Pacing: 3 weeks (plus 1 week for reteaching/enrichment)

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| **Mathematical Practices** |
| *Mathematical Practices #1 and #3* *describe a classroom environment that encourages thinking mathematically and are critical for quality teaching and learning.*  *Practices in bold are to be emphasized in the unit.*  **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. |
| **Domain and Standards Overview** |
| **Geometry**   * **Solve real-world and mathematical problems involving area, surface area, and volume.** |

| **Priority and** Supporting **CCSS** | **Explanations and Examples\*** |
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| **6.G.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.**  6.G.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.  6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems. | **6. G.1.**Special quadrilaterals include rectangles, squares, parallelograms, trapezoids, rhombi, and kites. Students can use tools such as the Isometric Drawing Tool on NCTM’s Illuminations site to shift, rotate, color, decompose and view figures in 2D or 3D (<http://illuminations.nctm.org/ActivityDetail.aspx?ID=125>)  Examples:  • Find the area of a triangle with a base length of three units and a height of four units.  • Find the area of the trapezoid shown below using the formulas for rectangles and triangles.    • A rectangle measures 3 inches by 4 inches. If the lengths of each side double, what is the effect on the area?  • The area of the rectangular school garden is 24 square units. The length of the garden is 8 units. What is the length of the fence needed to enclose the entire garden?  • The sixth grade class at Hernandez School is building a giant wooden H for their school. The H will be 10 feet tall and 10 feet wide and the thickness of the block letter will be 2.5 feet.  o How large will the H be if measured in square feet?  o The truck that will be used to bring the wood from the lumber yard to the school can only hold a piece of wood that is 60 inches by 60 inches. What pieces of wood (how many and which dimensions) will need to be bought to complete the project?  6.G.3. Example:  • On a map, the library is located at (-2, 2), the city hall building is located at (0, 2), and the high school is located at (0, 0). Represent the locations as points on a coordinate grid with a unit of 1 mile.  o What is the distance from the library to the city hall building? The distance from the city hall building to the high school? How do you know?  o What shape is formed by connecting the three locations? The city council is planning to place a city park in this area. How large is the area of the planned park?  6.G.4. Students construct models and nets of three dimensional figures, describing them by the number of edges, vertices, and faces. Solids include rectangular and triangular prisms. Students are expected to use the net to calculate the surface area.  (Continued on next page) |
|  | Students can create nets of 3D figures with specified dimensions using the Dynamic Paper Tool on NCTM’s Illuminations (<http://illuminations.nctm.org/ActivityDetail.aspx?ID=205>).  Students also describe the types of faces needed to create a three-dimensional figure. Students make and test conjectures by determining what is needed to create a specific three-dimensional figure.  Examples:  • Describe the shapes of the faces needed to construct a rectangular pyramid. Cut out the shapes and create a model. Did your faces work? Why or why not?  • Create the net for a given prism or pyramid, and then use the net to calculate the surface area. |

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| **Concepts**  **What Students Need to Know** | **Skills**  **What Students Need To Be Able To Do** | **Bloom’s Taxonomy Levels** |
| * Area of polygons   + triangles   + special quadrilaterals * Problems   + with and without context | * FIND/DETERMINE area of polygons   + COMPOSE (into rectangles)   + DECOMPOSE (into triangles and other shapes) * SOLVE/APPLY (problems with and without context) | 3  3,4  3,4  3 |

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| **Essential Questions** |
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| **Corresponding Big Ideas** |
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| **Standardized Assessment Correlations**  **(State, College and Career)** |
| **Expectations for Learning (in development)**  This information will be included as it is developed at the national level. CT is a governing member of the Smarter Balanced Assessment Consortium (SBAC) and has input into the development of the assessment. |

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| **Tasks and Lessons from the Mathematics Assessment Project (Shell Center/MARS, University of Nottingham & UC Berkeley)**  **These tasks can be used during the course of instruction when deemed appropriate by the teacher.** |
| **Candle Box** <http://map.mathshell.org/materials/tasks.php?taskid=385&subpage=expert>  **Smoothie Box** <http://map.mathshell.org/materials/tasks.php?taskid=392&subpage=expert>  **Fruit Boxes** <http://map.mathshell.org/materials/tasks.php?taskid=275&subpage=expert>  **Security Camera** <http://map.mathshell.org/materials/tasks.php?taskid=273&subpage=expert> |

| **Unit Assessments**  **The items developed for this section can be used during the course of instruction when deemed appropriate by the teacher.** |
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| 1. What is the area of the triangle shown below? Show or explain how you found your answer.     Answer: 36 in2 with an explanation that may include:   * Use of the formula A = ½ bh * Finding the area of an 8 in by 9 in rectangle and dividing the result in half.   Partial Credit: Correct answer, 36 in2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of finding the area of a triangle.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. What is the area of triangle with base 7 yd. and height 11 yd?   Answer: 38.5 yd2 with an explanation that may include:   * Use of the formula A = ½ bh * Finding the area of an 7 yd by 11 yd rectangle and dividing the result in half.   Partial Credit: Correct answer, 38.5 yd2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of finding the area of a triangle.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. What is the area, in square centimeters, of the hexagon below? Show or explain how you found your answer.     Answer: (For a regular hexagon with sides equal to 2 cm.) Possible answers include:   1. The student uses a ruler to measure and divides the hexagon into two triangles and a rectangle and calculates the area.     Area of each triangle = ½(1)(3.5) = 1.75 cm2  Area of the rectangle = 2(3.5) = 7 cm2  Total area = 2(1.75) + 7 = 10.5 cm2 (Continued on the next page)   1. The student uses a ruler to measure and divides the hexagon into 6 equilateral triangles and calculates the area.     Area of each triangle = ½(2)(1.7) = 1.7  Total area = 10.2 cm2 (Precision of measurement results in a different answer, a triangle height of 1.75 cm results in the same  answer found using method a)   1. The student uses a ruler to measure and divides the hexagon into two trapezoids and calculates the area.     Area of each trapezoid = ½(2 + 4)1.7 = 10.2 cm2 (Precision of measurement results in a different answer, a trapezoid height of  1.75 cm results in the same answer found using method a)    Partial Credit: Correct answer, ≈ 10.2 – 10.5 cm2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of finding the area of a hexagon by decomposing into triangles, rectangles or trapezoids.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. What is the area of the polygon below? Show or explain how you found your answer     Answer: 8 ft2 with an explanation that may include:   1. The student decomposes the trapezoid into a rectangle and a triangle as shown below:     Area of the rectangle = 2 × 3 = 6 ft2  Area of the triangle = ½(2)(2) = 2 ft2  Total area = 6 + 2 = 8 ft2   1. The student decomposes the trapezoid into two triangles as shown below:     Area of triangle on left = ½(2)(3) = 3 ft2  Area of triangle on right = ½(2)(5) = 5 ft2  Total area = 3 + 5 = 8 ft2  Partial Credit: Correct answer, 8 ft2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of finding the area of a trapezoid by decomposing into triangles and/or rectangles.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. What is the area of the polygon below? Show or explain how you found your answer.   3 ft  7 ft  Answer: 21 ft2 with an explanation that may include:   1. The student composes the parallelogram into a rectangle as shown below:     Area = 3 × 7 = 21 ft2   1. The student decomposes the parallelogram into two triangles as shown below:     Area of each triangle is ½(3)(7) = 10.5 ft2  Total area = 10.5 + 10.5 = 21 ft2  Partial Credit: Correct answer, 8 ft2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of finding the area of a trapezoid by decomposing into triangles and/or rectangles.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. Lara is tiling the patio around her pool. The area of the pool is 960 square feet.     50 feet    POOL  25 feet  What is the area of the patio around the pool? Show or explain how you found your answer.    Answer: 290 ft2 with an explanation that may include:  The area of the patio including the pool is 25 × 50 = 1250 ft2.  The area of the patio = 1250 – 960 = 290 ft2.  Partial Credit: Correct answer, 290 ft2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of finding the area of the patio around the pool.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. The vertices of a quadrilateral are the points: A(3, 4), B(3, 1), C(-1, 1), and D(-1, 4).   a. What is the length of side AB?  b. What is another name for this quadrilateral?    Answer: a. 3  b. rectangle or parallelogram |
| 1. The vertices of a quadrilateral are the points: A(3, 4), B(3, 1), C(-1, 1), and D(-1, 4).   What is the perimeter of quadrilateral ABCD?  Show or explain how you found your answer.    Answer: 14 units with an explanation that may include:  The length and width of the rectangle are 4 and 3 units.  The perimeter is 2(4) + 2(3) = 14 units.  Partial Credit: Correct answer, 14 units, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of finding the perimeter of a rectangle.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. a. Plot the points C(-4,5) and D(4,5) on the coordinate plane below.     b. What is the length of the line segment that joins points C and D?  Answer: a. Correct plotting of points C and D.  b. 8 units  Partial Credit: Correct answers, a) Points C and D plotted correctly and b) length 8 units, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of plotting points on a coordinate plane and finding the distance between two points on the coordinate plane.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. The net below can be folded on the dashed lines.   http://ritter.tea.state.tx.us/student.assessment/resources/online/2009/taks_g09_math/images/33graphicaa.gif  a. What 3-dimensional figure is made when the net is folded on the dashed lines?  b. What is the surface area of this 3-dimensional figure  Answer: a. Rectangular prism  b. 150.88 cm2  Partial Credit: Correct answers, a) Rectangular prism and b) 150.88 cm2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of identifying a rectangular solid from a net and finding the surface area of a rectangular solid.  No Credit: Incorrect answer with an incorrect or missing explanation. |
| 1. A toy store needs boxes that measure 14 inches long by 6 inches wide by 4 inches tall.   a. Draw a net below for a box with these dimensions.  b. What is the surface area of each box?  Answer: a. The student draws a net that can be folded to make a rectangular solid with dimensions 14in. by 6 in. by 4 in.  b. 328 in2  Partial Credit: Correct answers, a) The student draws a net that can be folded to make a rectangular solid with dimensions 14in. by 6 in. by 4 in and b) 328 in2, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of drawing an appropriate net for a rectangular solid and finding the surface area of a rectangular solid.  No Credit: Incorrect answer with an incorrect or missing explanation. |