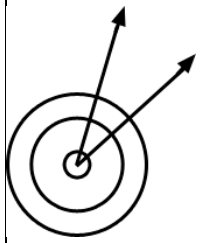
Fourth Grade Quarter 4

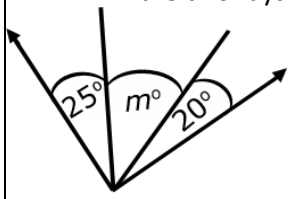
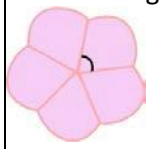
Module 4: Angle Measure and Plane Figures

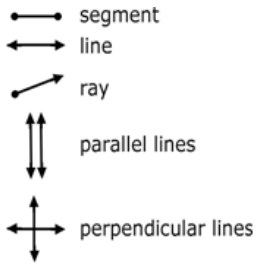
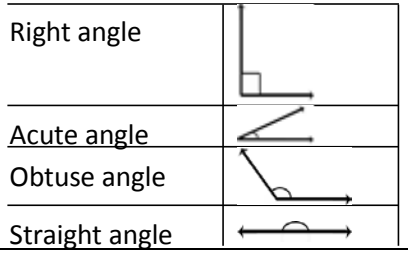
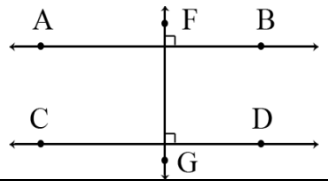
Approximately 20 days – Begin around March 22nd

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	 	**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

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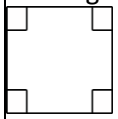
				• **Example**: Identify which of these shapes have perpendicular or parallel sides and justify your selection.  A possible justification that students might give is: The square has perpendicular lines because the sides meet at a corner, forming right angles.  <u>Angle Measurement</u>: This expectation 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

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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

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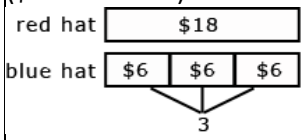
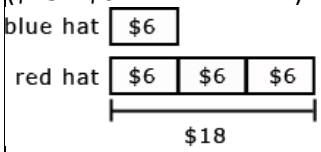
			4.MP.4. Model with mathematics. 4.MP.5. Use appropriate tools strategically. 4.MP.7. Look for and make use of structure.	In solving this problem, the student should identify $6 as the quantity that is being multiplied by 3. The student should write the problem using a symbol to represent the unknown. ($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

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			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

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<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
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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>
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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.	