



TEACHER PAGE

Lesson: Effect on Surface Area and Volume as Dimensions Change

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New Arizona Math Strand 4 Geometry and Measurement Grade 9-12
Articulated 4MH4-04 Compare perimeter, area, or volume of figures when dimensions are changed.

Materials:

Art supplies: string, colored paper, modeling clay, plastic shapes, markers or crayons

Learning Objectives: The student will be able to:

1. demonstrate understanding of how surface area and volume in 3-D figures change when the dimensions of the figure are changed.
2. demonstrate and explain the correct use of a formula for a specific figure
3. demonstrate understanding of the vocabulary: length, width, height, radius, surface area and volume.

Overview and Content:

This is a step-by-step process lesson focusing on student understanding of how surface area and volumes change as he dimensions of a figure change. The lesson also focuses on working with the formula for determining surface area and volume of 3-D figures. The lesson moves deliberately through several figures and provides needed time to determine the calculations. The student cannot move forward in the lesson without determining the correct answers. The lesson uses visual techniques in leading the students to understanding how surface area and volume are related.

Follow-up and Extensions:

SO WHAT! reveals the truth behind the Matryoshka Russian dolls. In the DIG DEEPER section, this math concept is used with for planetary calculations. TALK ABOUT IT! develops student understanding of the relationship between surface area and volume by having the volume remain constant while the surface area changes, e.g. determine all the possible dimensions and surface area a 3-D figure can take on while the volume remains constant. In this section, partners work together to design a greenhouse that will be restricted in volume to 6000ft^3 .

Assessment:

Correct responses on multiple-choice questions validates understanding the concept

Teacher Note:

This lesson emphasizes the concept of maximizing the volume while minimizing the surface area. This is an extremely important concept in business and industrial fields as well as in higher mathematics.



