Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

# Warm Up

$$
\begin{array}{r} 34 \\ \times\ 62 \\ \hline \end{array}
\qquad
\begin{array}{r} 70 \\ \times\ 67 \\ \hline \end{array}
\qquad
\begin{array}{r} 54 \\ \times\ 70 \\ \hline \end{array}
$$

$$
\begin{array}{r} 18 \\ \times\ 52 \\ \hline \end{array}
\qquad
\begin{array}{r} 79 \\ \times\ 69 \\ \hline \end{array}
\qquad
\begin{array}{r} 29 \\ \times\ 45 \\ \hline \end{array}
$$

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

# Warm Up Answers

| 34 | 70 | 54 |
|---:|---:|---:|
| × 62 | × 67 | × 70 |
| 68 | 490 | 0 |
| 2,040 | 4,200 | 3,780 |
| 2,108 | 4,690 | 3,780 |

| 18 | 79 | 29 |
|---:|---:|---:|
| × 52 | × 69 | × 45 |
| 36 | 711 | 145 |
| 900 | 4,740 | 1,160 |
| 936 | 5,451 | 1,305 |

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

Lesson 2.1                                                    October 29, 2014

# Essential Question:

## What does it mean to multiply fractions?

Lesson 2.1                                                    October 29, 2014

# Lesson Objective:

Students will be able to:

use a visual model and a formal process for multiplying fractions.

# Self-Evaluation Scale

| Score | Description |
|-------|-------------|
| 4 | I can teach other students how to use a visual model and a formal process for multiplying fractions. |
| 3 | I can use a visual model and a formal process for multiplying fractions. |
| 2 | I recognize, but still need help to use a visual model and a formal process for multiplying fractions. |
| 1 | I do not know how to use a visual model and a formal process for multiplying fractions. |

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# Activity 1

With a partner, work on Activity 1 on pages 31 of your Big Ideas Record and Practice Journal.

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.
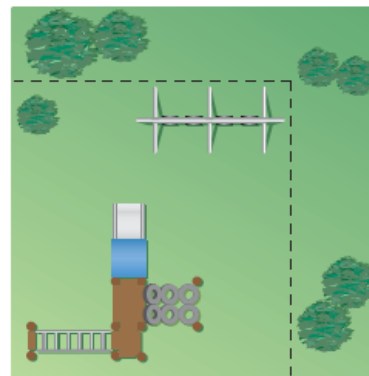
## 2  ACTIVITY: Multiplying Fractions
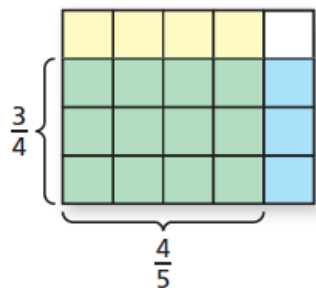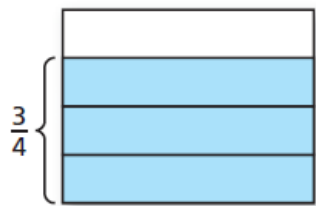
**Work with a partner. A park has a playground that is $\frac{3}{4}$ of its width and $\frac{4}{5}$ of its length. What fraction of the park is covered by the playground?**

**Fold** a piece of paper horizontally into fourths and shade three of the fourths to represent $\frac{3}{4}$.

**Fold** the paper vertically into fifths and shade $\frac{4}{5}$ of the paper another color.

**Count** the total number of squares. This number is the denominator. The numerator is the number of squares shaded with both colors.

$$\frac{3}{4} \times \frac{4}{5} = \frac{12}{20} = \frac{3}{5}. \text{ So, } \frac{3}{5} \text{ of the park is covered by the playground.}$$

$$2 \overline{\smash{\big)}\, 12 \quad 20}$$

$$2 \overline{\smash{\big)}\, 6 \quad 10}$$

$$\boxed{3 \quad 5}$$

$$\frac{12}{20}$$

$$\frac{3}{5}$$

**October 29, 2014 Period 3 Lesson 2.1**

IN YOUR OWN WORDS What does it mean to multiply fractions?

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

## Key Idea

**Multiplying Fractions**

**Words**   Multiply the numerators and multiply the denominators.

**Numbers**   $\dfrac{3}{7} \times \dfrac{1}{2} = \dfrac{3 \times 1}{7 \times 2} = \dfrac{3}{14}$

**Algebra**   $\dfrac{a}{b} \cdot \dfrac{c}{d} = \dfrac{a \cdot c}{b \cdot d}$, where $b, d \neq 0$

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

**1 Multiplying Fractions**

Find $\dfrac{1}{5} \times \dfrac{1}{3}$.

$$\frac{1}{5} \times \frac{1}{3} = \frac{1 \times 1}{5 \times 3}$$

Multiply the numerators.

Multiply the denominators.

$$= \frac{1}{15}$$

Simplify.

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

## 2  Multiplying Fractions with Common Factors

Find $\dfrac{8}{9} \times \dfrac{3}{4} = \dfrac{24}{36}$

$\dfrac{3}{4}^{\,1} \quad \dfrac{2}{3}$

Estimate $1 \times \dfrac{3}{4} = \dfrac{3}{4}$

$6\,\overline{)24\ 36}$

$2\,\overline{)4\quad 6}$

$\quad\quad 2\quad 3$

$\left(\dfrac{2}{3}\right)$

$\dfrac{8}{9} \times \dfrac{3}{4} = \dfrac{8 \times 3}{9 \times 4}$ ← **Multiply the numerators.**

← **Multiply the denominators.**

$= \dfrac{\overset{2}{\cancel{8}} \times \overset{1}{\cancel{3}}}{\underset{3}{\cancel{9}} \times \underset{1}{\cancel{4}}}$  **Divide out common factors.**
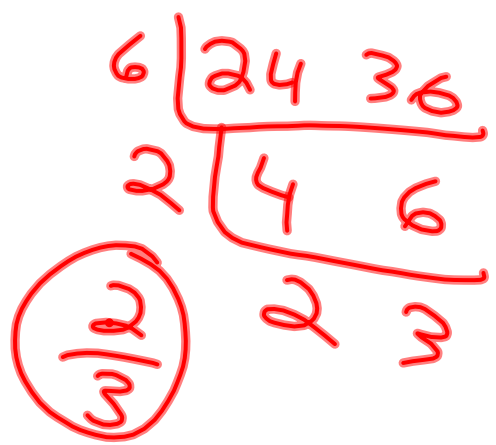
$= \dfrac{2}{3}$  **Simplify.**

∴ The product is $\dfrac{2}{3}$.

**Reasonable?** $\dfrac{2}{3} \approx \dfrac{3}{4}$ ✔

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

# On Your Own

**Multiply. Write the answer in simplest form.**

**1.** $\dfrac{1}{2} \times \dfrac{5}{6} = \dfrac{5}{12}$

**2.** $\dfrac{7}{8} \times \dfrac{1}{4} = \dfrac{7}{32}$

**3.** $\dfrac{3}{7} \times \dfrac{2}{3} = \dfrac{2}{7}$

**4.** $\dfrac{4}{9} \times \dfrac{3}{10} = \dfrac{2}{15}$

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

**4** **Multiplying a Fraction and a Mixed Number**

Find $\frac{1}{2} \times 2\frac{3}{4}$.

Estimate $\frac{1}{2} \times 3 = 1\frac{1}{2}$

$\frac{1}{2} \times 2\frac{3}{4} = \frac{1}{2} \times \frac{11}{4}$

Write $2\frac{3}{4}$ as the improper fraction $\frac{11}{4}$.

$= \frac{1 \times 11}{2 \times 4}$

Multiply the numerators and the denominators.

$= \frac{11}{8}$, or $1\frac{3}{8}$

Simplify.

∴ The product is $1\frac{3}{8}$.

**Reasonable?** $1\frac{3}{8} \approx 1\frac{1}{2}$ ✓

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

## 5 Multiplying Mixed Numbers

Find $1\dfrac{4}{5} \times 3\dfrac{2}{3}$.

**Estimate** $2 \times 4 = 8$

$$1\dfrac{4}{5} \times 3\dfrac{2}{3} = \dfrac{9}{5} \times \dfrac{11}{3}$$

Write $1\dfrac{4}{5}$ and $3\dfrac{2}{3}$ as improper fractions.

$$= \dfrac{\overset{3}{9} \times 11}{5 \times \underset{1}{3}}$$

Multiply fractions. Divide out the common factor 3.

$$= \dfrac{33}{5}, \text{ or } 6\dfrac{3}{5}$$

Simplify.

∴ The product is $6\dfrac{3}{5}$.

**Reasonable?** $6\dfrac{3}{5} \approx 8$ ✓

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

# On Your Own

## Multiply. Write the answer in simplest form.

**6.** $\dfrac{1}{3} \times 1\dfrac{1}{6}$

$\dfrac{1}{3} \cdot \dfrac{7}{6}$

$\boxed{\dfrac{7}{18}}$

**7.** $3\dfrac{1}{2} \times \dfrac{4}{9}$

$\dfrac{7}{2} \cdot \dfrac{4}{9}$

$\dfrac{14}{9} = \boxed{\dfrac{5}{9}}$

**8.** $1\dfrac{7}{8} \times 2\dfrac{2}{5}$

$\dfrac{15}{8} \cdot \dfrac{12}{5}$

$\dfrac{9}{2} = \boxed{4\dfrac{1}{2}}$

**9.** $5\dfrac{5}{7} \times 2\dfrac{1}{10}$

$\dfrac{40}{7} \cdot \dfrac{21}{10}$

$\dfrac{12}{1} = \boxed{12}$

$$3\frac{1}{3} \cdot 12$$

$$\frac{10}{3} \cdot \frac{12^4}{1} = \frac{40}{1} = 40$$

Learning Objective: Students will be able to use a visual model and a formal process for multiplying fractions.

# Assignment

Complete problems 8, 14, 18, 19, 35, 39, 40, 41, 54, 55, & 58 on pages 59 - 61 in your Big Ideas Text Book.

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Lesson 2.1                                                                    October 29, 2014

# Essential Question:

## What does it mean to multiply fractions?

Lesson 2.1                                                    October 29, 2014

# Lesson Objective:

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use a visual model and a formal process for multiplying fractions.

# Self-Evaluation Scale

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# Homework

In your Big Ideas Record and Practice Journal page 34.