

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

Warm Up

$$\begin{array}{r} 34 \\ \times 62 \\ \hline \end{array}$$

$$\begin{array}{r} 70 \\ \times 67 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \times 70 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \times 52 \\ \hline \end{array}$$

$$\begin{array}{r} 79 \\ \times 69 \\ \hline \end{array}$$

$$\begin{array}{r} 29 \\ \times 45 \\ \hline \end{array}$$

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Warm Up Answers

$$\begin{array}{r} 34 \\ \times 62 \\ \hline 68 \\ 2,040 \\ \hline 2,108 \end{array}$$

$$\begin{array}{r} 70 \\ \times 67 \\ \hline 490 \\ 4,200 \\ \hline 4,690 \end{array}$$

$$\begin{array}{r} 54 \\ \times 70 \\ \hline 0 \\ 3,780 \\ \hline 3,780 \end{array}$$

$$\begin{array}{r} 18 \\ \times 52 \\ \hline 36 \\ 900 \\ \hline 936 \end{array}$$

$$\begin{array}{r} 79 \\ \times 69 \\ \hline 711 \\ 4,740 \\ \hline 5,451 \end{array}$$

$$\begin{array}{r} 29 \\ \times 45 \\ \hline 145 \\ 1,160 \\ \hline 1,305 \end{array}$$

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Lesson 2.1

October 1, 2014

Essential Question:

What does it mean to multiply fractions?

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.

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

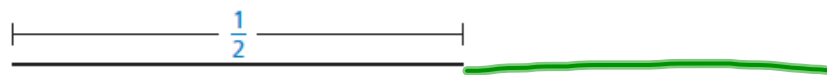
Activity 1

With a partner, work on Activity I on pages 3I of your Big Ideas Record and Practice Journal.

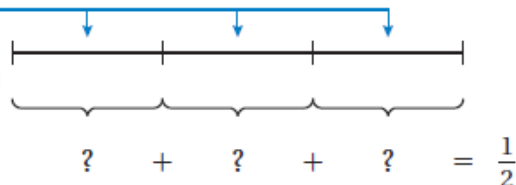
October 1, 2014 -Period 5 Lesson 2

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

- Draw a length of $\frac{1}{2}$.



Because you want to find $\frac{2}{3}$ of the length, divide it into 3 equal sections.



Now, you need to think of a way to divide $\frac{1}{2}$ into 3 equal parts.

- Rewrite $\frac{1}{2}$ as a fraction whose numerator is divisible by 3.

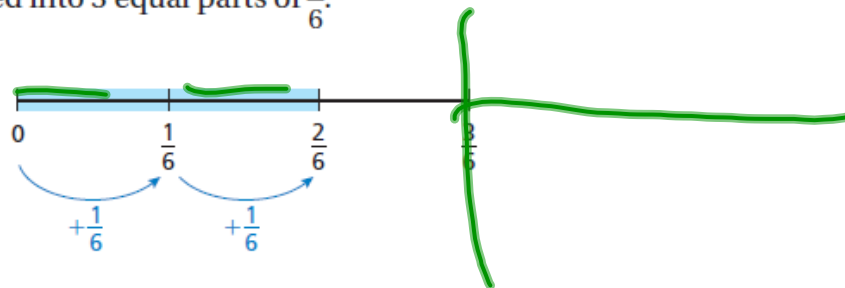
Because the length is divided into 3 equal sections, multiply the numerator and denominator by 3.



In this form, you see that $\frac{3}{6}$ can be divided into 3 equal parts of $\frac{1}{6}$.

- Each part is $\frac{1}{6}$ of the bottle of water, and you drank two of them. Written as multiplication, you have

$$\frac{2}{3} \times \frac{1}{2} = \frac{2}{\color{green}\boxed{6}} = \frac{\color{green}\boxed{1}}{\color{green}\boxed{3}}$$



• So, you drank $\frac{\color{green}\boxed{1}}{\color{green}\boxed{3}}$ of the bottle of water.

$$20 \cdot 10 = 200$$

$$10 \cdot 10 = 100$$

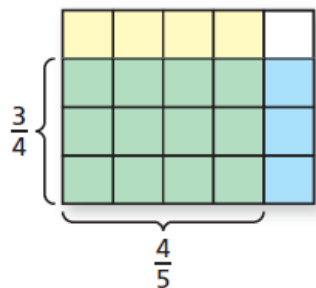
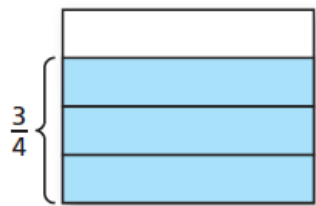
$$5 \cdot 10 = 50$$

$$1 \cdot 10 = 10$$

$$.5 \cdot 10 = 5$$

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2 ACTIVITY: Multiplying Fractions

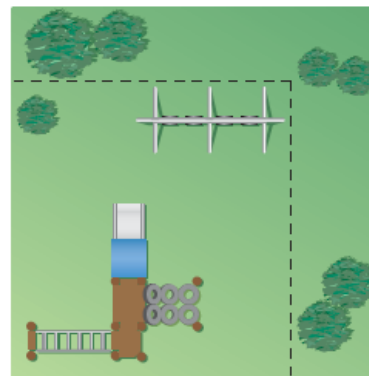


Work with a partner. A park has a playground that is $\frac{3}{4}$ of its width and $\frac{4}{5}$ of its length. What fraction of the park is covered by the playground?

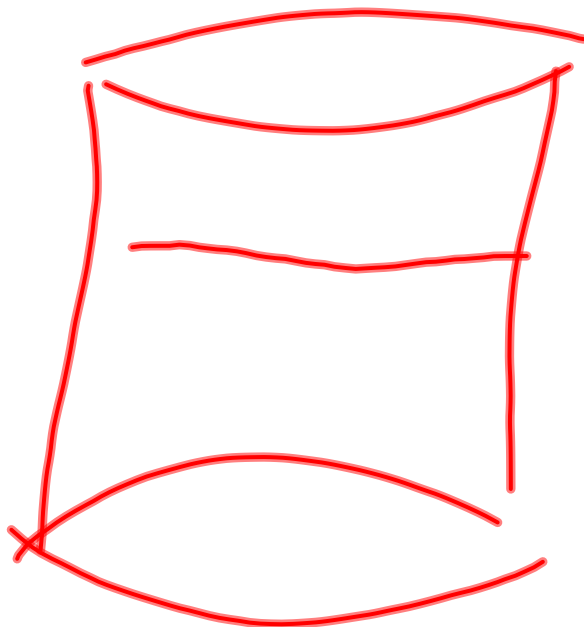
Fold a piece of paper horizontally into fourths and shade three of the fourths to represent $\frac{3}{4}$.

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.



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



Part of Part

October 1, 2014 -Period 5 Lesson 2

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

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

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Key Idea

Multiplying Fractions

Words Multiply the numerators and multiply the denominators.

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

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

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1 Multiplying Fractions

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

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

Multiply the numerators.

Multiply the denominators.

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

Simplify.

$$\frac{\cancel{25}^5}{\cancel{30}_9} \cdot \frac{\cancel{12}^4}{\cancel{15}_5} = \frac{5}{9}$$

The image shows a handwritten mathematical derivation. On the left, the fraction $\frac{25}{30}$ is written in black ink. A red horizontal line is drawn through the '25' and '30'. Above the '25' is a red '5', and below the '30' is a red '9'. To the right of this is a dot. Next is the fraction $\frac{12}{15}$ in black ink. A red horizontal line is drawn through the '12' and '15'. Above the '12' is a red '4', and below the '15' is a red '5' circled in red. To the right of this is an equals sign. Finally, the simplified fraction $\frac{5}{9}$ is written in red ink.

$$\begin{array}{r} 2 \\ \hline 4 \\ \hline 8 \\ \hline 4 \\ \hline 1 \end{array} \cdot \begin{array}{r} 821 \\ \hline 16 \\ \hline 20 \\ \hline 16 \\ \hline 515 \end{array} = \begin{array}{r} 2 \\ \hline 515 \end{array}$$

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2 Multiplying Fractions with Common Factors

Find $\frac{8}{9} \times \frac{3}{4}$.

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

$$\frac{8}{9} \times \frac{3}{4} = \frac{8 \times 3}{9 \times 4}$$

Multiply the numerators.

Multiply the denominators.

$$= \frac{\overset{2}{\cancel{8}} \times \overset{1}{\cancel{3}}}{\underset{3}{\cancel{9}} \times \underset{1}{\cancel{4}}}$$

Divide out common factors.

$$= \frac{2}{3}$$

Simplify.

• The product is $\frac{2}{3}$.

Reasonable? $\frac{2}{3} \approx \frac{3}{4}$ ✓



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On Your Own

Multiply. Write the answer in simplest form.

1. $\frac{1}{2} \times \frac{5}{6}$

2. $\frac{7}{8} \times \frac{1}{4}$

3. $\frac{3}{7} \times \frac{2}{3}$

4. $\frac{4}{9} \times \frac{3}{10}$

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4 Multiplying a Fraction and a Mixed Number

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

$$\begin{aligned} \frac{1}{2} \times 2\frac{3}{4} &= \frac{1}{2} \times \frac{11}{4} \\ &= \frac{1 \times 11}{2 \times 4} \\ &= \frac{11}{8}, \text{ or } 1\frac{3}{8} \end{aligned}$$

• The product is $1\frac{3}{8}$.

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

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

Multiply the numerators and the denominators.

Simplify.

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

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5

Multiplying Mixed Numbers

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

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

$$= \frac{\overset{3}{\cancel{9}} \times 11}{5 \times \cancel{3}_1}$$

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

••• The product is $6\frac{3}{5}$.

Estimate $2 \times 4 = 8$

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

Multiply fractions. Divide out the common factor 3.

Simplify.

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

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On Your Own

Multiply. Write the answer in simplest form.

6. $\frac{1}{3} \times 1\frac{1}{6}$

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

8. $1\frac{7}{8} \times 2\frac{2}{5}$

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

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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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Homework

In your Big Ideas Record and Practice Journal
page 34.