Marietta City Schools
District Unit Planner

Fifth Grade

Unit Name	**Unit 1:** *Investigating Volume of Solid Figures*	**Unit Duration (Days)**	*2-3 weeks*

[GA K-12 Standards](#)

In this unit, students are introduced to volume as a measurable attribute of solid figures by building on their understandings of area and multiplication. Students begin by first making sense of volume by building objects and counting the cubes, then analyzing images of prisms constructed of unit cubes and analyzing their structure. Students observe that multiplying the number of cubes in one layer by the number of layers of cubes gives the volume. Students recognize that the number of cubes in one layer represents the area of a rectangle. Students then generalize that they can use the product of the area of the base and the height of a rectangular prism to determine its volume and write expressions to represent the volume.

5.GSR.8 Examine properties of polygons and rectangular prisms, classify polygons by their properties, and discover volume of right rectangular prisms.
- **5.GSR.8.3** Investigate volume of right rectangular prisms by packing them with unit cubes without gaps or overlaps. Then, determine the total volume to solve problems.
- **5.GSR.8.4** Discover and explain how the volume of a right rectangular prism can be found by multiplying the area of the base times the height to solve real-life, mathematical problems.

5.NR.5 Write, interpret, and evaluate numerical expressions within real-life problems.
- **5.NR.5.1** Write, interpret, and evaluate simple numerical expressions involving whole numbers with or without grouping symbols to represent real-life situations.
    *5.NR.5.1 is explicitly taught in unit 3. This is a supporting standard for the formula of volume.

5.MP.1-8 Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals. *(It is important to note that MPs 1, 3 and 6 should support the learning in every lesson.)*
- **5.MP.1** Make sense of problems and persevere in solving them.
- **5.MP.2** Reason abstractly and quantitatively.
- **5.MP.3** Construct viable arguments and critique the reasoning of others.
- **5.MP.4** Model with mathematics.
- **5.MP.5** Use appropriate tools strategically.
- **5.MP.6** Attend to precision.
- **5.MP.7** Look for and make use of structure.
- **5.MP.8** Look for and express regularity in repeated reasoning.

The [Framework for Statistical Reasoning](#) and the [Mathematical Modeling Framework](#) should be taught throughout the units. The [K-12 Mathematical Practices](#) should be evidenced at some point throughout each unit depending on the tasks that are explored. It is important to note that MPs 1, 3 and 6 should support the learning in every lesson.

Essential Questions/ I CAN Statements

- What is volume?
- How do we measure volume?
- How are area and volume alike and different?
- How can you find the volume of cubes and rectangular prisms?
- What is a right rectangular prism?
- Why is volume represented with cubic units?
- How is the area represented with square units?
- How do we derive the formula for volume?
- How is the area of the base (B) times the height (h) the same as length times width times height (l x w x h)?
- What are some real world examples of volume?
- What is layering and how does it relate to volume?

Tier II Vocabulary Words- High Frequency Multiple Meaning	Tier III Vocabulary Words- Subject/ Content Related Words
equation, expression, height, length, unit cube, investigate, discover, explain, interpret, evaluate, volume, area, layer	area of base, edge length, gap, liquid volume, overlap, right rectangular prism, solid figure, cubic units (cubic cm, cubic in, cubic ft etc) [K-12 Mathematics Glossary](#)

Assessments

Formative Assessment(s):
- MCS Mini 8.3
- MCS Mini 8.4
- MCS K-5 Activity & Assessment Collection
- 5.GSR.8 Assessment Items
- Unit 1 Summative Assessment

Design it Revisited: 5.GRS.8 Performance Task
Students will apply their understanding of the volume of a rectangular prism to design and construct a cereal box for a local organization to support their toy drive. *(Suggested Timeframe: 2-3 days)*

Volume Formative Assessment Lesson

Also includes 5.NR.5
This learning plan is intended to help you assess how well students are able to model three dimensional figures and find their volume. *(Suggested Timeframe: 2-3 days)*

It is the responsibility of each schools' grade level PLC to identify appropriate instructional lessons and resources, based on data and student needs, using the suggested pacing duration. *The following learning tasks have been vetted to align to the standards included in this unit. The GA Dept. of Education strongly recommends that any additional tasks, resources, and/or assessments used for instruction should be vetted using the* Quality Assurance Rubric, *to ensure alignment to the state standards.*

Objective or Content	Learning Experiences		Differentiation Considerations

5.GSR.8 Examine properties of polygons and rectangular prisms, classify polygons by their properties, and discover volume of right rectangular prisms.
 	
5.NR.5 Write, interpret, and evaluate numerical expressions within real-life problems.
	GA DOE Learning Plans
	
	Layers in a Prism
	In this learning plan, students have the opportunity to reason about the volume of rectangular prisms by thinking about volume in terms of layers or equal groups of unit cubes. Students decompose rectangular prisms into layers and multiply the number of cubes in a layer by the number of layers. (Suggested Timeframe: 1-2 days)
	   ● Teacher Guidance
	   ● Student Reproducibles
	   ● Blackline Masters
	
	How Many Ways
	Also includes 5.NR.5
	In this learning plan, students will use cubes to build right rectangular prisms or draw right rectangular prisms in order to generalize a pattern for the volume of rectangular prisms. (Suggested Timeframe: 1-2 days)
	   ● Teacher Guidance
	   ● Student Reproducibles
	
	Volumes with Cubey
	Also includes 5.NR.5 and 5.PAR.6
	This learning plan tries to build on student intuition to develop an understanding of the volume of prisms. Students will explore the relationship between the number of equal layers in a rectangular prism and the total number of unit cubes (or volume). (Suggested Timeframe: 1-2 days)
		MCS Curriculum Resources
		
		SAVVAS Topic 11: Understand Volume Concepts
		Students explore concepts of volume measurement for rectangular prisms and some composite solid figures. They relate volume to multiplication and addition.
		   ● Lesson 11-1: Model Volume
		   ● Lesson 11-2: Develop a Volume Formula
		   ● 3-ACT Task: Fill'er Up
		
		MIP Module 13: Exploring Volume
		Students develop an understanding of volume as well as ways to measure it.
		   ● Counting Cubes p. 249
		   ● Build It! P. 252
		   ● Base x Height p. 253
		   ● What's the Rule? P. 255
		   ● Problem Solving p. 256
			Areas of Rectangles: Use multiplication to calculate area of rectangles.
			
			Penny's Box: Determine dimensions of a box with a given volume and reason about the economy of the box design.
			
			Cuboid Construction: Given a specific volume, build rectangular prisms.
			
			Spaced Out: Use a formula to calculate the volume of a rectangular prism.

- Teacher Guidance
- Student Reproducibles

Volume and Expression
Also includes 5.NR.5
In this learning plan, students will write and evaluate expressions from a context. (Suggested Timeframe: 1-2 days)
- Teacher Guidance
- Student Reproducibles

Design it
Also includes 5.NR.5
In this learning plan, students will investigate how the dimensions of a right rectangular prism can be used to determine the total volume. (Suggested Timeframe: 1-2 days)
- Teacher Guidance
- Student Reproducibles

Content Resources

MCS Links:
- MCS Math Curriculum Map
- MCS Math Instructional Framework

GA DOE Links:
Access all GADOE Curriculum Resources at the following site: GaDOE Inspire.

Additional Resources:
- Same Volume Different Dimensions
- Make it Fill it Find it Volume
- Concept of Volume
- Measure Volume
- Measure Volume 2