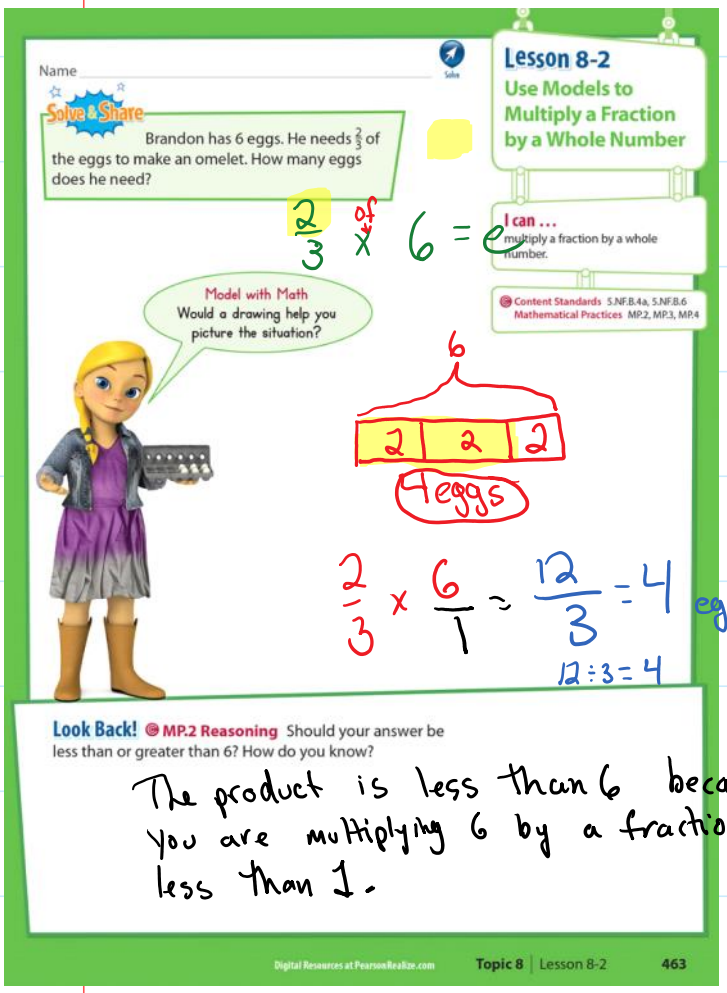
Lesson 8-2

Thursday, January 2, 2020 1:37 PM



Name _____

Lesson 8-2
Use Models to Multiply a Fraction by a Whole Number

Solve & Share
Brandon has 6 eggs. He needs $\frac{2}{3}$ of the eggs to make an omelet. How many eggs does he need?

$\frac{2}{3} \times 6 = e$

I can ...
multiply a fraction by a whole number.

Content Standards 5.NF.B.4a, 5.NF.B.6
Mathematical Practices MP.2, MP.3, MP.4

Model with Math
Would a drawing help you picture the situation?

6
2 | 2 | 2
4 eggs

$\frac{2}{3} \times \frac{6}{1} = \frac{12}{3} = 4$ eggs

$12 \div 3 = 4$

Look Back! MP.2 Reasoning Should your answer be less than or greater than 6? How do you know?

The product is less than 6 because you are multiplying 6 by a fraction less than 1.

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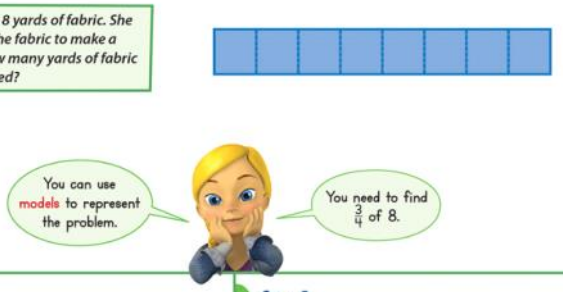
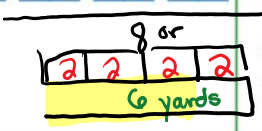
How Can You Model Multiplying a Fraction by a Whole Number?

Claudia has 8 yards of fabric. She needs $\frac{3}{4}$ of the fabric to make a banner. How many yards of fabric does she need?



Step 1

Since you are finding $\frac{3}{4}$ of 8, divide the model into 4 equal parts.



Step 2

Since you are finding $\frac{3}{4}$ of 8, take 3 of those parts to make 6.

So, $\frac{3}{4} \times 8 = 6$.

Claudia needs 6 yards of fabric to make a banner.

Convince Me! MP.4 Model with Math

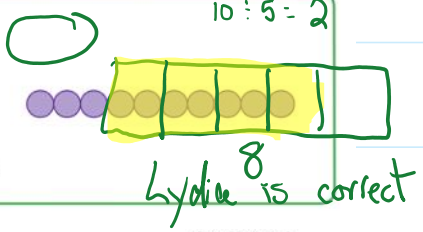
Here is how Lydia found the product $\frac{4}{5} \times 10$.

$\frac{4}{5} \times 10 = 4 \times \frac{1}{5} \times 10$

$= 4 \times \frac{10}{5}$

$= 4 \times 2 = 8$

Use the model at the right to show that Lydia's answer is correct.



Name

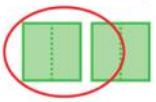
Another Example

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

Divide 2 into 4 equal parts.

Each part is $\frac{1}{2}$.

Circle 3 parts to get $\frac{3}{2}$.



So, $\frac{3}{4} \times 2 = \frac{3}{2}$.

Guided Practice

Do You Understand?

1. **MP.3 Construct Arguments** Explain why the product of $4 \times \frac{2}{3}$ is the same as the product of $\frac{2}{3} \times 4$.

The commutative property of multiplication

2. In the problem at the top of page 464, what multiplication equation could be used to find how many yards of fabric Claudia did not use?

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

Do You Know How?

In **3** and **4**, use the model to find each product.

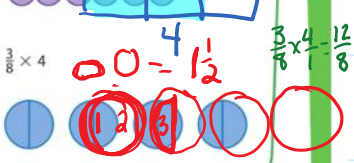
3. $\frac{2}{3} \times 6$

$\frac{2}{3} \times \frac{6}{1} = \frac{12}{3} = 4$

6 ÷ 3 = 2

2 × 2 = 4

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



$\frac{3}{8} \times \frac{4}{1} = \frac{12}{8} = \frac{4}{8} \div \frac{4}{4} = 1\frac{1}{2}$

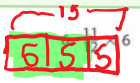
00 = $1\frac{1}{2}$

Independent Practice

In **5–7**, find each product. Draw models to help.

Complete 7, 11, 14

5. $\frac{2}{3} \times 15$



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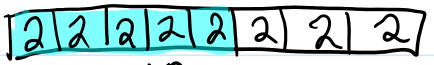
$\frac{2}{3} \times \frac{15}{1} = \frac{30}{3} = 10$

7. $\frac{5}{8} \times 16 =$

10

or



10

$\frac{5}{8} \times \frac{16}{1} = \frac{80}{8} = 10$

Math Practices and Problem Solving

8. **MP.3 Construct Arguments** Janice said that when you multiply a fraction less than 1 by a nonzero whole number, the product is always less than the whole number. Do you agree?

9. **Math and Science** A scientist wants to find out how the properties of water change when salt is added to it. For every cup of water she has, she replaces $\frac{1}{8}$ of it with salt. If she has 24 cups of water, how many cups will she replace with salt?

10. Shanna attends school for 1 week longer than $\frac{3}{4}$ of the year. How many weeks in a year does Shanna attend school?

11. **Higher Order Thinking** Gina has 48 stickers. $\frac{3}{8}$ of the stickers have pictures of flowers. $\frac{1}{8}$ of the stickers have pictures of plants. The rest of the stickers have pictures of people. How many stickers have pictures of people? Explain how you found your answer.

$\frac{3}{8} + \frac{1}{8} = \frac{4}{8}$ $\frac{8}{8} - \frac{4}{8} = \frac{4}{8} \div 4 = \frac{1}{2}$

$\frac{48}{1} \times \frac{1}{2} = \frac{48}{2} =$ 24 stickers

3/8 + 1/8 are stickers of flowers and plants.
8/8 - 4/8 are the stickers of just people.
4/8 = 1/2; 1/2 of 48 stickers is 24 stickers of people.

12. Two paperback books cost a total of $10. How much change will Stacy get if she buys two hardcover books and two paperback books and gives the clerk three $20 bills?

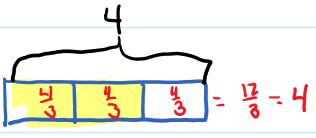
Common Core Assessment

13. Draw lines to match each expression on the left to its product on the right.

$\frac{3}{4} \times 16$	10
$\frac{5}{12} \times 12$	5
$\frac{9}{10} \times 5$	12

14. Draw lines to match each equation on the left to the number on the right that makes the equation true.

$\frac{2}{3} \times A = \frac{8}{3}$	4
$\frac{5}{6} \times B = 10$	13

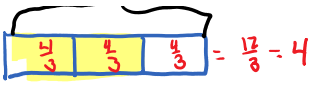


$= \frac{12}{3} = 4$

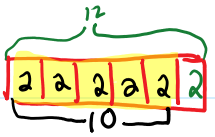
$\frac{3}{4} \times 16$	10
$\frac{5}{12} \times 12$	5
$\frac{9}{10} \times 5$	12
$\frac{2}{3} \times 15$	$4\frac{1}{2}$

makes the equation true.

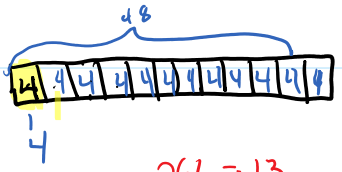
$\frac{2}{3} \times$ A $= \frac{8}{3}$	4
$\frac{5}{6} \times$ B $= 10$	13
$\frac{1}{12} \times$ C $= 4$	12
$\frac{1}{2} \times$ D $= \frac{13}{2}$	48



B.



C.



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