5th Grade Module 1 – Parent Videos

Topic A – Multiplicative Patterns on the Place Value Chart

Place Value in decimals
http://www.khanacademy.org/math/cc-fifth-grade-math/cc-5th-place-value-decimals-top/5th-cc-decimals-place-val/v/comparing-place-values-in-decimals

Use base ten blocks to understand how place value decreases with each shift to the right in a multi-digit number
http://learnzillion.com/lessons/2599-use-base-ten-blocks-to-understand-how-place-value-decreases-with-each-shift-to-the-right-in-a-multidigit-number

Place value chart and number disks show how place value decreases when dividing
http://commoncore.org/maps/math/video-gallery/division-algorithms-using-number-disks

Recognize place value relationships by multiplying and dividing by ten
http://learnzillion.com/lessons/2676-recognize-place-value-relationships-by-multiplying-and-dividing-by-ten

Exponents - Understand how multiplication by a power of ten causes decimal shifts
*****http://learnzillion.com/lessons/2583-represent-powers-of-10-using-whole-number-exponents

http://learnzillion.com/lessons/2730-understand-how-multiplication-by-a-power-of-ten-causes-decimal-shifts

Exponents - Understand how division by a power of ten causes decimal shifts
http://learnzillion.com/lessons/2805-understand-how-division-by-a-power-of-ten-causes-decimal-shifts

Topic B – Decimal Fractions and Place Value Patterns

Expanded Notation
http://www.khanacademy.org/math/cc-fifth-grade-math/cc-5th-place-value-decimals-top/5th-cc-decimals-place-val/v/expanding-out-a-decimal-by-place-value

Comparing decimals using base ten models and place value chart
http://learnzillion.com/lessons/564-compare-decimals-using-base-ten-blocks

Topic C – Place Value and Rounding Decimal Fractions

Rounding decimals to any place
http://learnzillion.com/lessons/3522-round-decimals-to-any-place-

Vertical number line to round decimals

Topic D – Adding and Subtraction Decimals

Adding decimals using base ten blocks
http://learnzillion.com/lessons/546-add-decimals-using-base-ten-blocks

Subtracting decimals using base ten blocks
http://learnzillion.com/lessons/547-subtract-decimals-using-baseten-blocks

Adding decimals example 1

Adding decimals example 2

Adding decimals word problem

Subtracting decimals

Subtracting decimals word problem

Adding and Subtracting decimals word problem exercise

Topic E- Multiplying Decimals

Multiplying decimals – shown as repeated addition using base ten models
http://learnzillion.com/lessons/556-multiply-decimals-by-whole-numbers-by-using-an-area-model

Using a place value chart and area model to multiply decimal times a single-digit whole number

Topic F- Dividing Decimals

Divide decimal by a single-digit whole number

****

***** Games

Place Value Slider

Decimal Identification Game

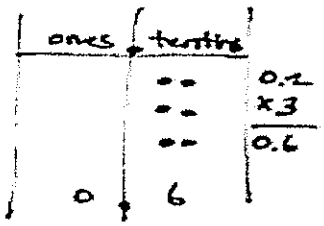
Rounding Decimals

Eureka Math™ Tips for Parents

Grade 5 Module 1

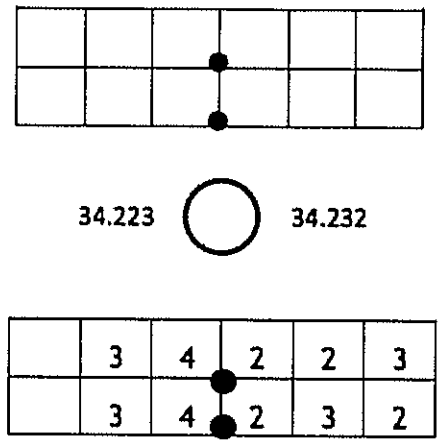
Place Value and Decimal Fractions

In this first module of Grade 5, we will extend 4th grade place value work to multi-digit numbers with decimals to the thousandths place. Students will learn the pattern that one-tenth times any digit on the place value chart moves it one place value to the right. They will also perform decimal operations to the hundredths place.



0.2 x 3 on the place value chart.

Notice how the dots for two tenths are simply repeated three times for a total of 0.6, or six tenths.



Place value chart for comparing decimals using <, >, =

What Comes After this Module:

In Module 2, we will continue to work with place value, moving to multiplication and division of decimal numbers. We move from concrete models to more abstract algorithms, always anchoring our work in our knowledge of place value patterns.

Terms, Phrases, and Strategies in this Module:

Thousandths: related to place value (we have already studied tenths and hundredths)

Exponents: how many times a number is to be used in a multiplication sentence

Millimeter: a metric unit of length equal to one thousandth of a meter

Equation: statement that two mathematical expressions have the same value, indicated by use of the symbol =; e.g., 12 = 4 x 2 + 4

Place value: the numerical value that a digit has by virtue of its position in a number

Standard form: a number written in the format: 135

Expanded form: e.g., 100 + 30 + 5 = 135

Unit form: e.g., 3.21 = 3 ones 2 tenths 1 hundredth

Word form: e.g., one hundred thirty-five

+ How you can help at home:

- When given a multi-digit number with decimal digits, ask your student what each digit represents (e.g., "What is the value of the 4 in the number 37.346?")
- Help practice writing numbers correctly by saying multi-digit decimal numbers and having your student write them down. Students can create their own place value charts to help

Key Common Core Standards:

- ***Understand the place value system***
  - Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left
  - Explain patterns in the number of zeros of the product when multiplying whole numbers by powers of 10
  - Read, write, and compare decimals to thousandths
  - Use place value understanding to round decimals to any place
- ***Perform operations with multi-digit whole numbers and with decimals to hundredths***
  - Add, subtract, multiply, and divide decimals to hundredths
- ***Convert like measurement units within a given measurement system***
  - Convert among different-sized standard measurement units within a given measurement system

Prepared by Erin Schweng, Math Coach

Welcome to *A Story of Units*!

Each module's parent tip sheet will highlight a new strategy or math model your student will be working on.

Place Value Chart - In Module 1, students will make extensive use of place value tools, as they have done in earlier grade levels. Now, however, students work with the extended place value chart, which includes place values to the thousandths.

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
	1 + 10								
	1								

(Above) Place Value Chart, with the thousandths place

(Below) 27.346 on the chart

tens	ones		tenths	hundredths	thousandths
2	7		3	4	6

Read on to learn a little bit about *Eureka Math*, the creators of *A Story of Units:*

Eureka Math is a complete, PreK-12 curriculum and professional development platform. It follows the focus and coherence of the Common Core State Standards (CCSS) and carefully sequences the progression of mathematical ideas into expertly crafted instructional modules.

This curriculum is distinguished not only by its adherence to the CCSS; it is also based on a theory of teaching math that is proven to work. That theory posits that mathematical knowledge is conveyed most effectively when it is taught in a sequence that follows the "story" of mathematics itself. This is why we call the elementary portion of *Eureka Math* "*A Story of Units*." The sequencing has been joined with methods of instruction that have been proven to work, in this nation and abroad. These methods drive student understanding beyond process, to deep mastery of mathematical concepts.

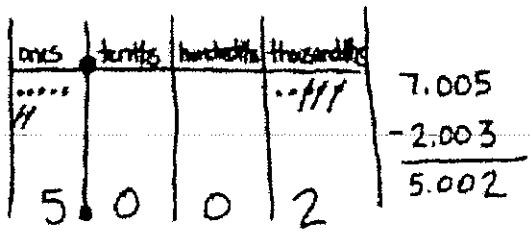
The goal of *Eureka Math* is to produce students who are not merely literate, but fluent, in mathematics. Your student has an exciting year of discovering the story of mathematics ahead!

Sample Problem from Module 1:
(Example taken from Module 1, Lesson 10)

Teacher says:

"Subtract 2 ones 3 thousandths from 7 ones 5 thousandths."

Students use place value chart to solve.



MATH NEWS

Grade 5, Module 1, Topic A

LAFAYETTE PARISH SCHOOL SYSTEM

Strength. Tradition. Excellence.

5th 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. This newsletter will discuss Module 1, Topic A.

Topic A: Multiplicative Patterns on the Place Value Chart

Words to know

- Thousandths/Hundredths/Tenths
- Place Value
- Decimal Fraction
- Exponents
- Digit
- Product
- Factors
- Equation

Thousandths – one of 1,000 equal parts; thousandth's place (in decimal notation) the position of the third digit to the right of the decimal point

Hundredths – one of 100 equal parts; hundredth's place (in decimal notation) the position of the second digit to the right of the decimal point

Tenths – one of 10 equal parts; tenth's place (in decimal notation) the position of the first digit to the right of the decimal point

Place Value - the value of the place of a digit (0-9) in a number

Decimal Fraction - a fractional number with a denominator of 10 or a power of 10 (10, 100, 1,000). It can be written with a decimal point.

Exponent - tells the number of times the base is multiplied by itself Example: 10^4 – the 4 is the exponent and tells us the 10 (base) is multiplied 4 times (10 x 10 x 10 x 10)

Equation – statement that two mathematical expressions have the same value

Objectives of Topic A

- **Reason concretely and pictorially using place value understanding to relate adjacent base ten units from millions to thousandths.**
- **Reason abstractly using place value understanding to relate adjacent base ten units from millions to thousandths.**
- **Use exponents to name place value units and explain patterns in the placement of the decimal point.**
- **Use exponents to denote powers of 10 with application to metric conversions.**

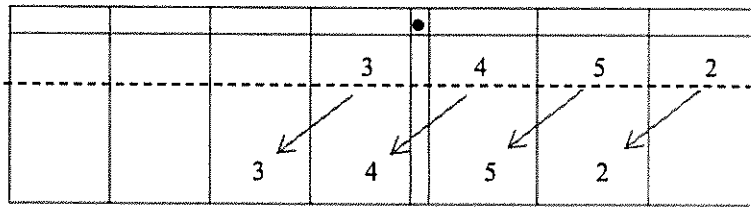
Focus Area – Topic A

Multiplication and Division Patterns on the Place Value Chart

When we **multiply** a **decimal fraction** by a power of 10, the **product** will be larger than the original number; therefore we are shifting to the left on the place value chart. The number of times we shift to the left depends on the power of 10. If multiplying by 10, we shift one place to the left. If multiplying by 100, we shift two places to the left and if multiplying by 1,000, we shift three places to the left and so on.

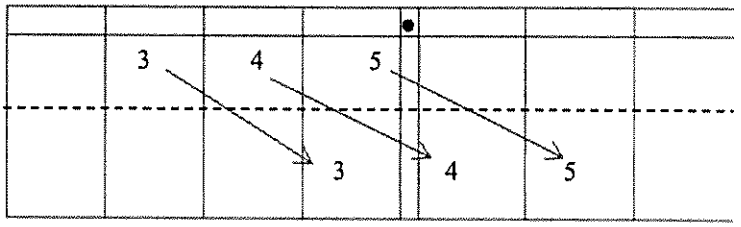
Example: Record the **digits** of the first factor on the top row of the **place value** chart. Draw arrows to show how the value of each digit changes when you multiply or divide. Record the product on the second row of the place value chart.

a. **3.452 x 10 = 34.52 (34.52 is 10 times greater than 3.452.)**



When we **divide** a **decimal fraction** by a power of 10, the **product** will be smaller than the original number; therefore we are shifting to the right on the place value chart. The number of times we shift to the right depends on the power of 10. If dividing by 10, we shift one place to the right. If dividing by 100, we shift two places to the right and if dividing by 1,000, we shift three places to the right and so on.

b. **345 ÷ 100 = 3.45 (3.45 is $\frac{1}{100}$ times as large as 345.)**



Exponents:

Example #1:
$10^5 = 10 \times 10 \times 10 \times 10 \times 10 = 100{,}000$

$10^3 = 10 \times 10 \times 10 = 1{,}000$

The students will recognize that the number of zeros in the **product** (answer in multiplication) is the same as the number of zeros in the **factors** (numbers being multiplied). A student could think of placing 10 on the place value chart and shifting the digits to the left. In 10^5 the 10 would have been shifted 5 places to the left.

Example #2:
$10{,}000 = 10 \times 10 \times 10 \times 10 = 10^4$
$100 = 10 \times 10 = 10^2$

The students will discover that the number of zeros in the number represents the number of times10 is being multiplied.

Example #3: 4×10^3
$= 4 \times 10 \times 10 \times 10$
$= 4 \times 1{,}000$
$= 4{,}000$

Convert 3 meters to centimeters. (1 meter = 100 centimeter)
100 is the same as 10^2.
$3 \text{ m} \times 10^2$
$= 3 \times 10 \times 10$
$= 3 \times 100$
$= 300 \text{ cm}$

Application Problems and Answers:

Canada has a population that is about $\frac{1}{10}$ as large as the United States. If United States population is about 320 million, about how many people live in Canada? Explain the number of zeros in your answer.

$\frac{1}{10}$ is the same as dividing by 10. To find the population of Canada, I divided 320,000,000 by 10 which equals 32,000,000. I pictured the place value chart in my head and I shifted 320,000,000 one place to the right which meant that instead of 7 zeros the number has 6 zeros.

$320{,}000{,}000 \div 10 = 32{,}000{,}000$

The population of Canada is 32,000,000.

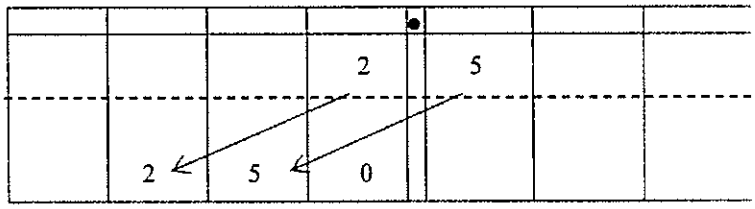
Shaunnie and Marlon missed the lesson on exponents. Shaunnie incorrectly wrote $10^5 = 50$ on her paper, and Marlon incorrectly wrote $2.5 \times 10^2 = 2.500$ on his paper.

a. What mistake has Shaunnie made? Explain using words, numbers, and pictures why her thinking is incorrect and what she needs to do to correct her answer.

Shaunnie believes that $10^5 = 10 \times 5$; however $10^5 = 10 \times 10 \times 10 \times 10 \times 10$ or 100,000. 10 is being multiplied times itself 5 times.

b. What mistake has Marlon made? Explain using words, numbers, and pictures why his thinking is incorrect and what he needs to do to correct his answer.

Marlon made the mistake of only adding zeros to the end of 2.5. He needs to remember that multiply by 10^2 makes a number 100 times greater, which is 250. He has to shift 2.5 two places to the left.



The length of the bar for a high jump competition must always be 4.75 m. Express this measurement in millimeters. Explain your thinking using an **equation** that includes an **exponent.**
(1 meter = 1,000 millimeter)

1,000 is the same as 10^3

4.75×10^3
$= 4.75 \times 10 \times 10 \times 10$
$= 4.75 \times 1{,}000$
$= 4{,}750 \text{ mm}$

***Students could either draw a place value chart or picture one in their head. Knowing that 4.75 is multiplied by 1,000, the decimal fraction has to shift 3 places to the left. 4,750 is 1,000 times greater than 4.75.

James drinks 800 milliliters of water each during his workout. Henry drinks 600 milliliters daily during his workout. If James works out 3 days each week, and Henry works out 5 days each week, how many **liters** do the boys drink in all each week while working out?

James (800 ml x 3 = 2400 ml)
Henry (600 ml x 5 = 3000 ml)

2400
+3000
5400 ml

1,000 ml = 1 liter

5400 ÷ 1000 = 5.4 L

(5400 is shifted to the right 3 places.)

The boys drank 5.4 liters of water.

MATH NEWS

LAFAYETTE PARISH SCHOOL SYSTEM

Grade 5, Module 1, Topic B

5th Grade Math

Module 1: Place Value and Decimal Fractions

Math Parent Letter

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Topic B: Decimal Fractions and Place Value Patterns

Words to know

- Thousandths/Hundredths/Tenths
- Standard Form
- Decimal Fraction
- Word Form
- Unit Form

Things to Remember!

Decimal Fraction - A fractional number with a denominator of 10 or a power of 10 (10, 100, 1,000) that can be written with a decimal point.

Standard form - A number written with one digit for each place value. Example: 52.64 or $52\frac{64}{100}$

Expanded form - A way to write numbers that shows the place value of each digit.
Example: 52.64 = 5 x 10 + 2 x 1 + 6 x 0.1 + 4 x 0.01
5 x 10 + 2 x 1 + 6 x $(\frac{1}{10})$ + 4 x $(\frac{1}{100})$

Unit form – A way to show how many of each size unit are in the number. 52.64 = 5 tens 2 ones 6 tenths 4 hundredths
52 ones 64 hundredths

Greater than symbol **(>)**

Less than symbol **(<)**

OBJECTIVES OF TOPIC B

- Name decimal fractions in expanded, unit, and word forms by applying place value reasoning.
- Compare decimal fractions to the thousandths using like units to express comparisons with >, <, =.

Focus Area – Topic B

Decimal Fractions and Place Value Patterns

Different ways of naming a decimal fraction

Example 1:

Standard Form: Thirteen thousandths = 0.013 = $\frac{13}{1000}$

Word Form

$\frac{13}{1000}$ =

0.013 = 1 × 0.01 + 3 × 0.001 ← Expanded Form

1 hundredth 3 thousandths

13 thousandths

Unit Forms

Example 2:

Word Form: Twenty-five and four hundred thirteen thousandths

Standard Form: $25\frac{413}{1000} = 25.413$

Expanded Forms: (with fractions or with decimals)

$$25\frac{413}{1000} = 2 \times 10 + 5 \times 1 + 4 \times \left(\frac{1}{10}\right) + 1 \times \left(\frac{1}{100}\right) + 3 \times \left(\frac{1}{1000}\right)$$

$$25.413 = 2 \times 10 + 5 \times 1 + 4 \times 0.1 + 1 \times 0.01 + 3 \times 0.001$$

Unit Forms:

2 tens 5 ones 4 tenths 1 hundredths 3 thousandths

25 ones 413 thousandths

Comparing decimal fractions

67.223 < 67.232

Strategy 1: Use a place value chart to compare the decimal fractions.

	6	7	2	2	3
	6	7	2	3	2

The place value chart shows that 67.223 is less than 67.232 because the digit 2 in the hundredths place in 67.223 is less than the digit 3 in the hundredths place in 67.232.

Strategy 2: Use unit form to compare decimal fractions.
67.223 = 67 ones 223 thousandths
67.232 = 67 ones 232 thousandths
67 ones is the same but 223 thousandths is less than 232 thousandths.

Mr. Pham wrote 2.619 on the board. Christy says its two and six hundred nineteen thousandths. Amy says its 2 ones 6 tenths 1 hundredth 9 thousandths. Who is right? Use words and numbers to explain your answer.

$2.619 = 2\frac{619}{1000}$ = two and six hundred nineteen thousandths

$2\frac{619}{1000} = 6 \times 1 + 6 \times \left(\frac{1}{10}\right) + 1 \times \left(\frac{1}{100}\right) + 9 \times \left(\frac{1}{1000}\right)$

2 ones 6 tenths 1 hundredth 9 thousandths

Both Amy and Christy are correct. Christy chose to represent the number in word form and Amy has chosen unit form. Both are equal to 2.619.

Lance measured 0.485 liter of water. Angel measured 0.5 liter of water. Lance said, "My beaker has more water than yours because my number has 3 decimal places and yours only has 1." Is Lance correct? Use words and numbers to explain your answer.

		0	4	8	5
		0	5	0	0

0.485 < 0.5

Lance is not correct. I know this because 5 tenths of a liter of water is equal to 500 thousandths of water. 500 thousandths is greater than 485 thousandths of water.

MATH NEWS

Grade 5, Module 1, Topic C

5th Grade Math

Module 1: Place Value and Decimal Fractions

Math Parent Letter

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Topic C: Place Value and Rounding Decimal Fractions

Words to know

- Thousandths/Hundredths/Tenths
- Decompose
- Decimal Fraction

Things to Remember!

Vertical number lines promotes students' understanding of rounding in that numbers are quite literally rounded up and down to the nearest multiple rather than left or right as in a horizontal number line.

Decompose – showing the different ways a number can be separated into the most of each place value unit

tens	ones	tenths	hundredths
5	2	9	
	52	9	
		529	

52.9 = 5 tens 2 ones 9 tenths
52 ones 9 tenths
529 tenths

OBJECTIVE OF TOPIC C

- Round a given decimal to any place using place value understanding and the vertical number line.

Focus Area – Topic C

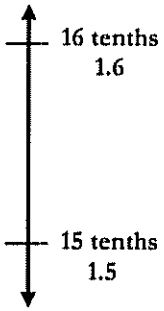
Place Value and Rounding Decimal Fractions

Rounding 1.57 to the nearest tenth

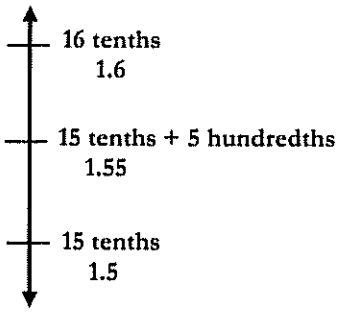
Step 1: Decompose 1.57 to show as many ones, tenths, and hundredths.

tens	ones	tenths	hundredths
	1	5	7
		15	7
			157

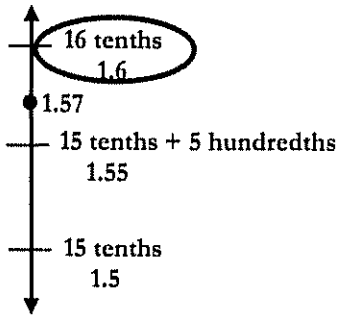
Step 2: Draw a vertical number line. Since we are going to round to the nearest tenth, we need to decide between which two tenths does 1.57 lie and indicate that on the vertical number line.



Step 3: Determine the halfway point or midpoint between 15 tenths and 16 tenths.

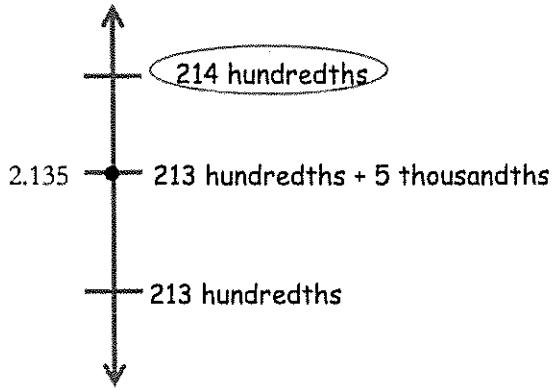


Step 4: Locate 1.57 on the number line. We can see that 1.57 is past the midpoint so 1.57 rounds to 16 tenths or 1.6.



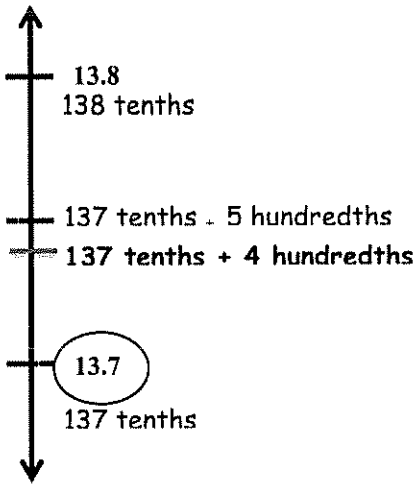
For open international competition, the throwing circle in the men's shot put must have a diameter of 2.135 meters. Round this number to the nearest hundredth to estimate the diameter. Use a number line to show your work.

tens	ones	tenths	hundredths	thousandths
	2	1	3	5
		21	3	5
			213	5
				2135



The diameter is 2.14 meters.

A decimal number has two digits to the right of its decimal point. If we round it to the nearest tenth, the result is 13.7. What is the **maximum** possible value of this number? Use words and the number line to explain your reasoning. Include the midpoint on your number line.



The maximum possible value is 13.74. If the number was 13.75 it would round to 13.8.

MATH NEWS

Grade 5, Module 1, Topic D

LAFAYETTE PARISH SCHOOL SYSTEM

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5th Grade Math

Module 1: Place Value and Decimal Fractions

Math Parent Letter

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Topic D: Add and Subtracting Decimals

Words to know

- Thousandths/Hundredths/Tenths
- Sum
- Unit Form
- Addend
- Difference
- Decimal Fraction

Thousandths – one of 1,000 equal parts; thousandths place (in decimal notation) the position of the third digit to the right of the decimal point

Hundredths – one of 100 equal parts; hundredths place (in decimal notation) the position of the second digit to the right of the decimal point

Tenths – one of 10 equal parts; tenths place (in decimal notation) the position of the first digit to the right of the decimal point

Unit form – shows how many of each size unit are in the number.
52.64 = 5 tens 2 ones 6 tenths 4 hundredths
52 ones 64 hundredth

Decimal Fraction - a fractional number with a denominator of 10 or a power of 10 (10, 100, 1,000). It can be written with a decimal point.

Addend – any number being added

Sum – answer to an addition problem

Difference – answer to a subtraction problem

Objectives of Topic D

- **Add decimals using place value strategies and relate those strategies to a written method.**
- **Subtract decimals using place value strategies and relate those to the written lesson.**

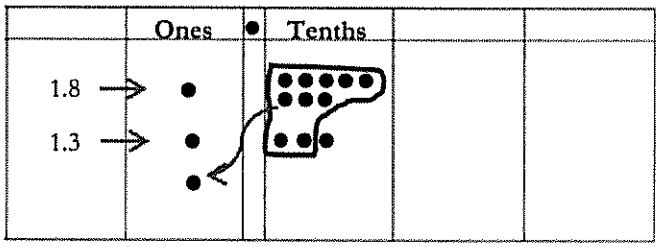
Focus Area– Topic D

Adding and Subtracting Decimals on the Place Value Chart

When adding and subtracting decimals students can use place value charts to assist them with regrouping. When adding, students begin by representing each digit in the numbers by drawing a dot in the correct area on the place value chart. Next, they will regroup when there are 10 or more dots in one place.

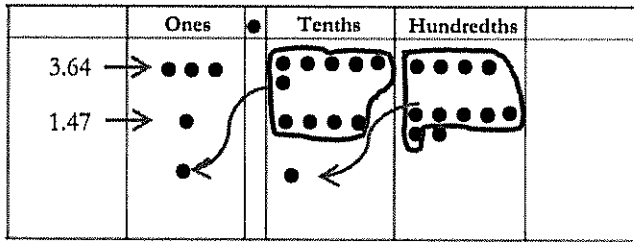
Example: Represent the digits of the first and second addends on the place value chart. Regroup when there are ten or more in one place. Record the sum.

a. **18 tenths + 13 tenths = 31 tenths (Unit Form)**
1.8 + 1.3 = _____



1.8
+ 1.3
3.1
Algorithm

b. **3.64 + 1.47 = _____**

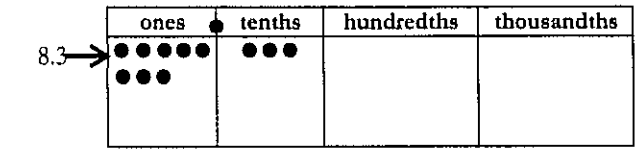


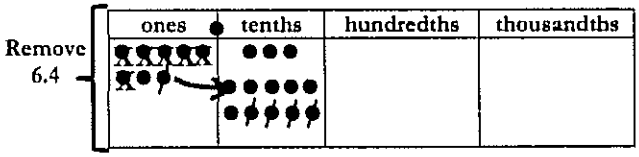
3.64
+ 1.47
5.11
Algorithm

Subtracting Decimals

When subtracting students will represent the digits in the minuend on their place value chart. Next the student will subtract the subtrahend by crossing out the numbers in the chart. Students will need to regroup if necessary.

Example:
83 tenths(minuend) – 64 tenths(subtrahend) = _____
8.3 – 6.4 = _____





****Since there are only 3 tenths, 1 one is renamed as 10 tenths. Now you have a total of 13 tenths and you can remove 4 tenths. Next remove 6 ones (x) from the 7 ones.**

$$\begin{array}{r} 7 \\ 8.\cancel{1}3 \\ -\ 6.4 \\ \hline 1.9 \end{array}$$ Algorithm

Application Problems and Answers:

Meyer has 0.64 GB of space remaining on his iPod. He wants to download a pedometer app (0.24 GB) a photo app (0.403 GB) and a math app (0.3 GB). Which combinations of apps can he download? Explain your thinking.

$$\begin{array}{r} 0.24 \\ 0.403 \\ +\ 0.3 \\ \hline 0.943 \end{array}$$ 0.943 > 0.64 He can't download all three apps.

$$\begin{array}{r} 0.24 \\ +\ 0.403 \\ \hline 0.643 \end{array}$$ 0.643 > 0.64 He can't download pedometer app and photo app.

$$\begin{array}{r} 0.24 \\ +\ 0.3 \\ \hline 0.54 \end{array}$$ 0.54 < 0.64 He can download pedometer app and math app.

$$\begin{array}{r} 0.403 \\ +\ 0.3 \\ \hline 0.703 \end{array}$$ 0.703 > 0.64 He can't download photo app and math app.

Meyer can't download all three apps because he needs 0.943 GB of space and he only has 0.64 GB of space. He can download the photo app by itself but he can't combine it with anything. He does have enough space to download the pedometer and the math app together.

Mrs. Fan wrote 5 tenths minus 3 hundredths on the board. Michael said the answer is 2 tenths because 5 minus 3 is 2. Is h correct? Explain.

Michael is incorrect. He is subtracting unlike units. The problem is 0.5 - 0.03 and he is subtracting 0.5 - 0.3. The 5 tenths can be renamed as 50 hundredths so 0.50 minus 0.0 equals 0.47.

Solve then write your answer in standard form.

a. 1 tenth + 2 tenths = **3 tenths = 0.3**

b. 14 tenths + 9 tenths = **23 tenths = 2.3**

c. 6 tenths + 3 thousandths
= 600 thousandths + 3 thousandths
= 603 thousandths = 0.603

d. 5 tenths – 2 tenths = **3 tenths = 0.3**

e. 37 thousandths – 16 thousandths
= 21 thousandths = 0.021

f. 7 hundreds 8 hundredths – 4 hundredths
= 7 hundreds 4 hundredths = 700.04

MATH NEWS

Grade 5, Module 1, Topic E

LAFAYETTE PARISH SCHOOL SYSTEM

5th 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.

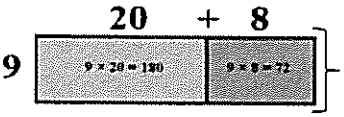
Topic E: Multiplying Decimals

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. 7 x 3 = 21 (Factor, Factor, Product)

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



180 and 72 are partial products.

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 ones 3 tenths 2 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.**

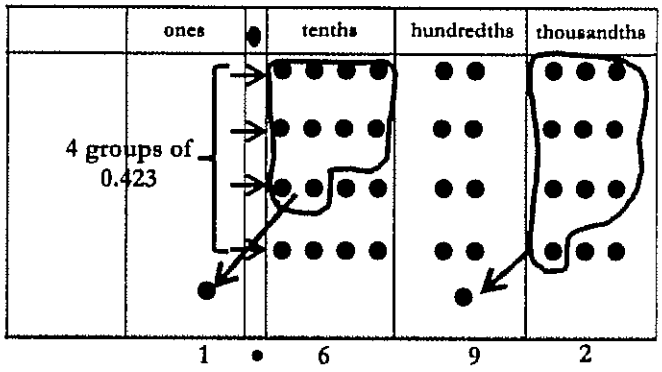
Focus Area– Topic E

Multiplying Decimals on the Place Value Chart and Area Model

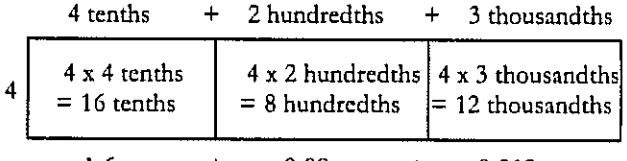
Place value understanding of whole number multiplication using place value charts and area models, help students make a connection between whole number products and products of one-digit whole number and decimal fraction.

Problem: 0.423 x 4

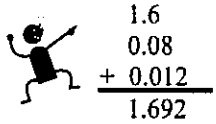
Using Place Value Chart: Students know that 423 times 4 means 4 groups of 423; therefore 0.423 times 4 means 4 groups of 0.423.
In the place value chart, we represent 0.423 four times since we need 4 groups of this decimal fraction. We will regroup when there are ten or more in one place.



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.



1.6 + 0.08 + 0.012 = 1.692



1.6
0.08
+ 0.012
1.692

0.423
x 4
1.692

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 x 5
↓
3 x 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 x 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 x 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 x 2 ones = 16 ones	8 x 6 tenths = 48 tenths	8 x 5 hundredths = 40 hundredths
	16	+ 4.8	+ 0.40

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

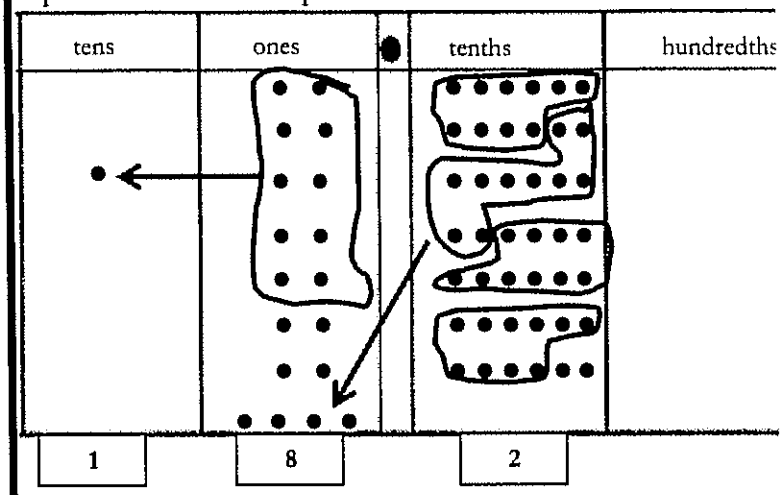
$2.65
x 8
$21.20
Algorithm

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 x 7 as 14.42. Use a place value chart to help Miles understand his mistake.



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 x 4 ⟶

	5 tenths	5 hundredths
4	4 x 5 tenths = 20 tenths	4 x 5 hundredths = 20 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.

MATH NEWS

Grade 5, Module 1, Topic F

LAFAYETTE PARISH SCHOOL SYSTEM

5th 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. Topic F concludes Module 1 with an exploration of division of decimal numbers by one-digit whole number divisors using place value charts and unit form.

Topic F: Diving Decimals

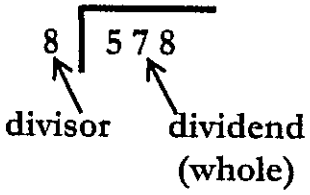
Words to know

- Thousandths/Hundredths/Tenths
- Dividend
- Quotient
- Dividend (Whole)
- Divisor
- Tape Diagram

Quotient – answer to a division problem

Dividend (whole) - a quantity to be separated into the number of equal groups or into the amount in each group

Divisor – tells the size of the group or the number of groups the whole is being separated into



Objectives of Topic F

- **Divide decimals by single-digit whole numbers involving easily identifiable multiples using place value understanding and relate to a written method.**
- **Divide decimals with a remainder using place value understanding and relate to a written method.**
- **Divide decimals using place value understanding including remainders in the smallest unit.**
- **Solve word problems using decimal operations.**

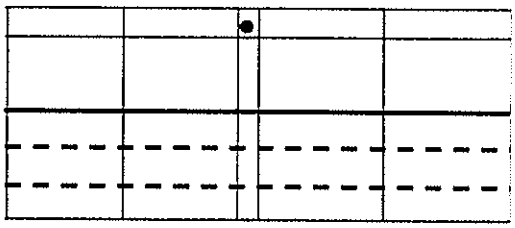
Focus Area– Topic F

Dividing Decimals on the Place Value Chart

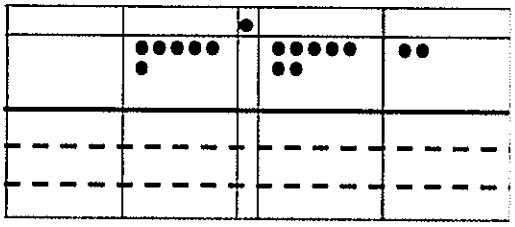
When dividing decimals students will use a place value chart to assist them.

Problem: **6.72 ÷ 3**

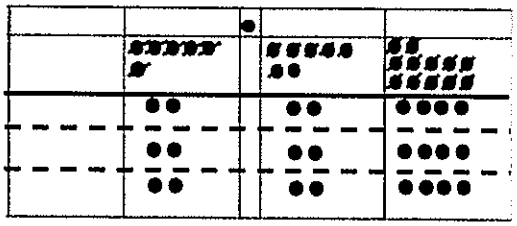
Step 1: **Draw a place value chart and separate the bottom part into 3 groups since we are taking the whole (6.72) and dividing it into 3 equal parts.**



Step 2: **Show 6.72 in the place value chart.**

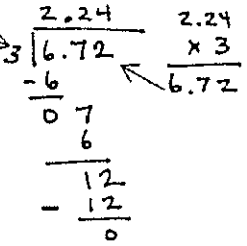


Step 3: **Begin with the larger units which in this problem is the ones place. We can share 6 ones equally with 3 groups. There will be 2 ones in each group.**
Now we move to the tenths. We can share 7 tenths with 3 groups by giving each group 2 tenths and then there will be 1 tenth left. The 1 tenth will be renamed as 10 hundredths. Now there are a total of 12 hundredths which can be shared with 3 groups by giving each group 4 hundredths.



Division Algorithm

Students will see a similarity between the algorithm and the place value chart.
We can check our answer by multiplying the quotient by the divisor. The answer should be the dividend or the whole.



Decimals can also be divided by breaking apart the dividend into unit form. Both of these parts can then be divided by the divisor and then added together to find the quotient.

12.64 ÷ 2

(12 ones ÷ 2) + (64 hundredths ÷ 2)

= 6 ones + 32 hundredths = 6.32

Application Problems and Answers:

12.48 milliliters of medicine were separated into doses of 4 ml each. How many doses were made?

= 12.48 ÷ 4

= (12 ones ÷ 4) + (48 hundredths ÷ 4)

= 3 ones + 12 hundredths

= 3.12 doses

3.12 doses can be made.

Grayson wrote the following in her math journal:

1.47 ÷ 7 = 2.1

Use words, numbers and pictures to explain why Grayson's thinking is incorrect.

1.47 ÷ 7 cannot equal 2.1 because 2.1 is greater than 1.47, which is the number that is being divided into 7 parts; therefore answer has to be smaller than 1.47.

1.47 ÷ 7

= (14 tenths ÷ 7) + (7 hundredths ÷ 7)

= 2 tenths + 1 hundredth

= 0.21

Grayson rewrote 1.47 as 14 ones and 7 tenths instead of 14 tenths and 7 hundredths.

Application Problems and Answers:

Mrs. Henderson makes punch by mixing 10.9 liters of apple juice, 600 milliliters of orange juice, and 8 liters of ginger ale. She pours the mixture equally into 6 large punch bowls. How much punch is in each bowl? Express your answer in liters.

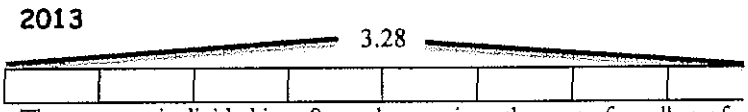
```
 10.9      liters
  8.0      liters
  0.600    liters (1 liter = 1,000 milliliters)
 19.500    liters of mixture
```

```
   3.250
6 | 19.500
  -18
    15
   -12
     30
     30
      00
      00
```

In each punch bowl, there are 3.250 or 3.25 liters of the mixture.

The price of most milk in 2013 was around $3.28 a gallon. This is eigh times as much as you would have probably paid for a gallon of milk in the 1950's. What was the cost for a gallon of milk during the 1950's?

Use a tape diagram to show your calculations. (**A tape diagram is a drawing that looks like a segment of tape, used to illustrate number relationships.**)



The segment is divided into 8 equal parts since the cost of a gallon of milk in 2013 was 8 times as much as in 1950.

1950 - The cost of a gallon of milk in 1950 is one of the 8 parts.

?

3.28 ÷ 8

= (32 tenths ÷ 8) + (8 hundredths ÷ 8)

= 4 tenths + 1 hundredth

= 0.41

Milk costs $0.41 a gallon in the 1950's.