

Name _____

Multiply a Fraction by a Whole Number Using Models

Essential Question How can you use a model to multiply a fraction by a whole number?



Numbers and Operations—
Fractions—4.NF.B.4b Also 4.NF.B.4c

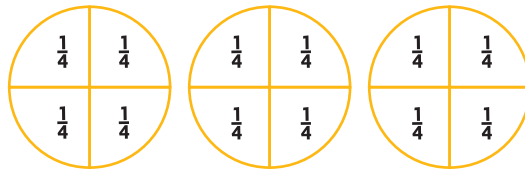
MATHEMATICAL PRACTICES
MP1, MP2, MP4

Unlock the Problem

Rafael practices the violin for $\frac{3}{4}$ hour each day. He has a recital in 3 days. How much time will he practice in 3 days?

Example 1 Use a model to multiply $3 \times \frac{3}{4}$.

Think: $3 \times \frac{3}{4}$ is 3 groups of $\frac{3}{4}$ of a whole. Shade the model to show 3 groups of $\frac{3}{4}$.



1 group of $\frac{3}{4} =$ _____

2 groups of $\frac{3}{4} =$ _____

3 groups of $\frac{3}{4} =$ _____

$3 \times \frac{3}{4} =$ _____

So, Rafael will practice for _____ hours in all.

- How many equal groups of $\frac{3}{4}$ should you model?



Math Talk

MATHEMATICAL PRACTICES 2

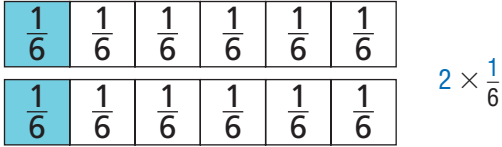
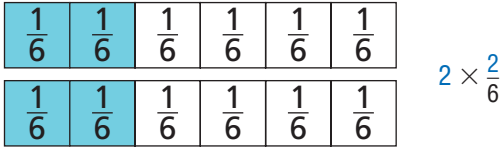
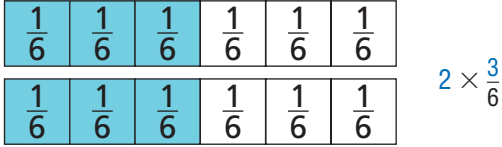
Reason Abstractly If you multiply $4 \times \frac{2}{6}$, is the product greater than or less than 4? Explain.

- Explain how you can use repeated addition with the model to find the product $3 \times \frac{3}{4}$.

- Rafael's daily practice of $\frac{3}{4}$ hour is in sessions that last for $\frac{1}{4}$ hour each. Describe how the model shows the number of practice sessions Rafael has in 3 days.

Example 2 Use a pattern to multiply.

You know how to use a model and repeated addition to multiply a fraction by a whole number. Look for a pattern in the table to discover another way to multiply a fraction by a whole number.

Multiplication Problem	Whole Number (Number of Groups)	Fraction (Size of Groups)	Product
 $2 \times \frac{1}{6}$	2	$\frac{1}{6}$ of a whole	$\frac{2}{6}$
 $2 \times \frac{2}{6}$	2	$\frac{2}{6}$ of a whole	$\frac{4}{6}$
 $2 \times \frac{3}{6}$	2	$\frac{3}{6}$ of a whole	$\frac{6}{6}$

When you multiply a fraction by a whole number, the numerator in the product is the product of the _____ and the _____ of the fraction. The denominator in the product is the same as the _____ of the fraction.

3. How do you multiply a fraction by a whole number without using a model or repeated addition?

4. Describe two different ways to find the product $4 \times \frac{2}{3}$.

Share and Show



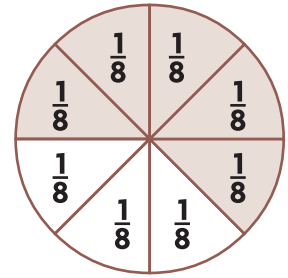
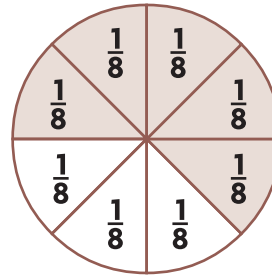
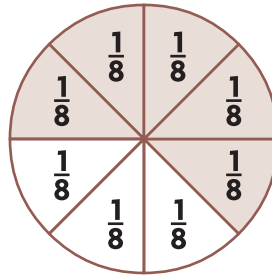
1. Find the product of $3 \times \frac{5}{8}$.

1 group of $\frac{5}{8} = \frac{\square}{8}$

2 groups of $\frac{5}{8} = \frac{\square}{8}$

3 groups of $\frac{5}{8} = \frac{\square}{8}$

$3 \times \frac{5}{8} = \underline{\hspace{2cm}}$

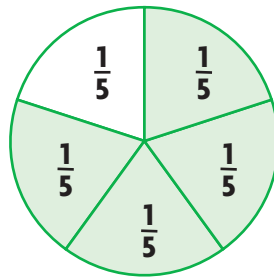
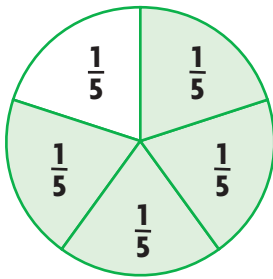


3 groups of $\frac{5}{8}$

Multiply.

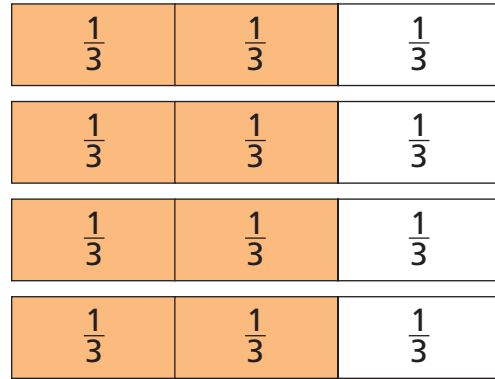


2.



$2 \times \frac{4}{5} = \underline{\hspace{2cm}}$

3.



$4 \times \frac{2}{3} = \underline{\hspace{2cm}}$



4. $5 \times \frac{3}{10} = \underline{\hspace{2cm}}$

5. $4 \times \frac{5}{6} = \underline{\hspace{2cm}}$



MATHEMATICAL PRACTICES 4

Model Mathematics
Describe how to model Exercise 5.

On Your Own

Multiply.

6. $2 \times \frac{7}{12} = \underline{\hspace{2cm}}$

7. $6 \times \frac{3}{8} = \underline{\hspace{2cm}}$

8. $5 \times \frac{2}{4} = \underline{\hspace{2cm}}$

9. $3 \times \frac{4}{6} = \underline{\hspace{2cm}}$

10. $2 \times \frac{5}{10} = \underline{\hspace{2cm}}$

11. $4 \times \frac{2}{8} = \underline{\hspace{2cm}}$



Look for a Pattern Algebra Write the unknown number.

12. $\square \times \frac{2}{3} = \frac{12}{3}$

13. $5 \times \frac{\square}{4} = \frac{10}{4}$

14. $2 \times \frac{7}{\square} = \frac{14}{8}$

Unlock the Problem

15. **THINK SMARTER** Lisa makes clothes for pets. She needs $\frac{5}{6}$ yard of fabric to make 1 dog coat. How much fabric does she need to make 3 dog coats?



- a. What do you need to find?
-
- b. What information do you need?
-
- c. Show the steps you use to solve the problem.

- d. Complete the sentence.

Lisa needs _____ yards of fabric to make 3 dog coats.

16. **GO DEEPER** Manuel's small dog eats $\frac{2}{4}$ bag of dog food in 1 month. His large dog eats $\frac{3}{4}$ bag of dog food in 1 month. How many bags do both dogs eat in 6 months?
-

17. **THINK SMARTER** Select the correct product for the equation.

$$\frac{24}{12}$$

$$\frac{18}{12}$$

$$\frac{24}{7}$$

$$\frac{18}{7}$$

$$9 \times \frac{2}{12} = \square$$

$$3 \times \frac{6}{7} = \square$$

$$6 \times \frac{4}{7} = \square$$

$$8 \times \frac{3}{12} = \square$$

Name _____

**Multiply a Fraction by a Whole Number
Using Models**



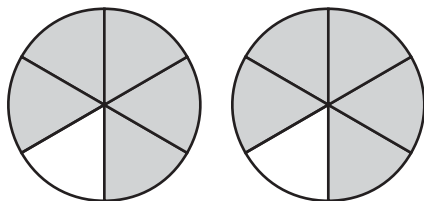
COMMON CORE STANDARD—4.NF.B.4
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers..

Multiply.

1. $2 \times \frac{5}{6} = \frac{10}{6}$

2. $3 \times \frac{2}{5} =$ _____

3. $7 \times \frac{3}{10} =$ _____



4. $3 \times \frac{5}{12} =$ _____

5. $6 \times \frac{3}{4} =$ _____

6. $4 \times \frac{2}{5} =$ _____

Problem Solving



7. Matthew walks $\frac{5}{8}$ mile to the bus stop each morning. How far will he walk in 5 days?

8. Emily uses $\frac{2}{3}$ cup of milk to make one batch of muffins. How many cups of milk will Emily use if she makes 3 batches of muffins?

9. **WRITE** *Math* Explain how you can use a model to find $4 \times \frac{3}{8}$. Include a drawing and a solution.

Lesson Check (4.NF.B.4b)

1. Aleta's puppy gained $\frac{3}{8}$ pound each week for 4 weeks. Altogether, how much weight did the puppy gain during the 4 weeks?

2. Pedro mixes $\frac{3}{4}$ teaspoon of plant food into each gallon of water. How many teaspoons of plant food should Pedro mix into 5 gallons of water?

Spiral Review (4.NF.A.2, 4.NF.B.3b, 4.NF.B.3c, 4.NF.B.4a)

3. Ivana has $\frac{3}{4}$ pound of hamburger meat. She makes 3 hamburger patties. Each patty weighs the same amount. How much does each hamburger patty weigh?

4. Write $\frac{7}{10}$ as a sum of fractions two different ways.

5. Lance wants to find the total length of 3 boards. He uses the expression $3\frac{1}{2} + (2 + 4\frac{1}{2})$. How can Lance rewrite the expression using both the Associative and Commutative Properties of Addition?

6. Fill in the blank with a symbol that makes this statement true:
$$\frac{5}{12} \bigcirc \frac{1}{3}$$



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