BWCS: 4th Grade Math Standards per Quarter 2016-17

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Standards in bold are found under major clusters.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

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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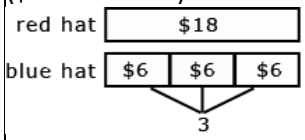
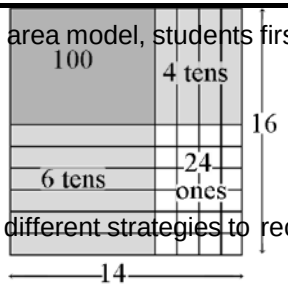
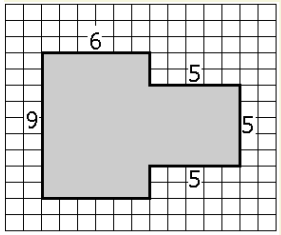
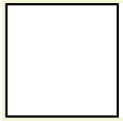
Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes and Resources
			4.MP.5. Use appropriate tools strategically. *4.MP.6.* Attend to precision.		
Module 3: Multi-Digit Multiplication and Division – Part 1, Topics A-D **Approximately 15 Days – Begin around 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. 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 + 120 400 100 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? 	

Blackwater Community School Curriculum Map 2016-2017

Fourth Grade Quarter 2

Module 3: Multi-Digit Multiplication and Division – Part 2, Topics E-H

Approximately 28 days – Begin around October 13th

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 unit 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.B – Use place value understanding and properties of operations to perform multi-digit arithmetic.**
Supporting Clusters:	4.OA.B – Game familiarity with factors and multiples.
Vocabulary	Associative property, composite number, distributive property, divisor, partial product , prime number, remainder, solve, principle of counting, organize, random, possibilities, similarities, differences, chart/arrays, systematic lists, tree diagram, outcomes, systematic list

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
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.)(Q1, Q3) 4.MP.1. Make sense of problems and persevere in solving them. 4.MP.2. Reason abstractly and	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 bag. She had 53 pieces of candy. She ate 14 pieces of candy. How many candy bags can Kim make now?	**Engage NY** M3 Lessons 14-21, 26-38 Also addressed in Module 7 **enVision** Topic 1,5,10

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			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.	(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.OA	**AZ**	**3.1**	Solve a variety of problems based on the multiplication principle of counting. a. Represent a variety of counting problems using arrays, charts, and	As students solve counting problems, they should begin to organize their initial random enumeration of possibilities into a systematic way of counting and organizing the possibilities in a chart (array), systematic list, or tree diagram. They note the similarities and differences among the representations and connect them to the multiplication principle of	**Engage NY** Not covered **enVision** Not covered

<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 & Resources</th></tr>
<tr><td></td><td></td><td></td><td>systematic lists, e.g., tree diagram.

b. Analyze relationships among representations and make connections to the multiplication principle of counting.

4.MP.1. Make sense of problems and persevere in solving them.
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.
4.MP.8. Look for and express regularity in repeated reasoning.</td><td>counting.
Examples:
• List all the different two-topping pizzas that a customer can order from a pizza shop that only offers four toppings: pepperoni, sausage, mushrooms, and onion.
○ A Systematic List
Mushroom-Onion Mushroom-Pepperoni
Mushroom-Sausage Onion-Pepperoni
Onion-Sausage Pepperoni-Sausage

○ A Chart (Array)
<table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>Pepperoni</td><td>x</td><td></td><td></td><td>x</td><td>x</td><td></td><td></td><td></td></tr><tr><td>Sausage</td><td>x</td><td>x</td><td></td><td></td><td></td><td>x</td><td></td><td></td></tr><tr><td>Mushroom</td><td></td><td>x</td><td>x</td><td>x</td><td></td><td></td><td></td><td></td></tr><tr><td>Onion</td><td></td><td></td><td>x</td><td></td><td>x</td><td>x</td><td></td><td></td></tr></table>
• At Manuel's party, each guest must choose a meal, a drink, and a cupcake. There are two choices for a meal – hamburger or spaghetti; three choices for a drink – milk, tea, or soda; and three choices for a cupcake -- chocolate, lemon, or vanilla. Draw a tree diagram to show all possible selections for the guests. What are some conclusions that can be drawn from the tree diagram?</td><td></td></tr>
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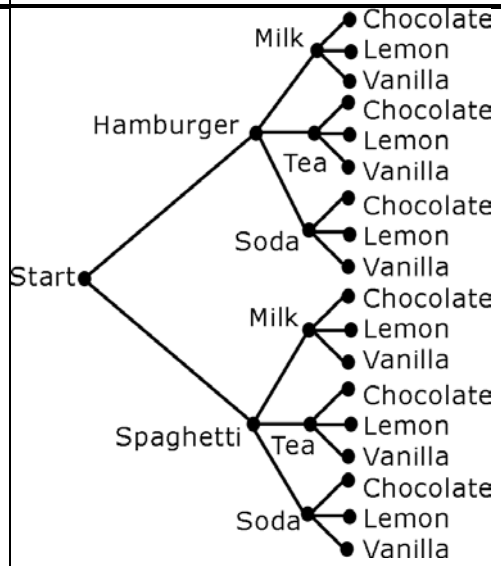
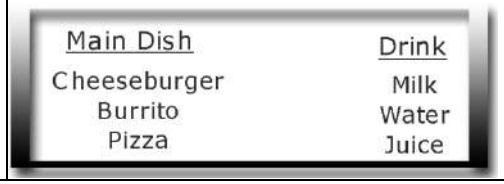
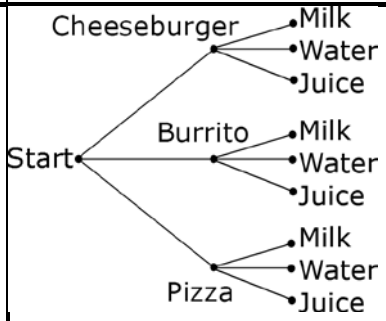
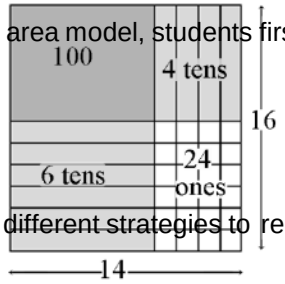
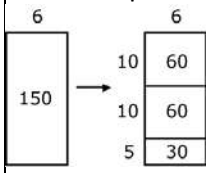
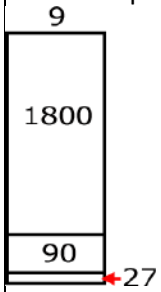
Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				 Sample conclusions: ○ There are 18 different dinner choices that include a meal, a drink, and a cupcake. ○ Nine dinner choices are possible for the guest that wants spaghetti for her meal. ○ A guest cannot choose a meal, no drink, and two cupcakes. • Use multiple representations to show the number of meals possible if each meal consists of one main dish and one drink. The menu is shown below. Analyze the various representations and describe how the representations illustrate the multiplication principle of counting. 	

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				 Milk Water Juice Cheeseburger x x x Burrito x x x Pizza x x x Both of the representations above illustrate a 3 • 3 relationship, which connects to the multiplication principle. Students explain where the multiplication principle appears in each representation. In this example, there are 3 • 3 = 9 possible meals.	
4.OA	B	4	Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite. 4.MP.2. Reason abstractly and quantitatively. 4.MP.7. Look for and make use of structure.	Students should understand the process of finding factor pairs so they can do this for any number 1 -100. **Example**: • Factor pairs for 96: 1 and 96, 2 and 48, 3 and 32, 4 and 24, 6 and 16, 8 and 12. Multiples can be thought of as the result of skip counting by each of the factors. When skip counting, students should be able to identify the number of factors counted e.g., 5, 10, 15, 20 (there are 4 fives in 20). **Example**: • Factors of 24: 1, 2, 3, 4, 6, 8,12, 24 Multiples : 1,2,3,4,5…24 2,4,6,8,10,12,14,16,18,20,22,24 3,6,9,12,15,18,21,24 4,8,12,16,20,24 8,16,24 12,24 24 To determine if a number between1-100 is a multiple of a given one-digit number, some helpful hints include the following:	**Engage NY** M3 Lessons 22-25 **enVision** Topic 1,11

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				• all even numbers that can be halved twice (with a whole number result) are multiples of 4 • all numbers ending in 0 or 5 are multiples of 5 Prime vs. Composite: • A prime number is a number greater than 1 that has only 2 factors, 1 and itself. • Composite numbers have more than 2 factors. Students investigate whether numbers are prime or composite by: ○ building rectangles (arrays) with the given area and finding which numbers have more than two rectangles (e.g. 7 can be made into only 2 rectangles, 1 x 7 and 7 x 1, therefore it is a prime number) ○ finding factors of the number.	
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 5^{th} 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.	**Engage NY** M3 Lessons 34-38 **enVision** Topic 5,6,7,8

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				• The area model shows the partial products. 14 x 16 = 224  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. 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.NBT	**B**	**6**	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies	In fourth grade, students build on their third grade work with division within 100. Students need opportunities to develop their understandings by using problems in and out of context.	**Engage NY** M3 Lessons 14-21, 26-33

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			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. 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.	**Examples**: • A 4th grade teacher bought 4 new pencil boxes. She has 260 pencils. She wants to put the pencils in the boxes so that each box has the same number of pencils. How many pencils will there be in each box? **Using Base 10 Blocks**: Students build 260 with base 10 blocks and distribute them into 4 equal groups. Some students may need to trade the 2 hundreds for tens but others may easily recognize that 200 divided by 4 is 50. **Using Place Value:** 260 ÷ 4 = (200 ÷ 4) + (60 ÷ 4) **Using Multiplication:** 4 x 50 = 200, 4 x 10 = 40, 4 x 5 = 20; 50 + 10 + 5 = 65; so 260 ÷ 4 = 65 Students may use digital tools to express ideas. • **Using an Open Array or Area Model** After developing an understanding of using arrays to divide, students begin to use a more abstract model for division. This model connects to a recording process that will be formalized in the 5th grade. ○ Example 1: 150 ÷ 6  Students make a rectangle and write 6 on one of its sides. They express their understanding that they need to think of the rectangle as representing a total of 150. 1. Students think, 6 times what number is a number close to 150? They recognize that 6 x 10 is 60 so they record 10 as a factor and partition the rectangle into 2 rectangles and label the area aligned to the factor of 10 with 60. They express that they have only used 60 of the 150 so	**enVision** Topic 9,10

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				they have 90 left. 2. Recognizing that there is another 60 in what is left they repeat the process above. They express that they have used 120 of the 150 so they have 30 left. 3. Knowing that 6 x 5 is 30. They write 30 in the bottom area of the rectangle and record 5 as a factor. 4. Students express their calculations in various ways: a. 150 150 ÷ 6 = 10 + 10 + 5 = 25 - 60 (6 x 10) 90 - 60 (6 x 10) 30 - 30 (6 x 5) 0 b. 150 ÷ 6 = (60 ÷ 6) + (60 ÷ 6) + (30 ÷ 6) = 10 + 10 + 5 = 25 • Example 2: 1917 ÷ 9  A student's description of his or her thinking may be: I need to find out how many 9s are in 1917. I know that 200 x 9 is 1800. So if I use 1800 of the 1917, I have 117 left. I know that 9 x 10 is 90. So if I have 10 more 9s, I will have 27 left. I can make 3 more 9s. I have 200 nines, 10 nines and 3 nines. So I made 213 nines. 1917 ÷ 9 = 213.	

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources

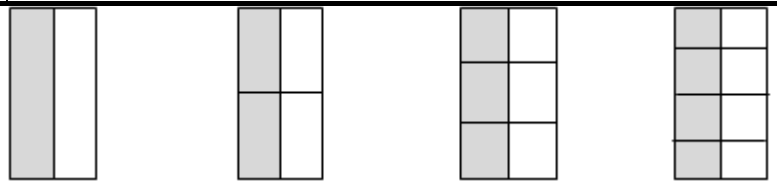
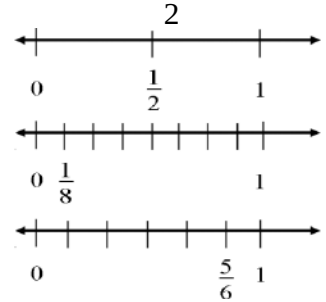
Unit 5: Fraction Equivalence, Ordering, and Operations – Part 1, Topics A-D

Approximately 20 days – Begin around November 23rd

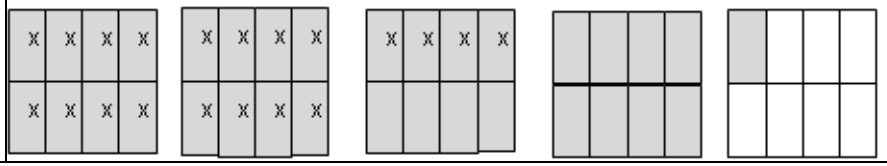
In this 45-day unit, students build on their Grade 3 work with unit fractions as they explore fraction equivalence and extend this understanding to mixed numbers. This leads to the comparison of fractions and mixed numbers and the representation of both in a variety of models. Benchmark fractions play an important part in students' ability to generalize and reason about relative fraction and mixed number sizes. Students then have the opportunity to apply what they know to be true for whole number operations to the new concepts of fraction and mixed number operations.

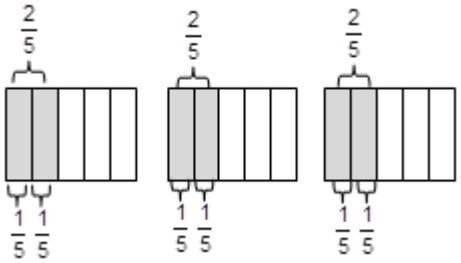
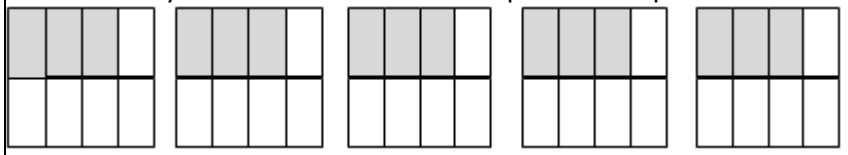
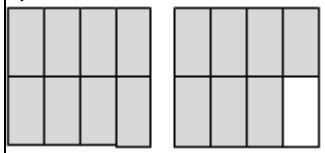
Major Clusters:	**4.NF.A – Extend understanding of fraction equivalence and ordering.** **4.NF.B – Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**
Supporting Clusters:	
Vocabulary	Benchmark, common denominator, denominator, line plot, mixed number, numerator

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
4.NF	**A**	**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. Use this principle to recognize and generate equivalent fractions. 4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics. 4.MP.7. Look for and make use of structure. 4.MP.8. Look for and express regularity in repeated reasoning.	This standard extends the work in third grade by using additional denominators (5, 10, 12, and 100). Students can use visual models or applets to generate equivalent fractions. All the models show 1/2. The second model shows 2/4 but also shows that 1/2 and 2/4 are equivalent fractions because their areas are equivalent. When a horizontal line is drawn through the center of the model, the number of equal parts doubles and size of the parts is halved. Students will begin to notice connections between the models and fractions in the way both the parts and wholes are counted and begin to generate a rule for writing equivalent fractions. 1/2 x 2/2 = 2/4.	**Engage NY** M5 Lessons 7-11, 16-28 **enVision** Topic 11

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				 $\frac{1}{2}$ $\frac{2}{4} = \frac{2 \times 1}{2 \times 2}$ $\frac{3}{6} = \frac{3 \times 1}{3 \times 2}$ $\frac{4}{8} = \frac{4 \times 1}{4 \times 2}$ Technology Connection: http://illuminations.nctm.org/activitydetail.aspx?id=80	
4.NF	**A**	**2**	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. 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.	Benchmark fractions include common fractions between 0 and 1 such as halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths, and hundredths. Fractions can be compared using benchmarks, common denominators, or common numerators. Symbols used to describe comparisons include <, >, =. • Fractions may be compared using $\frac{1}{2}$ as a benchmark.  Possible student thinking by using benchmarks: $\frac{1}{8}$ is smaller than $\frac{1}{2}$ because when 1 whole is cut into 8 pieces, the pieces are much smaller than when 1 whole is cut into 2 pieces. Possible student thinking by creating common denominators:	**Engage NY** M5 Lessons 12-15, 22-28 **enVision** Topic 11

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				$\frac{5}{6} > \frac{1}{2}$ because $\frac{3}{6} = \frac{1}{2}$ and $\frac{5}{6} > \frac{3}{6}$ Fractions with common denominators may be compared using the numerators as a guide. $\frac{2}{6} < \frac{3}{6} < \frac{5}{6}$ Fractions with common numerators may be compared and ordered using the denominators as a guide. $\frac{3}{10} < \frac{3}{8} < \frac{3}{4}$	
4.NF	**B**	**3 abc d**	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.* *c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.* *d. Solve word problems involving addition and subtraction of fractions referring to*	A fraction with a numerator of one is called a unit fraction. When students investigate fractions other than unit fractions, such as 2/3, they should be able to decompose the non-unit fraction into a combination of several unit fractions. **Examples**: Fraction Example 1: • 2/3 = 1/3 + 1/3 Being able to visualize this decomposition into unit fractions helps students when adding or subtracting fractions. Students need multiple opportunities to work with mixed numbers and be able to decompose them in more than one way. Students may use visual models to help develop this understanding. Fraction Example 2: • 1 ¼ - ¾ = □ 4/4 + ¼ = 5/4 5/4 – ¾ = 2/4 or ½ Word Problem Example 1: Mary and Lacey decide to share a pizza. Mary ate 3/6 and Lacey ate 2/6 of the pizza. How much of the pizza did the girls eat together? Solution: The amount of pizza Mary ate can be thought of a 3/6 or 1/6 and 1/6 and 1/6. The amount of pizza Lacey ate can be thought of a 1/6 and 1/6. The total amount of pizza they ate is	**Engage NY** M5 Lessons 1-11, 16-28 **enVision** Topic 12

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. 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. 4.MP.7. Look for and make use of structure. 4.MP.8. Look for and express regularity in repeated reasoning.	1/6 + 1/6 + 1/6 + 1/6 + 1/6 or 5/6 of the whole pizza. A separate algorithm for mixed numbers in addition and subtraction is not necessary. Students will tend to add or subtract the whole numbers first and then work with the fractions using the same strategies they have applied to problems that contained only fractions. Word Problem Example 2: • Susan and Maria need 8 3/8 feet of ribbon to package gift baskets. Susan has 3 1/8 feet of ribbon and Maria has 5 3/8 feet of ribbon. How much ribbon do they have altogether? Will it be enough to complete the project? Explain why or why not. The student thinks: I can add the ribbon Susan has to the ribbon Maria has to find out how much ribbon they have altogether. Susan has 3 1/8 feet of ribbon and Maria has 5 3/8 feet of ribbon. I can write this as 3 1/8 + 5 3/8. I know they have 8 feet of ribbon by adding the 3 and 5. They also have 1/8 and 3/8 which makes a total of 4/8 more. Altogether they have 8 4/8 feet of ribbon. 8 4/8 is larger than 8 3/8 so they will have enough ribbon to complete the project. They will even have a little extra ribbon left, 1/8 foot. Additional Example: • Trevor has 4 1/8 pizzas left over from his soccer party. After giving some pizza to his friend, he has 2 4/8 of a pizza left. How much pizza did Trevor give to his friend? Solution: Trevor had 4 1/8 pizzas to start. This is 33/8 of a pizza. The x's show the pizza he has left which is 2 4/8 pizzas or 20/8 pizzas. The shaded rectangles without the x's are the pizza he gave to his friend which is 13/8 or 1 5/8 pizzas. 	

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
4.NF	**B**	**4 abc**	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of $1/b$. *For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.* b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?* *4.MP.1.* Make sense of problems and persevere in solving them. *4.MP.2.* Reason abstractly and quantitatively.	Students need many opportunities to work with problems in context to understand the connections between models and corresponding equations. Contexts involving a whole number times a fraction lend themselves to modeling and examining patterns. **Examples**: • 3 x (2/5) = 6 x (1/5) = 6/5  • If each person at a party eats $3/8$ of a pound of roast beef, and there are 5 people at the party, how many pounds of roast beef are needed? Between what two whole numbers does your answer lie? A student may build a fraction model to represent this problem.  3/8 3/8 3/8 3/8 3/8  3/8 + 3/8 + 3/8 + 3/8 + 3/8 = 15/8 = 1 7/8	**Engage NY** M5 Lessons 1-6, 22-28, 35-40 **enVision** Topic 13

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			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. *4.MP.8.* Look for and express regularity in repeated reasoning.		

Fourth Grade Quarter 3

Module 5: Fraction Equivalence, Ordering, and Operations – Part 2, Topics D-H

Approximately 25 days – Begin around January 4th

In this 45-day module, students build on their Grade 3 work with unit fractions as they explore fraction equivalence and extend this understanding to mixed numbers. This leads to the comparison of fractions and mixed numbers and the representation of both in a variety of models. Benchmark fractions play an important part in students' ability to generalize and reason about relative fraction and mixed number sizes. Students then have the opportunity to apply what they know to be true for whole number operations to the new concepts of fraction and mixed number operations.

Major Clusters:	**4.NF.A – Extend understanding of fraction equivalence and ordering.** **4.NF.B – Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**
Supporting Clusters:	4.OA.C – Generate and analyze patterns. 4.MD.B – Represent and interpret data.
Vocabulary	Benchmark, common denominator, denominator, line plot, mixed number, numerator

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
4.OA	B	5	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.* (Students work with multiplication and apply it to area.) **(Q1, Q3)**	Patterns involving numbers or symbols either repeat or grow. Students need multiple opportunities creating and extending number and shape patterns. Numerical patterns allow students to reinforce facts and develop fluency with operations. Patterns and rules are related. A pattern is a sequence that repeats the same process over and over. A rule dictates what that process will look like. Students investigate different patterns to find rules, identify features in the patterns, and justify the reason for those features. **Example**: Pattern | Rule | Feature(s)	**Engage NY** M5 Lesson 41 **enVision** Topic 1,2

<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 & Resources</th></tr>
<tr><td></td><td></td><td></td><td>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.</td><td>
<table>
<tr><td>3, 8, 13, 18, 23, 28, …</td><td>Start with 3, add 5</td><td>The numbers alternately end with a 3 or 8</td></tr>
<tr><td>5, 10, 15, 20 …</td><td>Start with 5, add 5</td><td>The numbers are multiples of 5 and end with either 0 or 5. The numbers that end with 5 are products of 5 and an odd number.
The numbers that end in 0 are products of 5 and an even number.</td></tr>
</table>
After students have identified rules and features from patterns, they need to generate a numerical or shape pattern from a given rule.
Example:
• Rule: Starting at 1, create a pattern that starts at 1 and multiplies each number by 3. Stop when you have 6 numbers.
Students write 1, 3, 9, 27, 81, 243. Students notice that all the numbers are odd and that the sums of the digits of the 2 digit numbers are each 9. Some students might investigate this beyond 6 numbers. Another feature to investigate is the patterns in the differences of the numbers (3 - 1 = 2, 9 - 3 = 6, 27 - 9 = 18, etc.)</td><td></td></tr>
<tr><td>**4.NF**</td><td>**A**</td><td>**1**</td><td>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. Use this principle to recognize and generate equivalent fractions.

4.MP.2. Reason abstractly and quantitatively.
4.MP.4. Model with mathematics.</td><td>This standard extends the work in third grade by using additional denominators (5, 10, 12, and 100).

Students can use visual models or applets to generate equivalent fractions.

All the models show 1/2. The second model shows 2/4 but also shows that 1/2 and 2/4 are equivalent fractions because their areas are equivalent. When a horizontal line is drawn through the center of the model, the number of equal parts doubles and size of the parts is halved. Students will begin to notice connections between the models and fractions in the way both the parts and wholes are counted and begin to</td><td>**Engage NY**
M5 Lessons 7-11, 16-28

enVision
Topic 11</td></tr>
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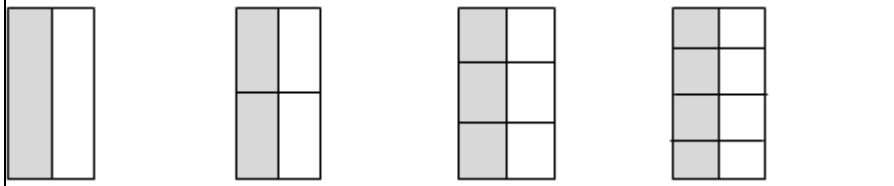
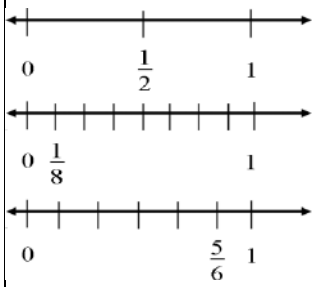
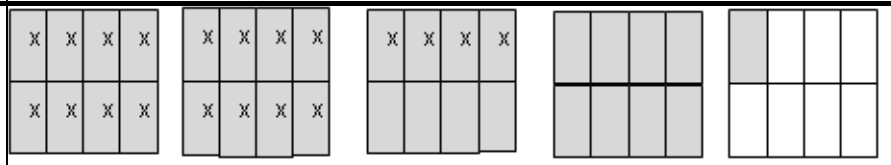
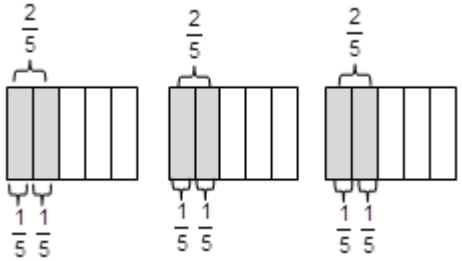
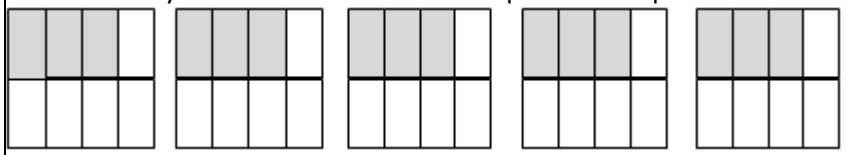
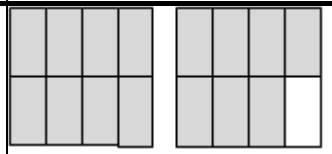
Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			4.MP.7. Look for and make use of structure. 4.MP.8. Look for and express regularity in repeated reasoning.	generate a rule for writing equivalent fractions. 1/2 x 2/2 = 2/4.  $\frac{1}{2}$ $\frac{2}{4} = \frac{2 \times 1}{2 \times 2}$ $\frac{3}{6} = \frac{3 \times 1}{3 \times 2}$ $\frac{4}{8} = \frac{4 \times 1}{4 \times 2}$ Technology Connection: http://illuminations.nctm.org/activitydetail.aspx?id=80	
4.NF	**A**	**2**	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. 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.	Benchmark fractions include common fractions between 0 and 1 such as halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths, and hundredths. Fractions can be compared using benchmarks, common denominators, or common numerators. Symbols used to describe comparisons include <, >, =. • Fractions may be compared using $\frac{1}{2}$ as a benchmark.  Possible student thinking by using benchmarks: $\frac{1}{8}$ is smaller than $\frac{1}{2}$ because when 1 whole is cut into 8 pieces, the pieces are much smaller than when 1 whole is cut into 2 pieces.	**Engage NY** M5 Lessons 12-15, 22-28 **enVision** Topic 11

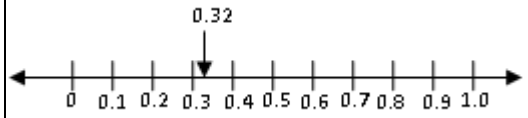
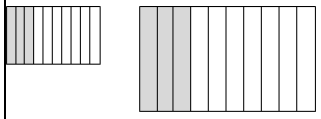
Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				Possible student thinking by creating common denominators: 5/6 ○ — > 1/2 because 3/6 = 1/2 and 5/6 > 3/6 Fractions with common denominators may be compared using the numerators as a guide. 2/6 ○ — < 3/6 < 5/6 Fractions with common numerators may be compared and ordered using the denominators as a guide. 3/10 ○ — < 3/8 < 3/4	
4.NF	**B**	**3 abc d**	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8=1/8+1/8+1/8 ; 3/8=1/8+2/8; 2 1/8=1 + 1+1/8=8/8+8/8 +1/8.* *c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between*	A fraction with a numerator of one is called a unit fraction. When students investigate fractions other than unit fractions, such as 2/3, they should be able to decompose the non-unit fraction into a combination of several unit fractions. **Examples**: Fraction Example 1: • 2/3 = 1/3 + 1/3 Being able to visualize this decomposition into unit fractions helps students when adding or subtracting fractions. Students need multiple opportunities to work with mixed numbers and be able to decompose them in more than one way. Students may use visual models to help develop this understanding. Fraction Example 2: • 1 ¼ - ¾ = □ 4/4 + ¼ = 5/4 5/4 – ¾ = 2/4 or ½ Word Problem Example 1: Mary and Lacey decide to share a pizza. Mary ate 3/6 and Lacey ate 2/6 of the pizza. How much of the pizza did the girls eat together?	**Engage NY** M5 Lessons 1-11, 16-28 **enVision** Topic 12

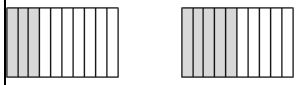
Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			addition and subtraction. *d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.* 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. 4.MP.7. Look for and make use of structure. 4.MP.8. Look for and express regularity in repeated reasoning.	Solution: The amount of pizza Mary ate can be thought of a 3/6 or 1/6 and 1/6 and 1/6. The amount of pizza Lacey ate can be thought of a 1/6 and 1/6. The total amount of pizza they ate is 1/6 + 1/6 + 1/6 + 1/6 + 1/6 or 5/6 of the whole pizza. A separate algorithm for mixed numbers in addition and subtraction is not necessary. Students will tend to add or subtract the whole numbers first and then work with the fractions using the same strategies they have applied to problems that contained only fractions. Word Problem Example 2: • Susan and Maria need 8 3/8 feet of ribbon to package gift baskets. Susan has 3 1/8 feet of ribbon and Maria has 5 3/8 feet of ribbon. How much ribbon do they have altogether? Will it be enough to complete the project? Explain why or why not. The student thinks: I can add the ribbon Susan has to the ribbon Maria has to find out how much ribbon they have altogether. Susan has 3 1/8 feet of ribbon and Maria has 5 3/8 feet of ribbon. I can write this as 3 1/8 + 5 3/8. I know they have 8 feet of ribbon by adding the 3 and 5. They also have 1/8 and 3/8 which makes a total of 4/8 more. Altogether they have 8 4/8 feet of ribbon. 8 4/8 is larger than 8 3/8 so they will have enough ribbon to complete the project. They will even have a little extra ribbon left, 1/8 foot. Additional Example: • Trevor has 4 1/8 pizzas left over from his soccer party. After giving some pizza to his friend, he has 2 4/8 of a pizza left. How much pizza did Trevor give to his friend? Solution: Trevor had 4 1/8 pizzas to start. This is 33/8 of a pizza. The x's show the pizza he has left which is 2 4/8 pizzas or 20/8 pizzas. The shaded rectangles without the x's are the pizza he gave to his friend which is 13/8 or 1 5/8 pizzas.	

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
					
4.NF	**B**	**4 abc**	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of $1/b$. *For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.* b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	Students need many opportunities to work with problems in context to understand the connections between models and corresponding equations. Contexts involving a whole number times a fraction lend themselves to modeling and examining patterns. **Examples**: • 3 x (2/5) = 6 x (1/5) = 6/5  • If each person at a party eats $3/8$ of a pound of roast beef, and there are 5 people at the party, how many pounds of roast beef are needed? Between what two whole numbers does your answer lie? A student may build a fraction model to represent this problem.  3/8 3/8 3/8 3/8 3/8	**Engage NY** M5 Lessons 1-6, 22-28, 35-40 **enVision** Topic 13

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			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. *4.MP.7.* Look for and make use of structure. *4.MP.8.* Look for and express regularity in repeated reasoning.	 3/8 + 3/8 + 3/8 + 3/8 + 3/8 = 15/8 = 1 7/8	
4.MD	B	4	Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.* 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.	• Ten students in Room 31 measured their pencils at the end of the day. They recorded their results on the line plot below. X X X X X X X X X X 3 ½" 4" 4 ¼" 5 1/8" 5 1/2" Possible questions: ○ What is the difference in length from the longest to the shortest pencil? ○ If you were to line up all the pencils, what would the total length be? If the 5 1/8" pencils are placed end to end, what would be their total length?	**Engage NY** M5 Lessons 22-28, 35-40 **enVision** Not Covered

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
Module 6: Decimal Fractions **Approximately 20 days – Begin around February 8th** This 20-day module gives students their first opportunity to explore decimal numbers via their relationship to decimal fractions, expressing a given quantity in both fraction and decimal forms. Utilizing the understanding of fractions developed throughout Unit 5, students apply the same reasoning to decimal numbers, building a solid foundation for Grade 5 work with decimal operations.					
Major Clusters:			**4.NF.C – Understand decimal notation for fractions, and compare decimal fractions.**		
Supporting Clusters:			4.MD.A – Solve problems involving measurement and conversion of measurements from a larger unit to a small unit.		
Vocabulary			Decimal number, decimal expanded form, decimal fraction, decimal point, fraction expanded form, hundredth, tenth		
Domain	**Cluster**	**Standard**	**Arizona's College and Career Ready Standards**	**Explanations & Examples**	**Notes & Resources**
4.NF	**C**	**5**	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$. (Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.)* 4.MP.2. Reason abstractly and quantitatively. 4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically.	Students can use base ten blocks, graph paper, and other place value models to explore the relationship between fractions with denominators of 10 and denominators of 100. Students may represent 3/10 with 3 longs and may also write the fraction as 30/100 with the whole in this case being the flat (the flat represents one hundred units with each unit equal to one hundredth). Students begin to make connections to the place value chart as shown in 4.NF.6. This work in fourth grade lays the foundation for performing operations with decimal numbers in fifth grade.	**Engage NY** M6 Lessons 4-8, 12-16 **enVision** Topic 13

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			4.MP.7. Look for and make use of structure.		
4.NF	**C**	**6**	Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.* *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.	Students make connections between fractions with denominators of 10 and 100 and the place value chart. By reading fraction names, students say 32/100 as thirty-two hundredths and rewrite this as 0.32 or represent it on a place value model as shown below. Hundreds | Tens | Ones | • | Tenths | Hundredths | | | • | 3 | 2 Students use the representations explored in 4.NF.5 to understand 32/100 can be expanded to 3/10 and 2/100. Students represent values such as 0.32 or 32/100 on a number line. 32/100 is more than 30/100 (or 3/10) and less than 40/100 (or 4/10). It is closer to 30/100 so it would be placed on the number line near that value. 	**Engage NY** M6 Lessons 1-8, 12-16 **enVision** Topic 13
4.NF	**C**	**7**	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model. *4.MP.2.* Reason abstractly and quantitatively. *4.MP.4.* Model with mathematics. *4.MP.5.* Use appropriate tools strategically.	Students build area and other models to compare decimals. Through these experiences and their work with fraction models, they build the understanding that comparisons between decimals or fractions are only valid when the whole is the same for both cases. • Each of the models below shows 3/10 but the whole on the right is much bigger than the whole on the left. They are both 3/10 but the model on the right is a much larger quantity than the model on the left.  When the wholes are the same, the decimals or fractions can be	**Engage NY** M6 Lessons 4-11 **enVision** Topic 13

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			4.MP.7. Look for and make use of structure.	compared. **Example**: • Draw a model to show that 0.3 < 0.5. (Students would sketch two models of approximately the same size to show the area that represents three-tenths is smaller than the area that represents five-tenths. 	
4.MD	A	2	Use the four 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. 4.MP.5. Use appropriate tools strategically. 4.MP.6. Attend to precision.	• <u>Addition:</u> Miguel had 1 dollar bill, 2 dimes, and 7 pennies. John had 2 dollar bills, 3 quarters, and 9 pennies. How much money did the two boys have in all? • <u>Subtraction:</u> A pound of apples costs $1.20. Rachel bought a pound and a half of apples. If she gave the clerk a $5.00 bill, how much change will she get back? • <u>Multiplication:</u> A pen costs $2.29. A calculator costs 3 times as much as a pen. How much do a pen and a calculator cost together? • 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.	**Engage NY** M6 Lessons 9-12, 15-16 Also addressed in Module 7 **enVision** Topic 13,14,15

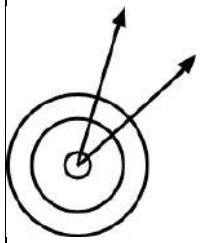
Fourth Grade Quarter 4

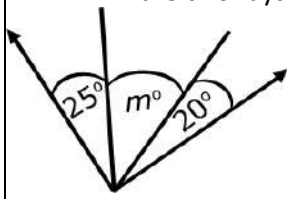
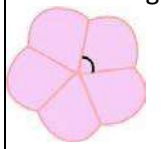
Module 4: Angle Measure and Plane Figures

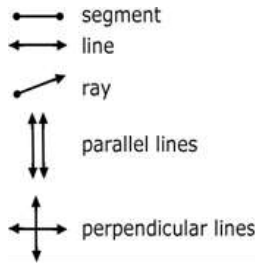
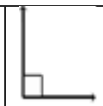
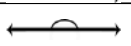
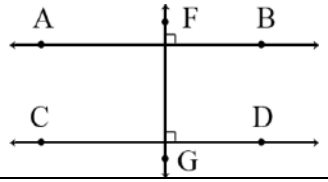
Approximately 20 days – Begin around March 22nd

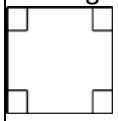
This 20-day module introduces points, lines, line segments, rays, and angles, as well as the relationships between them. Students construct, recognize, and define these geometric objects before using their new knowledge and understanding to classify figures and solve problems. With angle measure playing a key role in their work throughout the unit, students learn how to create and measure angles, as well as create and solve equations to find unknown angle measures. In these problems, where the unknown angle is represented by a letter, students explore both measuring the unknown angle with a protractor and reasoning through the solving of an equation. Through decomposition and composition activities as well as an exploration of symmetry, students recognize specific attributes present in two-dimensional figures. They further develop their understanding of these attributes as they classify two-dimensional figures based on them.

Major Clusters:	
Supporting Clusters:	4.MD.C – Geometric measurement: understand concepts of angle and measure angles. 4.G.A – Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Vocabulary	acute angle; acute triangle; adjacent angle; angle; arc; collinear; complementary angles; degree measure of an angle; diagonal; equilateral triangle; figure; interior of an angle; intersecting lines; isosceles triangle; length of an arc; line; line of symmetry; line segment; obtuse angle; obtuse triangle; parallel; perpendicular; point; protractor; ray; right angle, right triangle; scalene triangle; straight angle; supplementary angles; triangle; vertex; vertical angles

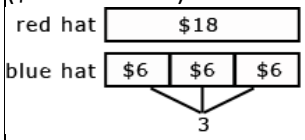
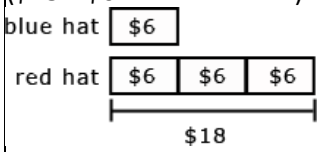
4.MD	C	5 ab	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through n one-degree angles is said to have an angle	The diagram below will help students understand that an angle measurement is not related to an area since the area between the 2 rays is different for both circles yet the angle measure is the same. 	**Engage NY** M4 Lessons 5-8 **enVision** Topic 16

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			measure of n degrees. 4.MP.6. Attend to precision. 4.MP.7. Look for and make use of structure.		
4.MD	C	6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. 4.MP.2. Reason abstractly and quantitatively. 4.MP.5. Use appropriate tools strategically. 4.MP.6. Attend to precision.	Before students begin measuring angles with protractors, they need to have some experiences with benchmark angles. They transfer their understanding that a 360º rotation about a point makes a complete circle to recognize and sketch angles that measure approximately 90º and 180º. They extend this understanding and recognize and sketch angles that measure approximately 45º and 30º. They use appropriate terminology (acute, right, and obtuse) to describe angles and rays (perpendicular).	**Engage NY** M4 Lessons 5-8 **enVision** Topic 15
4.MD	C	7	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. 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.6. Attend to precision.	• If the two rays are perpendicular, what is the value of m?  • Joey knows that when a clock's hands are exactly on 12 and 1, the angle formed by the clock's hands measures 30°. What is the measure of the angle formed when a clock's hands are exactly on the 12 and 4? • The five shapes in the diagram are the exact same size. Write an equation that will help you find the measure of the indicated angle. Find the angle measurement. 	**Engage NY** M4 Lessons 9-11 **enVision** Topic 16
4.G	A	1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify	Examples of points, line segments, lines, angles, parallelism, and perpendicularity can be seen daily. Students do not easily identify lines and rays because they are more abstract.	**Engage NY** M4 Lessons 1-4, 12-16

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			these in two-dimensional figures. 4.MP.5. Use appropriate tools strategically. 4.MP.6. Attend to precision	 Right angle  Acute angle  Obtuse angle  Straight angle 	**enVision** Topic 16
4.G	A	2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	**ADE Explanations & Examples** Two-dimensional figures may be classified using different characteristics such as, parallel or perpendicular lines or by angle measurement. <u>Parallel or Perpendicular Lines</u>: Students should become familiar with the concept of parallel and perpendicular lines. Two lines are parallel if they never intersect and are always equidistant. Two lines are perpendicular if they intersect in right angles (90°). Students may use transparencies with lines to arrange two lines in different ways to determine that the 2 lines might intersect in one point or may never intersect. Further investigations may be initiated using geometry software. These types of explorations may lead to a discussion on angles. Parallel and perpendicular lines are shown below: 	**Engage NY** M4 Lessons 12-16 **enVision** Topic 16

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
				• **Example**: Identify which of these shapes have perpendicular or parallel sides and justify your selection.  A possible justification that students might give is: The square has perpendicular lines because the sides meet at a corner, forming right angles.  <u>Angle Measurement</u>: This expectation is closely connected to 4.MD.5, 4.MD.6, and 4.G.1. Students' experiences with drawing and identifying right, acute, and obtuse angles support them in classifying two-dimensional figures based on specified angle measurements. They use the benchmark angles of 90°, 180°, and 360° to approximate the measurement of angles. Right triangles can be a category for classification. A right triangle has one right angle. There are different types of right triangles. An isosceles right triangle has two or more congruent sides and a scalene right triangle has no congruent sides.	
4.G	A	3	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. 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.	Students need experiences with figures which are symmetrical and non-symmetrical. Figures include both regular and non-regular polygons. Folding cut-out figures will help students determine whether a figure has one or more lines of symmetry.	**Engage NY** M4 Lessons 12-16 **enVision** Topic 16

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
Unit 7: Exploring Measurements with Multiplication **Approximately 20 days – Begin around April 25th** In this 20-day unit, students build their competencies in measurement as they relate multiplication to the conversion of measurement units. Throughout the unit, students will explore multiple strategies for solving measurement problems involving unit conversion.					
Major Clusters:			**4.OA.A – Use the four operations with whole numbers to solve problems.**		
Supporting Clusters:			4.MD.A – Solve problems involving measurement and conversion of measurements from a larger unit to a small unit.		
Vocabulary			customary system of measurement, customary unit, cup, gallon, metric system of measurement, metric unit, ounce, pint, pound, quart		
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. **BWCS Explanations & Examples** During quarter 2, students will be taught multiplication strategies: ***Array, area, Breaking into friendly numbers or Expanded form with distributive property.*** For division they will practice the following strategies: ***Compensation, Regrouping, and Partitioning.*** Students will be fluent in multiplying two-digit by two-digit values and divide three-digit dividends by one-digit divisor without reminders, but not limited to no reminders.	**Engage NY** M7 Lessons 1-5 **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 multiplicative comparison from additive comparison. 4.MP.2. Reason abstractly and quantitatively.	Using **Table 2**, students will be given the opportunities to solve multiplication and division word problems within all categories. Word problems involving addition and subtraction will be created and assess using **Table 1** in all categories and using grade-level appropriate values for quarter 4. 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?	**Engage NY** M7 Lessons 1-11 **enVision** Topic 1

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically. 4.MP.7. Look for and make use of structure.	In solving this problem, the student should identify $6 as the quantity that is being multiplied by 3. The student should write the problem using a symbol to represent the unknown. ($6 x 3 = ☐)  Table 2 includes the following division problem: • A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue hat? In solving this problem, the student should identify $18 as the quantity being divided into shares of $6. The student should write the problem using a symbol to represent the unknown. ($18 ÷ $6 = ☐)  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?" 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?"	
4.OA	**A**	**3**	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations,	Students need many opportunities solving multistep story problems using all four operations.	**Engage NY** M7 Lessons 6-14

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			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. 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.	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 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 ÷ 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 12th holding the remaining 2 students) 29 + 28 = 11 x 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	**enVision** Topic 1,5,10

<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 & Resources</th></tr>
<tr><td></td><td></td><td></td><td></td><td>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).</td><td></td></tr>
<tr><td>4.MD</td><td>A</td><td>1</td><td>Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. 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>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 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><table><tr><td>lb</td><td>oz</td></tr><tr><td>1</td><td>16</td></tr><tr><td>2</td><td>32</td></tr><tr><td>3</td><td>48</td></tr></table></td><td>Engage NY
M7 Lessons 1-14

enVision
Topic 14</td></tr>
<tr><td>4.MD</td><td>A</td><td>2</td><td>Use the four 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</td><td>• <u>Division/fractions:</u> Susan has 2 feet of ribbon. She wants to give her ribbon to her 3 best friends so each friend gets the same amount. How much ribbon will each friend get?
Students may record their solutions using fractions or inches. (The answer would be 2/3 of a foot or 8 inches. Students are able</td><td>Engage NY
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Topic 13,14,15</td></tr>
</table>

Domain	Cluster	Standard	Arizona's College and Career Ready Standards	Explanations & Examples	Notes & Resources
			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. *4.MP.5.* Use appropriate tools strategically. *4.MP.6.* Attend to precision.	to express the answer in inches because they understand that 1/3 of a foot is 4 inches and 2/3 of a foot is 2 groups of 1/3.) • Addition: Mason ran for an hour and 15 minutes on Monday, 25 minutes on Tuesday, and 40 minutes on Wednesday. What was the total number of minutes Mason ran? • Subtraction: A pound of apples costs $1.20. Rachel bought a pound and a half of apples. If she gave the clerk a $5.00 bill, how much change will she get back? • Multiplication: Mario and his 2 brothers are selling lemonade. Mario brought one and a half liters, Javier brought 2 liters, and Ernesto brought 450 milliliters. How many total milliliters of lemonade did the boys have? • 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.	