Activity: Volume and Surface Area

Format: Large Group

Objectives: The participants will cut out squares from the corners of graph paper to form boxes to see the effect of changing one variable on the surface area and volume formulas.

Related 2009 SOL(s):

7.5 The student will
- a) describe volume and surface area of cylinders;
- b) solve practical problems involving the volume and surface area of rectangular prisms and cylinders; and
- c) describe how changing one measured attribute of a rectangular prism affects its volume and surface area.

8.7 The student will
- a) investigate and solve practical problems involving volume and surface area of prisms, cylinders, cones, and pyramids; and
- b) describe how changing one measured attribute of a figure affects the volume and surface area.

Materials: 6 sheets of cm graph paper per person,
scissors,
scotch tape,
pencils,
paper,
calculator,
recording sheet.

Time Required: 60 minutes

Directions:

1. Hand out material. Inform the participants that you want them to create 6 boxes by using 6 sheets of 20 cm by 16 cm graph paper. To do this you need to cut 2 rows of the second sheet selecting either the length or width, 3 rows of the third sheet, 4 rows of the forth sheet, 5 rows of the fifth, and 10 rows of the sixth sheet. Remember if you choose to modify the length on the second sheet you must continue to modify the length on the remaining sheet. Have the participants cut out a 2-by-2 square from each corner of the graph paper. Fold the sides up and use the tape attach them together.

2. Using the fact that the paper is 1-cm graph paper ask the participants to describe how to find the volume and surface

area of these boxes. Allow the participants to discus and share ideas on how they found the volume and surface area. If the group does not bring up the fact that you need to have a top to determine surface area then you may need to prompt them.

3. Have the participants complete the chart and discuss their observations and make predictions

4. Ask a few participants to describe what is happening to the volume and surface area of their boxes. Ask them to describe any patterns they see on how the surface area and volume change and if there is any relationship between the two.

5. Discuss with the participants that using concrete and hands-on experimenting to get the student to start developing their understanding and then moving them to representational forms and finally to abstract concepts helps the students to create a better understanding of the material and concepts while building their problem-solving skills.

6. Discus how students can use this activity to develop their understanding of volume and surface area.

Closing and Debriefing:

Possible questions to ask:

- What did you learn from this session?
- How would you apply this to your classroom?
- What is still unclear?
- Comments and/or concerns?

Reflection for Presenter: (Please reflect on and complete the questions below immediately after delivering the session)

What specific examples of learning did you note?

What specific errors and/or misconceptions still need to be corrected?

Summarize the workshop evaluations.

Recording Sheet

Name:_____ Date:_____

Box	Length in cm	Width in cm	Height in cm	Surface Area Length times width	Volume Length times width times height
1) 20 by 16					
2)					
3)					
4)					
5)					
6)					
Prediction					
Prediction					

1) Describe any patterns you see in your data. _____
_____
_____
_____
_____
_____

2) How can you use this activity to support students understanding of volume and surface area? _____
_____
_____
_____
_____