Grade 8 Standards Parent Resource
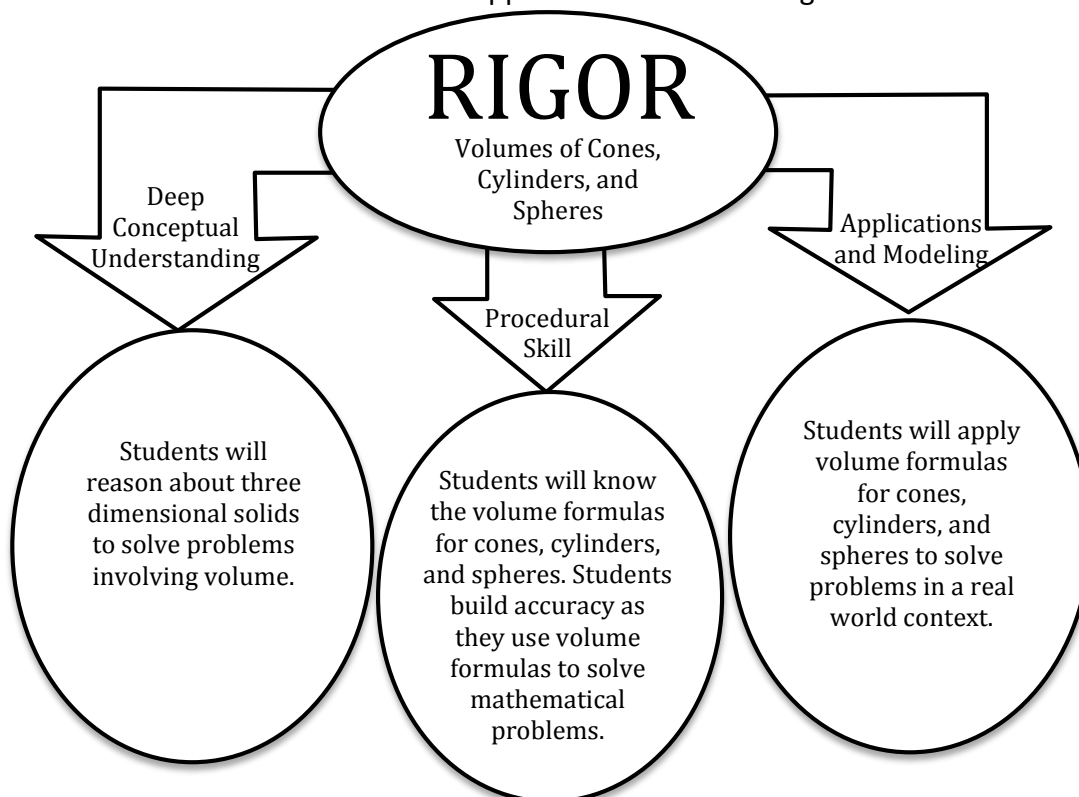
Unit #7: Transformations and Geometric Measurement

Unit 7 includes 3 topics of study, listed below. This resource is for Topic 3.

Topic # 1	Topic # 2	**Topic # 3**
Congruence Through Rigid Transformations	*Similarity Through Non-Rigid Transformations*	***Volumes of Cones, Cylinders, and Spheres***

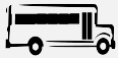| Topic	**Learning Goals by Common Core State Standard** *Students will be able to...*
Volumes of Cones, Cylinders, and Spheres	• Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. *Instructional videos in the hyperlinks above are meant to support C2.0 content, but may use vocabulary or strategies not emphasized by MCPS.*

The Common Core State Standards require a balance of three fundamental components that result in rigorous mathematics acquisition: deep conceptual understanding, procedural skill, and mathematical applications and modeling.

RIGOR
Volumes of Cones, Cylinders, and Spheres

Deep Conceptual Understanding

Procedural Skill

Applications and Modeling

Students will reason about three dimensional solids to solve problems involving volume.

Students will know the volume formulas for cones, cylinders, and spheres. Students build accuracy as they use volume formulas to solve mathematical problems.

Students will apply volume formulas for cones, cylinders, and spheres to solve problems in a real world context.

Learning Experiences by Common Core State Standard
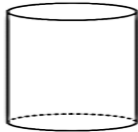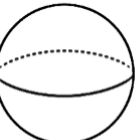
In school, your child will…
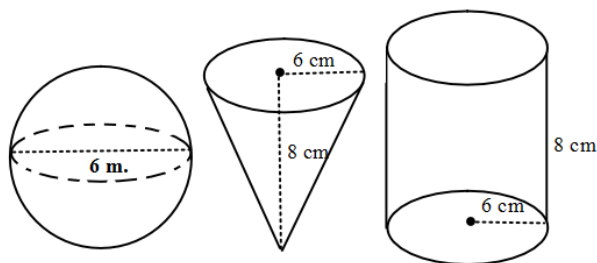
At home, your child can…

Topic #3: Volumes of Cones, Cylinders, and Spheres

- Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems

  Name each solid and write the volume formula.

Type of Solid			
Image of Solid			
Volume Formula			

Use the diagram below to determine which solid has the greater volume.

figures are not drawn to scale

What is the ratio of the volume of the cone to the volume of the cylinder?

What is the ratio of the volume of the sphere to the volume of the cylinder?

- Watch the online video, Understanding Engine Size to see how the volume of cylinders is applied in the real world.
- Take a trip to the local grocery store and examine which groceries are packaged in cylinders and which are packaged in rectangular prisms. Then discuss the following questions together.
  - Why do soups and pops and other food containers come in cylindrical containers?
  - When food companies ship these items, do they fill the shipping boxes completely?
  - When food companies ship these items, what type of package do they use? Is it a cylinder or prism?
  - If we ship items in prism boxes for packaging, why do we not make containers that fit this package better? What if we shipped items in prism containers?

  from http://illuminations.nctm.org/

Additional Resources
- Mangahigh.com – Volume of a Cylinder (online practice)
- Mangahigh.com – Volume of Spheres (online practice)
- Mathopolis.com – Estimate Volume – Cones (online practice)
- Estimate Volume - Cylinders and Cones (online game)
- Learn how to develop and apply the formula for:
  - Volume of a cylinder by using the concept of stacking circles.
  - Volume of a cone by comparing cones to cylinders.
  - Volume of a sphere by comparing spheres and cylinders with similar dimensions. (video tutorials)
- Grade 8 Standards Unit 7 Topic 3 Volumes of Cones, Cylinders, and Spheres (flexbook)

  Additional Practice links support C2.0 content,
  but may use vocabulary or strategies not emphasized by MCPS.