Module 3 - Lesson 8:

Multiply fractions less than 1 pictorially.

CCSS Standard – 5.NF.B.4.a / 5.NF.B.5.a / 5.NF.B.5.b

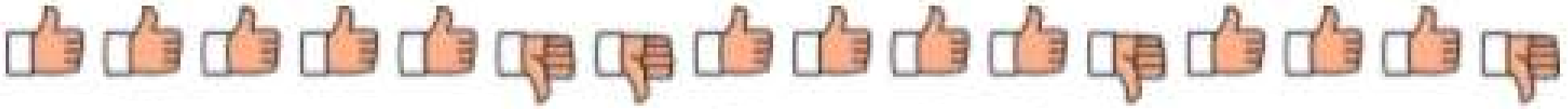
FLUENCY (10-min) **Happy Counting by Fifths – Visualizing a Number line**

When I give this signal, count up. 

When I give this signal, count down. 

When I give this signal, stop. 

Let's count by fifths. The first number you say is 0 fifths. Ready?



FLUENCY (10-min) **Choral Response: Equivalent Fractions**

What is the unknown equivalent fraction?
Raise your hand when you know.

$\frac{3}{9} = \frac{1}{\_}$

$\frac{6}{9} = \frac{2}{\_}$

$\frac{2}{8} = \frac{\_}{4}$

$\frac{4}{6} = \frac{\_}{3}$

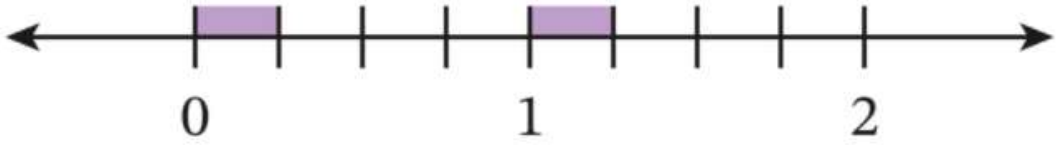
$\frac{6}{8} = \frac{3}{\_}$

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

FLUENCY (10-min)

Whiteboard Exchange: Multiply a Whole Number by a Fraction

Draw the number line and write the statement.
Find the value by using the number line. Write the answer as a whole number when possible.

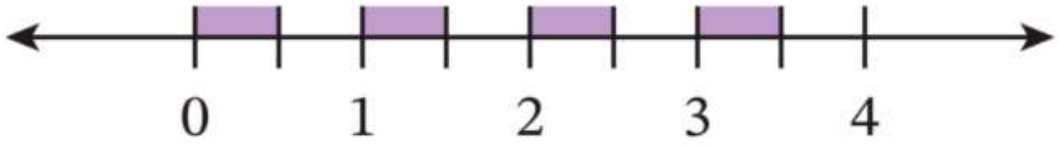


$\frac{1}{4} \times 2 = \underline{\frac{2}{4}}$

FLUENCY (10-min)

Whiteboard Exchange: Multiply a Whole Number by a Fraction

Draw the number line and write the statement.
Find the value by using the number line. Write the answer as a whole number when possible.

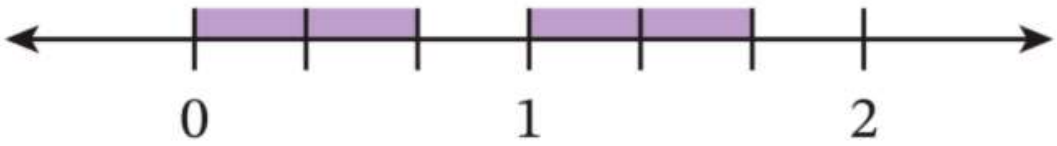


$\frac{1}{2} \times 4 = \underline{\frac{4}{2}} = \underline{2}$

FLUENCY (10-min)

Whiteboard Exchange: Multiply a Whole Number by a Fraction

Draw the number line and write the statement.
Find the value by using the number line. Write the answer as a whole number when possible.



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

FLUENCY (10-min)

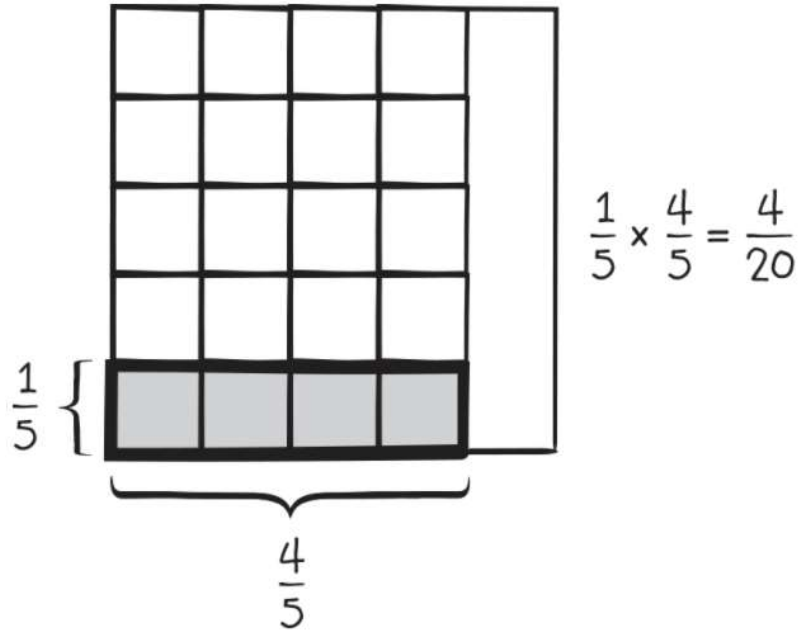
Whiteboard Exchange: Multiply a Whole Number by a Fraction

Draw the number line and write the statement.
Find the value by using the number line. Write the answer as a whole number when possible.

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

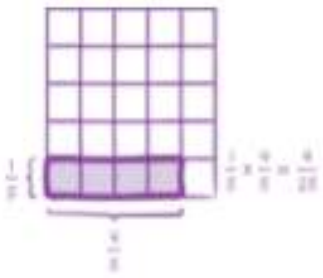
LAUNCH (5-min) **Identify an error and provide feedback on how to correct the error.**

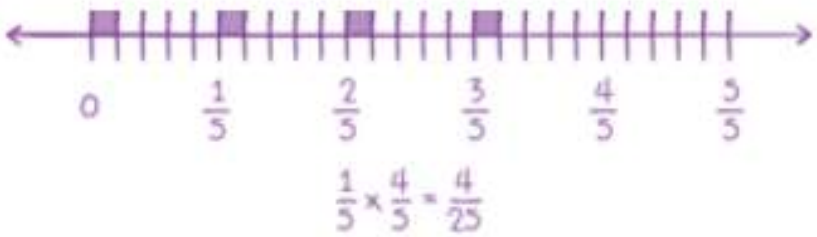
Look at the area model the to the right. Can you critique the student's work and identify where an error occurred?



The student did not partition the entire area model to make equal-size parts.

The student found 1/5 x 4/4 instead of finding 1/5 x 4/5.





LEARN (35-min) **Use a Number Line.**

Previous Lesson	This Lesson
$\frac{1}{4} \times \frac{1}{3}$	What does 2/3 x 3/4 mean? It means 2/3 OF 3/4 $\frac{2}{3} \times \frac{3}{4}$
$\frac{1}{2} \times \frac{3}{4}$	What does 3/4 x 2/5 mean? It means 3/4 OF 2/5 $\frac{3}{4} \times \frac{2}{5}$

Here are two product that are similar to those we found in a previous lesson and two products we will find in this lesson. What difference do you notice?

In the previous lesson, we used UNIT FRACTION (1 as the numerator). Will having a numerator larger than 1 change how our area models or number lines will look?

Yes, because we will need to shade more than 1 part of the other fraction.

Let's draw a number line to help us find the product!

LEARN (35-min)

Use a number line.

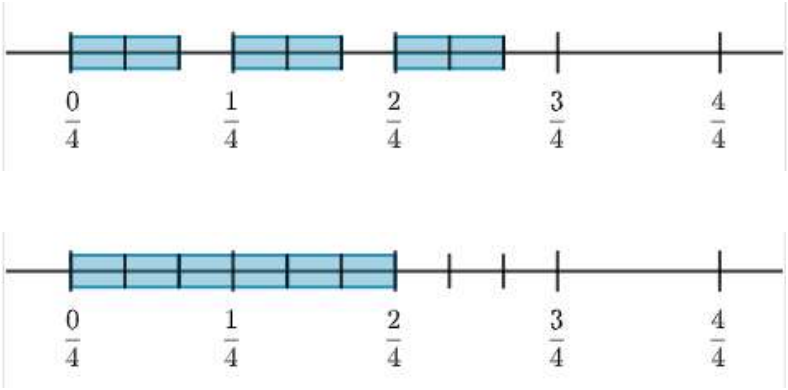
$$\frac{2}{3} \times \frac{3}{4} = \frac{6}{12}$$

$$\frac{6}{12} \div \frac{3}{3} = \frac{2}{4}$$

First, we start with a number line in fourths because we are taking 2/3 OF 3/4.

Next, we shade in 2/3 of EACH fourth.

If we connect all of our shaded boxes, we will get 2/4.



Is 6/12 a reasonable product to get when the number line shows us 2/4?

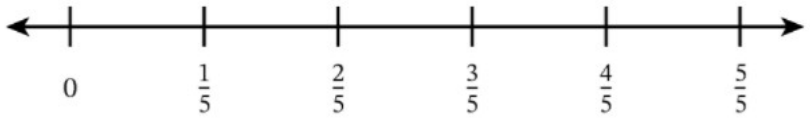
LEARN (35-min)

Use a number line.

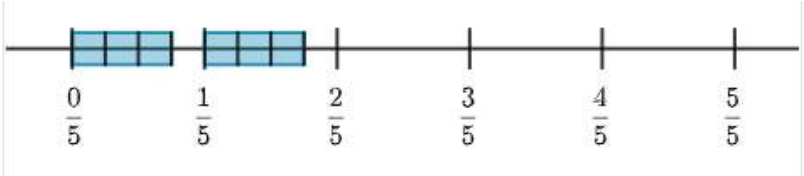
LEARN BOOK PAGE #67

$$\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$$

First, we start with a number line in fifths because we are taking 3/4 OF 2/5.

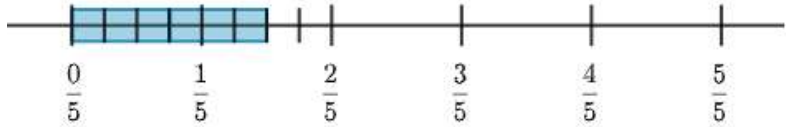


Next, we shade in 3/4 of EACH fifth.



If we connect all of our shaded boxes, we will get 6/20.

Why did I say the answer in twentieths?



Because 20 squares would make a whole on the number line.

LEARN (35-min)

Use an Area Model

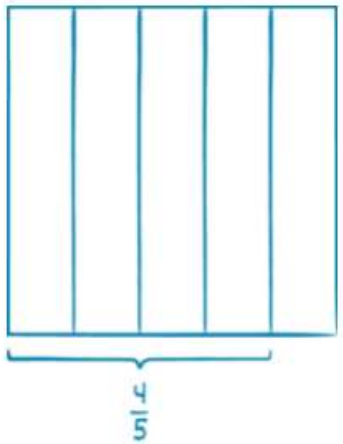
$$\frac{2}{5} \times \frac{4}{5} = \frac{8}{25}$$

What does 2/5 x 4/5 mean?

It means 2/5 OF 4/5

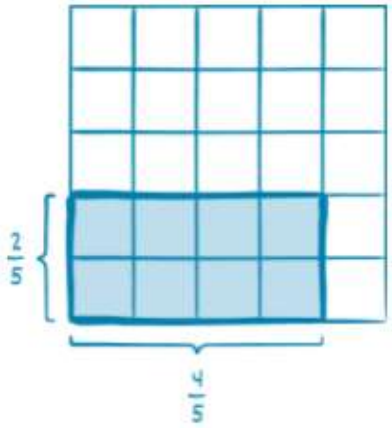
Let's draw an area model to help us find the product. What should we draw first? Why?

4/5 first because we want to find 2/5 of it.



After we draw 4/5, we can partition each of the 4 fifths into 5 equal parts and shade 2/5 of each of the 4 fifths.

How many equal parts are shaded? Of how many total?



I know that we can easily multiply the numerators and the denominators to get the product, but you need to also be able to use a number line or area model to represent the product. Which method do you prefer of the two, number line or area model?

LEARN (35-min) **Choose a Method**

LEARN BOOK PAGE #67

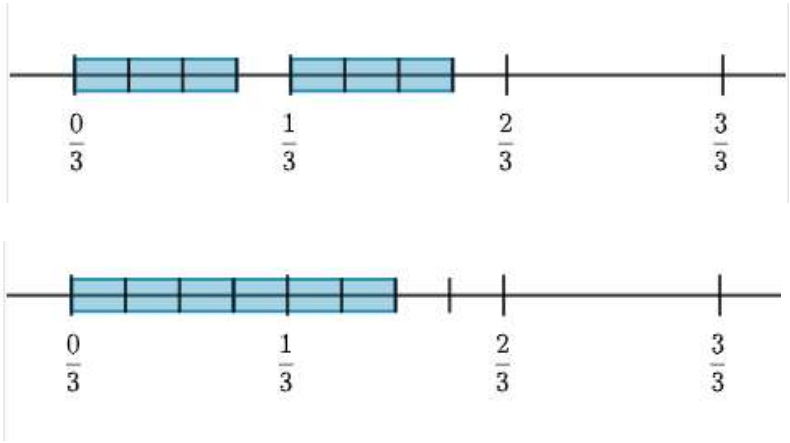
2. Sasha buys a bag of almonds that weighs $\frac{2}{3}$ pound. She uses $\frac{3}{4}$ of the bag to make trail mix. How many pounds of almonds does Sasha use to make the trail mix?

Which fraction should come first when we write the expression? Why?

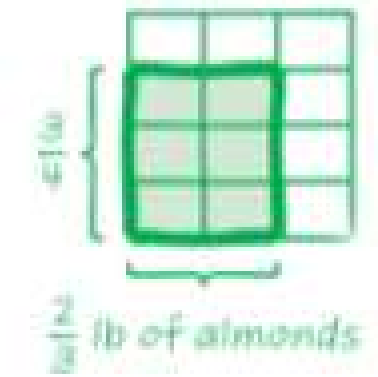
3/4 should come first. Because we are finding 3/4 OF 2/3.

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

Number Line Method



Area Model Method



The product of two fraction **less than 1** is **LESS than both the factors**.

$\frac{2}{5} \times \frac{4}{5} = \frac{8}{25}$

$\frac{3}{4} \times \frac{5}{6} = \frac{15}{24}$

$\frac{1}{5} \times \frac{4}{7} = \frac{4}{35}$

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

$\frac{4}{6} \times \frac{4}{8} = \frac{16}{48}$

$\frac{8}{9} \times \frac{4}{5} = \frac{32}{45}$

Sometimes True

Always True

Never True

Not less than one……..

$\frac{5}{3} \times \frac{3}{4} = \frac{15}{12}$

LAND (10-min)

Exit Ticket

Exit Ticket – PAGE 75

Small Group Time:
Problem Set Pages 70 -71

Homework:
Page 53 APPLY BOOK

Name _____ Date _____

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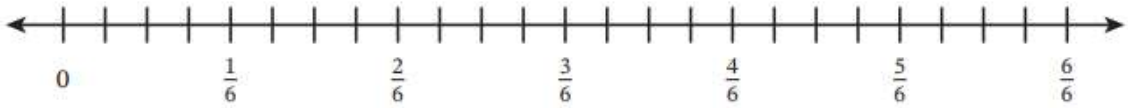
1. Show the product by using a number line. Then complete the equation.



$\frac{3}{4} \times \frac{5}{6} = \frac{\quad}{\quad}$

2. Show the product by using an area model. Then complete the equation.

$\frac{2}{5} \times \frac{3}{4} = \frac{\quad}{\quad}$