



# MATH NEWS



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Grade 5, Module 1, Topic E

## 5<sup>th</sup> Grade Math

Module 1: Place Value and Decimal Fractions

### Math Parent Letter

This document is created to give parents and students a better understanding of the math concepts found in the Eureka Math (© 2013 Common Core, Inc.) that is also posted as the Engage New York material taught in the classroom. Grade 5 Module 1 of Eureka Math (Engage New York) covers place value and decimal fractions. In Topic E students will focus on the multiplication of a decimal fraction by a one-digit whole number.

### Topic E: Multiplying Decimals

#### Words to know

- Thousandths/Hundredths/Tenths
- Product
- Factor
- Estimate
- Decimal Fraction
- Partial Product
- Unit Form

**Product** - The answer when two or more factors are multiplied together.

$$\begin{array}{r} 7 \times 3 = 21 \\ \text{Factor} \quad \text{Factor} \quad \text{Product} \end{array}$$

**Area Model** - a graphic organizer that organizes the partial products  
Example:

$$9 \begin{array}{|c|c|} \hline 20 & + 8 \\ \hline \end{array} \left. \begin{array}{l} 9 \times 20 = 180 \\ 9 \times 8 = 72 \end{array} \right\} \begin{array}{l} 180 \text{ and } 72 \text{ are} \\ \text{partial products.} \end{array}$$

**Decimal Fraction** - a fractional number with a denominator of 10 or a power of 10 (10, 100, 1000); can be written with a decimal point  
Examples: 0.46 5.32 0.9 12.008

**Unit Form** - A way to show how many of each size are in the number.  $5.32 = 5 \text{ ones } 3 \text{ tenths } 2 \text{ hundredths}$

**Estimate** - A number close to an exact amount. An estimate tells about how much or about how many.

### Objectives of Topic E

- Multiply a decimal fraction by single-digit whole number, relate to a written method through application of the area model and place value understanding, and explain the reasoning used.
- Multiply a decimal fraction by single-digit whole numbers, including using estimation to confirm the placement of the decimal point.

## Focus Area- Topic E

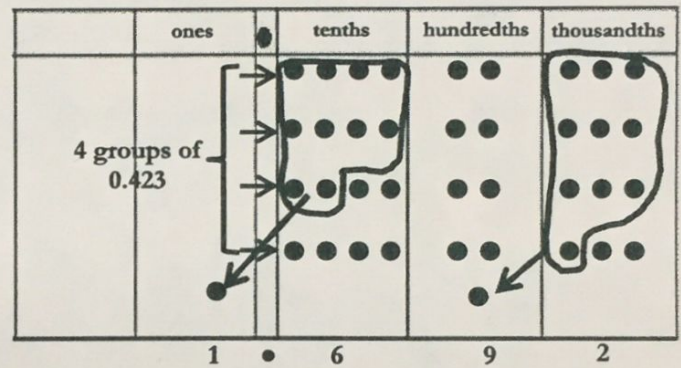
Multiplying Decimals on the Place Value Chart and Area Model

Place value understanding of whole number multiplication using place value charts and area models, help students make a connection between whole number products and products of one-digit whole number and decimal fraction.

**Problem:**  $0.423 \times 4$

*Using Place Value Chart:* Students know that 423 times 4 means 4 groups of 423; therefore 0.423 times 4 means 4 groups of 0.423.

In the place value chart, we represent 0.423 four times since we need 4 groups of this decimal fraction. We will regroup when there are ten or more in one place.



*Using Area Model:* The unit form of each digit of the decimal fraction is written above the model and the other number or factor is written along the side. Multiply the unit form of each digit along the top by the number on the side. Add each of the partial products to find the product.

$$\begin{array}{r}
 4 \text{ tenths} \quad + \quad 2 \text{ hundredths} \quad + \quad 3 \text{ thousandths} \\
 4 \begin{array}{|c|c|c|} \hline 4 \times 4 \text{ tenths} & 4 \times 2 \text{ hundredths} & 4 \times 3 \text{ thousandths} \\ \hline = 16 \text{ tenths} & = 8 \text{ hundredths} & = 12 \text{ thousandths} \\ \hline \end{array} \\
 1.6 \quad + \quad 0.08 \quad + \quad 0.012 \quad = \quad 1.692
 \end{array}$$

$$\begin{array}{r}
 1.6 \\
 0.08 \\
 + 0.012 \\
 \hline
 1.692
 \end{array}$$

$$\begin{array}{r}
 0.423 \\
 \times 4 \\
 \hline
 1.692
 \end{array}
 \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{Algorithm}$$

## Using Estimation

Estimation can be used to confirm that the decimal has the correct placement as well as determine the reasonableness of the product. Students usually want to work the problem and then round the answer. That is an incorrect procedure to follow when estimating. We round first to give us an idea of the exact answer.

*Example:*  
 $2.5 \times 5$   
 $\downarrow$   
 $3 \times 5 = 15$

2.5 rounded to the nearest whole number is 3. Therefore when it is multiplied by 5 the product is 15. This means that the answer to  $2.5 \times 3$  will be near 15 and will include a two-digit whole number.

From the choices given below, which could be the exact product for the problem  $2.5 \times 5$ ?

- a. 1.25      b. 0.125      c. 12.5

The answer would be letter 'c'. 12.5 is close to 15 and it consists of a two-digit whole number.


### Application Problem and Answer:

Mrs. Zamir wants to buy 8 protractors and some erasers for her classroom. She has \$30. If protractors cost \$2.65 each, how much will Mrs. Zamir have left to buy erasers?

	2 ones	6 tenths	5 hundredths
8	$8 \times 2 \text{ ones} = 16 \text{ ones}$	$8 \times 6 \text{ tenths} = 48 \text{ tenths}$	$8 \times 5 \text{ hundredths} = 40 \text{ hundredths}$
	16	+ 4.8	+ 0.40

16.  
 4.8  
 $+ 0.40$   
 21.20  
 \$21.20 (cost of 8 protractors)

$\$2.65$   
 $\times 8$   
 $\$21.20$

Algorithm 

29  
~~\$30.00~~  
 $- 21.20$   
 $\$ 8.80$

Mrs. Zamir has \$8.80 to spend on erasers.

### Application Problem and Answers:

Miles incorrectly gave the product of  $2.6 \times 7$  as 14.42. Use a place value chart to help Miles understand his mistake.

tens	ones	tenths	hundredths
	8	2	

*Note: The chart shows 8 dots in the ones column and 2 dots in the tenths column. An arrow points from the 2 dots in the tenths column to the 4 in the tens column of the incorrect product 14.42.*

Mike made the mistake by not regrouping the tenths as well as the ones. He should have gotten the answer 18.2 rather than 14.42.

Pedro is building a spice rack with 4 shelves that are each 0.55 meter long. At the hardware store, Pedro finds that he can only buy the shelving in whole meter lengths. Exactly how many meters of shelving does Pedro need? Since he can only buy whole number lengths, how many meters of shelving should he buy? Justify your thinking.

$0.55 \times 4 \rightarrow 4$

5 tenths	5 hundredths
$4 \times 5 \text{ tenths} = 20 \text{ tenths}$	$4 \times 5 \text{ hundredths} = 20 \text{ hundredths}$
20 tenths = 2	+ 0.20

Pedro needs exactly 2.20 or 2.2 meters of shelving. Since he can only buy whole number lengths, he will have to buy 3 meters of shelving.