Explain volume formulas and use them to solve problems (Standards G.GMD.1, 3)
Standard II.G.GMD.1: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Informal arguments for area formulas can make use of the way in which area scale under similarity transformations: when one figure in the plane results from another by applying a similarity transformation with scale factor k, its area is k^2 times the area of the first. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*
Concepts and Skills to Master
- Develop the formulas for the circumference of a circle, area of a circle, and volume of a cylinder, pyramid, and cone using a variety of arguments.   - Consider why the various formulas work, using drawings and models as needed.   - Use similarity to define π and develop the formula for the circumference of a circle.   - Use a limit argument to develop the area of a circle.   - Use Cavalier's principle to explain why the formulas for the volume of a cylinder, pyramid, and cone work.   - Relate the volumes among various solids with the same dimensions.

Related Standards: Current Course	Related Standards: Future Courses
G.C.4, 6.G.2, 7.G.4, 8.G.9	

Support for Teachers

Critical Background Knowledge
• Use mathematical language and a logical progression of ideas to present an argument.
Academic Vocabulary
cylinder, right prism, pyramid, cone, dissection argument, Cavalieri's principle, limit argument
Resources
Curriculum Resources: http://schools.utah.gov/curr/mathsec/Core/HighSchoolCurriculum.aspx

Explain volume formulas and use them to solve problems (Standards G.GMD.1, 3)	
Standard II.G.GMD.3: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. Informal arguments for volume formulas can make use of the way in which volume scale under similarity transformations: when one figure results from another by applying a similarity transformation, volumes of solid figures scale by k_3 under a similarity transformation with scale factor k.	
Concepts and Skills to Master	
- Find the volume of cylinders, pyramids, cones, and spheres in contextual problems. - Apply volume formulas to suggest solutions to real-world problems involving geometric solids.	
Related Standards: Current Course	Related Standards: Future Courses
7.G.6, 8.G.9	

Support for Teachers

Critical Background Knowledge
● Formulas for the volumes of cones, cylinders, and spheres (8.G.9).
Academic Vocabulary
pyramid, cylinder, cone, sphere, volume, length, width, height, base, radius, π.
Resources
Curriculum Resources: http://schools.utah.gov/curr/mathsec/Core/HighSchoolCurriculum.aspx