

Math 6 - Act. 19: Cube Models

Summary

This activity will give students a better understanding of the concepts of area and volume.

Main Core Tie

Mathematics Grade 6

[Strand: GEOMETRY \(6.G\) Standard 6.G.2](#)

Materials

- Multi-link cubes

- Two-centimeter graph paper

- Colored pencils

Additional Resource

Investigations in Number, Data, and Space – Containers and Cubes (Dale Seymour Publications)

Background for Teachers

Many students have a difficult time understanding the concepts of area and volume. The standard unit of volume in the metric system is the liter.

Intended Learning Outcomes

3. Reason mathematically.

Instructional Procedures

Invitation to Learn

Show a box that has centimeter grid marks on the outside. Ask the students if they could guess how many multi-link cubes could fit inside. Have them construct multi-link cubes so that it looks like the shape of the box. Ask the students if there is another way to arrange the multi-link cubes in order to get another box that is a different shape. How many different boxes can they find? Have them record their results both pictorially and using numbers (2 x 3 x 5).

Instructional Procedures

Following an introduction to area and volume, students will work in groups to build models of square centimeters. This becomes a good cooperative team effort at problem solving.

Students are provided with materials, but no initial instruction is given on how to build their models. They do have guidelines which are:

- The multi-link model must contain at least five different size boxes.

- They must recreate their models onto two-centimeter paper.

- They must know how many multi-link cubes it took to build their model.

- They must be able to tell you the dimension of the box.

After they have created their models from multi-link cubes, and then re-created them on paper, have the students count the number of squares there are on the outside of their object.

Tell them that this is the surface area (they may need to undo their paper models and lay them flat in order to count each square without missing any of them).

Have them list the dimensions of each of their boxes, as well as the surface area, using the worksheet provided.

Are there any patterns or generalizations they can see?

Record the findings of the class, on different size boxes, and the surface area that goes along with it.

Can any of their generalizations be made into a rule?

Volume = length x width x height

Surface area = the area of all the faces of the object

or $2lh + 2lh + 2wh$

Curriculum Integration

Math/Science--Have students use what they know about volume and surface area to come up with the dimensions of the container that will keep liquid hot the longest. The total volume of the object cannot be greater than 1,000 cubic centimeters.

Extensions

Possible Extensions/Adaptations

Using other three-dimensional shapes, such as cones and prisms, come up with another model, and find its volume and surface area.

Homework & Family Connections

Have the students take their models home and share them with their parents, describing what they have learned about the relationship of surface area and volume. Have parents sign a note stating what they think their child has learned from this project.

Assessment Plan

When the groups have completed their projects, they will send a spokesperson to the front of the room to share with the class what they have built, what it is called, and how it compares to some of the other models built by other groups. They will also tell the class the total volume and surface area of their model.

Authors

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