Core Content

Cluster Title: Explain volume formulas and use them to solve problems.
Standard (+) G.GMD.2: Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.
Concepts and Skills to Master
• Understand Cavalieri's Principle. • Use Cavalieri's Principle to find volumes of solid figures.

Supports for Teachers

Critical Background Knowledge	
volume formulas for right prisms, pyramids, cones, and cylinders.	
Academic Vocabulary	
Cavalieri's Principle, cross-sections, altitude, parallel, sphere, cone, cylinder	
Suggested Instructional Strategies	**Resources**
• Compare two stacks of pennies—one stacked vertically and the other leaning. Have students discuss properties of volume for the two stacks. Are the volumes the same? How are they different? Explain. • Use the idea of matching horizontal cross-sections from a cone to a cylinder and then from a cylinder to half of a sphere. • Derive the volume of a sphere using knowledge of the volume of a cone and the volume of a cylinder.	Cavalieri's Principle Applet: http://www.matematicasvisuales.com/english/html/history/cavalieri/cavalierisphere.html Cavalieri's Principle Proof (with graphics): http://blog.zacharyabel.com/tag/cavalieris-principle/
Sample Formative Assessment Tasks	
Skill-Based Task: Use a visual model to represent how to use Cavalieri's Principle to find the volume of a sphere from the volume of a cone.	**Problem Task:** Give an informal argument referencing Cavalieri's Principle and relating the volume of a cone to the volume of a sphere. Justify verbally and algebraically.

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