

Advanced Math Unit 1: Fluency with Whole Numbers and Decimals

Content Area: **Mathematics**
Course(s): **Mathematics 5**
Time Period: **September**
Length: **12 weeks - 60 Instructional Days**
Status: **Published**

Unit Overview

Students will develop a conceptual understanding and with accuracy and efficiency solve whole number and decimal operations. Students continue to use efficient strategies to multiply and the importance of place value is stressed. The models and strategies developed for whole numbers will be extended to decimal values. The properties of addition and multiplication will be applied to solve problems. Students will write and interpret expressions using the order of operations. This unit will be completed in 12 weeks (Trimester 1).

Priority Standards

MATH.6.NS.B.2	With accuracy and efficiency, divide multi-digit numbers using the standard algorithm.
MATH.6.NS.B.3	With accuracy and efficiency, add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MATH.6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
MATH.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MATH.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MATH.6.EE.A.2.c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
MA.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 $\frac{1}{10}$ of what it represents in the place to its left.
MA.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.

MA.5.NBT.A.3

Read, write, and compare decimals to thousandths.

MA.5.NBT.A.4

Use place value understanding to round decimals to any place.

MA.5.NBT.A.3a

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

MA.5.NBT.A.3b

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

MA.5.NBT.B

Perform operations with multi-digit whole numbers and with decimals to hundredths.

MA.5.NBT.B.5

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

MA.5.NBT.B.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.

MA.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.

Learning Goals & Targets

CCS Priority Standards

Learning Goal

MATH.5.NBT.A.1 [*Standard*] - 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.

SWBAT recognize it represents in the

MA.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.

SWBAT explain of 10, explain powers a power of 10, and

MA.5.NBT.A.3 Read, write, and compare decimals to the thousandths.

SWBAT read, write,

MA.5.NBT.A.3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.

SWBAT read and write expanded form.

MA.5.NBT.A3b Compare two decimals to thousandths based on meanings of the digits in each place using $>$, $=$, and $<$ symbols to record the results of comparisons. **SWBAT** compa and $<$ symbols to

MA.5.NBT.A4 Use place value understanding to round decimals to any place. **SWBAT** use pla

MA.5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths. **SWBAT** perform

MA.5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm. **SWBAT** fluently

MA.5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors using strategies based on place value and properties of operations. **SWBAT** find whole-number quotients and remainders using long division

MA.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. **SWBAT** 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.

MATH.5.OA.A.1 [Standard] - Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. **SWBAT** use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

MA.5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. **SWBAT** write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

MA.6.EE.A.1 Write and evaluate numerical expressions involving whole number exponents. **SWBAT** write and evaluate numerical expressions involving whole number exponents.

MA.6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. **SWBAT** write, read, and evaluate expressions in which letters stand for numbers.

MA.6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm. **SWBAT** fluently divide multi-digit numbers using the standard algorithm.

MA.6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm. **SWBAT** fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm.

MA.6.NS.B.4 I can find the greatest common factor of two or three whole numbers less than or equal to 100 and the least common multiple of two or three numbers less than or equal to 12. **SWBAT** find the greatest common factor of two or three whole numbers less than or equal to 100 and the least common multiple of two or three numbers less than or equal to 12.

Essential Questions

- How can patterns help you place the decimal point in a product or quotient?
- How can place value help you add and subtract decimals?
- How can the strategy "draw a diagram" help you solve a decimal multiplication problem?
- How can the strategy "make a table" help you organize and keep track of your bank account balance?
- How can the strategy draw a diagram help you solve a division problem?
- How can you estimate decimal quotients?
- How can you adjust the quotient if your estimate is too high or too low?
- How can you describe the relationship between two decimal place-value positions?
- How can you describe the relationship between two place-value positions?
- How can you divide by two digit divisors?
- How can you divide decimals by whole numbers?
- How can you estimate decimal sums and differences?
- How can you place the decimal point in a quotient?
- How can you tell where to place the first digit of a quotient without dividing?
- How can you use a basic fact and a pattern to multiply by a two digit number?
- How can you use a model to multiply a whole number and a decimal?
- How can you use a model to multiply decimals?
- How can you use a numerical expression to describe a situation?
- How can you use addition or subtraction to describe a pattern or create a sequence with decimals?
- How can you use an exponent to show powers of 10?
- How can you use compatible numbers to estimate quotients?
- How can you use expanded form and place value to multiply a decimal and a whole number?
- How can you use place value to compare and order decimals?
- How can you use place value to round decimals to a given place?
- How can you use properties of operations to solve problems?
- How can you use the strategy "solve a simpler problem" to help you solve a division problem?
- How do you know you have the correct number of decimal places in your product?

- How do you multiply by one digit numbers?
- How do you multiply by two digit numbers?
- How do you read, write, and represent decimals through thousandths?
- How do you read, write, and represent whole numbers through hundred millions?
- How do you solve and check division problems?
- How do you use the strategy "work backward" to solve multistep decimal problems?
- How is multiplication used to solve a division problem?
- In what order must operation be evaluated to find a solution when there are parentheses within parentheses?
- In what order must operations be evaluated to find the solution to a problem?
- What strategies can you use to place a decimal point in a product?
- When do you write a zero into the dividend to find a quotient?
- When solving a division problem, when do you write the remainder as a fraction?

Materials and Resources

Big Ideas Materials

*Stop watches/timers

Place value charts (from millions to thousandths)

*Multiplication and division charts

*Manipulatives (cubes, money, coins, counters)

Index cards

*Paper (chart, graph, lined, and blank)

Base ten blocks

Calculators

Colored pencils, markers, crayons

*Dry erase boards

Google Classroom Math

Iready Math

Reflex Math

SplashLearn

Khan Academy

Math Aids Place Value: http://www.math-aids.com/Place_Value/

<http://www.commoncoresheets.com/Values.php>

<http://www.printable-math-worksheets.com/place-value-chart.html>

- Assessment Guide
- Big Ideas Materials
- Calculators
- Google Classroom Math
- I ready
- LinkIt! Standards Assessments

Unit Assessments (Required)

- Big Ideas Grade 5 and 6 Assessments
- I Ready

Learning Plan and Pacing Guide

Time Frame	Lesson	Standard(s)	Target
Chapter 1 (11 days)	Chapter 1 Opener: Place Value Concepts	Performance Task Preview & Vocabulary	
	Lesson 1.1: Place Value Patterns	5.NBT.A.1	Understand the relationship between place value positions.
	Lesson 1.2: Place Value with Whole Numbers	5.NBT.A.1	Write multi-digit numbers in different forms and compare the values of digits.
	Lesson 1.3: Patterns and Powers of 10	5.NBT.A.2	Write numbers using exponents.
	Lesson 1.4: Decimals to Thousandths	5.NBT.A.1 5.NBT.A.3a	Write thousandths as fractions and decimals.
	Lesson 1.5: Place Value with Decimals	5.NBT.A.1 5.NBT.A.3a	Write decimals in different forms and compare the values of digits.
	Lesson 1.6: Compare Decimals	5.NBT.A.3b	Compare decimals to the thousandths place.
	lesson 1.7 Round decimals	5.NBT A4	use place value to round

Grade 6 Ch 1 lesson 1.1
 MATH.6.EE.A.1 Interpret
 numerical expressions involving
 exponents

Grade 6 Ch 1 lesson 1.2
 MATH.6.EE.A.2 write expressions
 which letters stand for numbers

Grade 6 Ch 1 lesson 1.3
 MATH.6.EE.A.2

Chapter 2
(8 days)

Chapter 2 Opener: Numerical Expressions	Performance Task Preview & Vocabulary	
Lesson 2.1: Number Properties	5.OA.A.1	Use number properties.
Lesson 2.2: Order of Operations	5.OA.A.1	Use order of operations to evaluate numerical expressions.
Lesson 2.3: Write Numerical Expressions	5.OA.A.1	Write numerical expressions.
Lesson 2.4: Evaluate Expressions with Grouping Symbols	5.OA.A.2	
	5.OA.A.1	Use order of operations to evaluate expressions with grouping symbols.
	5.OA.A.2	
End of Chapter 2: Place Value Concepts	Day 1 Performance Task	
End of Chapter 2: Place Value Concepts	Day 2 Centers	
End of Chapter 2: Place Value Concepts	Day 3 Chapter Assessment	
grade 6 ch 1 lesson 1.4 MATH.6.NS.B.4		find
GCF		
grade 6 ch 1 lesson 1.5 MATH.6.NS.B.4		find the
LCM		Assessment ch 1 Gr.
6		

Chapter 3
(10 days)

Chapter 3 Opener: Add and Subtract Decimals	Performance Task Preview & Vocabulary	
Lesson 3.1: Estimate Sums and Differences	5.NBT.A.4	Use rounding or compatible numbers to estimate sums and differences of decimals.
Lesson 3.2: Use Models to Add or Subtract Decimals	5.NBT.B.7	Use models to add or subtract decimals.
Lesson 3.3: Add Decimals	5.NBT.B.7	Add decimals and check whether the sum is reasonable.
Lesson 3.4: Subtract Decimals	5.NBT.B.7	Subtract decimals and check my answer.
Lesson 3.5: Add and Subtract Decimals	5.NBT.B.7	Use addition and subtraction to evaluate expressions involving decimals.
Lesson 3.6: Use Mental Math to Add or Subtract Decimals	5.NBT.B.7	Use mental math to add or subtract decimals.
Lesson 3.7: Problem Solving: Money	5.NBT.B.7	Solve multi-step word problems involving money.
End of Chapter 3: Add and Subtract Decimals	Day 1 Performance Task & Centers	
End of Chapter 3: Add and Subtract Decimals	Day 2 Chapter Assessment	
Review multiplication skills for Chapter 4		
Gr. 6 Ch 2 lesson 2.4		
MATH.6.NS.B.3	add & subtract decimals	

Chapter 4
(8 days)

Chapter 4 Opener: Multiply Whole Numbers	Performance Task Preview & Vocabulary	
Lesson 4.1: Multiplication Patterns	5.NBT.A.2	Find products involving multiples of 10 and powers of 10.
Lesson 4.2: Estimate Products	5.NBT.A.2	Use rounding and compatible numbers to estimate products.
Lesson 4.3: Multiply by One-Digit Numbers	5.NBT.B.5	Multiply multi-digit numbers by one-digit numbers.
Lesson 4.4: Multiply by Two-Digit	5.NBT.B.5	Multiply multi-digit numbers

	Numbers		by two-digit numbers.
	Lesson 4.5: Multiply Multi-Digit Whole Numbers	5.NBT.B.5	Multiply multi-digit whole numbers.
	End of Chapter 4: Multiply Whole Numbers	Day 1 Performance Task & Review	
	End of Chapter 4: Multiply Whole Numbers	Day 2 Chapter Assessment	
Chapter 5			
(10 days)	Lesson 5.1: Multiplication Patterns with Decimals	5.NBT.A.2 5.NBT.B.7	Find products involving decimals and powers of 10.
	Lesson 5.2: Estimate Products of Decimals and Whole Numbers	5.NBT.A.4 5.NBT.B.7	Use rounding and compatible numbers to estimate products of decimals and whole numbers.
	Lesson 5.3: Use Models to Multiply Decimals and Whole Numbers	5.NBT.B.7	Use models to multiply decimals and whole numbers.
	Lesson 5.4: Multiply Decimals and Whole Numbers	5.NBT.B.7	Multiply decimals and whole numbers.
	Lesson 5.5: Use Models to Multiply Decimals	5.NBT.B.7	Use models to multiply decimals.
	Lesson 5.6: Use Partial Products to Multiply Decimals	5.NBT.B.7	Use partial products to multiply decimals.
	Lesson 5.7: Use Strategies to Multiply Decimals	5.NBT.B.7	Use estimation and properties to multiply decimals.
	Lesson 5.8: Multiply Decimals	5.NBT.B.7	Multiply decimals.
	Lesson 5.9: Problem Solving: Multiply with Money	5.NBT.B.7	Solve multi-step word problems involving money.
	End of Chapter 5: Multiply Decimals	Chapter Assessment	Multiply decimals.
	Gr 6 ch 2 lesson 2.5 MATH.6.NS.B.3 multiply decimals		

Strategies for Multilingual learners

For Spanish speaking, students can use the multilingual Spanish book. Others need one-on-one support, vocabulary flashcards, eliminate word problems (computational problems only), picture clues, Google Translate, peer buddy.ELL

- Big Ideas student edition spanish book
- Bilingual dictionary
- Spanish Letters

Strategies for Students in Need of intervention

When students struggle with facts: Reflex Math, multiplication chart, flash cards, timed tests ACES/Struggling

When students struggle with word problems: highlight clue words, underline question, break down steps, read aloud, review vocabulary ACES/Struggling

- 1-1 conferencing
- center activities
- Flexible grouping
- highlight key words
- Manipulatives provided
- Visual Examples

Strategies for Enrichment

Big Ideas Enrichment & Extension Pages G&T

Big Ideas Differentiating the lesson pages G&T

- Desmos
- Enrichment and extension pages big ideas
- I ready pathway
- Kahn academy

Technology Integration

Math Playground http://www.mathplayground.com/grade_5_games.html

Khan Academy <http://www.khanacademy.org/math/cc-fifth-grade-math>

Illustrative Mathematics <http://www.illustrativemathematics.org>

Prodigy <http://www.prodigygame.com>

Learn Zillion <http://www.learnzillion.com>

aaamath <http://www.aaamath.com/grade5.html>

Math is Fun <https://www.mathsisfun.com/>

Sheppard Software <http://www.sheppardsoftware.com/math.htm>

Adapted Mind <http://adaptedmind.com>

Internet 4 Classrooms <http://internet4classrooms.com>

Academic Skill Builders <http://arcademicskillbuilders.com>

Math Play <http://www.math-play.com>

Class K-12 <https://www.classk12.com>

Figure This https://figurethis.nctm.org/challenges/math_index.htm

Freckle Education <https://www.freckle.com>

Greg Tang Math <https://gregtangmath.com>

Iready Math

- 8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
- 8.1.5.A.3 Use a graphic organizer to organize information about problem or issue.
- 8.1.5.A.4 Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
- 8.1.5.A.5 Create and use a database to answer basic questions.
- 8.1.5.A.6 Export data from a database into a spreadsheet; analyze and produce a report that explains the analysis of the data.

Interdisciplinary Connections

- Next Gen Science Standards (5. Matter and Energy in Organisms and Ecosystems Unit have connections to 5.MD.A.1)
- Next Gen Science Standards (5. Structure and Properties of Matter Unit have connections to 5.NBT.A.1; 5.NF.B.7; 5.MD.A.1; 5.MD.C.3; 5.MD.C.4)

21st Century Life & Career Ready Practices

- CRP11. Use technology to enhance productivity.
- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.