Diocese of Erie
Mathematics
Fifth Grade

Unit of Study	**Weeks:** 4
Unit 1: Whole Number and Decimal Fraction Place Value to the One-Thousandths Purpose: Fluently use place value to multiply, divide, estimate, and compare.	

Essential Questions:

- How are place value patterns repeated in large numbers and decimals?
- Where do you use whole numbers and/or decimals each day?
- What is the purpose of writing numbers in other ways than standard form?
- How does the location of a decimal point change the value of a number?
- How does a decimal point change the value of a whole number?
- What does it mean to estimate or analyze numerical quantities?
- How do we solve problems with whole numbers and decimals?
- How do we round decimals?
- How do we compare decimals?

Standards:

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.2 Explain patterns in the number of zeros of the product when multiplying a number by the power of 10.
5.NBT.3 Explain patterns in the placement of the decimal when a decimal is multiplied or divided by a power of 10.
5.NBT.4 Use whole number exponents to denote powers of 10.
5.NBT.5 Read, write, and compare decimals to thousandths.
5.NBT.5a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
5.NBT.5b Compare two decimals to thousandths based on based on meanings of the digits in each place, using <, >, = symbols to record the results of the comparison.
5.NBT.6 Use place value understanding to round decimals to any place.
5.NBT.7 Multiply decimals. (to hundredths place)
5.NBT.7 Divide decimals. (whole number divisors and dividends to hundredths place)

Standards Reinforced:

4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
4.NBT.2 Read and write multi-digit whole numbers using base ten numerals, number names, and expanded form.
4.NBT.3 Compare two multi-digit numbers based on meanings of the digits in each place, using >, <, = symbols to record the results of the comparison.
4.NBT.4 Use place value understanding to round multi-digit whole numbers to any place.

Vocabulary:		
expanded form	place value through billions	greater than, less than or equal
standard form	decimal	using symbols <, >, =
written form	decimal place value through thousandths	estimating
exponents	base ten blocks	rounding

Authentic Performance Assessment:

Inside Mathematics hosts these activities to compare rational numbers and understand decimal place value.
Outside class Olympics/Race and Record times. Compare running times vs jumping distances (Real world and ordering decimals) Have running races using stop watches and order times. Throw straw javelins or cotton balls in the classroom, measure distances and form averages then compare.
3 Compare prices of the same item using multiple grocery ads. (Real world money)
Change activity to use multiple ads: grocery, gas, etc. (Gas @ $2.099 per gallon vs food item @$2.99 per pound)
Use estimating and rounding the students will create a menu from a grocery ad when given a set amount of money. (Real world estimating)
Place value 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.
In this CPalms activity, students are asked to write numbers in both standard form (as base ten numerals) and expanded form.
Create a monthly budget.
This Georgia Standards website hosts several tasks working with fractions.
9. Illustrative Math has multiple tasks and activities for deeper thinking arranged by standard. These pertain specifically to place value.
www.mathantics.com variety of math activities
studyjams.scholastic.com Variety of math activities
10. Using a newspaper ad, compare best buys, i.e. 3/$1.00 vs 5/$2.00. Find the cost of one item when ad states 3/$1.00.

Computation Skills:
Round and estimate
Exponents and powers of ten
Addition
Multiplication and Division

Thinking and Reasoning Skills:
What patterns do you see in the place value of whole numbers and decimals and how do they compare?
Order decimals from greatest to least. What strategy did you use?
What different methods of estimation can you use to solve a problem and why would you choose one over another?
How does your knowledge of place value help you avoid calculator errors?
When are decimals used in real life?
What patterns do you notice when using decimals?
How can exponents make math calculations more efficient?

Real World Problems & Application/Catholic Identity:
Use of time reasoning in measuring distance or speed.
Use comparison of decimals to determine fastest runner or best score in gymnastics. (Especially during Olympics years)
Compare batting averages, on base percentages, baseball statistics.
When budgeting, make room in your budget for parish giving and other donations.
What difference does a 0 make in your bank account? Would changing the decimal place in your bank account make a difference? Do you think this ever happens by accident?
How do you quickly calculate tax, a percentage off at the store, or a 20% tip at a restaurant, using what you know about place value?
How does your knowledge of powers of 10 relate to the spread of germs and disease? Or the money you make in the bank or at the stock market?
Compare the number of Catholics in the world to other religions. Use exponents to write these numbers.

Reading and Writing in Math:
Journal writing using performance task #2, the students will compare and explain the differences among the results.
Using performance task #4, the students will write a story on how they used estimation to plan their menu for guests.
Work with partners to write larger whole numbers and/or decimals in standard, written and expanded form.

Questions/Discussion Strategies:
Group work
Think-pair-share
What happens to numbers when a decimal move to the right? When it moves left?
Is a number bigger because it has more digits? How do you know?
Other than retracing your steps, how can you determine if your answers are appropriate?
How does this relate to....?
What was one thing you learned (or two, or more)?
What math topics were you investigating?

What have you tried? What steps did you take?
What was your estimate or prediction?
Did you have a system? Explain it.
Did you use skills or build on concepts that were not necessarily mathematical?
If you broke this down into parts, what would they be?
Can you think of an anti-example?

Can you think of an example where that wouldn't work?
If you did this instead, what would happen?
Have we ever solved a problem like this before?

Technology/Manipulatives:
stop watches
meter sticks
place value charts
base-ten blocks
white boards
grocery ads

Websites
- Math Antics
- Kahn Academy
- Study Jams
- Freckle
- Splash Math
- Prodigy

I Have, Who Has for math (5-6) (Rounding whole numbers, rounding decimals to the nearest whole number and nearest decimal)
Vocab review using "Headbands" strategy

Accommodations/Acceleration/Differentiation:
Interventions: Place performance assessments (2-3) on a number line for visualization.

Web site practice (Math Antics or Study Jams). Use different sized chips or counters to visualize decimals in the tenths and hundredths place.
Extensions: Comparing items to find the best buy in volume purchasing #3.
Use number charts to help struggling students while practicing tables.

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Fifth Grade

Unit of Study	**Weeks:** 5
Module 2: Multi-digit Whole Number and Decimal Fraction Operations Purpose: In real-world contexts, fluently read, write, and compare decimals to the thousandths and multiply multi-digit whole numbers.	

Essential Questions:

- How does understanding the structure of the number system help you solve problems?
- How can you use the inverse of a numerical operation to help you compute an answer? *(How can you use opposite operations to get the figure out your answer?)*
- How do we compare decimals?
- What patterns occur in our number system?
- How do we solve problems with whole numbers and decimals?
- How does multiplying numbers relate to real world problems?

Standards:

5.NBT.5- Read, write, and compare decimals to thousandths.
5.NBT.5a- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
5.NBT.5b- Compare two decimals to thousandths based on meanings of the digits in each place using <, =, > symbols to record the results of the comparison
5.NBT.7- Fluently multiply multi-digit whole numbers using the standard algorithm.

Standards Reinforced:

4.NBT.2- Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.
4.NBT.3- Compare two multi-digit numbers based on meanings of the digits in each place using >, <, and = symbols to record the results of the comparison.

Vocabulary:		
place value (through billons)	subtrahend	quotient
decimals	difference	dividend
decimal place value (through thousandths)	Expanded form	divisor
base-10 block	Standard form	Greater than (>)
sum	Written/Word form	Less than (<)
addends	multiply	Equal to (=)
minuend	factors	Estimate
inverse	product	Rounding

Authentic Performance Assessment:

After receiving a "Party Planner Price List," the student will plan a 15-person party based on the theme created by the student. The student will be responsible for buying supplies, food, beverages, and an activity that will not exceed the $250 mark. Students will be expected to spend between $235 and $250 to receive full credit for that portion of the rubric. Students will be able to pick items under each category from the supplied price list provided by the teacher. Students must show ALL

computation work under each category of their supplies, food, beverages, and activity in which it MUST be accurate and relate to the blank data sheet each student will receive. Thank you notes are a mandatory item. Please see attached items below. (Rubric, Price List, Blank data sheet)
PAM Prep (Continental Press): Number Sense Practice Problems (Sample and #1,2,4)
Match Fishtank contains lessons, and math tasks that require grit and deep thinking.
Optional Idea: Service project for others (ex. making blankets for others) Students will need to calculate cost or amount of material needed for project.
You are a medical researcher and there has recently been an outbreak of a new virus. You must design a mask that protects doctors and nurses while they work with patients. Research other virus sizes to determine a reasonable estimate of this virus's size. Then, determine how close together (tightly woven) fibers in the mask should be to prevent this virus and other similar viruses from passing through. *Extend*: Design the mask. Be sure to think about the number of layers of protective material there should be, how big the mask should be, etc. Be sure to remember that you want enough oxygen to pass through for the medical workers to be safe.

Computation Skills:
Multiplication
Addition
Subtraction
Division
Estimation
Inverse operation

Thinking and Reasoning Skills:
Students will understand that the placement of the decimal is determined by multiplying or dividing a number by 10 or a multiple of 10.
Explain why "moving a decimal" works for dividing powers of ten.
Rules for multiplication and division of whole numbers also apply to decimals.
Multiplication and division are inverse operations and that addition and subtraction are inverse operations.
Explain when inverse operations could be helpful.

Real World Problems & Application/Catholic Identity:
Buying items from a store. Adding up the total in whole number or decimal form or buying an item and multiplying it by how many you want to purchase
Comparing prices in decimal form to find the better price
Knowing how much an item is by the location of the decimal point
Computation of items in everyday life
The importance of being specific to the thousandths place in: trauma medicine (blood ph), race car engines (usually parts are measured at least to the thousandths of an inch), and lasers (optical bandpass filters measured in nanometers)
Catholic Identity
Tithing

Reading and Writing in Math:
Reading of "The Multiplication of the Loaves and Fish"
http://www.goodnews.ie/multiplicationloavesfish.shtml
Students will be able to write as a reflection piece about their party planning.

What were some of the struggles of planning a party?
What would you have done differently?
What would you have done the same?
What were some of the strategies you used with computation of the numbers?
Journal Writing
Example: Why is 0.3 a larger number than 0.123 even though 0.123 has more digits? Explain in words and draw a diagram using base-10 blocks.

Questions/Discussion Strategies:
In relation to the decimal point, how do you know which number is larger? Smaller?
Why do we line up the decimal when comparing decimals?
Why do we line up the decimal when adding or subtracting decimals?
Is the shorter number (decimal) always the smallest number? 0.4 compared to 0.362
Prove that your answer is correct.
Explain in steps how you solved your problem.
How could you record your work?
What other math can you connect with this?
When do you use this math at home? At school? In other places?
What math words were used and why is this important?

Technology/Manipulatives:
Base-ten blocks
White board
Whole number and decimal place value chart
Number lines
Who Has More? Game on comparing decimals
Math websites (I.e. Math antics, Khan Academy, Studyjams,Quizlet, MathIXL, Reflex math(fluency program for all operations)
I Have, Who Has - Rounding Decimals to nearest whole number and nearest tenths

Accommodations/Acceleration/Differentiation:
Giving a place value chart on an assessment
For students experiencing difficulty with decimals, benchmark decimals could be given as well as base-10 blocks
Hands on greater than, less than, or equal to signs

Party Planner for _____

	Estimated Expenses	Actual Expenses
Supplies		
Food		
Drink		
Activity		
Total		

Supplies

ITEM	QUANTITY	PRICE	COST
Invitations			
Candles, Basic			
Plates, Solid			
Cups, Solid			
Napkins			
Utensils			
Thank You Notes			
		SUBTOTAL for supplies	

Food

ITEM	QUANTITY	PRICE	COST
		SUBTOTAL for food	

Drink

ITEM	QUANTITY	PRICE	COST

		SUBTOTAL for drink	

Activity

ITEM	QUANTITY	PRICE	COST
		SUBTOTAL for activity	

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Unit of Study Module 3: Addition and Subtraction of Fractions Purpose: Fluently add and subtract fractions.	**Weeks:** 8

Essential Questions:

- Why is it important to identify fractions as a part of a whole?
- How are adding/subtracting fractions similar to adding/subtracting whole numbers? How are they different?
- How can decomposing fractions and mixed numbers be used as a strategy to add/subtract fractions?
- How can models help us understand the addition and subtraction of fraction?
- How can understanding fractions make your life easier?

Standards:

5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators.
5.NF.3 Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

Standards Reinforced:

4.NF.4 Understand a fraction a/b with a >1 as a sum of fractions 1/b.
4.NF.4b Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation.
4.NF. 4c Add and subtract mixed numbers with like denominators, e.g. by replacing each mixed number with an equivalent fraction, and the relationship between addition and subtraction.
4.NF. 4d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators.

Vocabulary:		
addends	equivalent	LCM-Least Common Multiple
benchmark fractions	equivalent	minuend
decimal	fraction	mixed numbers
denominator	GCF- Greatest Common Factor	numerator
difference	improper fractions	subtrahend
	LCD- Least Common Denominator	sum

Authentic Performance Assessment:

See authentic performance assessment below that focuses on fractions using cooking. Students will need to calculate how much of each item is needed and how much of each item will remain once

used. *Extension*: Your friend accidently put in three eggs, which you cannot get out. How do you fix the recipe?

Computation Skills:
Addition
Subtraction
Decomposition
Comparing

Thinking and Reasoning Skills:
Fractions are a part to a whole.
Fractions allow us to make sense of situations that involve numbers that are not whole.
Computation with fractions is an extension of computation with whole numbers.
A fraction can be expressed in numerous ways.
MatchFishtank lessons, activities, and assessments on fraction addition and subtraction.

Real World Problems & Application/Catholic Identity:
Construction
Cooking
Measurement
Money

Catholic Identity
http://www.northwestgeorgianews.com/a-bible-lesson-on-fractions/article_2f09058b-4000-558e-b3ef-177cba064a51.html
(Article- A Bible lesson on fractions)- Students can read and reflect

Reading and Writing in Math:
Literature:
Fractions, Decimals, and Percents by David Adler; illustrated by Edward Miller
Piece = Part = Portion by Scott Gifford; illustrated by Shmuel Thaler
Working With Fractions by David Adler; illustrated by Edward Miller

Writing
Explain what the numerator and denominator of a fraction tell you. Give 2-3 different examples that include numbers, pictures and words.
Is 1/4 or 1/8 larger? Use words, pictures and numbers to explain your thinking to someone who doesn't understand. Can you write a general rule that helps you decide quickly?
John says that 1/100 is the smallest fraction. Do you agree or disagree? Use words, pictures and numbers to support your position.
Is 7/8 or 9/10 closer to 1? Use words, pictures and numbers to explain your thinking to someone who doesn't understand. Can you write a general rule that helps you decide quickly?
Sort the fraction cards into groups of close to 0, close to 1/2 or close to 1. What strategies did you use to quickly sort the cards into these groups? Which fractions were harder to place? Why?

Questions/Discussion Strategies:

What is a fraction?
How can we represent fractions?
What does the numerator/denominator tell us?
What did you know about fractions before today's lesson?
Why do you think it's important to learn about equivalent fractions?
Can you think of situations where you would use equivalent fractions?

Technology/Manipulatives:

White board
Fraction Pies
Fraction Sticks
Fraction blocks
Fraction chart
Task cards

Websites

- Math antics
- Khan Academy
- Studyjams
- Quizlet
- MathIXL (login required, 30 day free trial or paid subscription)
- Reflex math (fluency program for all operations)
- **http://classroom.jc-schools.net/basic/math-fract.html**

Accommodations/Acceleration/Differentiation:

Accommodations

Use of fraction chart on assessment
Keeping the denominator the same and scaffolding up to different denominators
Manipulatives

Acceleration

Two-digit fractions

Adding and Subtracting Fractions Performance Assessment
Role: You and your friends are preparing three desserts for a small party.
Product: You will present a list of how much of each item is needed to prepare the three desserts. Calculations need to be displayed. You will also present a grocery list needed to shop for these items. Lastly, you will present a list of how much of each item is remaining. Again, calculations need to be displayed.

Given the following recipes, you and your friends need to figure out: 1) how much of each item is used 2) how much of each item you need to purchase 3) and how much is left over.

Recipe 1 (Chocolate-Oatmeal Cookies)

1. 2 ¾ cups flour
2. 2 ½ teaspoons baking powder
3. ½ teaspoon salt
4. ½ cup margarine
5. 1 ¾ cups sugar
6. 1 ½ teaspoons vanilla
7. 2 eggs
8. 1 ¼ cups milk
9. 2 cups quick oatmeal
10. 1-ounce cocoa

Recipe 2 (Sugar Cookies)

1. 1 and 1/3 cups flour
2. 1 ¼ teaspoons baking powder
3. ¼ teaspoon salt
4. ¼ cup margarine
5. ¾ cup sugar
6. ¾ teaspoon vanilla
7. 3 eggs
8. 2/3 cup milk

When you purchase each ingredient, each container holds this amount:
Flour: 8 cups
Baking Powder: 20 teaspoons
Salt: 12 teaspoons
Sugar: 8 cups
Vanilla: 10 teaspoons
Eggs: 1 dozen
Milk: 16 cups
Margarine: 5 cups
Oatmeal: 8 cups
Cocoa: 8 ounces

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Fifth Grade

Unit of Study	**Weeks:** 8
Module 4: Multiplication and Division of Fractions Purpose: Extend previous understandings of multiplication and division to decimals to the hundredths and to fractions in real world contexts.	

Essential Questions:

- How is mathematics used to quantify, compare, represent, and model numbers?
- How are relationships represented mathematically?
- What does it mean to estimate or analyze numerical quantities?
- How do we solve problems with whole numbers and decimals?
- How do we multiply and divide fractions?
- How does multiplying and dividing fractions and decimal fractions relate to real world problems?

Standards:

5.NBT.9 Add, subtract, multiply and divide decimals to the 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.
5.NF.4 Interpret a fraction as division of the numerator by the denominator (a/b=a÷b). Solve world problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.
5.NF.5 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
5.NF.5a Interpret the product (a/b) x q as a part of a partition of q into b equal parts; equivalency, as the result of a sequence of operations a x q ÷ b.
5.NF.6b Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; explain why multiplying a given number by a fraction less than 1 results in a product smaller that the given number; and relate the principle of fraction equivalence a/b = (nxa)/(nxb) to the effect of multiplying a/b by one
5.NF.7 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models/equations to represent the problem.
5.NF.8 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
5.NF.8b Interpret division of a whole number by a unit fraction, and compute such quotients.
5.NF.8c Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.

Standards Reinforced:

4.NF.1 Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size.
4.NF.5 . Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
4.NF.5a Understand a fraction a/b as a multiple of 1/b.
4.NF.5b Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number.
4.NF.5c Solve word problems involving multiplication of a fraction by a whole number.

Vocabulary: Clustering Commutative property Compatible numbers Decimal Decimal place value Denominator Distributive property Dividend	Divisor Equivalent fractions Estimate Factors Greatest common factor Identity property Numerator Numerical expressions Order of operations	Product Quotient Reciprocal of the divisor Simplest form Unit fraction Unit price Zero property

Authentic Performance Assessment:

https://hcpss.instructure.com/courses/108/pages/5-dot-nf-dot-7-assessment-tasks (Quarter 4 Tasks) Dividing with fractions

Given a simple recipe, double or triple the quantity and determine the new measurements.

Given a recipe for 3 eggs and you only have two eggs, adapt the recipe for your use.

https://www.ixl.com/math/grade-5 Multiplying and dividing fractions M.10, N.7

PAM Prep Book E – Numeration and Number Sense: Practice Problem 3 (Multiplying Money)

Pre-Algebra and Reasoning: Sample Problem (Money and decimal practice)

https://hcpss.instructure.com/courses/108/pages/5-dot-nbt-dot-7-assessment-tasks (Quarter 2 and 3 tasks) Multiplication and Division of decimals

Determine tax on items bought, compare different state taxes.

Computation Skills:

Reducing Fractions to simplest form

Changing improper fractions to mixed and mixed fractions to improper fractions

Multiplication facts

Multiplication of fractions

Find the reciprocal and division of fractions

Multiplication of decimals

Division of decimals

Estimation

Thinking and Reasoning Skills:

Estimate and calculate the actual cost of items.

Do I have enough money to feed my family for the week?

Which store provides the best deals?

How many ingredients do I need to make three batches of cookies? A half of a batch?

How can I adjust a recipe if I only have part of the ingredients (I have 2 eggs when three are needed)?

Why are unit fractions important?

How does it make sense for dividing by a fraction to result in a larger quotient?

How are fractions like dividing?

Do any jobs you know of rely on this kind of dividing?

Real World Problems & Application/Catholic Identity:

Your recipe calls for ¾ pound of chicken, and feeds 4 people. You need to feed six people, and the chicken only comes in packages with weird weights – nothing in the units of ¾ pounds! What is the smallest sized package you can buy? Name 3 possible weights of chicken packages that would provide enough chicken for your needs.

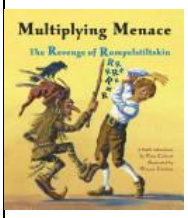
https://www.k5learning.com/free-math-worksheets/fifth-grade-5/word-problems (variety of mixed word problems)

Determine the cost in today's society to feed the 5,000 people as Jesus did.

Multiplying and Dividing Fractions Enrichment- Gwendolyn's Cupcake Trouble (Teachers Pay Teachers) Making cupcakes for a church's fellowship dinner and needs to make enough for 100 people.

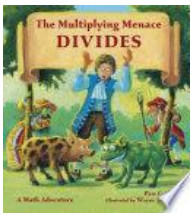
Reading and Writing in Math:
Look through the newspaper and find an article that is interesting to you. Count the first 100 words in the article and put a box around that section with a highlighter or marker. Follow the directions in the table below to determine the fraction of the words that are verbs, nouns, articles, compound words, and number words.

Journaling: create word problems using fractions and decimals for a friend to solve.

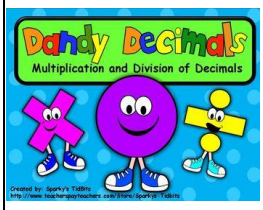


Multiplying Menace: The Revenge of Rumpelstiltskin
Author: **Pam Calvert**
Quiz: **109146 EN**
Quiz Type: **Reading Practice**

It's been 10 years since the queen defeated Rumpelstiltskin and now he's back to collect his payment from years before. He causes a stir in the kingdom by making mischief with his multiplying stick and threatens to do far worse if the debt is not repaid. It's up to Peter, the young prince, to take possession of the Rumpelstiltskin's magical multiplying stick and learn how to use it—and multiply both whole numbers and fractions-- in order to restore peace to the kingdom. A perfect mix of math, fairy-tale, and fun, The Multiplying Menace will get STEM/STEAM readers excited to solve the adventure one number at a time.



The Multiplying Menace Divides
Author: **Pam Calvert**
Quiz: **142841 EN**
Quiz Type: **Reading Practice**



Dandy Decimals (Multiplication and Division of Decimals) MCC5.NBT.7

Questions/Discussion Strategies:
How can I create a meal with the money I have?
How can I reduce a recipe to fit my family needs?
How can I increase a recipe to take a dish to a family picnic?
Where can I shop to get the best deals and save the most money?
Which state has the lowest taxes? Is it worth the gas to travel to a state where the taxes are less?

Technology/Manipulatives:
Explanations of dividing fractions from Khan Academy:
- Dividing Fractions with Sal Khan - Khan Academy
- Dividing whole numbers and fractions: t-shirts

Fractions videos from Khan Academy.
Skills practice (simple quizzes for multiplying and dividing fractions)

Youtube video song with vocabulary and points to remember when adding, subtracting, multiplying, and dividing fractions; performed by 5th graders. Sound and choreography is higher quality than most student performances. Math Antics - https://www.mathantics.com/
Accommodations/Acceleration/Differentiation: Extra practice and review: www.khanacademy.org/Official/Site

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Fifth Grade

Unit of Study	**Weeks:** 6
Unit 5: Addition and Multiplication with Volume and Area Purpose: Solve real world and mathematical problems concerning volume. Extend understanding of multiplication and area to fractional measurements.	

Essential Questions:

- How is mathematics used to quantify, compare, represent, and model numbers?
- How can mathematics support effective communication?
- How are relationships represented mathematically?
- What does it mean to estimate or analyze numerical quantities?
- What makes a tool and/or strategy appropriate for a given task?
- Why does "what" we measure influence "how" we measure?
- In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?
- How precise do measurements and calculations need to be?

Standards:

5.NF.5b Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.6 Interpret multiplication as scaling (resizing), by: 6a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication

5.MD.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

5.MD.3a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume. Can be used to measure volume.

5.MD.3b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

5.MD.5a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

5.MD.5b. Apply the formulas V= lxwxh and V=bxh for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

5.MD.5c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Standards Reinforced:
4.NF.4d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators
4.MD.4 Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Vocabulary:	Height	Side
Area	Length	Square measurement
Area of a rectangle	Parallelogram	Square unit
Area of a square	Perimeter	Squared
Cubic measure	Polygon	Volume
Cubic measures	Prisms	Width
Formula		

Authentic Performance Assessment:
PAM Prep (Continental Press 1997) Measurement and Geometry – Sample Problem and Practice Problems 1 and 2
HCPSS Assessments: A compilation of assessments with rubrics (Measurement)
You finally get to go visit your friend in Europe! As a thank you for providing a place for you to stay, you want to make her your favorite dinner. Unfortunately, in Europe, all of their cooking is done by weight. Research the information you need to create a unit conversion, and rewrite the recipe in European units. (Ingredients are measured in grams, mL, cm, and degrees Celsius).

Computation Skills:
Addition
Subtraction
Division
Multiplication
Reducing fractions
Formulas for perimeter, area, and volume

Thinking and Reasoning Skills:
Estimate how many cubes it will take to fill a box, use units to measure (blocks or sugar cubes). Compare results.
How are two-dimensional and three-dimensional measurements different? Is it possible to convert between square meters and cubic meters?
When is it important to know the volume of an object? (refrigerator volume for your home, which shape/dimension container would you like for your popcorn, etc.)
When is it important or useful to know whether a product will be greater than its factors?
How can you use your understanding of fractions to create rules for judging the reasonableness of your answers?
Do you use volume on a regular basis? Think about the daily activities that would not be possible if objects did not have volume.

Real World Problems & Application/Catholic Identity:
Find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.
A sandbox measures 6 feet long, 5 feet wide, and 3 feet deep. How many cubic feet of sand are needed to fill it?

The volume of a juice box is about 24 cubic inches. A juice box company wants to design a new juice box that holds the same volume. What are some possible dimensions for this juice box? Use pictures, numbers and/or words to show some possibilities.
What are the best ways to package your favorite candy? (memorable shape, personalized size, maximum volume, but minimizing packaging material)

Reading and Writing in Math:

mference and the Isle of Immeter by Cindy Neuschwander is a medieval geometry adventure, this time teaching the concepts of area and perimeter.

Writing Prompt:

- How are area, perimeter, and volume similar? How are they different?
- Why do you think it's important to know how to find the perimeter? Can you think of situations where you would need to know the perimeter of something? What kinds of jobs would require you to know how to find the perimeter?
- Why do you think it's important to know how to find area? Can you think of situations where you would need to know the area of something? What objects in this room could we find the area of? What are the differences between perimeter and area?
- How is the area of a triangle related to the area of a parallelogram? Why do you think it's important to learn how to find the area of triangles and parallelograms?
- Do you think it's possible to find the area of most polygons by splitting them up into rectangles and triangles? Are there any shapes you can think of that you wouldn't be able to split into rectangles and triangles?

Questions/Discussion Strategies:

- How can you find an unknown side length by using a known perimeter? Provide a written explanation and generate an equation to help you solve for the unknown side length.
- How can rectangles be alike but different?
- How can shapes have the same area but different perimeters?
- What does the perimeter of a polygon represent?
- What type of problem would require the use of area and perimeter as a solution?

Technology/Manipulatives:

Unit cubes
https://www.khanacademy.org/math/geometry-home/geometry-volume-surface-area
Sugar cubes
Studyjams.com
Tangrams

Accommodations/Acceleration/Differentiation:

Supports:
- Make the numbers used for perimeter and area smaller and scaffold to larger numbers.
- Make the attribute that is being measured explicit and offer clear direction.
- Use manipulatives.

Extensions:
- Have students represent rectangles in more than one way. (tiles and grid paper)
- Have students explore rectangles that have dimensions that include a fractional unit.
- Have students extend the ideas into three dimensions

Diocese of Erie
Mathematics
Fifth Grade

Unit of Study:	**Weeks:** 5
Unit 6: Graphing Data and Points on Coordinating Planes to Solve Problems Purpose: Use the coordinate plane system to solve real world and mathematical problems that include data in measurements of fractions of a unit.	

Essential Questions:

- How can data be organized and represented to provide insight into the relationship between quantities?
- How does the type of data influence the choice of display?
- How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?
- What makes a tool and/or strategy appropriate for a given task?

Standards:

5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, ¼, 1/8). Use operations on fractions for this grade to solve problems presented in line plots.
5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate plane system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second axis, with the convention that the names of the two axes and the coordinates correspond (i.e., x-axis and x-coordinate, y-axis and y-coordinate).
5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.

Standards Reinforced:

4.MD.5 Make a line plat to display a data set of measurements in fractions of a unit (1/2, ¼, 1/8). Solve problems involving additions and subtraction of fractions by using information presented in the line plots.
3.MD.7 Solve one- and two-step "how many more" and "how many less" problems using information presented in the scaled bar graphs.

Vocabulary:		
Review: graph	coordinate plane	quadrant
line plot	axes	horizontal scale
data	x-axis	vertical scale
scale	y-axis	x-coordinate
equal intervals	ordered pairs	y-coordinate
points	grid	origin
	coordinates	

Authentic Performance Assessment:

5.MD.2 - Assessment Tasks: Grade 5 Mathematics hosts activities and rubrics for line plots
Fifth Grade Unit 1: Graphing Pre-assessment (Coordinate planes/line plots)
https://hcpss.instructure.com/courses/108/pages/5-dot-g-2-assessment-tasks **(Coordinate planes)**

Using graph paper graph your neighborhood, adding points for houses, activities, landmarks, etc. Measure distances and record, using graph blocks to measure.
Create an imaginary town or city on a coordinate grid. Use it to find distances between two buildings using two different methods. Create words problems based on their imaginary towns.

Computation Skills:
Reading a line plot with whole numbers and fractions
Graphing points on a coordinate plane
Using a number line
Making comparisons between whole numbers and/or fractions
Online resources: Line Plot Worksheets

Thinking and Reasoning Skills:
Interpreting and Analyzing line plots
Comparing whole numbers and fractions on a line plot
Creating rectangles using a coordinate grid
Graphing patterns

Real World Problems & Application/Catholic Identity:
Turtle Race: plotting a turtle race with fractions
Have a Math Olympics and use a line plot to record distances in javelin throw (straws), shot put (cotton balls or softballs, if outside), discus (frisbees).
http://www.commoncoresheets.com/Grids.php (real world use, grid sheets)
Locating and using graphing skills in the real world.
Marking locations on a grid, finding distances on a grid, and distances from nearest church, nursing home, etc., and calculated how long it would take to walk there for a visit after measuring their gait.
Place objects outside and using a coordinate plane, locate them, using steps to count distances or meter sticks for measurement.
Career planning, plan a city or park area. Use a grid to determine where everything would go.
Discuss how graphing rates allows engineers and scientists to design better cars and even plan airplane paths and schedules!

Reading and Writing in Math:
Math Journal: Use a line plot to make up a story
Read a coordinate plane to locate an object. Create a story using a coordinate plane as a map.
Draw a geometric shape and name the coordinates. Ask a partner to recreate the shape. Discuss when this could be used in real life. Relate it to the childhood activity of placing different shapes into the ball and making them fit vs mass production of parts.

Questions/Discussion Strategies:
How can you use a line plot to compare distances?
What is the best way to use a coordinate plane to find certain locations?
How is a coordinate plane like longitude and latitude? How is it different?
How can you use a coordinate plane to create geometrical shapes?

Technology/Manipulatives:
I Have, Who Has Grade 5-6 Identify the Object at the Location 1
Name the Coordinates and Quadrants 1
Identify the Object at the Location 2
Name the Coordinates and Quadrants 2
KHAN Academy
http://www.commoncoresheets.com

Geoboards
Accommodations/Acceleration/Differentiation: Interventions: Use premade line plots to answer specific questions Use 1 Quadrant grids Extensions: Create data and use it to build a line plot Use 4 quadrant grids to plot information.