

Attributes of a Rectangular Prism

Reporting Category	Measurement
Topic	Exploring how changing an attribute of a rectangular prism affects its volume and surface area
Primary SOL	7.5c The student will describe how changing one measured attribute of a rectangular prism affects its volume and surface area.
Related SOL	7.5b

Materials

- Cubes
- Rectangular Prisms activity sheet (attached)

Vocabulary

rectangular prism, length, width, height (earlier grades)
attribute (7.5)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Place students into groups of four, and give each group some cubes and a copy of the activity sheet. Ask each group to complete the first page of the activity sheet, as you circulate among the groups, assisting as needed. After all groups have completed the first page, have one member from each group report their findings. Facilitate a discussion on the conclusions reached.
2. Ask each group to complete the second page of the activity sheet. After each group has finished, conduct a similar discussion as with the previous page.
3. Ask each group to complete the third page, and, as before, conduct a discussion upon completion.
4. Students should conclude that changing one attribute of a rectangular prism has a direct effect on the prism's volume. This direct relationship does not exist for surface area.

Assessment

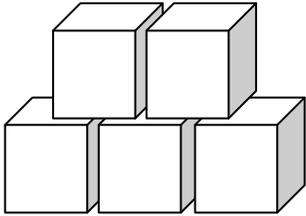
- **Questions**
 - How does the volume of a rectangular prism change when the length, width, or height is changed?
 - How does the surface area of a rectangular prism change when the length, width, or height is changed?
- **Journal/Writing Prompts**
 - Explain why there is no direct relationship between changing one attribute of a rectangular prism and the surface area of the prism.
 - Explain what happens to the original volume when you double both the width and the height.

Extensions and Connections (for all students)

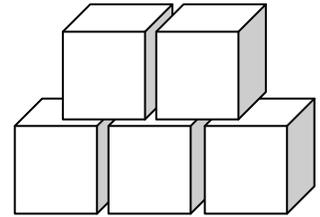
- Have students investigate other types of prisms (e.g., triangular prisms) to see if the same relationship occurs with volume. Is there a direct relationship between changing one attribute and the surface area?

Strategies for Differentiation

- On the activity sheet, stress the vocabulary: double is the same as multiplying by 2; multiplying by $\frac{1}{2}$ is the same as dividing by 2.
- Some students will need a drawing of the prism along with the cube representation.
- Students may need a modified recording sheet to help fill in the activity chart. For an example, see SOL 7.5b.



Rectangular Prisms



Name _____ Date _____

	Length	Width	Height	Volume	Surface Area
Original Prism	3	4	2		
Length \times 2		4	2		
Width \times 2	3		2		
Height \times 2	3	4			

1. Use your blocks to build a prism that has a length of 3, a width of 4, and a height of 2. Find the volume and surface area of your prism. Record your results in the table.
2. Using your blocks, double the **length** of your prism. Do not change the width or height. Find the volume and surface area of your new prism. Record your results in the table.
3. Using your blocks, double the **width** of your prism. Do not change the length or height. Find the volume and surface area of your new prism. Record your results in the table.
4. Using your blocks, double the **height** of your prism. Do not change the length or width. Find the volume and surface area of your new prism. Record your results in the table.

Compare the volume of your original prism to the volume of new prisms, and explain how changing an attribute affects volume.

Compare the surface area of your original prism to the surface area of new prisms, and explain how changing an attribute affects surface area.

	Length	Width	Height	Volume	Surface Area
Original Prism	6	4	2		
Length \times 1/2		4	2		
Width \times 1/2	6		2		
Height \times 1/2	6	4			

1. Use your blocks to build a prism that has a length of 6, a width of 4, and a height of 2. Find the volume and surface area of your prism. Record your results in the table.
2. Using your blocks, use 1/2 the **length** of your original prism. Do not change the width or height. Find the volume and surface area of your new prism. Record your results in the table.
3. Using your blocks, use 1/2 the **width** of your original prism. Do not change the length or height. Find the volume and surface area of your new prism. Record your results in the table.
4. Using your blocks, use 1/2 the **height** of your original prism. Do not change the length or width. Find the volume and surface area of your new prism. Record your results in the table.

Compare the volume of your original prism to the volume of new prisms, and explain how changing an attribute affects volume.

Compare the surface area of your original prism to the surface area of new prisms, and explain how changing an attribute affects surface area.

Predict what would happen if you tripled one of the attributes.

Test your prediction.

Will the same pattern occur with other rectangular prisms? Explain.

Predict what would happen if you changed two attributes of the prism.

Test your prediction.
