

<b>A 3D Adventure</b> Geometry and Measurement		<b>Student/Class Goal</b> Students will be familiar with common geometric shapes and formulas, but will further apply these formulas to their everyday lives.
<b>Outcome</b> <i>(lesson objective)</i> Students will demonstrate their knowledge of geometric relationships by using measurements and applying theorems to solve problems based on everyday objects and activities.		<b>Time Frame</b> 3 Hours
<b>Standard</b> <i>Use Math to Solve Problems and Communicate</i>		<b>NRS EFL 5-6</b>
<b>Components of Performance (COPs)</b> Understand, interpret, and work with pictures, numbers, and symbolic information.	<b>Activity Addresses COPs</b> <i>(process)</i> Students will solve problems using different geometric theorems/formulas, while creating/identifying different three dimensional shapes and calculating volume and surface area.	
Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.	Students will use problem solving strategies to assess and appraise various measurements. Students will diagram various shapes and figures. Students will evaluate/compare geometric figures to predict changes.	
Define and select data to be used in solving the problem.	Students will choose the correct unit of measure and the appropriate formula.	
Determine the degree of precision required by the situation.	Students will compare/contrast calculated measurements; students will estimate whole numbers and square roots.	
Solve problem using appropriate quantitative procedures and verify that the results are reasonable.	Students will use a ruler to confirm results from calculated results of special triangles. Students will check results with calculators.	
Communicate results using a variety of mathematical representations, including graphs, charts, tables, and algebraic models.	Students communicate with each other in pairs for the purpose of ordering and classifying shapes.	
<b>Activity Addresses Benchmarks</b> <i>(content)</i> M.6.6, M.6.8, M.6.10, M.6.26, M.6.27, M.6.28		
<b>Materials</b> Pencils Construction Paper Colored Pencils Rulers Foam Cut-outs Formula Sheet Graph Paper Calculators Contextual Problems Hand-out Assessment		
<b>Learner Prior Knowledge</b> Square roots, exponents, PEMDAS, measuring with rulers, equivalent fractions, solving proportions, experience with theorems/formulas to calculate perimeter and area, compare units of measure, measuring scales, conversions, rounding.		
<b>Instructional Activities</b> Step 1 Instructor creates visual representation of all geometric shapes, patterns, and figures focusing on volume of triangles, cubes, and circles; including correct labels for each. Students will then create their		

own "cheat sheet" by note taking with colored pencils at their desks. Students will be given a review sheet identifying various three dimensional shapes (cubes, triangles, and circles). Instructor will also have shapes formed from foam.

Here are the steps to creating the "cheat sheet":

Give the students sheets of cardstock and draw a line down the middle of the page (or fold in half). Teacher will perform an example of volume and surface area for each three dimensional object drawn on the board. Have them draw a visual representation of each irregular polygon and circle down the left hand side of the page. Then, students will be given a formula sheet that simply states the formulas for volume and surface area. Instructor should spend time reviewing this sheet with the students.

Step 2

Students will create geometric shapes and patterns by tracing cardboard cut-outs patterns onto construction paper. Students will trace one shape for each of the following: trapezoids, circles, and irregular triangles. After students have cut-out their shapes, students will measure each cut-out with a ruler and determine the unit of measure. Students will label each cut-out with the correct length for each side. Students should round to the nearest whole number. Then, students will calculate perimeter, area, and circumference for each shape, and then write it in the inside of the shapes.

Step 3

Students should then choose one foam shape and draw/create their own shape/pattern from foam. Students will then trade/compare shapes, surface area, and volume with their friends. Students will identify equivalent shapes and patterns such as similar cubes; students will represent their findings in the form of a proportion and can be written as an equivalent fraction.

Step 4

After students have time to draw and label shapes and find measurements the instructor will conduct a scavenger hunt identifying three dimensional objects within the classroom, school building, or school yard. Using a tape measure the students will calculate measurements using appropriate units and draw a representation of the item onto graph paper. Students must choose correct the correct formula and proper name/label for each shape/object chosen. Instructor should perform examples within the classroom before allowing students to begin scavenger hunt. Students will share their findings with the class upon reconvening.

Step 5

Instructor will distribute hand-outs with contextualized word problems for practice applying the concepts. Hand-outs could be considered homework depending on class length/time.

**Assessment/Evidence** *(based on outcome)*

McGraw Hill Geometry pages 143-145 with 80% accuracy (complete as take home or partially in-class).

**Teacher Reflection/Lesson Evaluation**

Not yet completed

**Next Steps**