Module 3 - Lesson 9:

Multiply fractions by unit fractions by making simpler problems.

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

FLUENCY (10-min) **Whiteboard Exchange: Add Fractions**

Raise your hand when you know the answer to each question.
Wait for my signal to say the answer.

$$\frac{1}{3} + \frac{1}{2} =$$

Look at the fractional units.
*Do they have **LIKE units**?*

*No! Are the units **RELATED**?*

*No! **RENAME <u>both fractions</u>** to make fractional units, or denominators, the same*

FLUENCY (10-min) **Whiteboard Exchange: Add Fractions**

Raise your hand when you know the answer to each question.
Wait for my signal to say the answer.

$$\frac{1}{2} + \frac{2}{5} =$$

Look at the fractional units.
*Do they have **LIKE units**?*

*No! Are the units **RELATED**?*

*No! **RENAME <u>both fractions</u>** to make fractional units, or denominators, the same*

FLUENCY (10-min) **Whiteboard Exchange: Add Fractions**

Raise your hand when you know the answer to each question
Wait for my signal to say the answer.

$$\frac{2}{3}+\frac{2}{4}=$$

Look at the fractional units.
*Do they have **LIKE units**?*

*No! Are the units **RELATED**?*

*No! **RENAME both fractions** to make fractional units, or denominators, the same*

FLUENCY (10-min) **Whiteboard Exchange: Add Fractions**

Raise your hand when you know the answer to each question.
Wait for my signal to say the answer.

$$\frac{5}{4}+\frac{1}{6}=$$

Look at the fractional units.
*Do they have **LIKE units**?*

*No! Are the units **RELATED**?*

*No! **RENAME** __**both fractions**__ to make fractional units, or denominators, the same*

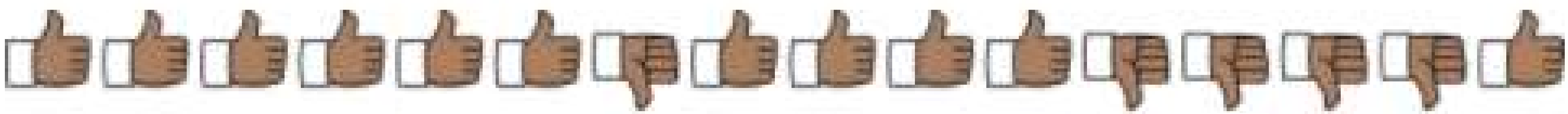
FLUENCY (10-min) **Happy Counting by Fifths – Visualizing a Number line**

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. Today we will <u>rename the fractions as whole numbers or mixed numbers when possible</u>. The first number you say is 0 fifths. Ready?



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FLUENCY (10-min) **Equivalent Fractions**

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

$$\frac{2}{10} = \frac{1}{} \qquad \frac{2}{12} = \frac{}{6} \qquad \frac{6}{10} = \frac{3}{} \qquad \frac{8}{12} = \frac{}{3} \qquad \frac{10}{12} = \frac{5}{}$$

$$\frac{12}{15} = \frac{}{5}$$

LAUNCH (5-min) **Consider different ways to find the products of fractions with very small units.**

Let's look at three different expressions and think how me might find their products.

$$\frac{1}{5} \times \frac{3}{4} = \frac{3}{20}$$

Number Line Method

Area Model Method

$$\left(\frac{1}{6} \times \frac{1}{4}\right) \times 3$$

$$\frac{1}{24} \times 3 = \frac{3}{24} \text{ or } \frac{1}{8}$$

Number Line Method

Area Model Method

$$\frac{1}{93} \times \frac{93}{117} = \frac{1}{117}$$

~~Number Line Method~~

~~Area Model Method~~

Number lines and area models are good ways to find the product of two fractions, BUT for some problems both methods can be challenging. Today, will be able to find a product for a problem like this without drawing models.

LEARN **(35-min)**

Use Known Products to Multiply

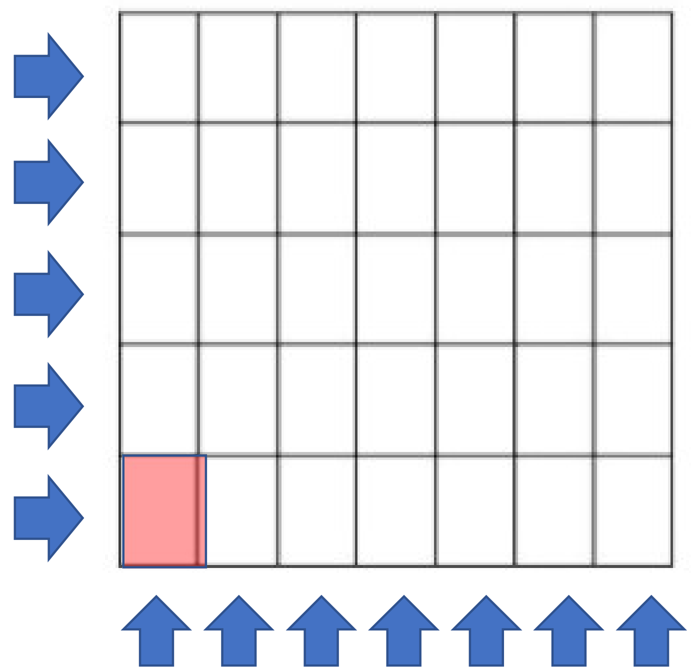
Remove page 77 from your LEARN book. Place the page in the plastic sleeve.

Look at the area model. What do you notice about how the area model is **partitioned**?

Use the portioned area model to find 1/5 **of** 1/7. What is the product?

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

We see 5 horizontal rows; therefore, we know it is partitioned into ***fifths****.*



We see 7 vertical columns; therefore, we know it is portioned into ***sevenths****.*

LEARN (35-min)

Use Known Products to Multiply

Page 79 of your LEARN book.

1. Use a known product to make a simpler problem. Show your thinking.

a. $\frac{1}{5} \times \frac{1}{7} = \frac{1}{35}$

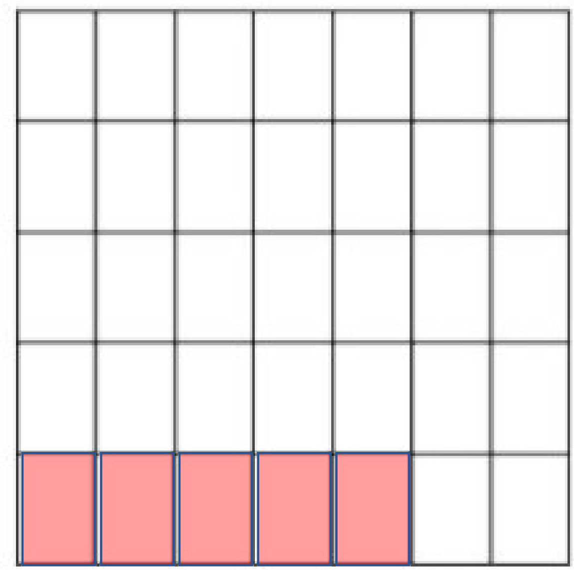
b. $\frac{1}{5} \times \frac{2}{7} = \frac{2}{35}$ or $\frac{1}{35} \times 2$

c. $\frac{1}{5} \times \frac{3}{7} = \frac{3}{35}$ or $\frac{1}{35} \times 3$

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

e. $\frac{1}{5} \times \frac{5}{7} = \frac{5}{35}$ or $\frac{1}{35} \times 5$

Can you see how knowing 1/5 x 1/7 = 1/35 helps us find the products of the other multiples?

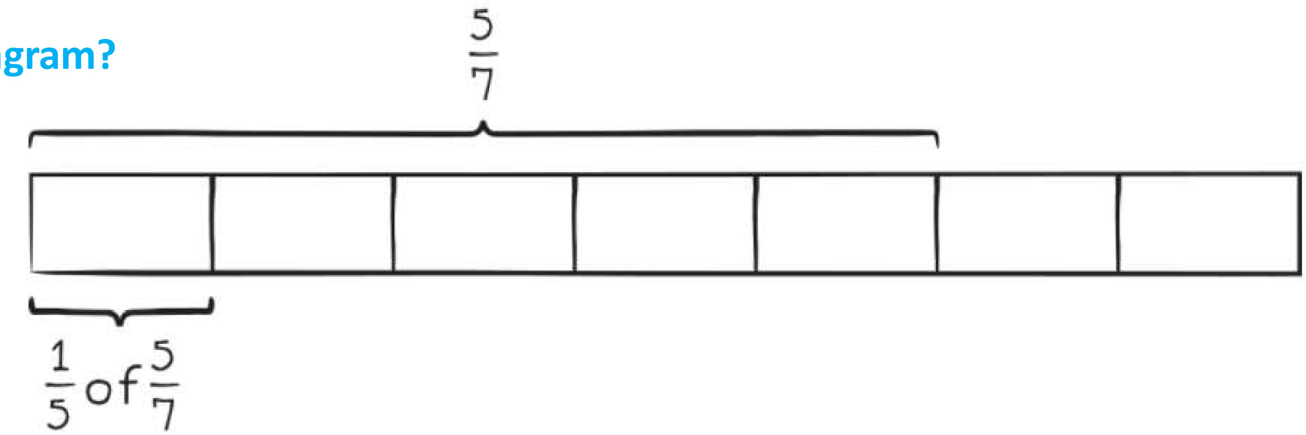


LEARN (35-min)

Use Unit Language to Multiply

What do you notice about this tape diagram?

$$\frac{1}{5} \times \frac{5}{7} = \frac{5}{35} \text{ or } \frac{1}{7}$$



What would it be if it were 1/5 x 5?

$$\frac{1}{5} \times 5 = \frac{5}{5} \text{ or } 1$$

$$\frac{1}{{}_{1}\cancel{5}} \times \frac{\cancel{5}^{1}}{7} = \frac{1}{7}$$

LEARN (35-min)

Use Unit Language to Multiply

LEARN BOOK PAGE 79

2. Fill in the blanks to find the product $\frac{1}{4} \times \frac{4}{5}$. $\frac{1}{4}$ of 4 is **1**. $\frac{1}{4}$ of 4 fifths is **1** fifths. $\frac{1}{4} \times 4 = \frac{4}{4}$ or 1	$\frac{1}{\cancel{4}_{1}} \times \frac{\cancel{4}^{1}}{5} = \frac{1}{5}$
3. Fill in the blanks to find the product $\frac{1}{8} \times \frac{8}{9}$. $\frac{1}{8}$ of 8 is **1**. $\frac{1}{8}$ of 8 ninths is **1** ninths. $\frac{1}{8} \times 8 = \frac{8}{8}$ or 1	$\frac{1}{\cancel{8}_{1}} \times \frac{\cancel{8}^{1}}{9} = \frac{1}{9}$
4. Fill in the blanks to find the product $\frac{1}{5} \times \frac{10}{11}$. $\frac{1}{5}$ of 10 is **2**. $\frac{1}{5}$ of 10 elevenths is **2** elevenths. $\frac{1}{5} \times 10 = \frac{10}{5}$ or 2	$\frac{1}{\cancel{5}_{1}} \times \frac{\cancel{10}^{2}}{11} = \frac{2}{11}$

LEARN (35-min) **Compare Unit Language**

Can we use unit language to find the products for these problems?

$$\frac{1}{5} \times \frac{6}{11} = \frac{6}{55}$$

In this problem, the numerator of the second factor is **not the same number** as the denominator of the first factor, 6 is not a multiple of 5.

There is NO cross or diagonal relationship here. We must multiply across.

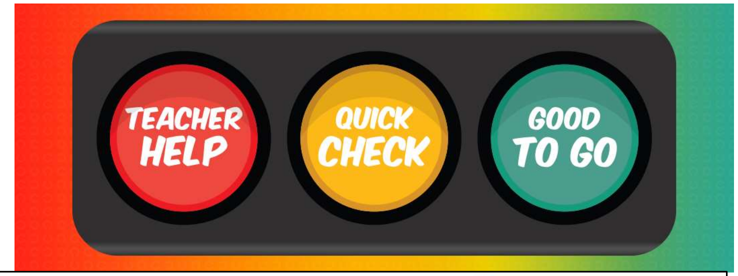
$$\frac{1}{{}_{1}\cancel{3}} \times \frac{\overset{1}{\cancel{3}}}{117} = \frac{1}{117}$$

In this problem, the numerator of the second factor **IS the same number** as the denominator of the first factor.

There is a cross or diagonal relationship here. We can reduce both sides to ONE before we multiply across.

LAND (10-min)

Exit Ticket



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Make a simpler problem by using a known product or unit language. Then multiply.

1. $\frac{1}{5} \times \frac{5}{7} =$ ______

2. $\frac{1}{3} \times \frac{6}{10} =$ ______

3. $\frac{1}{9} \times \frac{6}{7} =$ ______

4. $\frac{1}{8} \times \frac{4}{7} =$ ______

Exit Ticket – PAGE 85

Small Group Time:
Problem Set Page 83

Homework:
Page 59 APPLY BOOK