

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 $\frac{3}{8}$ and $\frac{5}{8}$ 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.

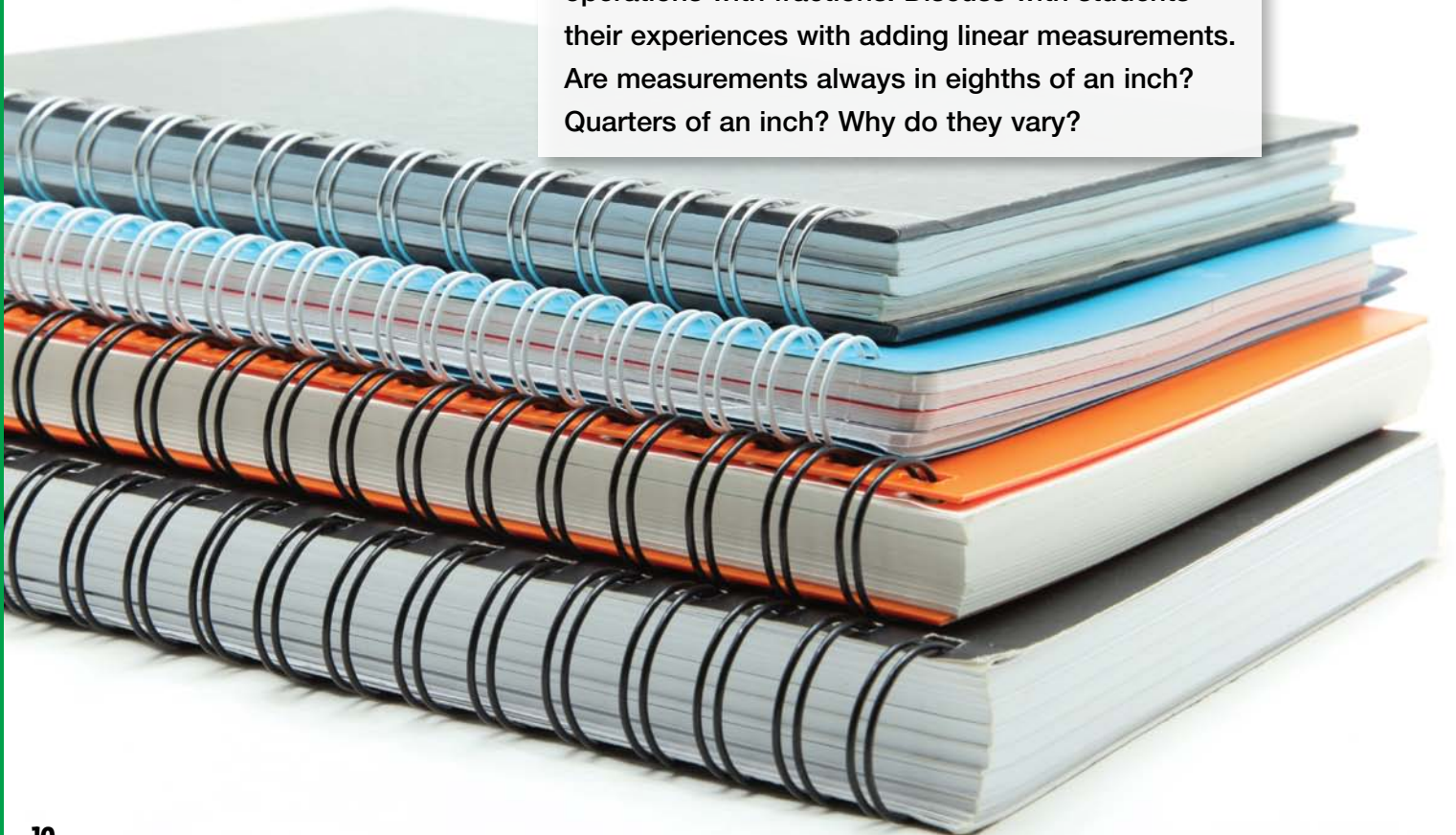
- **Say:** *These fractions have a common denominator; the denominators are the same, or alike. We call $\frac{3}{8}$ and $\frac{5}{8}$ like fractions.*

Write $\frac{3}{4}$ next to $\frac{3}{8}$ and $\frac{5}{8}$.

- **Ask:** *Are $\frac{3}{4}$ and $\frac{5}{8}$ like fractions? $\frac{3}{4}$ and $\frac{3}{8}$?* Elicit that $\frac{3}{4}$ and $\frac{5}{8}$ are **unlike fractions**, as are $\frac{3}{4}$ and $\frac{3}{8}$. 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?





Set the Stage

Build Background WHOLE CLASS

Review the terms *equivalent fraction*, *numerator*, and *denominator*. Write the fraction $\frac{1}{2}$ and draw a circle on the board with $\frac{1}{2}$ shaded.

- **Ask:** *What part of the circle is shaded?* [$\frac{1}{2}$] Draw a line that divides the halves in half. **Ask:** *What is an equivalent fraction in fourths?* [$\frac{2}{4}$] Draw lines to divide the fourths in half. **Ask:** *Eighths?* [$\frac{4}{8}$]

Write the problem $\frac{1}{4} + \frac{1}{4} = \underline{\quad}$ on the board.

- **Ask:** *How do you add like fractions, or fractions with common denominators?* [Add the numerators; use the same denominator.] *What is the sum?* [$\frac{2}{4}$]

$$\frac{1}{4} + \frac{1}{4} = \frac{2}{4} \quad \leftarrow \text{Add the numerators.}$$

$$\frac{1}{4} + \frac{1}{4} = \frac{2}{4} \quad \leftarrow \text{Use the same denominator.}$$



Warm-Up Activity

Use this short thinking exercise to jump-start the instructional session.

Name Answer Key

1

List the 5 smallest whole numbers that are

- multiples of 4 and not multiples of 2.
- multiples of 43 and odd.
- 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.



Foundation Skill Practice

Use this VersaTiles® activity to help students activate their prior knowledge.

Explore Common Multiples

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

Find the LCM for the pair of numbers.

- | | |
|------------|------------|
| 1 3 and 5 | 2 4 and 7 |
| 3 4 and 8 | 4 3 and 6 |
| 5 2 and 5 | 6 2 and 4 |
| 7 7 and 6 | 8 12 and 6 |
| 9 12 and 5 | 10 6 and 9 |
| 11 5 and 6 | 12 3 and 8 |

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



Answer Box

A	B	C	D	E	F
4	12	10	30	6	18
G	H	I	J	K	L
24	28	8	60	42	15



Objective: Find the least common multiple of two numbers, using a table of multiples.

Introduce the Concept



Materials

- Deluxe Rainbow Fraction® Circles

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 $\frac{1}{2} + \frac{1}{4} = \underline{\hspace{1cm}}$ 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 $\frac{2}{4} + \frac{1}{4} = \underline{\hspace{1cm}}$ 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.*

$$\begin{array}{r} \frac{1}{2} + \frac{1}{4} = \underline{\hspace{1cm}} \\ \downarrow \quad \downarrow \\ \frac{2}{4} + \frac{1}{4} = \frac{3}{4} \end{array}$$



Guided Practice

LESSON
1 Add Unlike Fractions Name Answer Key

Try This

- Use Fraction Circles to model and draw the addition problem.
- Cover up the original Fraction Circles so that all the Fraction Circles are the same color.
- Draw the problem with like denominators.
- Write the problem using equivalent fractions.
- Find the sum.

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

Problem	Equivalent Fractions	Sum
1. $\frac{1}{2} + \frac{1}{8} =$	$\frac{4}{8} + \frac{1}{8} =$	$\frac{5}{8}$
2. $\frac{1}{8} + \frac{1}{4} =$	$\frac{1}{8} + \frac{2}{8} =$	$\frac{3}{8}$
3. $\frac{1}{3} + \frac{1}{4} =$	$\frac{4}{12} + \frac{3}{12} =$	$\frac{7}{12}$
4. $\frac{1}{4} + \frac{3}{8} =$	$\frac{2}{8} + \frac{3}{8} =$	$\frac{5}{8}$
5. $\frac{1}{8} + \frac{1}{4} =$	$\frac{1}{8} + \frac{2}{8} =$	$\frac{3}{8}$
6. $\frac{3}{8} + \frac{1}{2} =$	$\frac{3}{8} + \frac{4}{8} =$	$\frac{7}{8}$
7. $\frac{2}{3} + \frac{1}{4} =$	$\frac{8}{12} + \frac{3}{12} =$	$\frac{11}{12}$

Add and Subtract Fractions ■ Lesson 1
Hands-On Standards®, Common Core Fractions

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.

Reinforce the Concept

Check for Understanding WHOLE CLASS

Observe students as they model the problems using equivalent fractions.

- **Ask:** How do you know which equivalent fractions to use? [I look at both fractions and use equivalent fractions that make the denominators the same.]

Summarize WHOLE CLASS

- **Say:** Sometimes you have to rename one of the addends; sometimes you have to rename both addends.
- **Ask:** When do you have to rename both addends? [when neither denominator is a multiple of the other]
What is $\frac{1}{2} + \frac{1}{3}$? [$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$]



Independent Practice

Use this VersaTiles® activity to give students more practice with the skills they learned in the lesson.

It's in the Denominator!

Example

Add.

$$\frac{3}{4} + \frac{1}{6}$$

$$\frac{3}{4} + \frac{1}{6}$$

- Find the least common denominator (LCD) of the fractions.

12 is the LCD of 4 and 6.

- Find equivalent fractions with the LCD.

$$\frac{3}{4} = \frac{9}{12} \text{ and } \frac{1}{6} = \frac{2}{12}$$

- Add the numerators. Put the result over the common denominator.

$$\frac{9}{12} + \frac{2}{12} = \frac{11}{12}$$

So, $\frac{3}{4} + \frac{1}{6} = \frac{11}{12}$

Add.

1 $\frac{1}{3} + \frac{1}{9}$

2 $\frac{2}{5} + \frac{7}{10}$

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

4 $\frac{5}{8} + \frac{2}{3}$

5 $\frac{3}{8} + \frac{1}{4}$

6 $\frac{9}{12} + \frac{3}{4}$

7 $\frac{3}{5} + \frac{1}{4}$

8 $\frac{10}{15} + \frac{1}{3}$

9 $\frac{4}{5} + \frac{1}{10}$

10 $\frac{2}{7} + \frac{3}{14}$

11 $\frac{1}{2} + \frac{1}{6}$

12 $\frac{1}{12} + \frac{1}{6}$



Answer Box

A	B	C	D	E	F
$\frac{17}{20}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{2}{3}$	$\frac{1}{4}$	1
G	H	I	J	K	L
$1\frac{2}{9}$	$\frac{4}{9}$	$\frac{5}{6}$	$\frac{9}{10}$	$1\frac{1}{2}$	$1\frac{1}{10}$

2 Objective: Find the sum of two fractions with unlike denominators.



VersaTiles® student book, page 2



Remediation

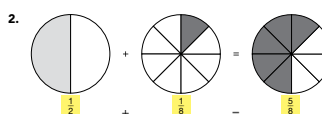
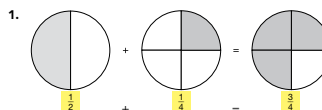
Use this page to give students additional concrete-to-abstract practice.

Lesson

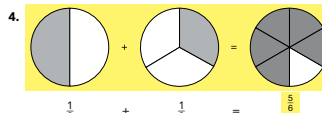
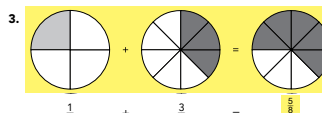
1 Add Unlike Fractions

Name Answer Key

Use Fraction Circles to build the model. Write the addends and the sum.



Use Fraction Circles to model the addition problem. Draw the model by shading the circles. Write the sum.



Find each sum.

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

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

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

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

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

10. $\frac{1}{4} + \frac{2}{3} = \frac{11}{12}$

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Hands-On Standards®, Common Core Fractions

Online resource available at hand2mind.com/hosfractionsgr5



Enrichment

VersaMate™

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



Fractions Pack

Add and Subtract Unlike Fractions

Add Unlike Fractions 2

hand2mind.com/versamate

