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

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 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.3a	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).
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.A.4	Use place value understanding to round decimals to any place.
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.
MATH.6.NS.B.2	With accuracy and efficiency, divide multi-digit 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.
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).

Learning Goals & Targets

CCS Priority Standards	Learning Goa
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** recogn it represents in tl
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** explair of 10, explain pa a power of 10, a
MA.5.NBT.A.3 Read, write, and compare decimals to the thousandths.	**SWBAT** read, w
MA.5.NBT.A3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, eg., 347.392 =3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000).	**SWBAT** read ar expanded form.
MA.5..NBT.A3b Compare two decimals to thousandths based on meanings of the digits in each place using >, =,	**SWBAT** compa

and < symbols to record the results of comparisons.	and < symbols t
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** perfor
MA.5..NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	**SWBAT** fluentl
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 w divisors using st
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, su and strategies ba
MATH.5.OA.A.1 [*Standard*] - Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	**SWBAT** use pa these symbols.
MA.5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.	**SWBAT** write s expression witho
MA.6.EE.A.1 Write and evaluate numerical expressions involving whole number exponents.	**SWBAT** write a
MA.6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.	**SWBAT** write,
MA.6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.	**SWBAT** fluentl
MA.6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm.	**SWBAT** fluent
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 t three numbers le

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 sow 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 yo 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 int 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	Write thousandths as fractions and decimals.
	5.NBT.A.3a	
Lesson 1.5: Place Value with Decimals	5.NBT.A.1	Write decimals in different forms and compare the values of digits.
	5.NBT.A.3a	
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 decimals

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 5.OA.A.2	Write numerical expressions.
	Lesson 2.4: Evaluate Expressions with Grouping Symbols	5.OA.A.1 5.OA.A.2	Use order of operations to evaluate expressions with grouping symbols.
	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 Assessment ch 1 Gr. 6	MATH.6.NS.B.4	find the LCM	
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 5.NBT.B.7	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 Numbers	5.NBT.B.5	Multiply multi-digit 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 acticities
- 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.