Unit 6 - *Graphing-Geometry-Volume*

Overview

In this unit, students are formally introduced to several new geometric concepts, including coordinate graphing and the use of hierarchies to classify two-dimensional shapes by their properties and working with protractors for angle measure and angle drawing. Students also review volume, working from counting the cubes that will fit into a box to measuring prisms in continuous units and using standard formulas (V = l x w x h and V = b x h) to find their volumes. The order of this unit and Unit G (Division and Decimals) could be interchanged.

21st Century Capacities: Synthesizing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP2 Reason abstractly and quantitatively
MP3 Construct viable arguments and critique the reasoning of others
MP7 Look for and make use of structure
MP8 Look for and express regularity in repeated reasoning

Analyze patterns and relationships.
CCSS.MATH.CONTENT.5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
CCSS.MATH.CONTENT.5.MD.C.5.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.
CCSS.MATH.CONTENT.5.MD.C.5.B Apply the formulas *V*

Transfer:

Students will be able to independently use their learning in new situations to...

1. Draw conclusions about graphs, shapes, equations, or objects. (Synthesizing)
2. Justify reasoning using clear and appropriate mathematical language.
3. Apply familiar mathematical concepts to a new problem or apply a new concept to rework a familiar problem. (Synthesizing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Mathematicians examine relationships to discern a pattern, generalizations, or structure.
2. Mathematicians analyze characteristics and properties of geometric shapes to develop mathematical arguments about geometric relationships.
3. Mathematicians use number sense to compute fluently.

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. What makes these shapes similar? Different?
B. How does classifying bring clarity?
C. How can I use what I know to help me find what is missing?
D. How do I interpret this mathematical model?

$= l \times w \times h$ 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. CCSS.MATH.CONTENT.5.MD.C.5.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. Graph points on the coordinate plane to solve real-world and mathematical problems. CCSS.MATH.CONTENT.5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate). CCSS.MATH.CONTENT.5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. Classify two-dimensional figures into categories based on their properties. CCSS.MATH.CONTENT.5.G.B.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. CCSS.MATH.CONTENT.5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.	***Acquisition:***	
	Students will know… 1. The properties of polygons. 2. How to plot coordinates on a grid. 3. How to calculate volume. 4. How to determine the missing dimension given some information about a rectangular prism. 5. How to name polygons based on characteristics. 6. The hierarchy of polygons as defined by given characteristics. 7. Vocabulary: coordinate, coordinate plane, ordered pair, point, x-axis, y-axis, sequence, arrangement, polygon, quadrilateral, square, rectangle, rhombus, trapezoid, hierarchy, acute angle, acute triangle, angle, equilateral triangle, isosceles triangles, obtuse triangle, property, classify, right angle, right triangle, congruent, irregular polygon, regular polygon, parallel, parallelogram, sub category, kite, hexagons, pentagon, volume, cube, dimension, length, width, height, patterns, prism, rectangular prism, cubic centimeter, edge, area, base, cubic unit, cubic inches, edge	*Students will be skilled at…* 1. Describing the properties and characteristics of polygons 2. Justifying the classification of certain polygons 3. Identifying the formula for volume 4. Calculating the volume of a rectangular prism with given dimensions 5. Determining the missing dimension using a given volume and single dimension. 6. Plotting coordinates on a grid 7. Naming coordinates from a grid