

Unit Title: *Measuring Shapes (5th Grade): Classifying 2-D and 3-D shapes and Volume*

Standards Addressed:

5.G.3 *Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles*

5.G.4 *Classify two-dimensional figures in a hierarchy based on properties.*

5.MD.3 *Recognize volume as an attribute of solid figures and understand concepts of volume measurement.*

- a. *A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume.*
- b. *A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.*

5.MD.4 *Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.*

5.MD.5 *Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.*

- a. *Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.*
- b. *Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.*
- c. *Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.*

By the end of the unit, what will students ...

Know	Understand	Be Able to Do
<p>Vocabulary: area, attribute, base, categorize, congruent, edge, face, hierarchy, lateral face, parallel, perimeter, polygon, polyhedron (polyhedra), prism, property, regular, right angle, unit cube, vertex, volume</p> <p>Names of specific polygons based on numbers of sides</p> <p>$V = (l)(w)(h)$ $V = Bh$</p>	<p>Students will understand that we organize and classify shapes based on the characteristics (attributes) of the shape.</p> <p>Students will understand that often irregular shapes or solids can be separated into familiar shapes or solids. Then composite areas or volumes can be found.</p> <p>Students will understand that volume is found from measurements of area similarly to how areas are found from measurements of lengths.</p> <p>Students will understand that the type of units used describe what is being measured, and what is being measured has a specific type of unit.</p>	<p>The students will be able to classify polygons and explain the hierarchy of quadrilaterals.</p> <p>The students will be able to compare and contrast 1-D, 2-D and 3-D measurements (lengths vs. area vs. volume).</p> <p>The students will be able to explain the role of units in geometric measurement.</p> <p>The students will be able to correctly calculate volumes of right rectangular prisms and composite shapes made of right rectangular prisms.</p> <p>The students will be able to apply geometric measurement to real-world problems.</p>

Pre-Assessment Ideas: Graphic organizer on polygons to name, measure and calculate areas and perimeters (prior information). Given a rectangular right prism, ask students to describe it and find a volume with a provided word bank (upcoming learning).

Summative Assessment Ideas: Complete quadrilateral hierarchy organizer. Calculate volumes of simple right rectangular prisms and composite rectangular prisms. Apply volume to real world problems. Essay: Explain the role of units in measurements.

Formative Assessment Ideas: Exit cards, station and activity work, homework, class discourse, questioning.