Understand the place value system (Standards 5.NBT.1–4)

Standard 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.

Concepts and Skills to Master

- Know the names and positions of each place value
- Understand the value of each digit in the base 10 system
- Understand that the value of a digit within a number increases or decreases when multiplied or divided by ten in the base ten system
- Accurately multiply multi-digit numbers by powers of 10
- Accurately divide multi-digit numbers by powers of 10
- Model whole numbers and parts of whole numbers with drawings, base ten blocks, and other concrete models

Teacher Note: This is students' first exposure to decimal operations and extends into 5.NBT,2. "Students 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. This standard calls for students to reason about the magnitude of numbers. Students should work with the idea that the tens place is ten times as much as the ones place, and the ones place is 1/10th the size of the tens place." (http://www.ncpublicschools.org/docs/curriculum/mathematics/scos/5.pdf)

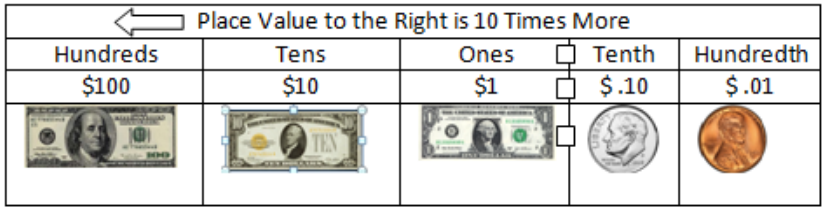
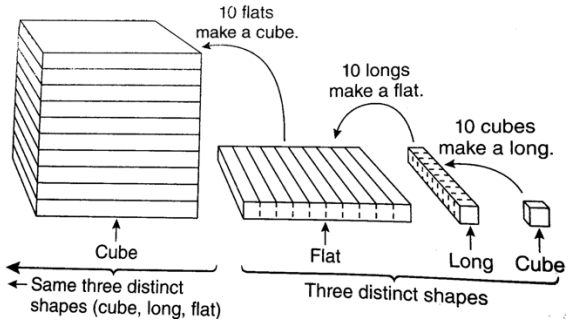
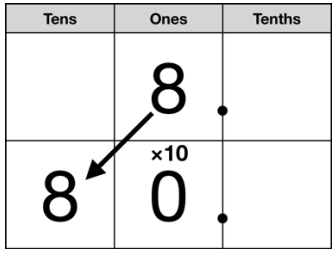
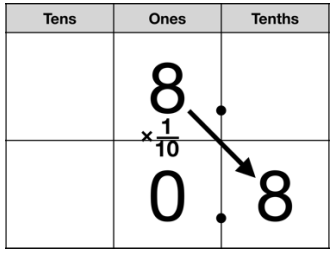
Related Standards: Current Grade Level	Related Standards: Future Grade Levels
5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. **5.NBT.3** Read, write, and compare decimals to thousandths. **5.NBT.4** Use place value understanding to round decimals to any place. **5.NBT.5** Fluently multiply multi-digit whole numbers using the standard algorithm. **5.NBT.6** Find whole-number quotients of whole numbers with up to four-digit dividends and two digit divisors **5.NBT.7** Add, subtract, multiply, and divide decimals to the hundredths **5.MD.1** Convert among different-sized standard measurement units within a given (metric) measurement system	**6.EE.1** Write and evaluate numerical expressions involving whole-number exponents **6.NS.2** Fluently divide multi-digit numbers using the standard algorithm for each operation **6.NS.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation

Critical Background Knowledge from Previous Grade Levels

- Recognize that in a multi-digit number, a digit in one place represents 10 times what it represents in the place value to its right (4.NBT.1)
- Multiply one-digit whole numbers by multiples of ten (3.NBT.3)

Academic Vocabulary

base ten system, decimal, names of the place values, tenth, hundredth, thousandth

Suggested Models	Suggested Strategies
   	• Relate money ($1,000, $100, $10, $1, $0.10, $0.01) to the place value of a standard number • Roll dice and place each digit rolled into a place value chart to create the largest, or smallest number possible • Use base ten blocks to represent a given number. Then use blocks to create a number 10 times greater, and 1/10 as large as the original number • Create number line representations of the numbers, including decimal values

Understand the place value system (Standards 5.NBT.1–4)

Standard 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.

Concepts and Skills to Master

- Understand why multiplying by a power of 10 shifts the digits of a whole number or decimal that many places to the left
- Understand why dividing by a power of 10 shifts the digits of a whole number or decimal that many places to the right
- Understand that when multiplying by powers of 10, the exponent indicates how many places the digits of the number will shift increasing the value 10 times for every place the digits shift
- Understand that when dividing by a power of 10, the exponent indicates how many places the digits of the number will shift, decreasing the value of the number by 1/10 for every place the digits shift
- Understand that an exponent indicates the number of times a base is multiplied by itself

Related Standards: Current Grade Level

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 the left
5.NBT.5 Fluently multiply multi-digit numbers using the standard algorithm
5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths

Related Standards: Future Grade Levels

6.EE.1 Write and evaluate numerical expressions involving whole-number exponents

Critical Background Knowledge from Previous Grade Levels

- Recognize that in a multi-digit number, a digit in one place represents 10 times what it represents in the place value to its right (4.NBT.1)
- Multiply one-digit whole numbers by multiples of ten (3.NBT.3)

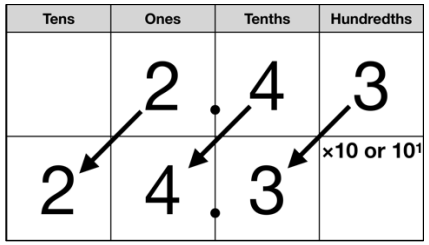
Academic Vocabulary

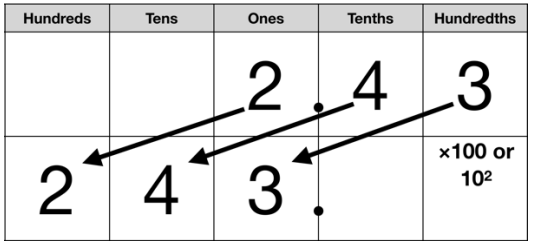
base ten, exponential notation (^), product, power of ten, exponent, base

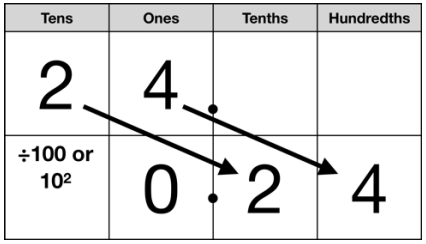
Suggested Models

Multiply Numbers by Powers of Ten

Standard Form	Exponential Form	Examples
10	10^1	$.45 \times 10^1 = 4.5$
100	10^2	$.45 \times 10^2 = 45$
1,000	10^3	$.45 \times 10^3 = 450$







Suggested Strategies

- Display patterns in a number multiplied by powers of ten. Compare the number of zeros in the products in relation to the power of ten factors.
- Use mental math to multiply a factor by multiples of 10, 100, 1000
- Use mental math to divide a dividend by 10, 100, 1000
- Reason about the relative size of a product or quotient based on the power of ten being used to compute.
- Use base ten blocks to model multiplication of division by a power of ten.

Divide Numbers by Powers of Ten

Standard Form	Exponential Form	Examples
10	10^1	$45 \div 10^1 = 4.5$
100	10^2	$45 \div 10^2 = .45$
1,000	10^3	$45 \div 10^3 = .045$

Understand the place value system (Standards 5.NBT.1–4)

Standard 5.NBT.3 Read, write, and compare decimals to thousandths.

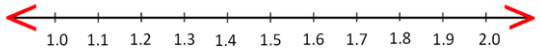
a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form. *For example, 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).*

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

Concepts and Skills to Master

- Express a given number in multiple ways:
  - base-ten numerals (347.392)
  - number names (three hundred forty-seven and three hundred ninety-two thousandths)
  - expanded form 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000)
- Understand that when comparing two numbers, one first looks at the whole number, then the individual digits
- Understand that a number (greater than 0) in the tenths place always has a greater value than the number in the hundredths place
- Generalize that the number with the most tenths is greater
- Understand that if the number of tenths is the same, the number with more hundredths is greater. If the number of tenths and hundredths is the same, the number with more thousandths is greater
- Use terms including greater than, more than, less than, fewer than, equal to, and same as, to describe comparisons
- Use the symbols >, =, and < to correctly to compare decimals to thousandths

Teacher Note: Students compare numbers and record the comparisons with the symbols >, =, and <. Emphasis should be placed on the meaning of quantities rather than tricks such as "the alligator eats the bigger number," etc. The inequality symbols (<, >) are shortcuts for identifying the relationship between two numbers where one is greater or smaller than the other. The statements are read from left to right (e.g., 1.5 < 2.8 is read one and five tenths is less than two and eight tenths) A number line can be used to develop the understanding of the inequality symbols. In fifth grade students are not expected to use the term "inequality" when comparing numbers.



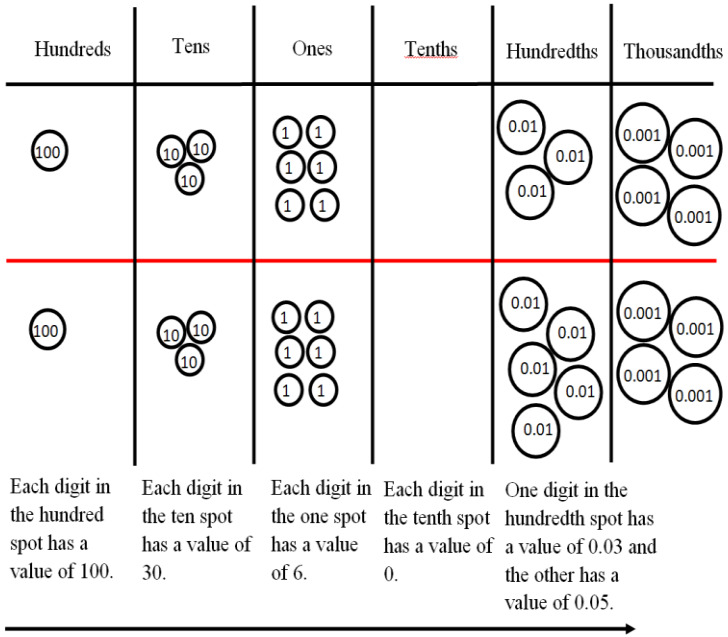
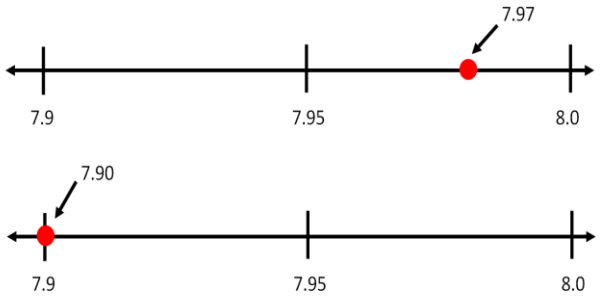
Related Standards: Current Grade Level	Related Standards: Future Grade Levels
5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left **5.NBT.4** Use place value understanding to round decimals to any place	**6.NS.7** Understand ordering and absolute value of rational numbers. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. **6.EE.8** Write an inequality of the form $x > c$ or $x < c$

Critical Background Knowledge from Previous Grade Levels

- Compare two decimals to hundredths by reasoning about their size. Record the results of comparisons with the symbols >, <, or = and justify the conclusions (4.NF.7)
- Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons (4.NBT.2)
- Compare two fractions with the same numerator or the same denominator. Record the results of comparisons with the symbols >, =, or < (3.NF.3)

Academic Vocabulary

base-ten numeral (also known as standard form), number names (also known as word form), expanded form, compare, more, fewer, greater than (>), less than (<), equal to (=), same as

Suggested Models	Suggested Strategies
Compare 136.034 and 136.054 using a place value chart.  Each digit in the hundred spot has a value of 100. Each digit in the ten spot has a value of 30. Each digit in the one spot has a value of 6. Each digit in the tenth spot has a value of 0. One digit in the hundredth spot has a value of 0.03 and the other has a value of 0.05. Since 0.05 is a greater value than 0.03, that number has a larger value. So, 136.034 is less than 136.054. Or 136.034 < 136.054. **Compare 7.97 and 7.90 using a double number line.**  7.90 is closer to the left of the number line than 7.97. So 7.97 is greater than 7.90. Or 7.97 > 7.90.	• Use concrete materials such as objects on a place value chart, base-ten blocks, and number lines to compare two multi-digit numbers with decimals

Understand the place value system (Standards 5.NBT.1–4)

Standard 5.NBT.4 Use place value understanding to round decimals to any place.

Concepts and Skills to Master

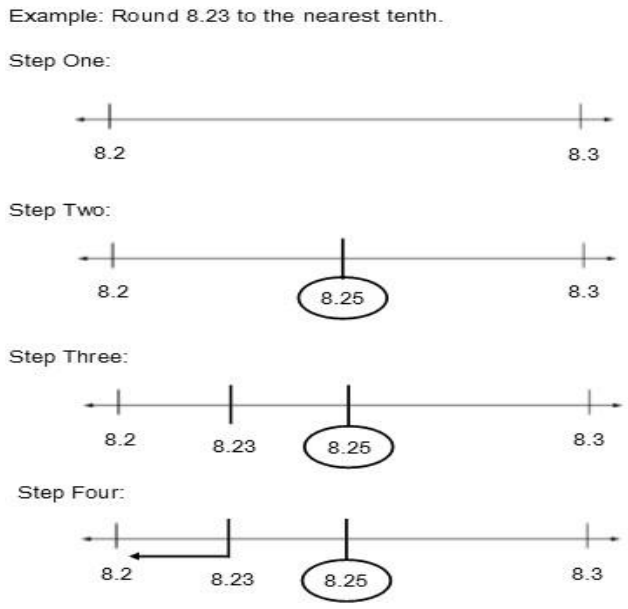
- Use place value understanding to round numbers with decimals to the nearest whole number, tenth, and hundredth
- Understand that rounding can be applied to any place within a number including decimals
- Understand when rounding to the nearest whole number, tenths, or hundredths place, the goal is to approximate the closest number with zero units in the places to the right of the digit to be rounded to (For example, 478.235 rounded to the nearest tenth is 478.2; and 478.235 rounded to the nearest hundredth is 478.24)
- Connect rounding numbers to the location of the number on a number line by identifying the benchmark numbers and using the midpoint to determine which benchmark number is closer (For example, when rounding 478.235 to the nearest tenth, the benchmark numbers are 478.2 and 478.3. The midpoint is 478.25. The number 478.235 is to the left of the midpoint and closer to 478.2 than 478.3. The number 478.235 is therefore rounded to 478.2.)

Related Standards: Current Grade Level	Related Standards: Future Grade Levels
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.3** Read, write, and compare decimals to thousandths.	Fifth grade is the last grade level in which rounding is specifically addressed. Rounding may be used to support problem solving in various standards in future grade levels.

Critical Background Knowledge from Previous Grade Levels

- Use place value understanding to round multi-digit whole numbers to any place up to 1,000,000 (4.NBT.3)
- Use place value understanding to round two-digit and three-digit numbers to the nearest 10 and 100 (3.NBT.1)

Suggested Models



Academic Vocabulary

round a decimal, benchmark number, midpoint, digits, estimate, close to, nearest place, ones place, tenths place, hundredths place

Suggested Strategies

- Create and use horizontal and vertical open number lines to identify, locate, and label benchmark numbers, midpoints, and target numbers to assist in rounding
- Use base-ten blocks, decimal bars, and drawings to model the concept of rounding with decimals
- Use a place value chart and/or place value disks as a tool for support when rounding
- Use pennies, dimes, and dollars to model rounding

Perform operations with multi-digit whole numbers and with decimals to hundredths (Standards 5.NBT.5–7).

Standard 5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

Concepts and Skills to Master

- Extend understanding of multiplication with specified multi-digit numbers to multiply with any multi-digit whole numbers
- Fluently compute products of whole numbers using a variety of strategies including the standard algorithm
- Use properties of operation and place value to explain a standard algorithm
- Understand and explain connections between various multiplication strategies and a standard algorithm

Teacher Note: A standard algorithm of multiplication is neither an expectation nor a focus in fourth grade. Students use multiple strategies for multiplication in grades 3-5. By the end of fourth grade students use a range of algorithms based on place value, properties of operations, and/or the relationships between addition and multiplication to multiply multi-digit whole numbers. Students are expected to fluently multiply multi-digit whole numbers using a standard algorithm by the end of fifth grade. Fifth grade students should not only focus on the standard algorithm, but should progress from strategies used in fourth grade to a standard algorithm.

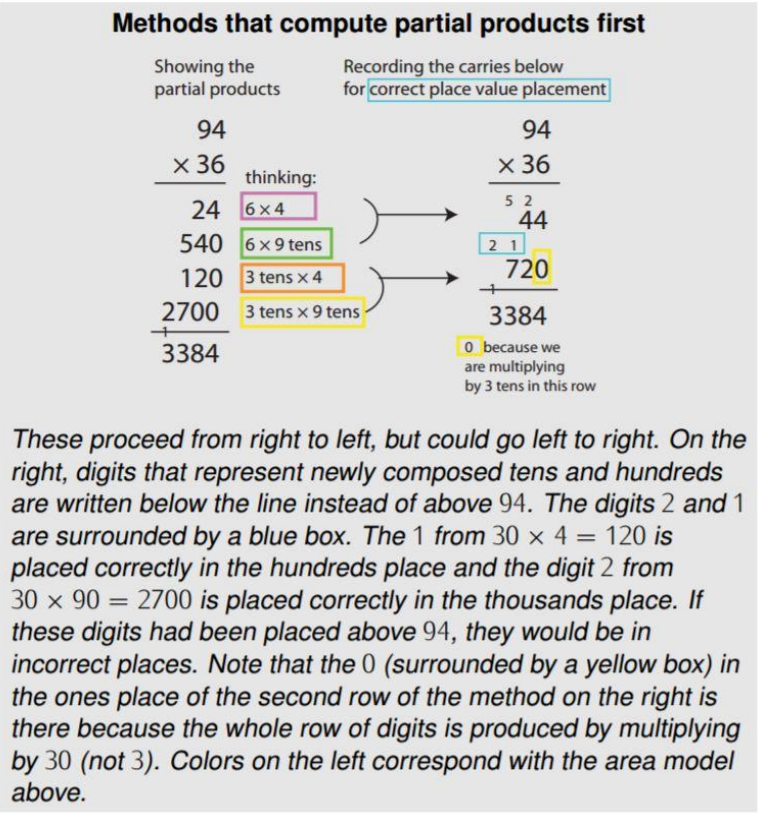
Related Standards: Current Grade Level	Related Standards: Future Grade Levels
5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. **5.NBT.2** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 **5.NBT.7** Multiply decimals to hundredths, using concrete models or drawings and strategies based on place value **5.NF.4** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction (using area models and partial products) **5.MD.5** Relate volume to the operations of multiplication	**6.NS.3** Fluently multiply multi-digit decimals using the standard algorithm **7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers

Critical Background Knowledge from Previous Grade Levels

- Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models (4.NBT.5)
- Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities (3.OA.3)
- Apply properties of operations as strategies to multiply and divide (3.OA.5)
- Multiply one-digit whole numbers by multiples of 10 in the range 10–90, for example, 9 × 80 and 5 × 60 (3.NBT.3)

Academic Vocabulary

multiply, factor, product, factor pairs, multiples, distributive property, area model, partial products, algorithm

Suggested Models	Suggested Strategies
 *Also see models on the Core Guide for Standard 4.NBT.5	Teacher Note: This standard refers to fluency which means accuracy (correct answer), efficiency (a reasonable amount of steps), and flexibility (using strategies such as the distributive property or breaking numbers apart also using strategies according to the numbers in the problem. This standard builds upon students' work with multiplying numbers in third and fourth grade. In fourth grade, students developed understanding of multiplication through using various strategies. While the standard algorithm is mentioned, alternative strategies are also appropriate to help students develop conceptual understanding. • Area models • Partial products • Standard algorithm • Compare different models to show how place value is utilized to arrive at the same product
Images Source: http://commoncoretools.me/wp-content/uploads/2015/03/ccss_progression_nbp_k5_2015_03_16.pdf	

Perform operations with multi-digit whole numbers and with decimals to hundredths (Standards 5.NBT.5–7).

Standard 5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two- digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Concepts and Skills to Master

- Extend understanding of division with one-digit divisors to divide numbers by two-digit divisors
- Understand how to compute quotients of two-digit divisors and two, three, and four-digit dividends
- Understand how to compute quotients in a variety of situations, including with zeros in various places
- Interpret whole-number quotients of whole numbers with and without remainders from partitive and quotative contexts (Partitive: interpret 560 ÷ 80 as the number of objects in each share when 560 objects are partitioned equally into 80 shares; Quotative: interpret 560 ÷ 80 as a number of shares when 560 objects are partitioned into equal shares of 80 objects each)
- Connect physical representations (objects) to visual representations (drawings)
- Connect physical and visual representations to equations
- Use a variety of strategies to find quotients between the following numbers with and without remainders:
    - two-digit divisors and two-digit dividends
    - two-digit divisors and three-digit dividends
    - two-digit divisors and four-digit dividends

Teacher Note: The standard algorithm of division is neither an expectation nor a focus in fifth grade. Students use multiple strategies for division in grades 3-5. In fourth and fifth grade students use a range of algorithms based on place value, properties of operations, and/or the relationships between subtraction and division to divide multi-digit whole numbers. Students are expected to fluently divide multi-digit whole numbers using the standard algorithm by the end of sixth grade.

Related Standards: Current Grade Level	Related Standards: Future Grade Levels
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.2** Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 **5.NBT.5** Fluently multiply multi-digit whole numbers using the standard algorithm. **5.NBT.7** Multiply decimals to hundredths, using concrete models or drawings and strategies based on place value	**6.NS.2** Fluently divide multi-digit numbers using the standard algorithm **6.NS.3** Fluently divide multi-digit decimals using the standard algorithm **7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers

Critical Background Knowledge from Previous Grade Levels

- Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models (4.NBT.6)
- Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities (3.OA.3)
- Apply properties of operations as strategies to multiply and divide (3.OA.5)

Academic Vocabulary

dividend, divisor, quotient, partial quotients, remainder, place value

Suggested Models	Suggested Strategies
There are 1,716 students participating in Field Day. They are put into teams of 16 for the competition. How many teams get created? If you have left over students, what do you do with them?	• Use the relationship between multiplication and division • Use repeated subtraction and sharing as division strategies • Use manipulatives such as base-ten blocks or place-value discs and drawings such as equal groups, arrays, and area models to represent division • Use partial quotients and place value sections to model and visualize division • Explain connections between physical models, visual models, and equations

Student 1

1,716 divided by 16
There are 100 16's in 1,716.
1,716 – 1,600 = 116
I know there are at least 6 16's.
116 - 96 = 20
I can take out at least 1 more 16.
20 - 16 = 4
There were 107 teams with 4 students left over. If we put the extra students on different team, 4 teams will have 17 students.

Student 2

1,716 divided by 16.
There are 100 16's in 1,716.
Ten groups of 16 is 160. That's too big.
Half of that is 80, which is 5 groups.
I know that 2 groups of 16's is 32.
I have 4 students left over.

1716 -1600	100
116 -80	5
36 -32	2
4	

Student 3

1,716 ÷ 16 =
I want to get to 1,716
I know that 100 16's equals 1,600
I know that 5 16's equals 80
1,600 + 80 = 1,680
Two more groups of 16's equals 32, which gets us to 1,712
I am 4 away from 1,716
So we had 100 + 6 + 1 = 107 teams
Those other 4 students can just hang out

Student 4

How many 16's are in 1,716?
We have an area of 1,716. I know that one side of my array is 16 units long. I used 16 as the height. I am trying to answer the question what is the width of my rectangle if the area is 1,716 and the height is 16. 100 + 7 = 107 R 4

	100	7
16	100 x 16 = 1,600	7 x 16 =112
	1,716 - 1,600 = 116	116 - 112 = 4

Perform operations with multi-digit whole numbers and with decimals to hundredths (Standards 5.NBT.5–7).

Standard 5.NBT.7 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. In this standard, dividing decimals is limited to a whole number dividend with a decimal divisor or a decimal dividend with a whole number divisor. Compare the value of the quotient on the basis of the values of the dividend and divisor.

Concepts and Skills to Master

- Use previous understandings for adding and subtracting whole numbers to adding and subtracting decimals to hundredths
- Understand that a whole number can be written with a decimal point followed by one or more zeros
- Understand that when adding or subtracting decimals, units must be aligned with the corresponding places correctly (hundredths are aligned with hundredths; tenths are aligned with tenths; ones are aligned with ones, etc.)
- Use previous understandings for multiplying whole numbers to multiplying decimals to hundredths
- Explain why when multiplying by 0.1 or by 0.01 the product is 10 or 100 times as small as the multiplicand (the digits shift one or two places to the right of the decimal point)
- Use a variety of methods to reason about the placement of a decimal point in the product of two decimals
- Use previous understandings for dividing whole numbers to dividing decimals to hundredths
- Explain why when dividing by 0.1 or by 0.01 the quotient becomes 10 times or 100 times as large as the dividend (the digits shift one or two places to the left of the decimal point)
- Understand that when the decimal point in the divisor is shifted to make a whole number, the decimal point in the dividend should shift the same number of places
- Apply a variety of strategies based on place value to add, subtract, multiply, and divide decimals

Teacher Note: Students are not required to multiply hundredths by hundredths. Expectations for division of decimals is limited to a whole number dividend with a decimal divisor or a decimal dividend with a whole number divisor. Fifth grade students are not required to compute decimal dividends by decimal divisors.

Related Standards: Current Grade Level	Related Standards: Future Grade Levels
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.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. **5.NBT.5** Fluently multiply multi-digit whole numbers using the standard algorithm. **5.NBT.6** Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors. **5.MD.1** Convert among different-sized standard measurement units within a given measurement system. **5.NF.4, 5.NF.6** Multiply a fraction by a fraction **5.NF.3, 5.NF.7** Divide with fractions	**6.NS.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. **7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

Critical Background Knowledge from Previous Grade Levels

- Fluently multiply and divide within 100 (3.OA.7)
- Fluently add and subtract multi-digit whole numbers using the standard algorithm (4.NBT.4)
- Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers (4.NBT.5)
- Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors (4.NBT.6)

divisor, dividend, whole number, decimal, properties of operations, operation notations

Suggested Strategies

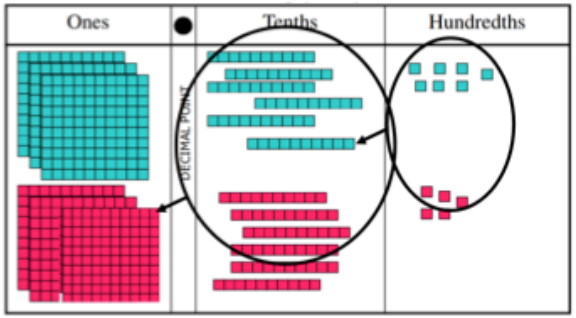
- Use the relationship between addition and subtraction
- Use the relationship between multiplication and division
- Apply whole number strategies to decimal computation (area model, number line, base-ten blocks)

Suggested Models

Models for Addition and Subtraction With Decimals

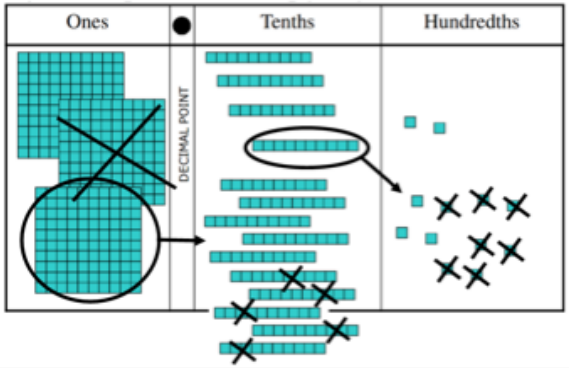
Add using a place value mat

3.57 + 2.65 = 6.22



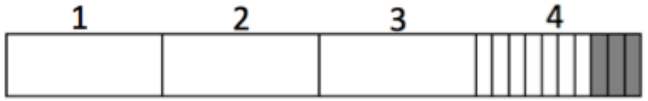
Subtract using a place value mat

3.42 – 1.57 = 1.85



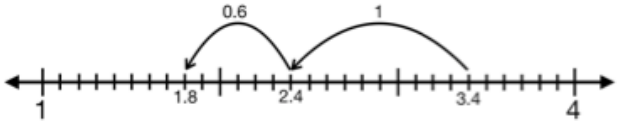
Subtract using a tape diagram

4 – 0.3 = 3.7



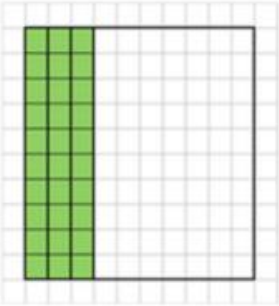
Subtract using a number line

3.4 – 1.6 = 1.8

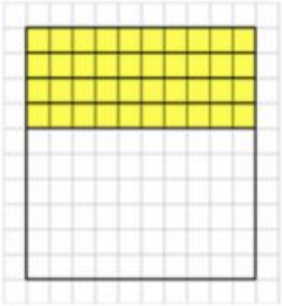


Models for Multiplication With Decimals

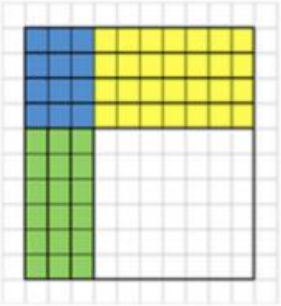
0.3 = 30 hundredths



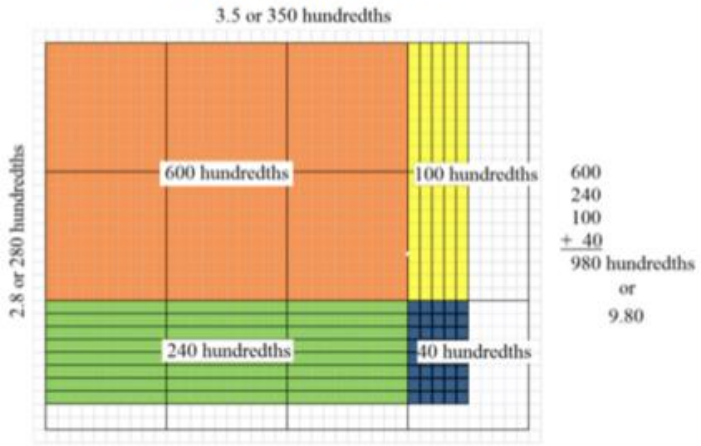
0.4 = 40 hundredths



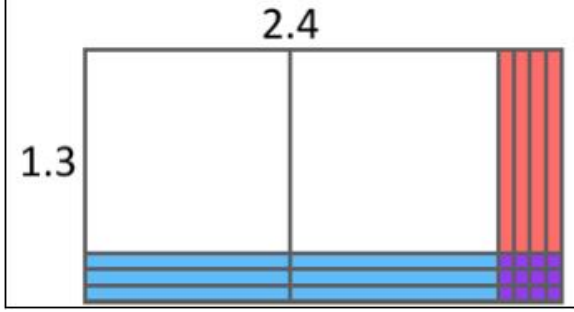
Shaded area is 0.12
or 12 hundredths



Area model for 2.8 x 3.5



Area model for 2.4 x 1.3



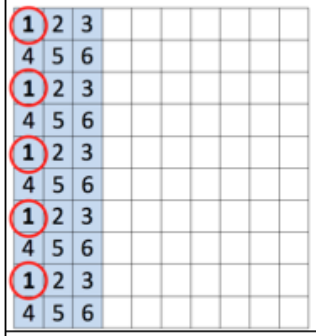
Open area model for 2.4 x 1.3

	2	+	.4
1 +	2		.4
.3	.6		.12

2.4
− 1.3
.12 (0.3×0.4)
.60 (0.3×2)
.40 (1×0.4)
+ 2.00 (1×2)
3.12

Models for Division With Decimals

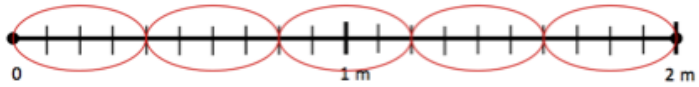
0.30 ÷ 6 = 0.05



0.30 is shaded. The student numbered each of the hundredths 1 through 6 to represent 6 groups. The student then circled the number 1 to show the number of hundredths in each group.

Finding the number of groups

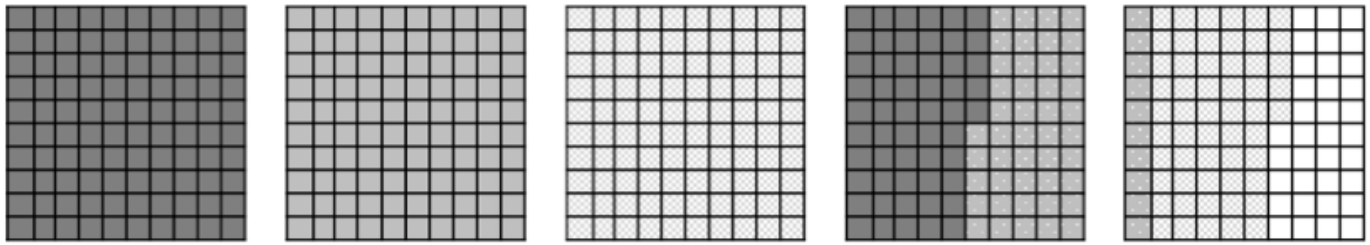
2 ÷ 0.4 = 5



Students could draw a segment to represent 2.0 meters and partition into tenths. They may then circle groups of 4 tenths, determining that there are 5 groups of 4 tenths within 2 meters

Hundred Grid to Model all Operations

A relay race lasts 4.65 miles. The relay team has 3 runners. If each runner goes the same distance, how far does each team member run? Make an estimate, find your actual answer, and then compare them.



My estimate is that each runner runs between 1 and 2 miles. If each runner went 2 miles, that would be a total of 6 miles which is too high. If each runner ran 1 mile, that would be 3 miles, which is too low. I used the 5 grids above to represent the 4.65 miles. I am going to use all of the first 4 grids and 65 of the squares in the 5th grid. I have to divide the 4 whole grids and the 65 squares into 3 equal groups. I labeled each of the first 3 grids for each runner, so I know that each team member ran at least 1 mile. I then have 1 whole grid and 65 squares to divide up. Each column represents one-tenth. If I give 5 columns to each runner, that means that each runner has run 1 whole mile and 5 tenths of a mile. Now, I have 15 squares left to divide up. Each runner gets 5 of those squares. So each runner ran 1 mile, 5 tenths and 5 hundredths of a mile. I can write that as 1.55 miles. My answer is 1.55 and my estimate was between 1 and 2 miles. I was pretty close.

Possible solution equations:

4.65 ÷ 3 = 1.55 miles

3 x 1.55 = 4.65 miles

1.55 + 1.55 + 1.55 = 4.65 miles

4.65 – 1.55 – 1.55 = 1.55 miles

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