Lesson 1

Same Height

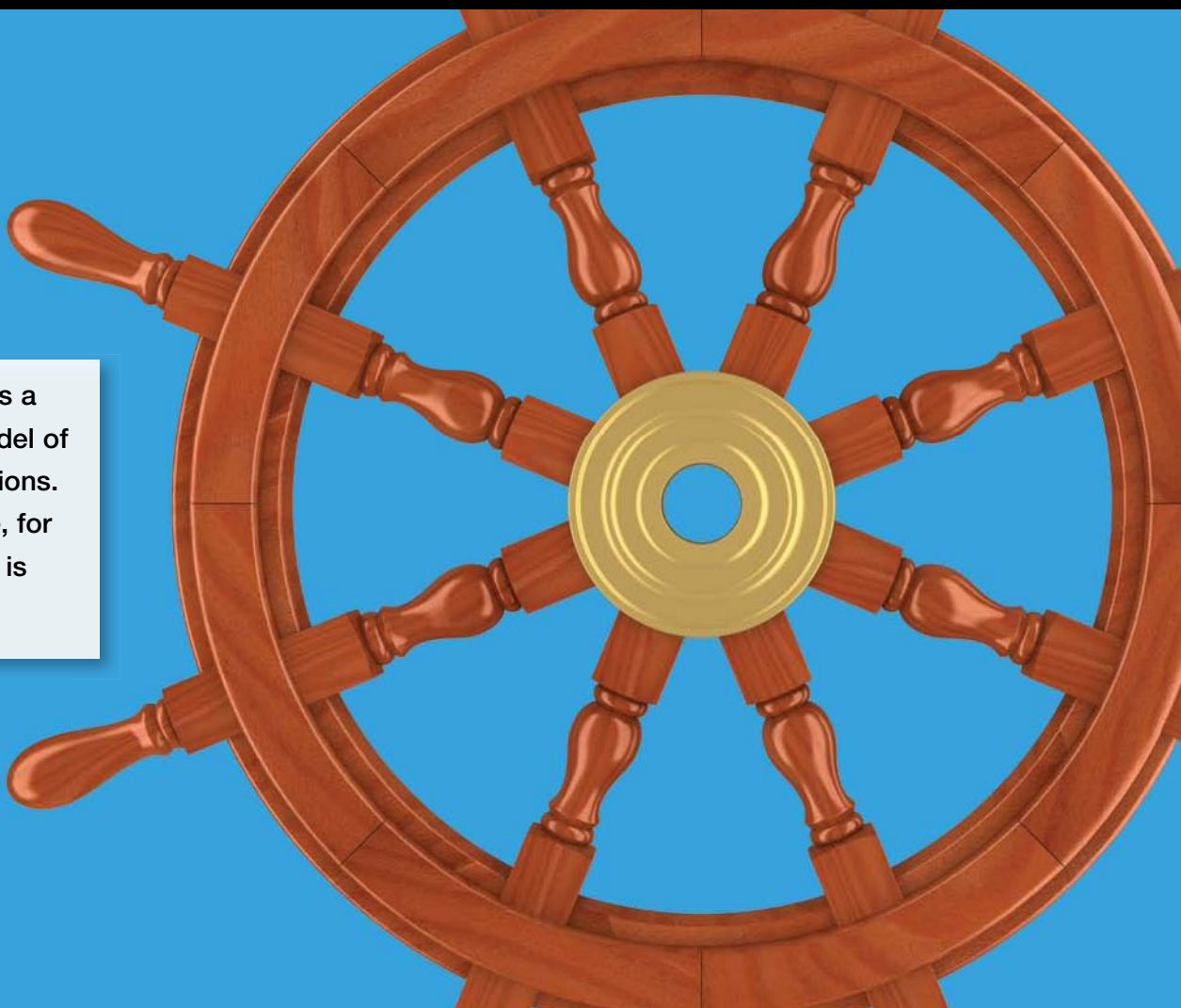
Equivalent fractions, such as $\frac{1}{2}$ and $\frac{3}{6}$, represent the same number. They differ only in representation, in being based on a different partition of the whole. Students can apply what they know about defining fractions to discover this. They will make use of this concept when they add and subtract with unlike fractions.

Common Core State Standard

4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Vocabulary/ELL Support

- **Ask:** *What word does **equivalent** sound like?* [equal] Explain that equivalent fractions are equal fractions. Demonstrate equivalent fractions by presenting a large paper circle. Fold the paper circle in half. Open and point to one half.
- **Ask:** *What fraction of the circle is this?* [$\frac{1}{2}$] Fold the paper back in half, and then in half again. Open and point to the same place on the circle.
- **Ask:** *What fraction of the circle do these two parts represent?* [$\frac{2}{4}$]
- **Say:** $\frac{1}{2}$ *and* $\frac{2}{4}$ *are **equivalent fractions**; they are equal.*
- **Equivalent fractions** are fractions that have the same value; they represent the same part of a whole or the same location on a number line.



A ship's wheel is a good visual model of equivalent fractions. It is easy to see, for example, that $\frac{1}{2}$ is the same as $\frac{4}{8}$.

Set the Stage

Build Background WHOLE CLASS

Show students two classroom objects that are the same height, such as two chairs. Then have students find or name objects in the classroom that are the same height or length.

- **Ask:** *How do you know the objects have the same height or length?* [Samples: They match each other exactly; they have the same measurement from top to bottom or from end to end.]

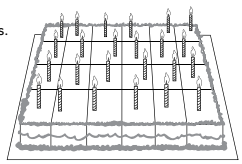
Warm-Up Activity

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

Name *Answer Key*

1

Here is a birthday cake cut into pieces.



How many pieces do you see?

ANSWER: 24 pieces

COMMENTS & EXTENSIONS: Trace your hand on graph paper. How many of the graph paper squares does your hand cover? Which is bigger, your hand or your foot? Trace your foot and count the squares it covers.

Online resource available at **hand2mind.com/hosfractionsgr4**

Foundation Skill Practice

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

Factors and Products

Find the missing factor or product.

1. 2 × ■ = 8
2. 3 × ■ = 18
3. 1 × 3 = ■
4. ■ × 5 = 45
5. 7 × 2 = ■
6. 3 × 7 = ■
7. ■ × 6 = 30
8. 4 × 7 = ■
9. 6 × ■ = 6
10. 2 × 8 = ■
11. 4 × ■ = 32
12. 9 × 3 = ■

Answer Box

A	B	C	D	E	F
1	3	4	9	6	21
G	H	I	J	K	L
8	14	16	5	28	27

Find the missing factor or product.

1. 3 × ■ = 15
2. 2 × 3 = ■
3. 2 × 5 = ■
4. 8 × ■ = 16
5. 3 × 3 = ■
6. ■ × 6 = 24
7. 8 × 4 = ■
8. ■ × 4 = 4
9. 4 × 9 = ■
10. 5 × 7 = ■
11. ■ × 9 = 72
12. ■ × 4 = 28

Answer Box

A	B	C	D	E	F
9	8	7	1	32	35
G	H	I	J	K	L
36	10	4	6	5	2

Objective: Find the missing factor or product to complete a fact. 1

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Introduce the Concept

Materials

- Fraction Tower® Equivalency Cubes

Model the Activity WHOLE CLASS

Distribute Fraction Tower Cubes. Have students work along with you in small groups as you model the lesson.

- **Ask:** *Look at all the Fraction Towers. Which color represents thirds?* [orange] *How can you show* $\frac{2}{3}$*?* [2 orange cubes]
- **Ask:** *What are some same-color Fraction Tower Cubes that are the same height as* $\frac{2}{3}$*?* [4 teal, 8 black] *What are the fractions for those two towers?* [$\frac{4}{6}$, $\frac{8}{12}$]

Write $\frac{2}{3} = \frac{4}{6} = \frac{8}{12}$ on the board.

- **Say:** $\frac{2}{3}$, $\frac{4}{6}$, *and* $\frac{8}{12}$ *are* **equivalent fractions**. *They all name the same part of a region, set, or line segment.*
- **Ask:** *Do you notice a pattern in the numerators and denominators? Look at the fractions as pairs:* $\frac{2}{3} = \frac{4}{6}$, $\frac{2}{3} = \frac{8}{12}$, $\frac{4}{6} = \frac{8}{12}$. [Sample: For $\frac{2}{3} = \frac{4}{6}$, the numerator and denominator of $\frac{4}{6}$ are double the numerator and denominator of $\frac{2}{3}$. For $\frac{2}{3} = \frac{8}{12}$, the numerator and denominator of $\frac{8}{12}$ are four times the numerator and denominator of $\frac{2}{3}$.]

Guided Practice

Lesson 1 Same Height

Name Answer Key

Try This
- Model the first fraction using Fraction Tower Cubes.
- Use hints to model an equivalent fraction.
- Fill in the answer blanks.

1. $\frac{3}{4} = \frac{6}{8}$ — 3 yellow = 6 blue
2. $\frac{1}{3} = \frac{4}{12}$ — 1 orange = 4 black
3. $\frac{8}{12} = \frac{4}{6}$ — 8 black = 4 teal
4. $\frac{4}{10} = \frac{2}{5}$ — 4 purple = 2 green
5. $\frac{3}{4} = \frac{9}{12}$
6. $\frac{2}{3} = \frac{4}{6}$
7. $\frac{1}{2} = \frac{5}{10}$
8. $\frac{3}{5} = \frac{6}{10}$
9. $\frac{2}{8} = \frac{1}{4}$
10. $\frac{6}{12} = \frac{2}{4}$

Model first fraction.

Model equivalent fraction.

Challenge

Find an equivalent fraction without using cubes. Show your work.

$\frac{1}{2} = \frac{10}{20}$ $\frac{1}{4} = \frac{4}{16}$ $\frac{2}{3} = \frac{6}{9}$ $\frac{4}{20} = \frac{1}{5}$ $\frac{10}{15} = \frac{2}{3}$

Online resource available at **hand2mind.com/hosfractionsgr4**

Guided Practice SMALL GROUP

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

Color hints are given in the first three problems to help students find equivalent fractions. For the Challenge section, students need to multiply or divide to find the equivalent fraction. Ask them to model one of the problems using paper strips or drawings.

Reinforce the Concept

Check for Understanding WHOLE CLASS

Observe students as they model pairs of equivalent fractions.

- **Ask:** *How did you find an equivalent fraction for problem 6?* [Sample: I looked at both denominators. Since thirds are orange and sixths are teal, I had to find a tower as tall as 2 orange cubes.]

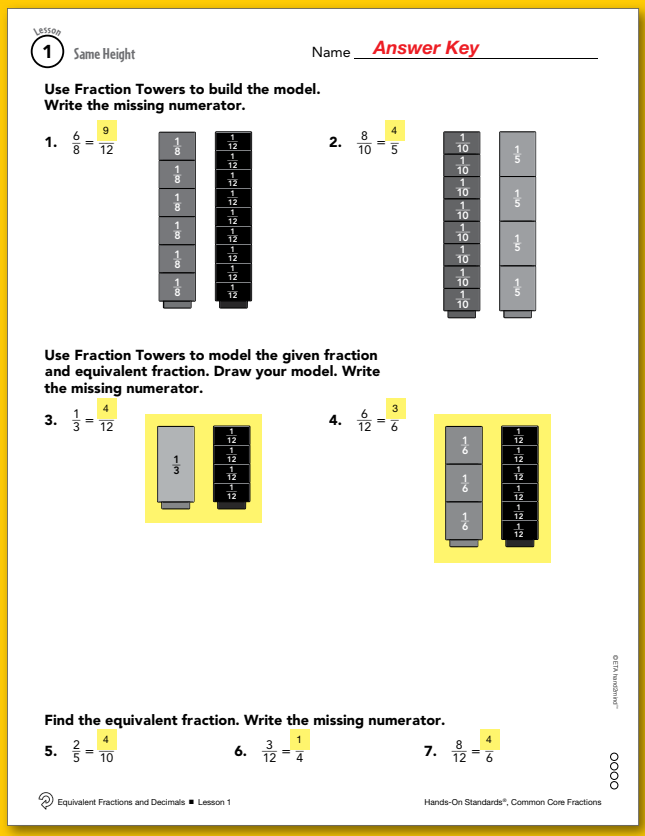
Summarize WHOLE CLASS

Have students discuss how to find equivalent fractions.

- **Ask:** *When you use the Fraction Tower Cubes, how do you know when you have found an equivalent fraction?* [The towers for both fractions are the same height.]

Remediation

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


Lesson 1 Same Height Name Answer Key

Use Fraction Towers to build the model. Write the missing numerator.

1. $\frac{6}{8} = \frac{9}{12}$ 2. $\frac{8}{10} = \frac{4}{5}$

Use Fraction Towers to model the given fraction and equivalent fraction. Draw your model. Write the missing numerator.

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

Find the equivalent fraction. Write the missing numerator.

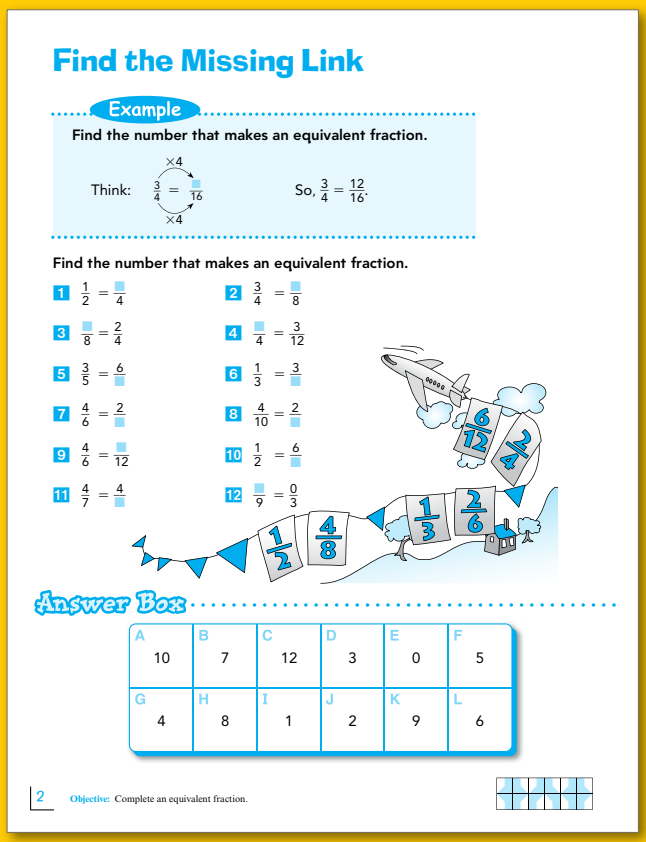
5. $\frac{2}{5} = \frac{4}{10}$ 6. $\frac{3}{12} = \frac{1}{4}$ 7. $\frac{8}{12} = \frac{4}{6}$

Equivalent Fractions and Decimals ■ Lesson 1 Hands-On Standards®, Common Core Fractions

Online resource available at **hand2mind.com/hosfractionsgr4**

Independent Practice

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


Find the Missing Link

Example

Find the number that makes an equivalent fraction.

Think: $\frac{3}{4} = \frac{\square}{16}$ (×4) So, $\frac{3}{4} = \frac{12}{16}$.

Find the number that makes an equivalent fraction.

1. $\frac{1}{2} = \frac{\square}{4}$ 2. $\frac{3}{4} = \frac{\square}{8}$
3. $\frac{\square}{8} = \frac{2}{4}$ 4. $\frac{\square}{4} = \frac{3}{12}$
5. $\frac{3}{5} = \frac{6}{\square}$ 6. $\frac{1}{3} = \frac{3}{\square}$
7. $\frac{4}{6} = \frac{2}{\square}$ 8. $\frac{4}{10} = \frac{2}{\square}$
9. $\frac{4}{6} = \frac{\square}{12}$ 10. $\frac{1}{2} = \frac{6}{\square}$
11. $\frac{4}{7} = \frac{4}{\square}$ 12. $\frac{\square}{9} = \frac{0}{3}$

Answer Box

A	B	C	D	E	F
10	7	12	3	0	5
G	H	I	J	K	L
4	8	1	2	3	6

2 Objective: Complete an equivalent fraction.

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Enrichment