

Place Value, Decimals, and Multiplying

Content Area: **Math**
Course(s):
Time Period: **MP1**
Length: **45**
Status: **Published**

Unit Overview

Unit Summary	Unit Rationale
<p>A focus of unit 1 is to understand place value to the thousandths place. This concept builds on students grade 4 understanding of decimals to the hundredths place. After examining the quantitative relationships that exist between the digits in place value positions of a multi-digit number, learners apply their previous understandings of adding and subtracting to add and subtract decimals. While learners read, write, and compare decimals to the thousandths place using base-ten numerals, number names, and expanded form, the focus of this unit is addition and subtraction of decimals to the hundredths place.</p>	<p>Place value and decimal calculation are key to developing financial literacy, scientific study, and understanding real-world data trends. They are important in becoming an informed participant in society, and in higher levels of mathematics study.</p>

NJSLS

MATH.5.NBT.A.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.
MATH.5.NBT.A.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.
MATH.5.NBT.A.3.a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
MATH.5.NBT.A.3.b	Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.
MATH.5.NBT.A.4	Use place value understanding to round decimals to any place.
MATH.5.NBT.B.5	With accuracy and efficiency, multiply multi-digit whole numbers using the standard algorithm.
MATH.5.NBT.B.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.

Standards for Mathematical Practice

MATH.K-12.1	Make sense of problems and persevere in solving them
MATH.K-12.2	Reason abstractly and quantitatively
MATH.K-12.3	Construct viable arguments and critique the reasoning of others
MATH.K-12.4	Model with mathematics
MATH.K-12.5	Use appropriate tools strategically
MATH.K-12.6	Attend to precision
MATH.K-12.7	Look for and make use of structure
MATH.K-12.8	Look for and express regularity in repeated reasoning

Unit Focus

Enduring Understandings	Essential Questions
<ul style="list-style-type: none">• Basic facts and place-value patterns can be used to find products when one factor is a multiple of 10, 100, or 1,000; an exponent with 10 at the base can be used to represent powers of 10.• Understanding each digit's place value in a number provides a way to understand the number's value.• Our number system is based on powers of 10. Whenever we get 10 in one place value, we move to the next greater place value.• Our number system is based on powers of 10. Digits within decimal numbers have place value. Understanding a digit's decimal place value in a number helps determine the value of the number.• Place value can be used to compare and order whole numbers and decimals.• Rounding is a process for finding the multiple of 10, 100, and so on, or of 0.1, 0.01, and so on, closest to a given number.• Place value blocks can be used to add and subtract decimals.• Adding multi-digit decimals is similar to adding multi-digit whole numbers.• Subtracting multi-digit decimals is similar to subtracting multi-digit whole numbers.• Place-value patterns and mental math can be	<ul style="list-style-type: none">• How can you explain patterns in the number of zeroes in a product?• How are place-value positions related?• How can you read and write decimals to the Thousandths?• How can you represent decimals?• How can you compare decimals?• How can you round decimals?• How can you use models to add decimals?• How can you add decimals?• How can you subtract decimals?• How can you use products and mental math to multiply a whole number by a power of 10?• What is a common way to record multiplication of 1-digit numbers?• What is a common way to record multiplication of 2-digit numbers?• How do you multiply 3-digit numbers by 2-digit numbers?• How can you multiply with zeroes?• How can you use multiplication to solve problems?

used to write the product of a whole number and a power of 10.

- The standard multiplication algorithm is a shortcut for the expanded algorithm. Regrouping is used rather than showing all the partial products.
- The standard multiplication algorithm involves breaking the calculation into simpler ones using place value and properties of operations. Regrouping is used rather than showing all partial products.
- The meaning of multiplication is the same, no matter the size of the numbers. Both the partial products method and the standard algorithm for multiplying whole numbers are based on properties of operations.
- The process for multiplying factors with zeros is always the same regardless of the size of the numbers with zeros. Estimation is a strategy that can be used to check the final product for reasonableness.
- The meaning of multiplication is the same, no matter the size of the numbers. The standard algorithm for multiplying whole numbers is based on properties of operations and can be used to solve problems.

Learning Targets

- explain that a digit in one place represents $\frac{1}{10}$ of what it would represent in the place to its left.
- explain that a digit in one place represents ten times what it would represent in the place to its right.
- explain patterns in the number of zeros of the product when multiplying a whole number by powers of 10.
- write powers of 10 using whole-number exponents.
- multiply a whole number of up to a three digits by a whole number of up one digits using the standard algorithm with accuracy and efficiency.
- add and subtract decimals to hundredths using concrete models and drawings.
- multiply and divide decimals to hundredths using concrete models and drawings.
- add, subtract, multiply, and divide decimals to hundredths using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- relate the strategy to the written method and explain the reasoning used
- read and write decimals to thousandths using base-ten numerals
- read and write decimals to thousandths using number names.
- read and write decimals to thousandths using expanded form.
- compare two decimals to thousandths using $>$, $=$, and $<$ symbols.
- compare decimals when each is presented in a different form (base-ten numeral, number name, and expanded form).
- round decimals to any place value.

Prerequisite Skills

Read, write and represent whole numbers.

Use models to solve addition, subtraction, and multiplication.

Common Misconceptions

When trying to extend their understanding of whole number place value to decimal place value a misconception is that as you move to the left of the decimal point, the number increases in value. Students may misunderstand the meaning of the exponent when multiplying by powers of ten, thinking it gives how many zeros instead of how many decimals places to move. A further misconception that the number with the most digits has the greatest value. This can change when discussing decimals.

Spiraling For Mastery

Current Unit Content/Skills	Spiral Focus	Activity
<ul style="list-style-type: none"> • use exponents to write powers of 10 • write multi-digit whole numbers in expanded form with exponents • learn relationships between place values in whole numbers • learn relationships between place values in decimals • write decimals in expanded form • compare decimals • round decimals. • estimate decimal sums and differences • use estimation of decimal sums and differences to check reasonability of their exact answers • apply the properties of addition to decimals • learn mental math 	<ul style="list-style-type: none"> • compare, read, and write whole numbers to one million • write a number in expanded form • compare and round multi-digit whole numbers • use decimal notation by writing a fraction with a denominator of 10 or 100 as a decimal • compare decimals to hundredths by reasoning about their size • record the results of comparison using the symbols $<$, $>$, and $=$ • justify comparison by using a visual fraction model. • use the standard algorithm for addition and subtraction • estimate sums and differences using mental 	<ul style="list-style-type: none"> • Math Diagnostic and Intervention System Activities • IXL

<p>strategies for addition of decimals</p> <ul style="list-style-type: none"> • find sums of decimals with visual models. • estimate decimal sums and differences • use models and breaking apart to subtract decimals • use a number line and partial differences of decimals. • develop fluency and understanding by using the multiplication algorithm with whole numbers. 	<p>math strategies</p> <ul style="list-style-type: none"> • write fractions with denominators of 10 as decimals • write fractions with denominators of 100 as decimals • understand the relationship between fractions and decimals • add fractions with denominators of 10 by changing to equivalent fractions • add fractions with denominators of 100 by changing to equivalent fractions • understand decimal place value. • round whole numbers • use rounding and compatible numbers to estimate computations with all four operations • use strategies and properties to multiply 1-digit numbers by numbers with up to 4 digits • use strategies and properties to multiply two 2-digit numbers 	
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MATH.5.NBT.A.1

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MATH.5.NBT.A.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.

MATH.5.NBT.A.3.a

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

MATH.5.NBT.A.3.b

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

MATH.5.NBT.A.4

Use place value understanding to round decimals to any place.

MATH.5.NBT.B.5

With accuracy and efficiency, multiply multi-digit whole numbers using the standard algorithm.

MATH.5.NBT.B.7

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Assessment

Formative Assessment	Summative Assessment
<ul style="list-style-type: none">• Homework• Lesson Checks• MathXL• Quizzes• Exit Tickets• Lesson Reflections• Performance Tasks	<ul style="list-style-type: none">• Topic Tests (Common Assessments)• Unit 1 Benchmark (Link-It)

Resources

Key Resources	Supplemental Resources
<ul style="list-style-type: none">• Savvas EnVision Math 5• Pacing Guide	<ul style="list-style-type: none">• IXL• Delta Math• Desmos• Khan Academy

Career Readiness, Life Literacies, and Key Skills

PFL.9.1.2. FI.1

Differentiate the various forms of money and how they are used (e.g., coins, bills, checks, debit and credit cards).

PFL.9.1.2.FP.3

Identify the factors that influence people to spend or save (e.g., commercials, family, culture, society).

TECH.9.4.2.CT.3

Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

TECH.9.4.2.IML.2

Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).

Interdisciplinary Connections

ELA.L.RF.5.4.A

Read grade-level text with purpose and understanding.

ELA.SL.II.5.2

Summarize a written text read aloud or information presented in diverse media and formats (e.g., visually, quantitatively, and orally).

SCI.K.ESS3.A

Natural Resources