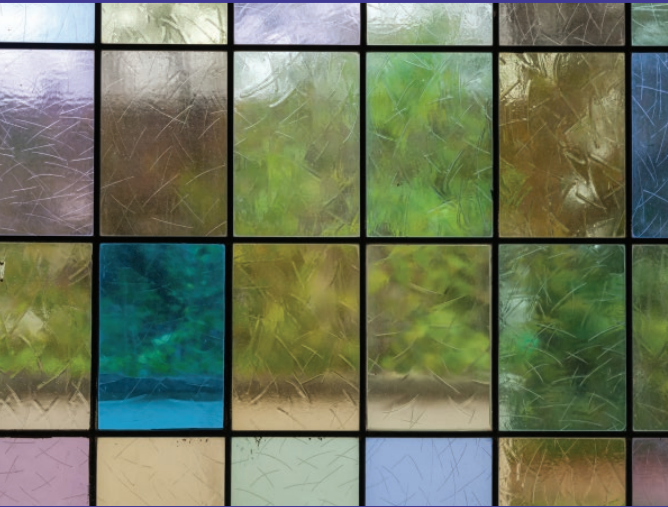Name: _____

Lesson 9

Using Area Models to Multiply Fractions

My Learning Goals

I can interpret the meaning of multiplying with fractions.

I can explain the sequence of operations when multiplying with fractions.

I can represent fraction products as rectangular areas.

Activate

Selling More Pizzas

> **Read the story. Then, answer the question. Sketch a model and write an equation to explain your reasoning.**

The fifth-graders are making rectangular pizzas to sell at home basketball games. One pizza costs $24, but customers can buy part of the pizza.

1 Zoe bought $\frac{2}{3}$ of $\frac{3}{4}$ of a pizza. How much pizza did Zoe buy? How much did she pay?

Explore

Using Area Models with Fractions

When you multiply a fraction by a fraction, you are calculating a part of a part. You can represent the product of two fractions using an area model.

Worked Example

Consider an area model for $\frac{1}{4} \times \frac{1}{2}$ and what it represents.

To represent $\frac{1}{4}$, partition the square into 4 equal parts along the vertical line. Then, shade $\frac{1}{4}$.

To represent $\frac{1}{2}$, partition the square along the horizontal into 2 equal parts along the horizontal line. Then, shade $\frac{1}{2}$.
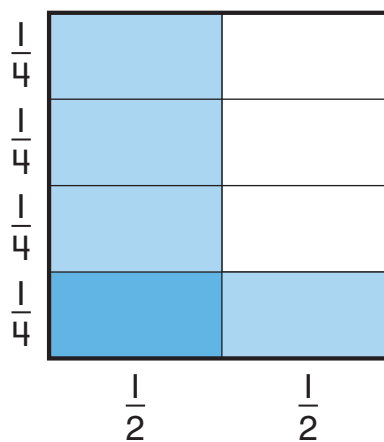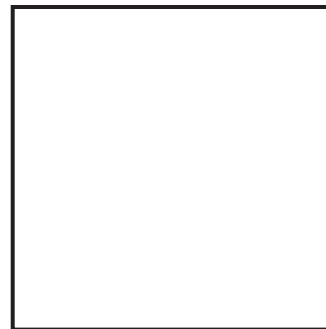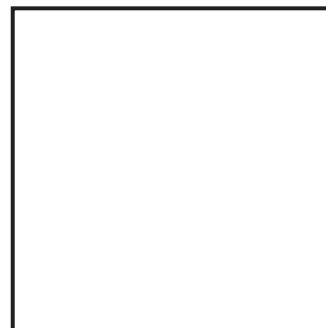
$$\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$$

The area of the overlapping region is the product of the fractions.

› **Represent each product using an area model.**
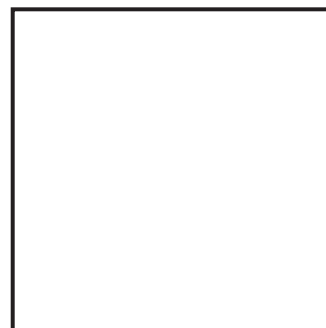**Then, calculate the product.**

1 $\dfrac{3}{4} \times \dfrac{1}{2}$

2 $\dfrac{2}{3} \times \dfrac{3}{4}$

3 $\dfrac{1}{2} \times \dfrac{2}{3}$

› **Review the products calculated in Questions 1 through 3.**

4 Write a rule to calculate the product of 2 fractions.

Explore

Multiple Representations

❯ **Analyze the strategies. Then, answer each question.**

Lachlan

$\frac{3}{8}$
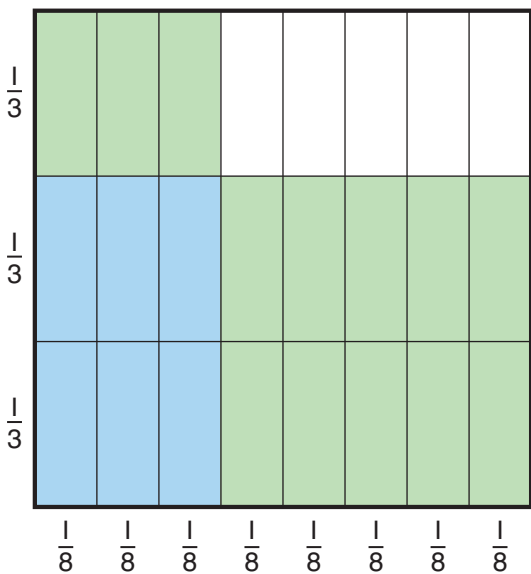
$$\frac{2}{3} \times \frac{3}{8} = \frac{2}{8}$$

Aaliyah

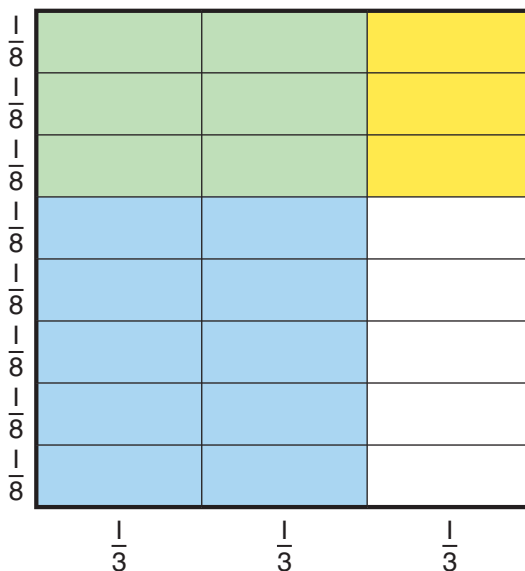$$\frac{2}{3} \times \frac{3}{8} = \frac{2 \times 3}{3 \times 8} = \frac{6}{24}$$

Camila

$$\frac{2}{3} \times \frac{3}{8} = \frac{6}{24}$$

Henry

$$\frac{2}{3} \times \frac{3}{8} = \frac{6}{24}$$

1 How are the methods alike?

2 How are the methods different?

3 Which method do you prefer? Why?

4 Carlos noticed that when he multiplies 2 fractions less than 1, the product is less than each of the 2 fractions he multiplied. Owen didn't think Carlos's products were correct because he learned that when multiplying, the product is greater than the factors. Who is correct? Explain your reasoning.

_____

_____

_____

My Just Right Problem

Reflect

Area Model Multiplication

> **Read the story. Then, answer each question.**

Charlotte is using an area model to multiply $\frac{3}{4}$ and $\frac{1}{2}$.

1 How can Charlotte partition a square to represent the problem?

2 How can you use an area model to represent the product? Explain your reasoning.

3 What is the product of $\frac{3}{4}$ and $\frac{1}{2}$? Explain your reasoning.

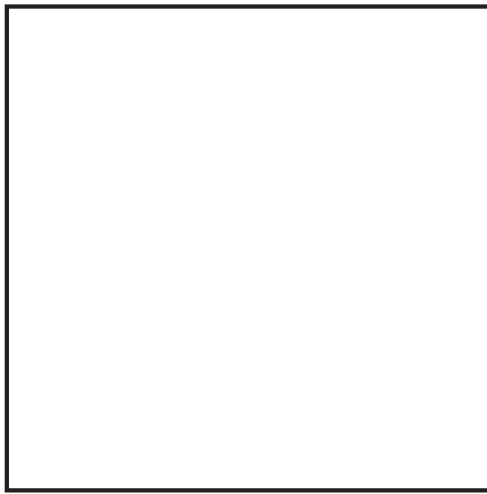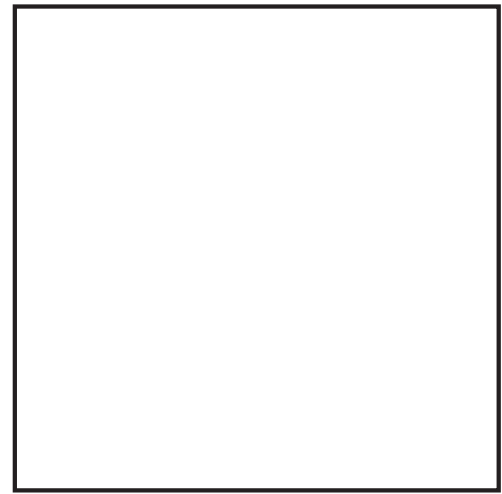> **Choose the problem that feels just right for you and fill in the star.**

Name: _____

Lesson 9

Using Area Models to Multiply Fractions

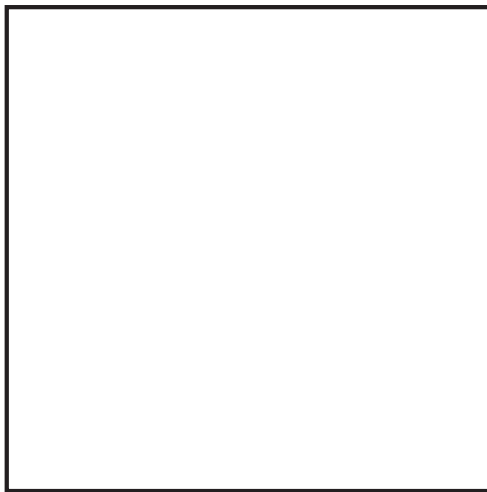❯ **Represent each product using an area model. Then, calculate the product.**
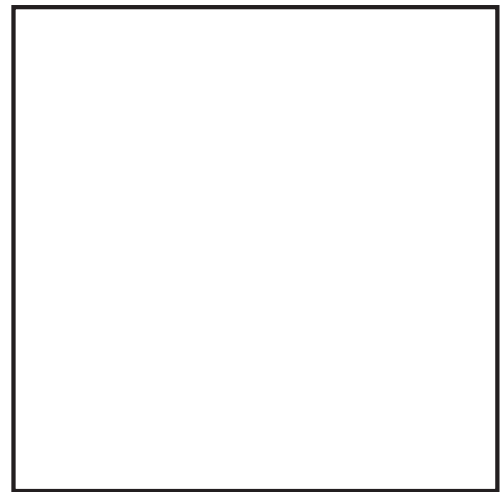
1 $\dfrac{3}{4} \times \dfrac{1}{3}$

2 $\dfrac{1}{2} \times \dfrac{3}{5}$
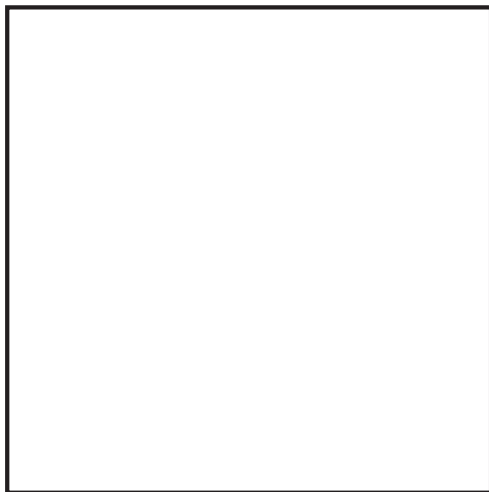
3 $\dfrac{1}{6} \times \dfrac{2}{3}$

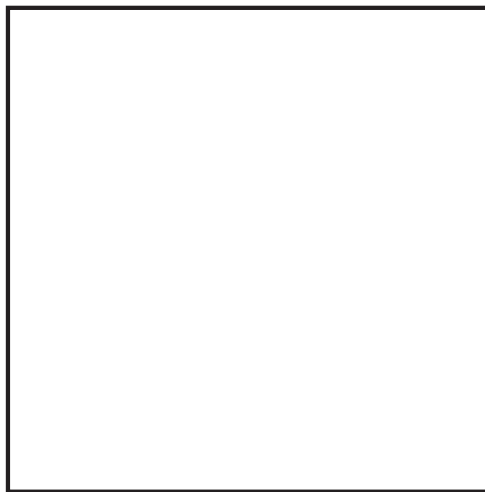**4** $\dfrac{1}{3} \times \dfrac{4}{5}$

5 $\frac{1}{4} \times \frac{1}{3}$

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

> **Calculate each product.**

7 $\frac{3}{5} \times \frac{4}{7}$

8 $\frac{2}{9} \times \frac{1}{4}$

9 Write and solve your own fraction multiplication problem using an area model.