Blackwater Community School Curriculum Map 2016-2017

Fourth Grade Quarter 1

Module 1: Place Value, Rounding, and Algorithms for Addition and Subtraction

Approximately 25 days – Begin around July 27th

In this 25-day module of Grade 4, students extend their work with whole numbers. They begin with large numbers using familiar units (hundreds and thousands) and develop their understanding of millions by building knowledge of the pattern of times ten in the base ten system on the place value chart (4.NBT.1). They recognize that each sequence of three digits is read as hundreds, tens, and ones followed by the naming of the corresponding base thousand unit (thousand, million, billion).

Major Clusters:	**4.OA.A – Use the four operations with whole numbers to solve problems.** **4.NBT.A – Generalize place value understanding for multi-digit whole numbers.** **4.NBT.B – Use place value understanding and properties of operations to perform multi-digit arithmetic.**
Supporting Clusters:	
Vocabulary	ten thousands, hundred thousands, one millions, ten millions, hundred millions, algorithm, variable

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
4.NBT	**A**	**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. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* 4.MP.2. Reason abstractly and quantitatively. 4.MP.6. Attend to precision. 4.MP.7. Look for and make use of structure.	Students should be familiar with and use place value as they work with numbers. Some activities that will help students develop understanding of this standard are: • Investigate the product of 10 and any number, then justify why the number now has a 0 at the end. (7 x 10 = 70 because 70 represents 7 tens and no ones, 10 x 35 = 350 because the 3 in 350 represents 3 hundreds, which is 10 times as much as 3 tens, and the 5 represents 5 tens, which is 10 times as much as 5 ones.) While students can easily see the pattern of adding a 0 at the end of a number when multiplying by 10, they need to be able to justify why this works. • Investigate the pattern, 6, 60, 600, 6,000, 60,000, and 600,000 by dividing each number by the previous number.	**Engage NY** M1 Lessons 1-4, 11-19 **enVision** Topic 1,3

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
4.NBT	**A**	**2**	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. 4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics. 4.MP.6. Attend to precision. 4.MP.7. Look for and make use of structure.	The expanded form of 275 is 200 + 70 + 5. Students use place value to compare numbers. For example, in comparing 34,570 and 34,192, a student might say, both numbers have the same value of 10,000s and the same value of 1000s however, the value in the 100s place is different so that is where I would compare the two numbers.	**Engage NY** M1 Lessons 1-6, 11-19 **enVision** Topic 3
4.NBT	**A**	**3**	Use place value understanding to round multi-digit whole numbers to any place. 4.MP.2. Reason abstractly and quantitatively. 4.MP.6. Attend to precision.	When students are asked to round large numbers, they first need to identify which digit is in the appropriate place. **Example**: Round 76,398 to the nearest 1000. • Step 1: Since I need to round to the nearest 1000, then the answer is either 76,000 or 77,000. • Step 2: I know that the halfway point between these two numbers is 76,500. • Step 3: I see that 76,398 is between 76,000 and 76,500. • Step 4: Therefore, the rounded number would be 76,000.	**Engage NY** M1 Lessons 7-10 **enVision** Topic 3,4,7
4.NBT	**B**	**4**	Fluently add and subtract multi-digit whole numbers using the standard algorithm. 4.MP.2. Reason abstractly and quantitatively. 4.MP.5. Use appropriate tools strategically. 4.MP.7. Look for and make use of structure. 4.MP.8. Look for and express regularity in	Students build on their understanding of addition and subtraction, their use of place value and their flexibility with multiple strategies to make sense of the standard algorithm. They continue to use place value in describing and justifying the processes they use to add and subtract. When students begin using the standard algorithm their explanation may be quite lengthy. After much practice with using place value to justify their steps, they will develop fluency with the algorithm. Students should be able to explain why the algorithm works. • 3892 <u>+ 1567</u>	**Engage NY** M1 Lessons 11-19 **enVision** Topic 4

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			repeated reasoning.	Student explanation for this problem: 1. Two ones plus seven ones is nine ones. 2. Nine tens plus six tens is 15 tens. 3. I am going to write down five tens and think of the10 tens as one more hundred.(notates with a 1 above the hundreds column) 4. Eight hundreds plus five hundreds plus the extra hundred from adding the tens is 14 hundreds. 5. I am going to write the four hundreds and think of the 10 hundreds as one more 1000. (notates with a 1 above the thousands column) 6. Three thousands plus one thousand plus the extra thousand from the hundreds is five thousand. • 3546 - 928 Student explanation for this problem: 1. There are not enough ones to take 8 ones from 6 ones so I have to use one ten as 10 ones. Now I have 3 tens and 16 ones. (Marks through the 4 and notates with a 3 above the 4 and writes a 1 above the ones column to be represented as 16 ones.) 2. Sixteen ones minus 8 ones is 8 ones. (Writes an 8 in the ones column of answer.) 3. Three tens minus 2 tens is one ten. (Writes a 1 in the tens column of answer.) There are not enough hundreds to take 9 hundreds from 5 hundreds so I have to use one thousand as 10 hundreds. (Marks through the 3 and notates with a 2 above it. (Writes down a 1 above the hundreds column.) 4. Now I have 2 thousand and 15 hundreds. 5. Fifteen hundreds minus 9 hundreds is 6 hundreds. 6. (Writes a 6 in the hundreds column of the answer). 7. I have 2 thousands left since I did not have to take away any thousands. (Writes 2 in the thousands place of answer.)	

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
				Note: Students should know that it is mathematically possible to subtract a larger number from a smaller number but that their work with whole numbers does not allow this as the difference would result in a negative number.	
4.OA	**A**	**1**	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. 4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics.	A multiplicative comparison is a situation in which one quantity is multiplied by a specified number to get another quantity (e.g., "a is n times as much as b"). Students should be able to identify and verbalize which quantity is being multiplied and which number tells how many times.	**Engage NY** M1 Lessons 1-4 **enVision** Topic 1
4.OA	**A**	**3**	Solve multistep word problems posed with whole numbers and having whole-number answers ~~using the four operations, including problems in which remainders must be interpreted~~. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (Focus on addition and subtraction.) 4.MP.1. Make sense of problems and persevere in solving them. 4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically. 4.MP.6. Attend to precision.	Students need many opportunities solving multistep story problems addition and subtraction. An interactive whiteboard, document camera, drawings, words, numbers, and/or objects may be used to help solve story problems. **Examples:** The basketball team raised a total of $154,694 in September and $29,987 more in October than in September. How much money did they raise in all? There were 12,345 people at a concert on Saturday night. On Sunday night, there were 1,795 fewer people at the concert than on Saturday night. How many people attended the concert on both nights? Estimation skills include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of situations using various estimation strategies. Estimation strategies include, but are not limited to: • front-end estimation with adjusting (using the highest place value and	**Engage NY** M1 Lessons 11-19 Also addressed in Module 3 & 7 **enVision** Topic 1,5,10

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			4.MP.7. Look for and make use of structure.	estimating from the front end, making adjustments to the estimate by taking into account the remaining amounts), • clustering around an average (when the values are close together an average value is selected and multiplied by the number of values to determine an estimate), • rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding affected the original values), • using friendly or compatible numbers such as factors (students seek to fit numbers together - e.g., rounding to factors and grouping numbers together that have round sums like 100 or 1000), using benchmark numbers that are easy to compute (student's select close whole numbers for fractions or decimals to determine an estimate).	

Module 2: Unit Conversions and Problem Solving with Metric Measurement

Approximately 7 days – Begin around August 31st

Module 2 uses length, mass and capacity in the metric system to convert between units using place value knowledge. Students recognize patterns of converting units on the place value chart, just as 1000 grams is equal 1 kilogram, 1000 ones is equal to 1 thousand. Conversions are recorded in two-column tables and number lines, and are applied in single- and multi-step word problems solved by the addition and subtraction algorithm or a special strategy. Mixed unit practice prepares students for multi-digit operations and manipulating fractional units in future modules.

Major Clusters:					
Supporting Clusters:			4.MD.A – Solve problems involving measurement and conversion of measurements from a larger unit to a small unit.		
Vocabulary			Kilometer, mass, milliliter, mixed units		
4.MD	A	1	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.	The units of measure that have not been addressed in prior years are pounds, ounces, kilometers, milliliters, and seconds. Students' prior experiences were limited to measuring length, mass, liquid volume, and	**Engage NY** M2 Lessons 1-5

<table>
<tr><th>Domain</th><th>Cluster</th><th>Standard</th><th>Arizona's College and Career Ready Standards</th><th>Explanations & Examples</th><th>Notes and Resources</th></tr>
<tr><td></td><td></td><td></td><td>Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), (Q1, Q2)

4.MP.2. Reason abstractly and quantitatively.
4.MP.5. Use appropriate tools strategically.
4.MP.6. Attend to precision.</td><td>elapsed time. Students did not convert measurements. Students need ample opportunities to become familiar with these new units of measure. Students may use a two-column chart to convert from larger to smaller units and record equivalent measurements. They make statements such as, if one foot is 12 inches, then 3 feet has to be 36 inches because there are 3 groups of 12.

Example:
<table><tr><td>kg</td><td>g</td></tr><tr><td>1</td><td>1000</td></tr><tr><td>2</td><td>2000</td></tr><tr><td>3</td><td>3000</td></tr></table><table><tr><td>ft</td><td>in</td></tr><tr><td>1</td><td>12</td></tr><tr><td>2</td><td>24</td></tr><tr><td>3</td><td>36</td></tr></table></td><td>Also addressed in Module 7

enVision
Topic 14</td></tr>
<tr><td>4.MD</td><td>A</td><td>2</td><td>Use the four (only addition and subtraction) operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

4.MP.1. Make sense of problems and persevere in solving them.
4.MP.2. Reason abstractly and quantitatively.
4.MP.4. Model with mathematics.</td><td><u>Addition:</u> Brandon's backpack weighs 3,140 grams. Brandon weighs 22 kilograms 610 grams. How much does Brandon and his backpack weigh together?
<u>Subtraction:</u> The electrician had 7 m 23 cm of electrical wire. He used 551 cm for one wiring project. How many centimeters of wire did he have left?
Number line diagrams that feature a measurement scale can represent measurement quantities. Examples include: ruler, diagram marking off distance along a road with cities at various points, a timetable showing hours throughout the day, or a volume measure on the side of a container.</td><td>Also addressed in Unit 6 & 7

Engage NY
M2 Lessons 1-5

enVision
Topic 13,14,15</td></tr>
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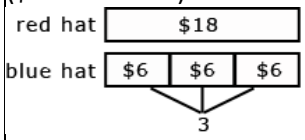
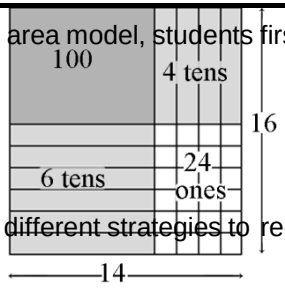
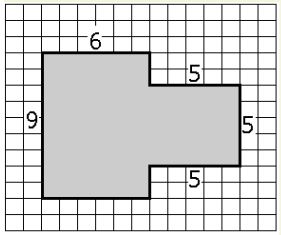
Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			4.MP.5. Use appropriate tools strategically. *4.MP.6.* Attend to precision.		
Module 3: Multi-Digit Multiplication and Division – Part 1, Topics A-D **Approximately 15 Days – Begin around September 8th** In this 43-day module, students use place value understanding and visual representations to solve multiplication and division problems with multi-digit numbers. As a key area of focus for Grade 4, this module moves slowly but comprehensively to develop students' ability to reason about the methods and models chosen to solve problems with multi-digit factors and dividends.					
Major Clusters:			**4.OA.A – Use the four operations with whole numbers to solve problems.** **4.NBT.A – Generalize place value understanding for multi-digit whole numbers.** **4.NBT.B – Use place value understanding and properties of operations to perform multi-digit arithmetic.**		
Supporting Clusters:			4.MD.A – Solve problems involving measurement and conversion of measurements from a larger unit to a small unit.		
Vocabulary			Associative property, composite number, distributive property, divisor, partial product, prime number, remainder		
4.OA	**A**	**1**	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. *4.MP.2.* Reason abstractly and quantitatively. *4.MP.4.* Model with mathematics.	A *multiplicative comparison* is a situation in which one quantity is multiplied by a specified number to get another quantity (e.g., "*a* is *n* times as much as *b*"). Students should be able to identify and verbalize which quantity is being multiplied and which number tells how many times.	**Engage NY** M3 Lessons 1-6, 12-13 **enVision** Topic 1
4.OA	**A**	**2**	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing	Students need many opportunities to solve contextual problems. Table 2 includes the following multiplication problem: • A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? In solving this problem, the student should identify $6 as the	**Engage NY** M3 Lessons 1-13 **enVision** Topic 1

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			multiplicative comparison from additive comparison. 4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically. 4.MP.7. Look for and make use of structure.	quantity that is being multiplied by 3. The student should write the problem using a symbol to represent the unknown. ($6 x 3 = ☐)  When distinguishing multiplicative comparison from additive comparison, students should note that: • **Additive comparisons** focus on the difference between two quantities (e.g., Deb has 3 apples and Karen has 5 apples. How many more apples does Karen have?). A simple way to remember this is, "How many more?" **Table 1 - Comparison** • **Multiplicative comparisons** focus on comparing two quantities by showing that one quantity is a specified number of times larger or smaller than the other (e.g., Deb ran 3 miles. Karen ran 5 times as many miles as Deb. How many miles did Karen run?). A simple way to remember this is "How many times as much?" or "How many times as many?" **Table 2 – Comparison**	
4.OA	**A**	**3**	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. 4.MP.1. Make sense of problems and persevere in solving them.	Students need many opportunities solving multistep story problems using all four operations. An interactive whiteboard, document camera, drawings, words, numbers, and/or objects may be used to help solve story problems. **Example**: • Chris bought clothes for school. She bought 3 shirts for $12 each and a skirt for $15. How much money did Chris spend on her new school clothes? 3 x $12 + $15 = *a* In division problems, the remainder is the whole number left over when as large a multiple of the divisor as possible has been subtracted. **Example**: • Kim is making candy bags. There will be 5 pieces of candy in each	**Engage NY** M3 Lessons1-3, 12-13 Also addressed in Unit 7 **enVision** Topic 1,5,10

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically. 4.MP.6. Attend to precision. 4.MP.7. Look for and make use of structure.	bag. She had 53 pieces of candy. She ate 14 pieces of candy. How many candy bags can Kim make now? (7 bags with 4 leftover) • Kim has 28 cookies. She wants to share them equally between herself and 3 friends. How many cookies will each person get? (7 cookies each) $28 \div 4 = a$ • There are 29 students in one class and 28 students in another class going on a field trip. Each car can hold 5 students. How many cars are needed to get all the students to the field trip? (12 cars, one possible explanation is 11 cars holding 5 students and the 12^{th} holding the remaining 2 students) $29 + 28 = 11 \times 5 + 2$ Estimation skills include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of situations using various estimation strategies. Estimation strategies include, but are not limited to: • front-end estimation with adjusting (using the highest place value and estimating from the front end, making adjustments to the estimate by taking into account the remaining amounts), • clustering around an average (when the values are close together an average value is selected and multiplied by the number of values to determine an estimate), rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding affected the original values), • using friendly or compatible numbers such as factors (students seek to fit numbers together - e.g., rounding to factors and grouping numbers together that have round sums like 100 or 1000), using benchmark numbers that are easy to compute (student's select close whole numbers for fractions or decimals to determine an estimate).	
4.NBT	**A**	**1**	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place	Students should be familiar with and use place value as they work with numbers. Some activities that will help students develop understanding of this standard are:	**Engage NY** M3 Lessons 4-11

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.* 4.MP.2. Reason abstractly and quantitatively. 4.MP.6. Attend to precision. 4.MP.7. Look for and make use of structure.	• Investigate the product of 10 and any number, then justify why the number now has a 0 at the end. (7 x 10 = 70 because 70 represents 7 tens and no ones, 10 x 35 = 350 because the 3 in 350 represents 3 hundreds, which is 10 times as much as 3 tens, and the 5 represents 5 tens, which is 10 times as much as 5 ones.) While students can easily see the pattern of adding a 0 at the end of a number when multiplying by 10, they need to be able to justify why this works. • Investigate the pattern, 6, 60, 600, 6,000, 60,000, and 600,000 by dividing each number by the previous number.	**enVision** Topic 1,3
4.NBT	**B**	**5**	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. 4.MP.2. Reason abstractly and quantitatively. 4.MP.3. Construct viable arguments and critique the reasoning of others. 4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically. 4.MP.7. Look for and make use of structure.	Students who develop flexibility in breaking numbers apart have a better understanding of the importance of place value and the distributive property in multi-digit multiplication. Students use base ten blocks, area models, partitioning, compensation strategies, etc. when multiplying whole numbers and use words and diagrams to explain their thinking. They use the terms factor and product when communicating their reasoning. Multiple strategies enable students to develop fluency with multiplication and transfer that understanding to division. Use of the standard algorithm for multiplication is an expectation in the 5th grade. Students may use digital tools to express their ideas. Use of place value and the distributive property are applied in the scaffold examples below. • To illustrate 154 x 6 students use base 10 blocks or use drawings to show 154 six times. Seeing 154 six times will lead them to understand the distributive property, 154 X 6 = (100 + 50 + 4) x 6 = (100 x 6) + (50 X 6) + (4 X 6) = 600 + 300 + 24 = 924. • The area model shows the partial products. 14 x 16 = 224	**Engage NY** M3 Lessons 4-13 **enVision** Topic 5,6,7,8

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
				Using the area model, students first verbalize their understanding:  • 10 x 10 is 100 • 4 x 10 is 40 • 10 x 6 is 60, and • 4 x 6 is 24. They use different strategies to record this type of thinking. 100 + 40 + 60 + 24 = 224 Students explain this strategy and the one below with base 10 blocks, drawings, or numbers. 25 x24 400 (20 x 20) 100 (20 x 5) 80 (4 x 20) 20 (4 x 5) 600 25 x24 500 (20 x 25) 100 (4 x 25) 600 • Matrix model This model should be introduced after students have facility with the strategies shown above. 20 5 20 500 100 480 + 120 200 100 4 80 20 0 600	
4.MD	A	3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, 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.*	Students developed understanding of area and perimeter in 3rd grade by using visual models. While students are expected to use formulas to calculate area and perimeter of rectangles, they need to understand and be able to communicate their understanding of why the formulas work. The formula for area is l x w and the answer will always be in square units.	**Engage NY** M3 Lessons 1-3 **enVision** Topic 15

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically. 4.MP.6. Attend to precision. 4.MP.7. Look for and make use of structure.	The formula for perimeter can be 2 l + 2 w or 2 (l + w) and the answer will be in linear units. What is closest to the area of the shaded figure below? Each square equals one square mile.  What is the area of this rectangle?  What is the perimeter of the square?