

Grade: 5th

Strand: Measurement & Data

Standard/Topic: MAT-05.MD.05

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

- Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes. 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 to represent the associative property of multiplication.
- 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.
- 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 problem



		Sample Activities
Score 4.0 Complex	In addition to Score 3.0, in-depth inferences and applications that go beyond the target content. The student will: - Design real world problems that involve volume of 3-dimensional shapes. - Apply knowledge of rectangular prisms to determine reasonableness of dimensions in real-world situations.	Example: Find a storage unit/container in the classroom and plan for better organization of the supplies based on volume measurements (considering rectangular prisms and square/rectangular units).
	3.5 In addition to target performance, in-depth inferences and applications with partial understanding	
Score 3.0 Target	The student will: Relate volume to the operations of multiplication and addition and solve real world & mathematical problems involving volume. 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. (Substandard 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. (Substandard D) The student exhibits no major errors or omissions.	Students work in pairs. One student uses unit cubes and the other multiplies edge lengths. Compare results. Switch roles with the next problem. Explore multiplying three numbers in any order. Build a model with unit cubes. Find the volume using the two different formulas and compare results. Use unit cubes and formulas. Possible Assessment Opportunities: - Investigation pages: 97 - Investigation pages: 111
	2.5 No major errors or omissions regarding the simple content and partial understanding of the target content	
Score 2.0 Simple	There are no major errors or omissions regarding the simpler details and processes as the student: - The student will recognize or recall specific terminology, such as: <u>Volume, length, width, height, formula, additive, multiply, edge, equation, 3</u>	Use the concept of "groups of" in multiplication to build models that represent given volumes (e.g., How could you create a rectangular prism that has a volume of twenty cubic units?)

	<u>dimensional, right rectangular prism, unit cubes</u> • The student will perform basic processes, such as: ◦ Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes. Show that the volume is the same as when multiplying the edge lengths, equivalently by multiplying the height by the area of the base. (Substandard A) ◦ Represent threefold whole-number products as volumes to represent the associative property of multiplication. (Substandard B) However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	
	1.5 Partial understanding of the simple, but major errors or omissions regarding the target content	
Score 1.0	With help, partial understanding of the simple and target content	
	0.5 With help, partial understanding of the simple content, but not the targeted content	