Lesson 1

Common Core State Standard

5.NF.A.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, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)

Add Unlike Fractions

Students know how to add like fractions and they know how to generate equivalent fractions. They can apply these understandings to add unlike fractions. Models help students make the necessary connections.

Vocabulary/ELL Support

Write 3/8 and 5/8 on the board.

- Ask: How are they the same? [The denominators are the same.]
Circle the denominators. Use visual/concrete models to reinforce the equal-sized pieces. Place like pieces on top of one another to show that their areas coincide.

- Say: These fractions have a common denominator; the denominators are the same, or alike. We call 3/8 and 5/8 like fractions.

- Ask: Are 3/4 and 3/8 like fractions? 3/4 and 5/8? Elicit that 3/4 and 5/8 are unlike fractions, as are 3/4 and 3/8. Explain that only the denominators are considered in deciding whether fractions are like or unlike. Use visual/concrete models to reinforce that the parts are not the same size. Make sure students understand that like does not refer to liking the fractions.

- Like fractions are fractions that have the same denominator.

Many everyday contexts, such as the total thickness of a stack of notebooks, suggest operations with fractions. Discuss with students their experiences with adding linear measurements. Are measurements always in eighths of an inch? Quarters of an inch? Why do they vary?
**Objective:** Find the least common multiple of two numbers, using a table of multiples.

<table>
<thead>
<tr>
<th><strong>Number</strong></th>
<th>Multiples</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2 4 6 8 10 12 14 16 18 20</td>
</tr>
<tr>
<td>3</td>
<td>3 6 9 12 15 18 21 24 27 30</td>
</tr>
<tr>
<td>4</td>
<td>4 8 12 16 20 24 28 32 36 40</td>
</tr>
<tr>
<td>5</td>
<td>5 10 15 20 25 30 35 40 45 50</td>
</tr>
<tr>
<td>6</td>
<td>6 12 18 24 30 36 42 48 54 60</td>
</tr>
<tr>
<td>7</td>
<td>7 14 21 28 35 42 49 56 63 70</td>
</tr>
<tr>
<td>8</td>
<td>8 16 24 32 40 48 56 64 72 80</td>
</tr>
<tr>
<td>9</td>
<td>9 18 27 36 45 54 63 72 81 90</td>
</tr>
<tr>
<td>10</td>
<td>10 20 30 40 50 60 70 80 90 100</td>
</tr>
<tr>
<td>12</td>
<td>12 24 36 48 60 72 84 96 108 120</td>
</tr>
</tbody>
</table>

Find the LCM for the pair of numbers:
- 3 and 5
- 4 and 7
- 2 and 5
- 7 and 6
- 12 and 5
- 5 and 6

**Use this table of multiples to help you find the least common multiple (LCM).**

**Answer Key**

**Name**

1. List the 5 smallest whole numbers that are:
   - a. multiples of 4 and not multiples of 2.
   - b. multiples of 43 and odd.
   - c. even and not multiples of 4.

**Answer:**
- a. impossible; b. 43, 129, 215, 301, 387; c. 2, 6, 10, 14, 18

**Comments & Extensions:** Part a has no answer. Every multiple of 4 is a multiple of 2. In Part b alternating multiples fit: 43, 86, 129, 172, 215, etc. Similarly, in Part c the answer is alternating even numbers: 2, 4, 6, 8, 10, 12, 14, 16, 18, etc.

Describe a pattern for your answers in Parts a to c. Use this pattern to find the next 5 numbers that fit.

**Online resource available at hand2mind.com/hosfractionsgr5**

**Add and Subtract Fractions**
Model the Activity  WHOLE CLASS

Distribute Fraction Circles and BLM 1 (Fraction Circles). Have students work along with you in small groups as you model the lesson. Write the problem \( \frac{1}{2} + \frac{1}{4} = \) __ on the board.

■ Ask: What do you notice about these two fractions? [The denominators are different.] How would you model this addition problem? [Show \( \frac{1}{2} \) (pink) and \( \frac{1}{4} \) (yellow) together on a circle.]

■ Ask: Once we combine those Fraction Circle pieces, how do we name the result? [We can’t because the pieces are not the same size.]

■ Ask: Can we rename one of the fractions in the addition problem so that we can name the sum? Which one? [\( \frac{1}{2} \) can be replaced by \( \frac{2}{4} \)] Allow students to investigate other possibilities for the denominators. [eighths, twelfths]

Place two yellow pieces (\( \frac{2}{4} \)) on top of the pink piece (\( \frac{1}{2} \)) to show that the fractions are equivalent. Write \( \frac{2}{4} + \frac{1}{4} = \) ____ under the first number sentence.

■ Say: Since the fractions now have like (or common) denominators, you can add the numerators and use the same denominator.

\[
\frac{1}{2} + \frac{1}{4} = \frac{3}{4} \]

Guided Practice  SMALL GROUPS

Prepare ahead Each small group will need a set of Fraction Circles.

Students will use the large circle as a workmat to model the addition problems. They leave the models in place long enough to draw a picture of the addends with unlike fractions, and then a picture with like fractions showing the sum.
Objective:
Find the sum of two fractions with unlike denominators.

\[
\begin{align*}
\frac{17}{20} & \quad \frac{1}{2} & \quad \frac{5}{8} & \quad \frac{2}{3} & \quad \frac{1}{4} \\
\frac{1}{9} & \quad \frac{4}{9} & \quad \frac{5}{6} & \quad \frac{9}{10} & \quad \frac{1}{2} & \quad \frac{1}{12} & \quad \frac{1}{6}
\end{align*}
\]

It's in the Denominator!

Example

Add:
\[
\frac{2}{3} \quad \frac{5}{6} \quad \frac{3}{4}
\]
- Find the least common denominator (LCD) of the fractions. 12 is the LCD of 4 and 6.
- Find equivalent fractions with the LCD:
  \[
  \frac{2}{3} = \frac{8}{12} \quad \frac{5}{6} = \frac{10}{12} \quad \frac{3}{4} = \frac{9}{12}
  \]
- Add the numerators. Put the result over the common denominator.
  \[
  \frac{8}{12} + \frac{10}{12} + \frac{9}{12} = \frac{27}{12} = \frac{9}{4}
  \]

Add:
\[
\begin{align*}
1 & \quad \frac{2}{3} + \frac{5}{6} \\
2 & \quad \frac{1}{3} + \frac{1}{5} \\
3 & \quad \frac{1}{3} + \frac{3}{10} \\
4 & \quad \frac{3}{4} + \frac{1}{5} \\
5 & \quad \frac{1}{4} + \frac{1}{6} \\
6 & \quad \frac{1}{10} + \frac{1}{5} \\
7 & \quad \frac{1}{3} + \frac{3}{4} \\
8 & \quad \frac{1}{2} + \frac{1}{12} \\
9 & \quad \frac{3}{4} + \frac{1}{10}
\end{align*}
\]

Answer Box:

Enrichment

VersaMate™

This hands-on strategy game combines skill-building fractions practice with tactical game play.

Fractions Pack

Add and Subtract Unlike Fractions

hand2mind.com/versamate