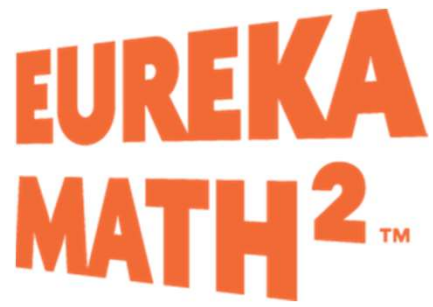




Module 4 - Lesson 18:

Relate decimal-number multiplication to fraction multiplication.

CCSS Standard – 5.NBT.B.7

FLUENCY (10-min)

Whiteboard Exchange: Divide Whole Numbers by Unit Fractions



Write and complete the equation.

$$2 \div \frac{1}{2} = \underline{\hspace{2cm}}$$

$$2 \div \frac{1}{3} = \underline{\hspace{2cm}}$$

$$3 \div \frac{1}{4} = \underline{\hspace{2cm}}$$

$$3 \div \frac{1}{5} = \underline{\hspace{2cm}}$$

$$5 \div \frac{1}{6} = \underline{\hspace{2cm}}$$

$$7 \div \frac{1}{7} = \underline{\hspace{2cm}}$$

$$6 \div \frac{1}{8} = \underline{\hspace{2cm}}$$

$$9 \div \frac{1}{7} = \underline{\hspace{2cm}}$$

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

What is the product? Raise your hand when you know.
Simplify if possible.

$$\frac{1}{2} \times \frac{1}{6} = \underline{\hspace{2cm}}$$

$$\frac{1}{2} \times \frac{4}{6} = \underline{\hspace{2cm}}$$

$$\frac{1}{6} \times \frac{1}{6} = \underline{\hspace{2cm}}$$

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

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

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

$$\frac{4}{5} \times \frac{6}{9} = \underline{\hspace{2cm}}$$

$$\frac{11}{5} \times \frac{6}{9} = \underline{\hspace{2cm}}$$

FLUENCY (10-min)

Whiteboard Exchange: Add or Subtract Decimal Numbers



Write and complete the equation.

Show YOUR method.

$$0.57 + 0.34 = \underline{\hspace{2cm}}$$

$$2.8 + 4.56 = \underline{\hspace{2cm}}$$

FLUENCY (10-min)

Whiteboard Exchange: Add or Subtract Decimal Numbers



Write and complete the equation.

Show YOUR method.

$$0.71 - 0.09 = \underline{\hspace{2cm}}$$

$$3.6 - 1.48 = \underline{\hspace{2cm}}$$

LAUNCH (5-min)

Which One Doesn't Belong?

Take one minute to find which one doesn't belong with the rest.
Be able to explain your reasoning.

Each is a representation of 4×0.1

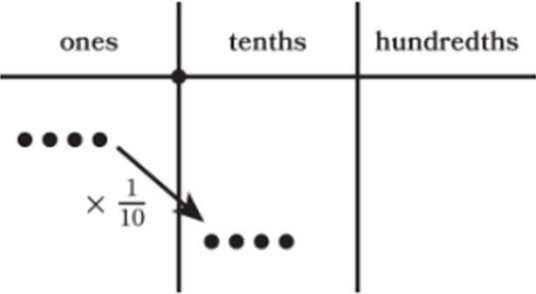
Which one doesn't belong? Why?

A does not belong because it is the only representation that shows addition.

B does not belong because it is the only representation on a place value chart.

C does not belong because it is the only representation that shows multiplication with both factors in standard form.

D does not belong because it is the only representation that does not have an addition sign or multiplication sign.

A $0.1 + 0.1 + 0.1 + 0.1$	B 
C 4×0.1	D $\frac{1}{10} \text{ of } 4$

LAUNCH (5-min)

Which One Doesn't Belong?

How are A and C related?

The expression 4×0.1 means 4 groups of 0.1, which is $0.1 + 0.1 + 0.1 + 0.1$.

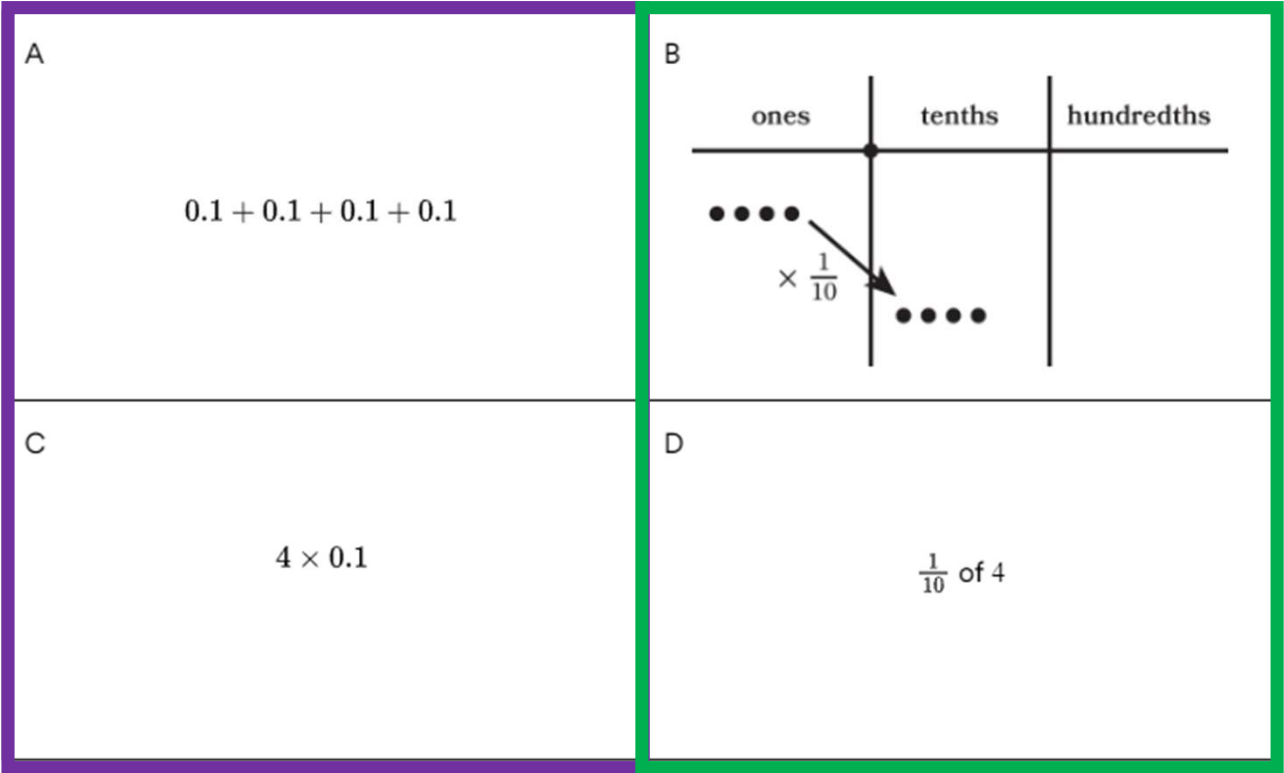
How are B and D related?

$\frac{1}{10}$ of 4 means $\frac{1}{10} \times 4$. The products are the same because multiplication can be done in either order.

What number can we use to describe all four representations?

- 0.4
- 4 tenths
- $\frac{4}{10}$

Today, we will use fractions and place value understanding to multiply decimal numbers by decimal numbers.



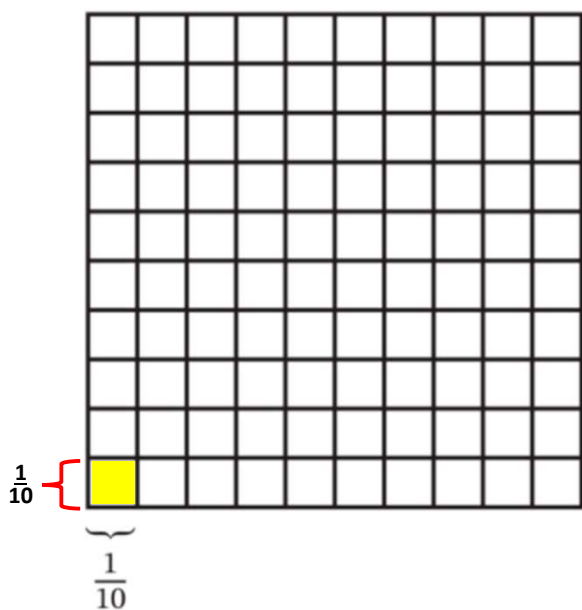
LEARN (35-min)**Multiply Decimal Numbers by One Tenth**

This problem is different from previous ones because both factors are decimals.

We can use what we know about fraction multiplication to find the product. Let's rename them as fractions.

What is another way to write $1/10 \times 1/10$?

Let's draw an area model of this to see if $1/100$ makes sense.



$$0.1 \times 0.1$$



$$\frac{1}{10} \times \frac{1}{10} = \frac{1}{100}$$

$$\frac{1}{10} \text{ of } \frac{1}{10}$$

What do we have to do now to show $1/10$ of $1/10$?

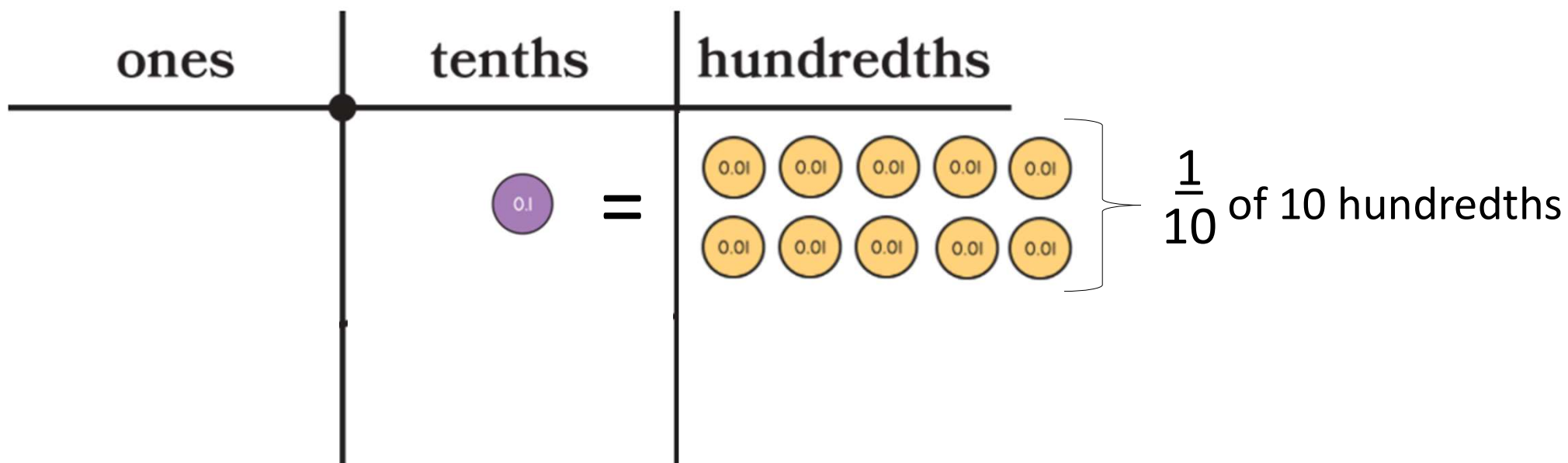
So, we proved with an area model that $1/10 \times 1/10 = 1/100$.
Let's show the same problem using a place value chart.

LEARN (35-min)

Multiply Decimal Numbers by One Tenth

$$0.1 \times 0.1$$

$$\frac{1}{10} \text{ of } \frac{1}{10} = \frac{1}{100}$$

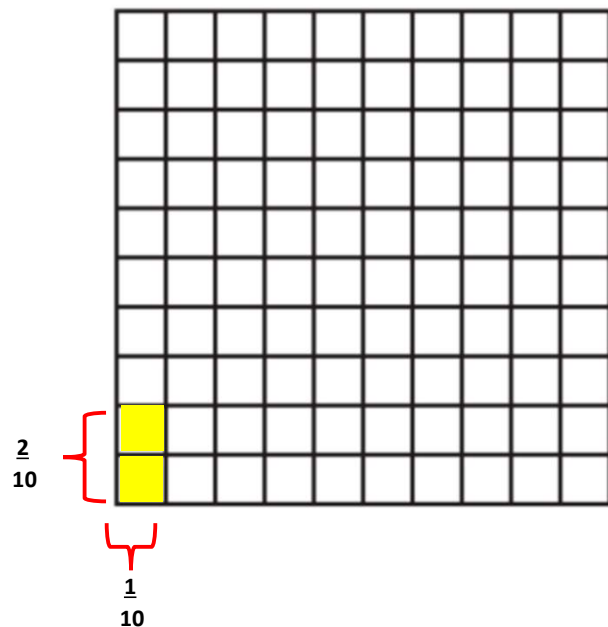


LEARN (35-min)

Multiply Decimal Numbers by One Tenth

Let's do another problem.
Start by renaming them as fractions.

Let's draw an area model of this to see if $2/100$ makes sense.



$$\begin{array}{ccc} 0.2 & \times & 0.1 \\ \downarrow & & \downarrow \\ \frac{2}{10} & \times & \frac{1}{10} = \frac{2}{100} \\ \frac{2}{10} & \text{of} & \frac{1}{10} \end{array}$$

So, we proved with an area model that $2/10 \times 1/10 = 2/100$.

LEARN (35-min)

Compare the products

Let's compare the products we calculated:

What happened to the digits in the first factor when we multiplied it by 0.1?

The digits shifted one place value unit to the right.

$$\begin{array}{l} 0.1 \times 0.1 = 0.01 \\ 0.2 \times 0.1 = 0.02 \end{array}$$

Based on what we have seen so far about multiplying by 0.1, what do you think the product will be for this problem:

$$\begin{array}{l} 1.2 \times 0.1 = 0.12 \\ \frac{12}{10} \times \frac{1}{10} = \frac{12}{100} \end{array}$$

LEARN (35-min)**Multiply Decimal Number by One Hundredth**

Hopefully by now you are starting to notice some patterns when we multiply by 0.1.
Let's use fractions to multiply by **0.01** and see what we notice.

$$0.1 \times 0.01$$



$$\frac{1}{10} \times \frac{1}{100} = \frac{1}{1,000}$$

$$0.1 \times 0.01 = \underline{0.001}$$

LEARN (35-min)

Try a few more to test the pattern....

$$0.5 \times 0.01 = \underline{\text{0.005}}$$



$$\frac{5}{10} \times \frac{1}{100} = \frac{5}{1,000}$$

$$1.5 \times 0.01 = \underline{\text{0.015}}$$

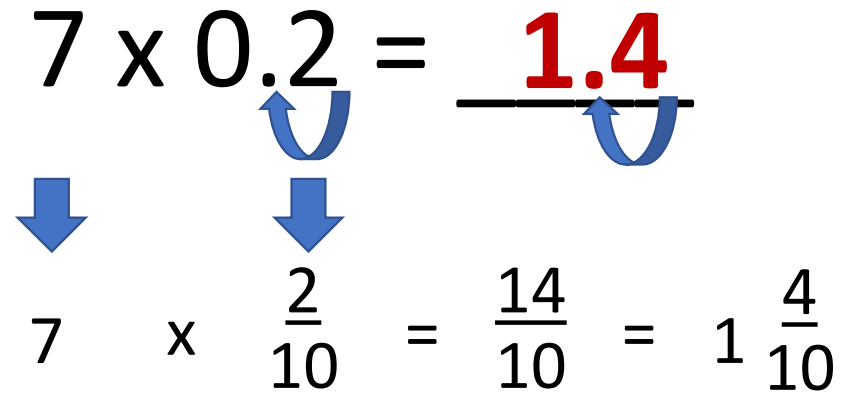


$$\frac{15}{10} \times \frac{1}{100} = \frac{15}{1,000}$$

LEARN (35-min)

Try a few more to test the pattern....

$$7 \times 0.2 = \underline{1.4}$$



$$7 \times \frac{2}{10} = \frac{14}{10} = 1 \frac{4}{10}$$

LEARN (35-min)

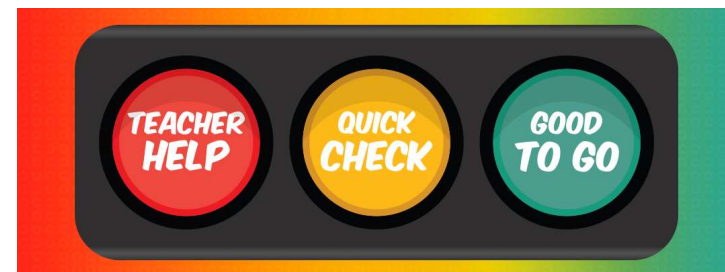
Complete the Table

LEARN book page 165.

Complete the table to find each product. The first row is completed for you.			
	Fraction Form	Unit Form	Standard Form
0.4×0.6	$\frac{4}{10} \times \frac{6}{10} = \frac{24}{100}$	4 tenths $\times$ 6 tenths = 24 hundredths	$0.4 \times 0.6 = 0.24$
0.2×0.3	$\frac{2}{10} \times \frac{3}{10} = \frac{6}{100}$	2 tenths $\times$ 3 tenths = 6 hundredths	$0.2 \times 0.3 = \underline{0.06}$
0.07×0.9	$\frac{7}{100} \times \frac{9}{10} = \frac{63}{1,000}$	7 hundredths $\times$ 9 tenths = 63 thousandths	$0.07 \times 0.9 = \underline{0.063}$
0.5×0.08	$\frac{5}{10} \times \frac{8}{100} = \frac{40}{1,000}$	5 tenths $\times$ 8 hundredths= 40 thousandths	$0.4 \times 0.6 = \underline{0.040}$
1.3×0.4	$\frac{13}{10} \times \frac{4}{10} = \frac{52}{100}$	13 tenths $\times$ 4 tenths= 52 hundredths	$1.3 \times 0.4 = \underline{0.52}$

LAND (10-min)

Exit Ticket



Name

Date



18

Multiply. Show your work.

1. $0.7 \times 0.2 =$ _____

2. $2.5 \times 0.03 =$ _____

Exit Ticket – PAGE 171

Small Group Time:

Problem Set Pages 167 – 169

Homework:

Page 113 APPLY BOOK