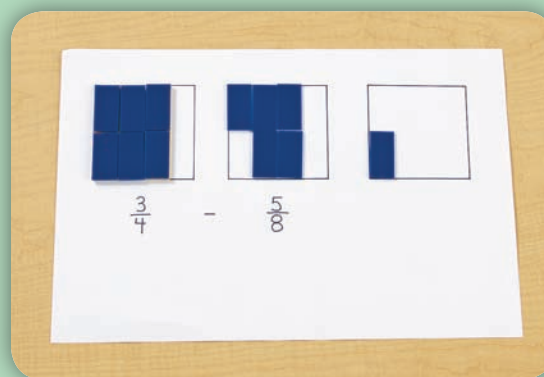
1. Have students model each fraction.

Ask: What expression can you write to show the situation? Write $\frac{3}{4} - \frac{5}{8}$ on the board.

Ask: Using what you know about adding two fractions, what do you think you should do first to subtract these two fractions?

Materials

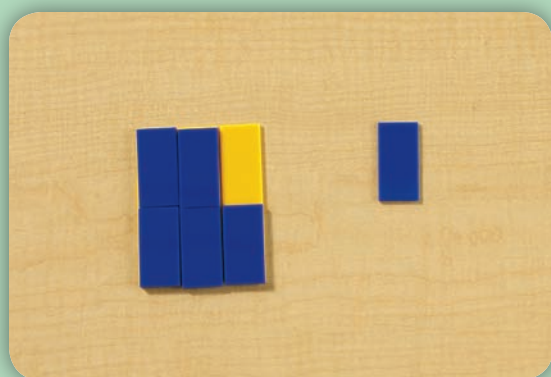
- Deluxe Rainbow Fraction® Squares (2 sets per group)
- paper (11" x 17"; 1 sheet per group)
- pencils (1 per group)



2. Have students substitute $\frac{6}{8}$ for $\frac{3}{4}$. **Ask:** Now that both fractions have the same denominator, how can you find the difference? Have students write and model the subtraction equation for the situation.

Look Out!

Some students may not measure the squares properly when finding equivalent fractions. Suggest that these students place the Fraction Squares over each other to ensure that the fractional values are exactly the same. Other students may not recognize the importance of finding common denominators, instead looking for a Fraction Square that will be the same size. Have these students explain why their solution works and how they can use it to find the differences in other situations.



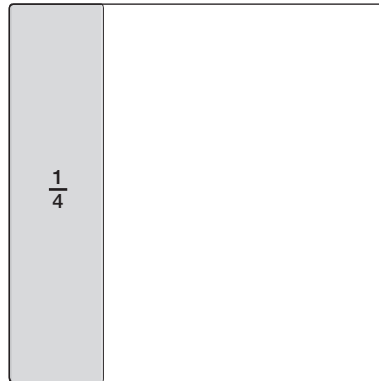
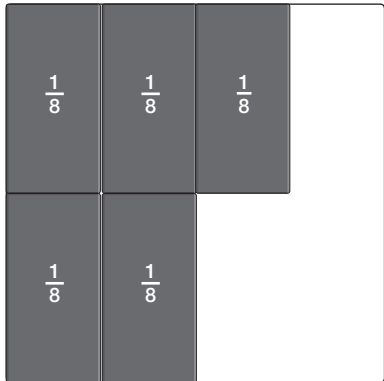
3. **Say:** The Fraction Squares can be used to check your answer. Have students model each fraction again. This time have them place the five blue pieces on top of the three yellow pieces. **Ask:** What piece is needed to completely cover the three yellow pieces? What fraction does this piece represent? Is this fraction the same as your answer?



Use Fraction Squares to model the fractions shown. Use Fraction Squares to find fractions with the same denominators. Write the fractions and then find the difference.

(Check students' work.)

1.



$$\underline{\frac{5}{8}} - \underline{\frac{1}{4}} = \underline{\frac{3}{8}}$$

Using Fraction Squares, model the subtraction problem. Sketch the model. Write the difference.

(Check students' models.)

2. $\frac{5}{6} - \frac{1}{3}$

3. $\frac{3}{4} - \frac{3}{8}$

$$\underline{\frac{1}{2}}$$

$$\underline{\frac{3}{8}}$$

Find each difference.

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

5. $\frac{5}{6} - \frac{2}{3} = \underline{\frac{1}{6}}$

6. $\frac{3}{5} - \frac{1}{10} = \underline{\frac{1}{2}}$

7. $\frac{3}{4} - \frac{1}{12} = \underline{\frac{2}{3}}$

8. $\frac{5}{8} - \frac{1}{4} = \underline{\frac{3}{8}}$

9. $\frac{2}{5} - \frac{1}{10} = \underline{\frac{3}{10}}$

10. $\frac{2}{3} - \frac{5}{12} = \underline{\frac{1}{4}}$

11. $\frac{7}{12} - \frac{1}{4} = \underline{\frac{1}{3}}$

Answer Key

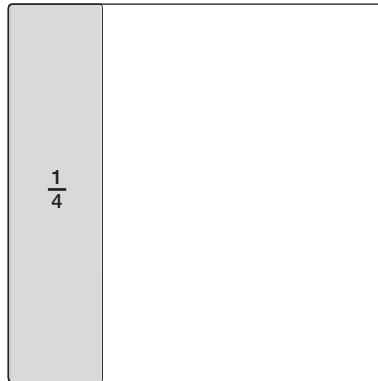
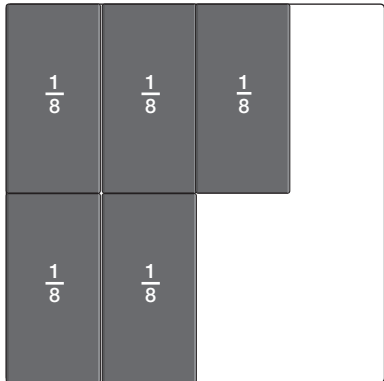
Challenge! Explain how you can use addition to check that you subtracted correctly. Draw a picture to help,

Challenge: (Sample) You can work backward by adding the answer to the number you subtracted to get the number you started with.

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Use Fraction Squares to model the fractions shown. Use Fraction Squares to find fractions with the same denominators. Write the fractions and then find the difference.

1.



_____ - _____ = _____

Using Fraction Squares, model the subtraction problem. Sketch the model. Write the difference.

2. $\frac{5}{6} - \frac{1}{3}$

3. $\frac{3}{4} - \frac{3}{8}$

Find each difference.

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

5. $\frac{5}{6} - \frac{2}{3} =$ _____

6. $\frac{3}{5} - \frac{1}{10} =$ _____

7. $\frac{3}{4} - \frac{1}{12} =$ _____

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

9. $\frac{2}{5} - \frac{1}{10} =$ _____

10. $\frac{2}{3} - \frac{5}{12} =$ _____

11. $\frac{7}{12} - \frac{1}{4} =$ _____

Name _____

Challenge! Explain how you can use addition to check that you subtracted correctly. Draw a picture to help,

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