FIFTH GRADE MATHEMATICS – Unit 2

Dear Parents,

During Unit 2, your child will extend their understanding of the base-ten system to the relationship between adjacent places, how numbers compare, and how numbers round for decimals to thousandths.

PLACE VALUE AND DECIMALS DECIMAL COMPUTATION

Students need to:

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. Nbt1

Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Read, write, and compare decimals to thousandths.

- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).
- Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Use place value understanding to round decimals to any place.

Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step real world problems.

Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

KEY VOCABULARY

Decimal	Round
Digit	Equivalent Fractions
Place value	Tenth
Powers of Ten	Hundredth
Exponent	Thousandth

WAYS PARENTS CAN HELP

- Play "wipe-out" with a calculator. Students key in the same number, for ex. 256,734.891. Ask them to "wipeout" one of the digits without changing any of the other digits. Ex. "Wipe out the digit 9." Students will need to know that the 9 has a value of 0.09 in order to wipe it out from the calculator.
- How many articles/items can you find in a catalog with prices that have a given number in the units place and a given number in the tenths place and or the hundredths place? (i.e. with a 3 in the units place, a 7 in the tenths place and a nine in the hundredths place)
- Play 20 questions using a number as what needs to be figured out using questions focusing on place value.
- Compare decimals that they see in their environment (i.e. cost of items, times at a sporting event, weight on a digital scale…)

CCPS Informational Videos for Parents

Multiplying Decimals

http://video.carrollk12.org/view/MULTDECIMALSAREAMODEL

http://video.carrollk12.org/view/WINKER2L

http://video.carrollk12.org/view/WINKLERMULTIPLYWHOLEBYDECIMAL

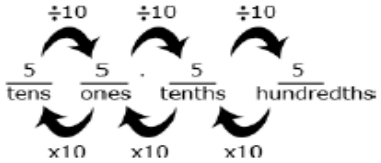
http://video.carrollk12.org/view/WINKLERMULTDECIMALS1

Multiplication with Powers of 10

http://video.carrollk12.org/view/MCDONNELLPOWERSOF10

BACKGROUND INFORMATION AND EXAMPLES FOR PARENTS

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 a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Students need to be provided with opportunities to explore this concept and come to this understanding; this should not just be taught procedurally. Students should look for patterns.

Students might write:

- *$36 \times 10 = 36 \times 10^1 = 360$; $36 \times 10 \times 10 = 36 \times 10^2 = 3{,}600$; $36 \times 10 \times 10 \times 10 = 36 \times 10^3 = 36{,}000$*

Students might say:

- *I noticed that every time I multiplied by 10, I added a zero to the end of the number. That makes sense because each digit's value became 10 times larger. To make a digit 10 times larger, I have to move it one place value to the left.*
- *When I multiplied 36 by 10, the 30 became 300. The 6 became 60, or the 36 became 360. So I had to add a 0 at the end to have the 3 represent 3 one-hundreds (instead of 3 tens) and the 6 represents 6 tens (instead of 6 ones).*

Students should be able to use the same type of reasoning as above to explain why the following multiplication and division problem by powers of 10 make sense.

- *$523 \times 10^3 = 523{,}000$ – The place value 523 is increased by 3 places; $5.223 \times 10^2 = 522.3$ – The place value of 5.223 is increased by 2 places; $52.3 \div 10^1 = 5.23$ - The place value of 52.3 is decreased by 1 place.*

Read, write, and compare decimals to thousandths.

- **Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.**

This standard references expanded form of decimals with fractions included. Students should build on their work from Fourth Grade, where they worked with both decimals and fractions interchangeably. Expanded form is included to build upon work in 5.NBT.2 and deepen students' understanding of place value.

Students build on the understanding they developed in fourth grade to read, write, and compare decimals to thousandths. They connect their prior experiences with using decimal notation for fractions and addition of fractions with denominators of 10 and 100. They use concrete models and number lines to extend this understanding to decimals to the thousandths. Models may include base ten blocks, place value charts, grids, pictures, drawings, manipulatives, technology-based, etc. They read decimals using fractional language and write decimals in fractional form, as well as in expanded notation. This investigation leads them to understanding equivalence of decimals (0.8 = 0.80 = 0.800).

Some equivalent forms of 0.72 are: *72/100 7/10 + 2/100 7 x (1/10) + 2 x (1/100) 0.70 + 0.02 70/100 + 2/100 0.720 720/1000 7 x (1/10) + 2 x (1/100) + 0 x (1/1000)*

Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Students need to understand the size of decimal numbers and relate them to common benchmarks such as 0, 0.5(0.50 and 0.500), and 1. Comparing tenths to tenths, hundredths to hundredths, and thousandths to thousandths is simplified if students use their understanding of fractions to compare decimals.

Example: *Comparing 0.25 and 0.17, a student might think, "25 hundredths is more than 17 hundredths". They may also think that it is 8 hundredths more. They may write this comparison as $0.25 > 0.17$ and recognize that $0.17 < 0.25$ is another way to express this comparison. Comparing 0.207 to 0.26, a student might think, "Both numbers have 2 tenths, so I need to compare the hundredths. The second number has 6 hundredths and the first number has no hundredths so the second number must be larger. Another student might think while writing fractions, "I know that 0.207 is 207 thousandths (and may write 207/1000). 0.26 is 26 hundredths (and may write 26/100) but I can also think of it as 260 thousandths (260/1000). So, 260 thousandths is more than 207 thousandths.*

Use place value understanding to round decimals to any place.

Students should go beyond simply applying an algorithm or procedure for rounding. The expectation is that students have a deep understanding of place value and number sense and can explain and reason about the answers they get when they round. Students should have numerous experiences using a number line to support their work with rounding.

Example: *Round 14.235 to the nearest tenth. Students recognize that the possible answer must be in tenths thus, it is either 14.2 or 14.3. They then identify that 14.235 is closer to 14.2 (14.20) than to 14.3 (14.30).*