5th Grade Unit 2

Place Value and Operations with Decimals

Unit Planning Team:

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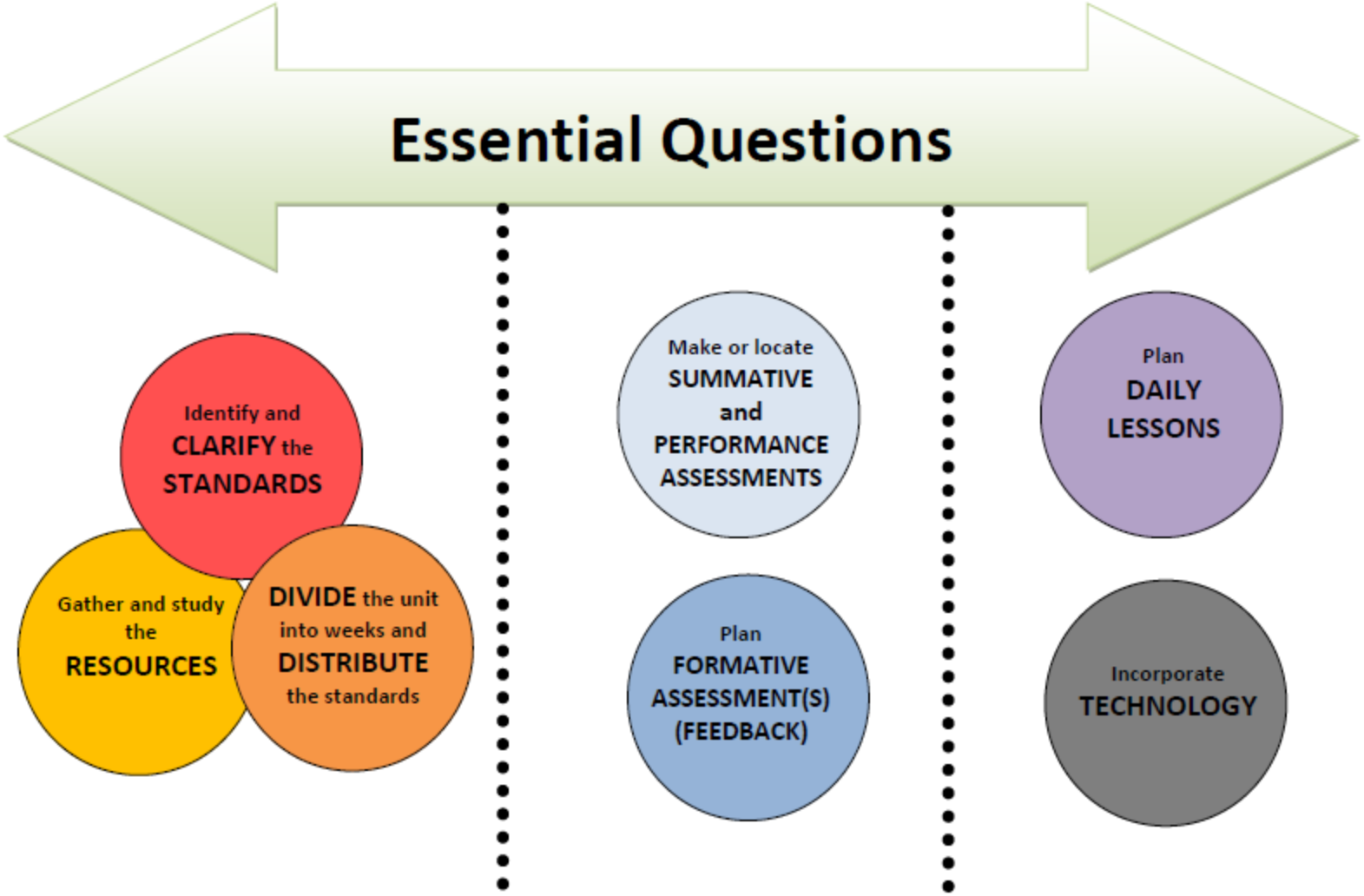
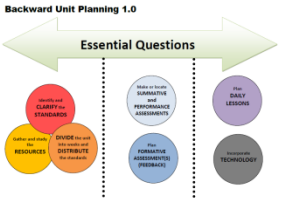
Backward Unit Planning 1.0



Essential Questions



R.P.S. Common Core Math Curriculum — 5th Grade

Unit 3 – Place Value & Operations with Decimals — **9 Weeks**

Students will draw on their experiences with place value from grades two through four with whole number patterns and will be able to generalize those patterns in decimal numbers, namely the power of ten. As students work word problems with measurements in the metric system, where the same patterns occur, they begin to appreciate the value and meaning of decimals. Students will continue to develop their fluency with multi-digit multiplication. They continue building their strategies for multi-digit division. Students will 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.

Essential Questions:

How can I take whole number patterns and what I know about base 10 fractions to generalize this understanding to decimal numbers?

How do the strategies we use related to the four operations apply to decimal numbers?

Number and Operations in Base Ten	
Understand the place value system.	
5.NBT.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.NBT.3	Read, write, and compare decimals to thousandths.
	a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).
	b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
5.NBT.4	Use place value understanding to round decimals to any place.
Perform operations with multi-digit whole numbers and with decimals to hundredths.	
5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
	Minimum expectation: Standard algorithm is not expected to be applied until 4th quarter.
5.NBT.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
5.NBT.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Measurement and Data	
Convert like measurement units within a given measurement system.	
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.
Operations and Algebraic Thinking	
Write and interpret numerical expressions.	
These standards will not be taught in isolated lessons, but will be addressed during Number Talks and Problem Solving discussion and notation.	
5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*

How can I take whole number patterns and what I know about base 10 fractions to generalize this understanding to decimal numbers?

How do the strategies we use related to the four operations apply to decimal numbers?

Background Knowledge

- Whole number place value understanding (How many 1s are in 10, how many 10s are in 100 etc.) Students can compare place values and explain patterns
- Base 10 fractions understanding (1/10, 1/100, 1/100)
- a÷b= a/b What does this look like? 5 sharing 3 *When students can see the 3 divided into fifths. 3/5*
- Be able to name fractions parts: What is 1/3 of ¼
- Experience with multiple groups, equal sharing, and base 10 problems
- Experience working with comparing fractions
- Experience with improper and mixed numbers- Students should be comfortable using both improper fractions and mixed numbers. The students should understand the relationship between the two and that both are correct ways of notating (How does this connect to decimals? Students will be better prepared write 23/10 as a decimal when they can reason about how many tenths it takes to make a whole.)

Number and Operations in Base Ten	
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5.NBT.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Use this language instead of adding or taking away zeros.

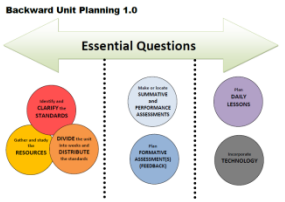
# of groups	X	# in each group	=	Total

This is the notion that is brought out in notation from 5.NBT. 1 and 5.NBT.2

This discussion really begins in unit 2 (Fractions to fractions) and continues to decimals. Number talks are a great way to being the conservations with decimals

Give them a reason to round…naked numbers do not give the students a reason to round. (Ex. Shopping scenarios, distance, use estimation)

Occurs daily in problem solving and number talks



Identify and CLARIFY the STANDARDS

Measurement and Data	
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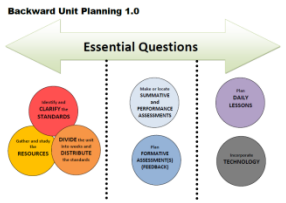
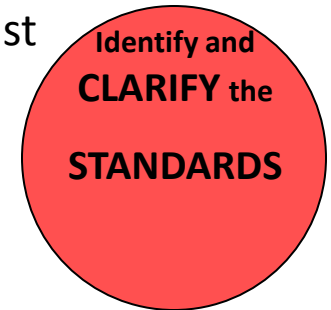
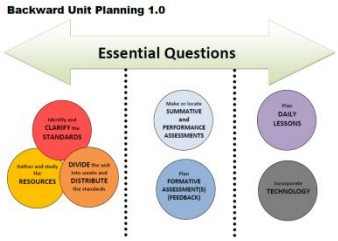
5. MD.1 Incorporate the metric system into decimal place value word problems. (NBT 1-2)

When students learn to reason about relationships on the reference sheet they will be able to use what they already know about multiplication and division to solve the problem. The focus should be on reasoning and relationships rather than just memorization. (NBT 5-7)



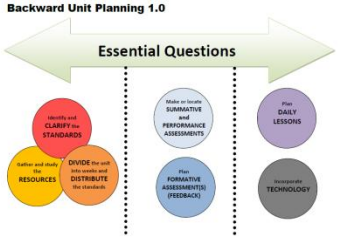


Week	Standards	Structure/Resources
1-2	5.NBT.1Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. 5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. 5.NBT.5 5.NBT.6 5.NBT.7 These operations will come out during our problem solving discussions/strategies 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. Bring out 5.OA.1 & 5.OA.2 in discussions	•Alternate between multiplication and measurement division using both whole numbers and decimals (we are merging our ideas of whole numbers and fractions in this unit) •The number in the # in each group needs to be a power of ten (10, 100, 0.1, 0.01) **# of groups** X **# in each group** = **Total** •Introduce decimal notation •See Chapter 7 in ECM book (listed on Rogers site) •Week 1: Animal at the Zoo pg. 154 • Week 2: Multiplication problem (cupcakes and frosting) (these problems and discussion will take multiple days) *Students need experience with both contextual problems and problems without context* •Measurement introduction: Could use Millions to Measure by David M Schwartz •**Number talk ideas:** Bundling base ten problems: • How many tens are 57? How many tens are in 243? (Good time to work on notation) •How many tenths are in 387.09? How many tens are in 387.09?



DIVIDE the unit into weeks and **DISTRIBUTE** the standards

Week	Standards	Structure/Resources
3	5.NBT.1 5.NBT.2 5.NBT.5 5.NBT.6 5.NBT.7 These operations will come out during our problem solving discussions/strategies 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. Bring out 5.OA.1 & 5.OA.2 in discussions	•Alternate between multiplication and measurement division using both whole numbers and decimals (we are merging our ideas of whole numbers and fractions in this unit) •Continue decimal notation •See Chapter 7 in ECM book (listed on Rogers site) •Mellery's Chili pg. 164 (the number sets should include whole numbers and decimals) *Students need experience with both contextual problems and problems without context* •**<u>Number talk ideas:</u>** • ECM book pg. 173 •Continue measurement problems pulling context and characters from *<u>Millions to Measure</u>*



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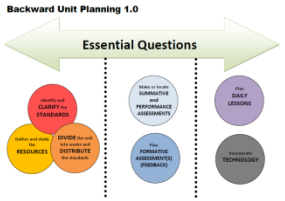
Week	Standards	Structure/Resources
4	5.NBT.3 Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. 5.NBT.5 5.NBT.6 5.NBT.7 These operations will come out during our problem solving discussions/strategies 5.MD.1 (1 day this week) Bring out 5.OA.1 & 5.OA.2 in discussions	Alternate between multiplication and measurement division using both whole numbers and decimals (we are merging our ideas of whole numbers and fractions in this unit) •Continue decimal notation •See Chapter 7 in ECM book (listed on Rogers site) •Intravenous Drip pg. 169 •Papa Pete's Pizza Place (on website) *Students need experience with both contextual problems and problems without context* •**<u>Number talk ideas:</u>** •Comparing decimals •Continue measurement problems pulling context and characters from *<u>Millions to Measure</u>*



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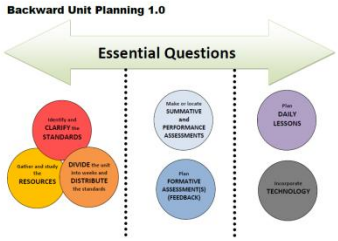
Week	Standards	Structure/Resources
5	5.NBT.3 a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. 5.NBT.4 Use place value understanding to round decimals to any place. 5.NBT.5 5.NBT.6 5.NBT.7 These operations will come out during our problem solving discussions/strategies 5.MD.1 (1 day this week) Bring out 5.OA.1 & 5.OA.2 in discussions	Alternate between multiplication and measurement division using both whole numbers and decimals (we are merging our ideas of whole numbers and fractions in this unit) •Continue decimal notation •Problems to pose •Applesauce Jars (website) •Water Challenge (website) Use to bring in rounding and multiplication *Students need experience with both contextual problems and problems without context* •**<u>Number talk ideas:</u>** •Comparing decimals, whole numbers, and fractions •Continue measurement problems pulling context and characters from *<u>Millions to Measure</u>*



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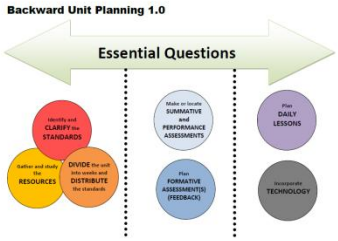
Week	Standards	Structure/Resources
6	5.NBT.3 a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. 5.NBT.4 Use place value understanding to round decimals to any place. 5.NBT.5 5.NBT.6 5.NBT.7 These operations will come out during our problem solving discussions/strategies 5.MD.1 (1 day this week) Bring out 5.OA.1 & 5.OA.2 in discussions	This would be a good time to do an interim assessment to see where your students are with the standards. Problems to pose: •Addition: The Daring Divers (website) *Students need experience with both contextual problems and problems without context* •**<u>Number talk ideas:</u>** •Continue measurement problems pulling context and characters from *<u>Millions to Measure</u>*



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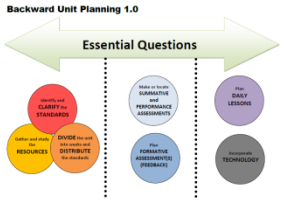
Week	Standards	Structure/Resources
7	5.NBT.5 5.NBT.6 5.NBT.7 These operations will come out during our problem solving discussions/strategies 5.MD.1 (1 day this week) Bring out 5.OA.1 & 5.OA.2 in discussions	If your students are ready to move forward: Problems to pose: •Problems to pose with Rate (website) •Pose multiplication and division problems •Order of Operation problems with decimals included and/or a rectangular prism with L,W, and H with decimals. Website Resources: Bowling for Numbers Watch Out for Parentheses 1, Comparing Products Video Game Scores Words to Expressions 1 Pose Problem with conversions in the metric system



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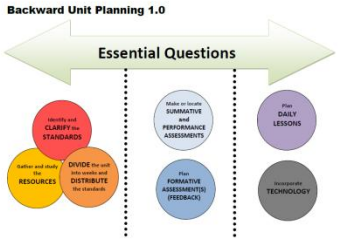
Week	Standards	Structure/Resources
8	5. NBT. 3 5. NBT. 4 5. NBT. 7 5.MD.1	•Continue to discuss decimals in both contextual and **non contextual** problems. The technology resources on the website include decimal open number sentences that would be great examples of non contextual problems. •Continue number talks; supplemental number talks for unit 3 (website) •The Deep Curriculum Alignment Project for Mathematics Sample Task located on the website has great questions to use to check for deep understanding. •Continue work with conversions. *If you see students continuing to struggle with certain aspects- you could use the games and activities for whole group while you pull students back for interventions.
9	All Standards	•Teachers could use Decimal Choice Boards during Week 9 to offer differentiation and this will provide small group opportunities before the assessment •Continue lessons from week 8 •End with an assessment



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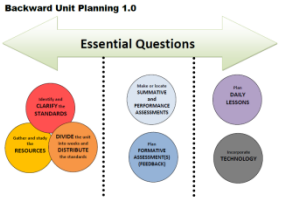
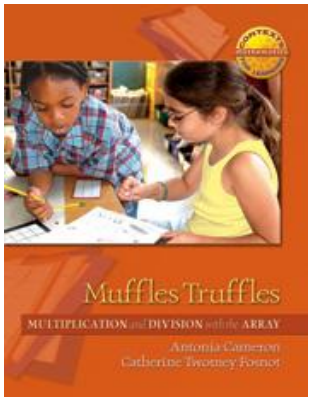
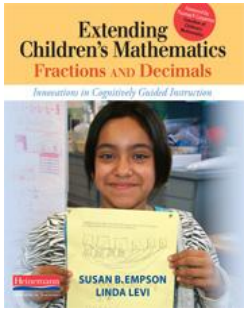
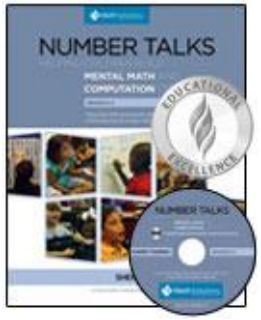
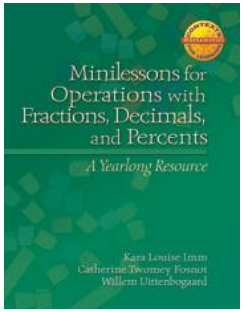
Gather and study the RESOURCES

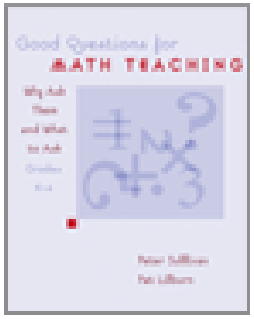


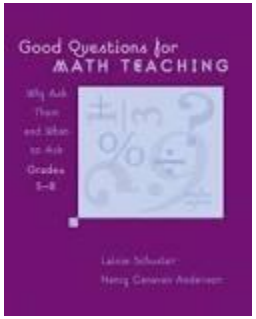




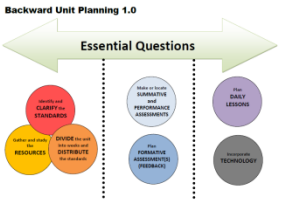








Options for Assessment – available online for Unit 2



Name: Date:

Unit 3 – Place Value and Operations with Decimals (5.MD.1)

Write >, <, or = in the circle to compare the measurements.

3 ½ hours	◯	200 minutes
3 quarts	◯	6 cups
5 kilometers	◯	5,000 meters
35 feet	◯	11 yards

Choose two of your solutions above and explain your thinking.

Name: Date:

Unit 3 – Place Value and Operations with Decimals (5.MD.1)

In the long jump, Karen can jump 51 inches, Debbie can jump 4 feet 4 inches, and Margaret can jump 1 yard, 1foot, 1 inch. Who can jump the farthest?

Use what you know about customary measurement to explain how you found your answer.

Name: Date:

Unit 3 – Place Value and Operations with Decimals

Round the following numbers to the nearest hundredth.

	Round to hundredth
5.025	
5.079	
5.103	
5.117	
5.108	

Solve

a. 0.35 x 1.5 =

b. 5.63 + 14.37 =

c. 37.1 x 2,584 =

d. 625 x 847 =

e. 85.703 + 12.197 =

f. 57.03 + 2.08 =

g. 0.3 + 0.82 =

h. 1.4 – 0.7 =

i. 7.148 – 0.07 =

Name: Date:

Unit 3 – Place Value and Operations with Decimals (5.NBT.1, 5.NBT.3)

1. Express as decimal numerals.

a. three thousandths	
b. thirty-four thousandths	
c. five hundred and seven hundredths	
d. 26/1000	
e. 3 94/100	

2. Express each of the following values in words.

a. 0.006

b. 12.056

c. 205.68

3. Write the number in expanded form using fractions or decimals to express the decimal place value units.

a. 24.73

b. 0.239

4. Write a decimal for each of the following.

a. 7 x 10 + 3 x 1 + 6 x (1/10) + 8 x (1/100)

b. 4 x 100 + 2 x 10 + 7 x 0.1 + 9 x 0.001

Adapted from NYS Common Core Mathematics Curriculum

Make or locate SUMMATIVE and PERFORMANCE ASSESSMENTS

LESSONS AND RESOURCES ARE AVAILABLE ONLINE.

Plan
DAILY LESSONS

Incorporate
TECHNOLOGY

NEW Teacher Created Resources pages!!!

RESOURCES

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