

Subject: Mathematics

Grade: Ninth

Standard: #2 Geometry  
#8 Reasoning

Key Concept: Students investigate volume.

Generalization: Students make conjectures, gather evidence, and generalize about volume.

Background:

This lesson could be used to motivate the study of the formulas for calculating volume. Students may work in pairs or individually within the tiers.

Each tier should be instructed to make a conjecture about the effects of different volumes for their particular activity. The amount of direction needed will depend on the ability levels of your students. In general, each activity is meant to introduce students to volume and get them thinking about volume.

This lesson is tiered in *process* according to *learning style*.

Tier I: ***Logical-Mathematical Learners***

Pairs of students complete “Lesson 3” on page 115 of Mathematics A Human Endeavor, Third Edition, ISBN #0-7167-2426-X. This lesson involves making comparisons between familiar units used for measuring volume and those used in Colonial America. You might want to have some actual instruments which are typically used to measure volume, e.g. cup, pint, quart and gallon, and some of the Colonial units, e.g. jigger, jill, jack, casks, etc., if you can find them. The lesson provides five questions to be answered from a table which compares the two systems. You may want to add a couple additional questions or have the students try to locate some of the Colonial units or approximations of them.

Tier II: ***Kinesthetic Learners***

This activity is taken from NCTM News Bulletin, February 2000. Pairs of students investigate volume using a standard-sized piece of paper, leaving it whole or cutting it into halves and fourths, and taping the edges together to form different sized cylinders. Students build the cylinders, nest them together,

and use popcorn kernels to discover the relationships among the volume of the cylinders. See page 2 of the reference for more details.

**Tier III: *Musical Learners***

This activity is adapted from Math for fun Projects, ISBN# 0-7613-0789-3, pages 188-189. Students investigate volume using glass bottles, water or some other liquid, and create a tune. Students should accurately measure and keep track of the amounts used to create their tune.

**Assessment:**

Use observation and questioning as you visit each tier to assess this lesson.