GRADE 5 UNIT 2 – GEOMETRIC MEASURES AND UNDERSTANDING VOLUME

Established Goals:
Standards

5.MD.3 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 it would be found 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.

Transfer

Students will be able to:

- Measure volume by counting the total number of same size cubic units required to fill a figure without gaps or overlap
- Choose an appropriate cubic unit based on the attributes of the 3-dimensional figure you are measuring.
- Show that the volume of a right rectangular prism found by counting all the unit cubes is the same as the formulas V w × h or V = B × h.
- Explain how both volume formulas relate to counting the cubes in one layer and multiplying that value by the number layers (height).
- Find the volume of a composite solid figure composed of two non-overlapping right rectangular prisms.
- Apply formulas to solve real world and mathematical problems involving volumes of right rectangular prisms and composites of same.

Meaning

ENDURING UNDERSTANDING	ESSENTIAL QUESTIONS
• Volume is a measure of the amount of space inside a solid figure. • Volume can be measured by counting the number of cubic units needed to fill a three-dimensional object. • The volume of some objects can be found by breaking apart the object into other objects for which the volume of each can be found. • Some problems can be solved by using objects to act out the action in the problem. • Some problems can be solved by reasoning about conditions in the problem.	• How can you use models to find the volume of a rectangular prism? • How can you find the volume of a rectangular prism? • How can you use formulas to solve a problem? • How can you find the volume of irregular solids? • How can you use objects to solve problems?

Acquisition

KNOWLEDGE	SKILLS
Students will know how to…	*Students will be skilled at…*

b. Apply the formula V= l x w x h and V= B x 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.	• Determine the volume of rectangular solids. • Count cubic units and use formulas to find the volume of rectangular prisms. • Build a rectangular prism and determine its volume. • Find the volume of rectangular solids. • Find the volume of irregular solids. • Identify simpler rectangular solids that make up an irregular solid. • Combine volumes to calculate the total volume. • Use object and reasoning to find the volume of solid figures. • Use unit cubes to find the volume of pictured solids.	• Measuring volume • Choosing an appropriate cubic for the 3-dimensional figure you are measuring. • Using the formulas V = l × w × h or V = B × h. • Explaining how both volume formulas relate to counting the cubes in one layer and multiplying that value by the number of layers (height). • Finding the volume of a composite solid figure composed of two non-overlapping right rectangular prisms. • Applying formulas to solve real world and mathematical problems involving volumes of right rectangular prisms and composites of same.

Vocabulary	Instruction and Pacing	
volume cubic unit cube prism	**Cubic Units**	**1 week**
	Volume with Cubes	**1 week**
	Volume Formula	**1 week**
	Volumes- layers of cubes	**1 week**
	Volume of Composite Figures	**1 week**
	Volume- Real World Problems	**1 week**

Resources

Common Core Standards, New Jersey Model Curriculum

Envisions Math Program Suggested Topics

- Topic 12 Volume

Differentiation and Accommodations

Provide graphic organizers
Provide manipulatives
Provide additional examples and opportunities for additional problems for repetition
Provide tutoring opportunities
Provide retesting opportunities after remediation (up to teacher and district discretion)
Teach for mastery not test
Teaching concepts in different modalities

Adjust pace and homework assignments	
21st Century Skills	Critical Thinking, Creative Thinking, Collaborating, Communicating, and Technology Literacy
Instructional Strategies	Fairfield Township School recognizes the importance of the varying methodologies that may be successfully employed by teachers within the classroom and, as a result, identifies a wide variety of possible instructional strategies that may be used effectively to support student achievement. These may include, but not be limited to, strategies that fall into categories identified by the Framework for Teaching by Charlotte Danielson: • Communicating with students • Using questioning and discussion techniques • Engaging students in learning • Using assessment in instruction • Demonstrating Flexibility and Responsiveness
Interdisciplinary Connections	Science, Technology, ELA

Common Misconceptions	**Proper Conceptions**
Students are unsure as to which units to use to measure volume because they are not sure what they are measuring	Volume is a measure of the amount of space inside a solid figure.
Students may confuse the need to find volume with area.	• Volume is a measure of the amount of space inside a solid figure. Volume can be measured by counting the number of cubic units needed to fill a three-dimensional object.

Performance Task

Erik was given 2 rectangular prisms. He was told to find the volume of each one. The first rectangular prism measured 5 cm tall, 2 cm long, and 2 cm wide. The second rectangular prism measured 4 cm long, 3 cm wide, and 2 cm high.

1) **Find the volume of each prism. Show your work.**
2) **Which prism could hold more centimeter cubes and by how many more?**
3) **Show 3 different sized rectangular prisms that would give you the same volume as the second one from above.**

Rubric

One point for each correct bullet.

ASSESSMENTS

Suggested Formative Assessment

Problem of the Day

Lesson Quizzes

Exit Ticket

Anecdotal Records (Topic Observation Checklist)

Suggested Summative Assessment

Grade level developed Unit/Envisions Topic Tests

Ed-Connect Express Tests /State Unit Benchmark Assessment/Performance Task