<table>
<tr><td>Grade: 5

Unit 4 –Multiplication Involving Whole Numbers and Decimals</td><td colspan="2">Subject: Math
Time Frame: 20 days
Domains:
Numbers and Operations in Base Ten
Numbers and Operations – Fractions</td></tr>
<tr><td>Standards</td><td>Content Standards:
5.NBT.1, 5.NBT.2, 5.NBT.3, 5.NBT.3b, 5.NBT.4, 5.NBT.5
http://www.corestandards.org/wp-content/uploads/Math_Standards.pdf</td><td>Practice Standards:
MP 1, 2, 3, 4, 5, 6, 7, 8</td></tr>
<tr><td>Enduring Understandings</td><td colspan="2">1. Understand the shift pattern when multiplying by 10, 100, or 1,000.
2. Understand that multiples of 5 need extra attention in the zeros pattern.
3. Understand how a place value model can be used to solve multi-digit multiplication problems.
4. Solve two-digit multiplication problems using various methods.
5. Solve multiplication problems in which one factor is a decimal number.
6. Solve multiplication problems in which at least one factor is a decimal number.
7. Multiply with decimal numbers greater than 1.
8. Understand and apply shift patterns when multiplying by 10, 100, 1,000, 0.1, or 0.01.
9. Round whole numbers and decimal numbers to estimate the product in a multiplication problem.</td></tr>
<tr><td>Essential Questions</td><td colspan="2">1. How does a digit's position affect its value?
2. How do you use multiples of ten to estimate and find products?
3. How do I round whole numbers and decimals when estimating the product in a multiplication problem?
4. How can we multiply large numbers?
5. How do we add, subtract, multiply, and divide decimals and what does our solution mean?
6. How does the size of a factor influence the size of a product?
7. What are the patterns that occur when multiplying decimals by multiple of 10?</td></tr>
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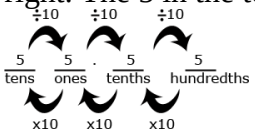
Vocabulary	**online dictionary visual math dictionary** powers of 10, exponent, decimal, decimal, decimal place, expanded form, word form, >, <, = place value, place value names (ones, tens, hundreds, tenths, hundredths, etc), digit, decimal place, rounding, standard algorithm, multiply, product, factor, decimal, tenths, hundredths, add, subtract, multiply, divide, addend, sum, difference, quotient, whole number,

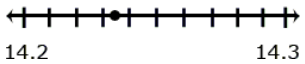
Priority and Supporting CCSS	Explanations and Examples*
5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	**5.NBT.1** In fourth grade, students examined the relationships of the digits in numbers for whole numbers only. This standard extends this understanding to the relationship of decimal fractions. Students use base ten blocks, pictures of base ten blocks, and interactive images of base ten blocks to manipulate and investigate the place value relationships. They use their understanding of unit fractions to compare decimal places and fractional language to describe those comparisons. Before considering the relationship of decimal fractions, students express their understanding that in multi-digit whole numbers, a digit in one place represents 10 times what it represents in the place to its right and 1/10 of what it represents in the place to its left. A student thinks, "I know that in the number 5555, the 5 in the tens place (5555) represents 50 and the 5 in the hundreds place (5555) represents 500. So a 5 in the hundreds place is ten times as much as a 5 in the tens place or a 5 in the tens place is 1/10 of the value of a 5 in the hundreds place. To extend this understanding of place value to their work with decimals, students use a model of one unit; they cut it into 10 equal pieces, shade in, or describe 1/10 of that model using fractional language ("This is 1 out of 10 equal parts. So it is 1/10". I can write this using 1/10 or 0.1"). They repeat the process by finding 1/10 of a 1/10 (e.g., dividing 1/10 into 10 equal parts to arrive at 1/100 or 0.01) and can explain their reasoning, "0.01 is 1/10 of 1/10 thus is 1/100 of the whole unit." In the number 55.55, each digit is 5, but the value of the digits is different because of the placement. For 5<u>5</u>.55, the underlined 5 is 1/10 of the 5 to the left and 10 times the 5 to the right. The 5 in the ones place is 1/10 of 50 and 10 times five tenths. For 55.<u>5</u>5, the underlined 5 is 1/10 of the 5 to the left and 10 times the 5 to the right. The 5 in the tenths place is 10 times five hundredths. 

*Source – Connecticut Core Standards for Mathematics as adapted from the Arizona Academic Content Standards

5.NBT.2 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.	**5.NBT.2** Examples: Students might write: • 36 x 10 = 36 x 10^1 = 360 • 36 x 10 x 10 = 36 x 10^2 = 3600 • 36 x 10 x 10 x 10 = 36 x 10^3 = 36,000 • 36 x 10 x 10 x 10 x 10 = 36 x 10^4 = 360,000 Students might think and/or 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 zero 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 × 10^3 = 523,000 (The place value of 523 is increased by 3 places.) • 5.223 × 10^2 = 522.3 (The place value of 5.223 is increased by 2 places.) • 52.3 ÷ 10^1 = 5.23 (The place value of 52.3 is decreased by one place.)

Priority and Supporting CCSS	Explanations and Examples*
5.NBT.3 Read, write, and compare decimals to thousandths. **a. 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)*.** **b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to**	**5.NBT.3** 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 as show in the standard 3a. This investigation leads them to understanding

record the results of comparisons.	equivalence of decimals (0.8 = 0.80 = 0.800). Example: Some equivalent forms of 0.72 are: 72/100 70/100 + 2/100 7/10 + 2/100 0.720 7 × (1/10) + 2 × (1/100) 7 × (1/10) + 2 × (1/100) + 0 × (1/1000) 0.70 + 0.02 720/1000 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

Priority and Supporting CCSS	Explanations and Examples*
5.NBT.4 Use place value understanding to round decimals to any place.	**5.NBT.4** When rounding a decimal to a given place, students may identify the two possible answers, and use their understanding of place value to compare the given number to the possible answers. 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 (14.200) than to 14.3 (14.300). • They may state in words 235 thousandths is closer to 200 thousandths than to 300 thousandths. 
5. NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	**5. NBT.5** In prior grades, students used various strategies to multiply. Students can continue to use these different strategies as long as they are efficient, but must also understand and be able to use the standard algorithm. In applying the standard algorithm, students recognize the importance of place value. Example: • 123 x 34. When students apply the standard algorithm, they, decompose 34 into 30 + 4. Then they multiply 123 by 4, the value of the number in the ones place, and then multiply 123 by 30, the value of the 3 in the tens place, and add the two products.

Resources
Math Expressions–Unit 4, Lessons 1-12 Soar to Success Math Intervention Mega Math Destination Math Common Core Mathematics-Newmark Learning- Units-1 Xtramath.org Connecticut State Department of Education http://www.sde.ct.gov/sde/cwp/view.asp?a=2618&q=320872

Unit Assessments
Unit Test Formative Assessments (Math Expressions) Quick Quizzes Performance Task Formative or Unit Assessment: http://3-5cctask.ncdpi.wikispaces.net/5.NBT.1-5.NBT4

Technology: Videos, Websites, Links
www.learnzillion.com https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.1 https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.2 https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.3 https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.4 https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.5 https://grade5commoncoremath.wikispaces.hcpss.org/5.NBT.7 https://grade5commoncoremath.wikispaces.hcpss.org/5.NF.5