CMS Lesson Plan

Subject: Math Lesson Date: 1/19/2016 – 1/22/2015

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| **GSE Assessment Limits/Standards**  **Unit 5 – Standards**  **Solve real-w orld and mathematical problems involving area, surface area, and volume.**  **MGSE6.G.1 Find area of right triangles, other triangles, 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.**  **MGSE6.G.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths (1/2 u), and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V= (length) x (width) x (height) and V= (area of base) x (height) to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.**  **MGSE6.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.** | **Tuesday & Wednesday – Thursday & Friday**  Topic: Geometry (G)  Find Area  Decompose Figures  Use Nets  Find Surface Area  Solve real-world and mathematical problems involving area, |
| **Lesson Objective/Learning Intention: (Objectives will vary depending upon the pace of the students)**  **By the end of this topic students should know:**  Understand how to classify special quadrilaterals: square, rhombus, trapezoid, parallelogram, rectangle, kite  Understand how to relate the area of triangles and the area of rectangles.  Solve problems in a real-world context.  Recognize symbolic notation for height (dotted line).  Visually and physically decompose and compose polygons into rectangles and triangles to find area.  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.   12  7  3  Identify the relationship between bases and heights in polygons.  Determine the area of polygons.  Find the volume of a right rectangular prism with appropriate unit fraction edge lengths by packing it with cubes of the appropriate unit fraction edge lengths (e.g., 3½ x 2 x 6) and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.  Clarification: It is not intended that this be modeled physically; it should be a conceptual activity modeled with drawings and diagrams. | |
| It is very important for students to continue to physically manipulate materials and make connections to the symbolic and more abstract aspects of geometry. Exploring possible nets should be done by taking apart (unfolding) three-dimensional objects. This process is also foundational for the study of surface area of prisms. Building upon the understanding that a net is the two-dimensional representation of the object, students can apply the concept of area to find surface area. The surface area of a prism is the sum of the areas for each face.  Multiple strategies can be used to aid in the skill of determining the area of simple two-dimensional composite shapes. A beginning strategy should be to use rectangles and triangles, building upon shapes for which they can already determine area to create composite shapes. This process will reinforce the concept that composite shapes are created by joining together other shapes, and that the total area of the two-dimensional composite shape is the sum of the areas of all the parts.  A follow-up strategy is to place a composite shape on grid or dot paper. This aids in the decomposition of a shape into its foundational parts. Once the composite shape is decomposed, the area of each part can be determined and the sum of the area of each part is the total area.  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.   12  7  3   * 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. * How large will the H be if measured in square feet? * 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 pieces and what dimensions) are needed to complete the project?   Derive the formula for triangles from rectangles.  Use the “Triangle Problem” for a mathematical extension involving the area of triangles.  <http://www.marktaw.com/blog/TheTriangleProblem.html> | |
| **Agenda:**  **Students will enter the classroom quietly, pick up their word problem and take their assigned seat. Students will use their new math notebook beginning on page 1 to complete their Graphic Organizer. They will underline/highlight (pencil is required) key terms on word problem then attach it to the graphic organizer (Glue Stick is required). Students then will initiate a discussion to complete the graphic organizer sections: Understand, Model, Solve, Explain (in sentences), and Answer. (10 minutes)**  **Students will complete their warmup in their notebooks.**  **Instruction (mini lessons) from Unit 4**  **Current Lesson Instruction**      **Real World Context**  **Work Period**  **Notes and Examples**  **Practice**  **Closing**  **Ticket out the Door**  **DLIQ**  **Quiz on 11/15/16**   |  |  |  | | --- | --- | --- | | **Assessment Tasks used** | | | | **Skill-based Task:**  Find the area of this trapezoid: | **Problem Task:**  Mario needs to buy sod for his backyard. Here is a diagram of Mario’s backyard. Determine how much sod he will need to purchase. | **Performance Task:**  **DOE Unit 5 Frameworks**  Who Put the Tan in Tangram?  What’s My Area?  **RCPS Required Assessment**  Foam Fish Tanks |   **Use pages 567 – 630 (depending on student progressions/abilities**   |  |  |  | | --- | --- | --- | | **MCC6.G.4 *Students are expected to:*** | | | | 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. | | | | **MASTERY Patterns of Reasoning:** | | | | **Conceptual**:  Understanding that the surfaces of three-dimensional shapes are composed of two dimensional faces.  Understanding surface area using nets can be used in real-world contexts (e.g., wrapping presents, packaging). | **Representational**:  Use a net to represent a 3-D figure.  Use a net to find the surface area of a 3-D figure made up of rectangles and triangles (polyhedron).  Compose and decompose a polyhedron using rectangles and triangles.  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.   Description: 6g 4 copy | **Procedural**:  The area of two-dimensional shapes can be used to find the surface area of the three-dimensional shape.  Transitioning from three dimensions to two dimensions requires spatial reasoning. | | **Mathematical Task:**  Use the real-world problem at [Figure This: Real World Application](http://www.figurethis.org/challenges/c62/challenge.htm) . Give the students three small ice blocks and an ice block the equivalent to the size of all three smaller blocks. Have the students find the surface area of the block and each cube. Have them create a hypothesis about which will melt faster–the intact ice block or the cubes. Have the students perform the experiment by observing and measuring the time it takes for the block to melt and for all three cubes to melt. How does the melting time compare to the surface area exposed? Generalize the relationship.  Extension: Can you create a formula to show the relationship? |  |  |  |  |  |  | | --- | --- | --- | | **Skill-based Task:**  Find the surface area. | **Problem Task:**  Belinda had two boxes to wrap for a birthday party. Box A has a length of 12 in, width of 8 in, and height of 6 in. Box B has a length of 11 in, width of 9 in, and height of 7 in. Which box will require the least amount of wrapping paper? | **Performance Task:**  **DOE Unit 5 Frameworks**  How Many Ways  Packaging Our Goods  Boxing Bracelets  **RCPS Required Assessment**  Foam Fish Tanks |   Make polyhedrons from given nets. Recognize the rectangles and triangles that compose the polyhedron. Find the area of each polygon and add together to find the total surface area of the polyhedron.  Have nets on graph paper to aid in finding the area of polyhedrons. | |
| **Website Resources: learnzillion.com (email me if you need a code), connected.mcgraw-hill.com (see my website for logon details)**    [Cutting Up Lesson](http://www.learner.org/courses/learningmath/geometry/session5/part_b/index.html)  Geoboards (NLVM) <http://nlvm.usu.edu/en/nav/frames_asid_282_g_3_t_3.html?open=activities>  Online dot paper: [http://illuminations.nctm.org/lessons/DotPaper.pdf#search=%22dot paper%22](http://illuminations.nctm.org/lessons/DotPaper.pdf%23search=%22dot%20paper%22)  Lessons on area: <http://illuminations.nctm.org/LessonDetail.aspx?ID=L580> | |

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| **Resources/Instructional Materials Needed:** *(What do students need in order to learn what is required of this lesson)*  Paper, pencil, binder, math notebook, 6th grade textbook (housed in the classroom), dot paper, centimeter grid paper, ELMO, Interwrite Pad, attention and focus. |
| **Notes: Differentiation – Students will use models, hands-on, remediation where needed, small group with peers and small groups with the teacher, online resources, dot paper, centimeter grid paper.** |