

Module 4 - Lesson 16:

Multiply decimal numbers to hundredths by two-digit whole numbers by using area models and vertical form.

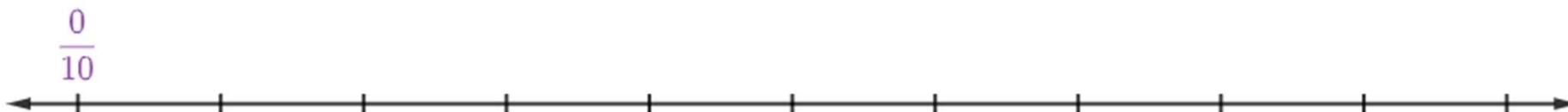
CCSS Standard – 5.NBT.B.7

FLUENCY (10-min)

Counting on the Number Line by 4 Tenths

Use the number line to count by 4 tenths in fraction form from $0/10$ to $40/10$.

The first number you say is $0/10$. Ready?



Now count by 4 tenths again. This time **RENAME** the fractions as whole numbers or mixed numbers when possible. The first number you say is 0. Ready?

Now count by 4 tenths again. This time say the number in decimal form. The first number you say is 0. Ready?

FLUENCY (10-min)

Whiteboard Exchange: Multiply in Unit and Standard Form



What is 2 x 3 tenths?

Then, write the equation with numbers in standard form.

$$2 \times 3 \text{ tenths} = \underline{\quad\quad} \text{ tenths}$$

$$3 \times 6 \text{ tenths} = \underline{\quad\quad} \text{ tenths}$$

$$4 \times 9 \text{ tenths} = \underline{\quad\quad} \text{ tenths}$$

$$5 \times 3 \text{ hundredths} = \underline{\quad\quad} \text{ hundredths}$$

$$6 \times 6 \text{ hundredths} = \underline{\quad\quad} \text{ hundredths}$$

$$7 \times 8 \text{ hundredths} = \underline{\quad\quad} \text{ hundredths}$$

FLUENCY (10-min)

Whiteboard Exchange: Standard and Unit Form



Write the unit form into
STANDARD FORM.

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

Write the standard form into
UNIT FORM in TENTHS.

125 hundredths = _____

4.81 = _____

306 hundredths = _____

7.03 = _____

1,472 hundredths = _____

19.24 = _____

5,098 hundredths = _____

20.07 = _____

LAUNCH (5-min)

Compare two ways to multiply two-digit whole numbers.

Tara and Ryan each found the product of 32×26 .

Tara used the area model method while Ryan use the vertical form method.

THINK-PAIR-SHARE: How are these two ways similar and different?

Both ways show the same partial products.

The area model breaks apart each factor into tens and ones. The vertical form does not show the parts of the factors.

Today, we will use area model and vertical form to multiply decimal numbers by two-digit whole numbers.

$$32 \times 26$$

Tara's Way

	20	6	
2	40	12	
30	600	180	

$$40 + 600 + 12 + 180 = 832$$

Ryan's Way

$$\begin{array}{r} 32 \\ \times 26 \\ \hline 12 \\ 180 \\ 40 \\ + 600 \\ \hline 832 \end{array}$$

LEARN (35-min)

Multiply by Using an Area Model

It is always a good habit to **ESTIMATE** before you multiply. Here 0.62 is about 1. So, 1×17 would give us a good starting point in finding the actual product.

How is this problem different from the other multiplication problems with decimal numbers we have done so far?

$$0.62 \times 17$$

This problem is multiplying a decimal by a two-digit number. We have only multiplied a decimal by a one-digit number or by multiples of 10, 100, or 1,000.

We are going to use an **area model** to solve this problem. How might we break apart 0.62 in the area model?

Now, we add all the partial products:

$$\begin{array}{r} 4.2 \\ 6.0 \\ 0.14 \\ + 0.20 \\ \hline 10.54 \end{array}$$

	6 tenths	2 hundredths
7	42 tenths or 4.2	14 hundredths or 0.14
10	60 tenths or 6.0	20 hundredths or 0.20

LEARN (35-min)

Multiply by Using Vertical Form

This time, we are going to use **vertical form** to solve this problem.

First, let's rename 0.62 as **62 hundredths**. This is an important step to remember, we are going to treat it as 62×17 , but we must remember that it is really 62 hundredths.

VERY IMPORTANT – we remembered that we multiplied hundredths, so we must rename this in standard form as:

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
			.		

$$0.62 \times 17$$

$$\begin{array}{r} 1 \\ 62 \text{ hundredths} \\ \times 17 \\ \hline 434 \\ + 620 \\ \hline 1054 \text{ hundredths} \\ \hline \mathbf{10.54} \end{array}$$

LEARN (35-min)

Side-by-Side: Multiply using Area Model and Vertical Form

$$33 \times 4.6$$

AREA MODEL

VERTICAL FORM

	4 ones	6 tenths
3	$3 \times 4 =$ 12 ones	18 tenths or 1.8
30	$30 \times 4 =$ 120 ones	180 tenths or 18 ones

$$\begin{array}{r} 120. \\ 18. \\ 12. \\ + 1.8 \\ \hline \mathbf{151.8} \end{array}$$

$$\begin{array}{r} 1 \\ 46 \text{ tenths} \\ \times 33 \\ \hline 138 \\ + 1380 \\ \hline 1518 \text{ tenths} \\ \mathbf{151.8} \end{array}$$

LEARN (35-min)

Side-by-Side: Multiply using Area Model and Vertical Form

$$2.05 \times 24$$

AREA MODEL

VERTICAL FORM

2 ones 0 tenths 5 hundredths

4

20

$4 \times 2 =$ 8 ones	0 tenths	20 hundredths or 0.20
$20 \times 2 =$ 40 ones	0 tenths	100 hundredths or 1 one

$$\begin{array}{r} 40. \\ 8. \\ 1. \\ + 0.2 \\ \hline 49.2 \end{array}$$

$$\begin{array}{r} 2 \\ 205 \text{ hundredths} \\ \times 24 \\ \hline 820 \\ + 4100 \\ \hline 4920 \text{ hundredths} \\ 49.20 \end{array}$$

LEARN (35-min)

Roll a Decimal Number



LEARN book – page 149.

We are going to roll a dice to create some decimal numbers to fill in the problems below.

TASK: Use either the area model or the vertical form to solve

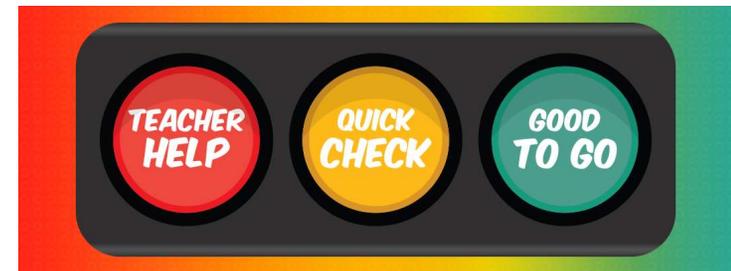
For each blank, roll a die. Write the number in the blank. When the blanks are filled in, find the product.

1. $0.\underline{\quad}\underline{\quad} \times 91$

2. $78 \times \underline{\quad}.\underline{\quad}\underline{\quad}$

LAND (10-min)

Exit Ticket



_____ Name

_____ Date



16

Multiply. Show your work.

$$38 \times 7.3 = \underline{\hspace{2cm}}$$

Exit Ticket – PAGE 155

Small Group Time:

Problem Set Pages 151 – 154

Homework:

Page 101 APPLY BOOK