Super Size or Down Size?

Suppose you have a container in the shape of a rectangular prism and you want to increase (super size) the volume of this container. If you double the dimensions of the original rectangular prism, how will the volume be affected? How will the surface area be affected by this change?

Suppose you have a large container in the shape of a rectangular prism and you want to decrease (down size) the volume of this container. If you decrease the dimensions by a scale factor of one-half, how is the volume affected? What effect will this change have on the surface area of the prism?

1. Make conjectures about changing the dimensions of a rectangular prism by a given scale factor and the resulting effect on surface area and volume.

2. Validate your volume conjectures by investigating with one-inch cubes. Use color tiles and/or one-inch grid paper to validate your conjectures about surface area.

3. Make generalizations based upon your findings.

4. How could these generalizations be extended to other geometric figures? Explain.

Super Size or Down Size?

Table 1: Investigations with Volume (Super Size)

Sketch of 3-D Figure	Sketch of 3-D Figure with dimensions doubled	Volume of Original Figure Process	Volume when dimensions are doubled Process	Volume of Original Figure	Volume when dimensions are doubled
		L x W x H	L x W x H		

Write a generalization about the effect of a scale factor change of 2 in dimensions of a rectangular prism and the resulting volume based upon your findings from this investigation.

Super Size or Down Size?

Table 2: Investigations with Volume (Down Size)

Sketch of 3-D Figure	Sketch of 3-D Figure with dimensions halved	Volume of Original Figure Process	Volume when dimensions are halved Process	Volume of Original Figure Process	Volume when dimensions are halved Process
		L x W x H	L x W x H		

Write a generalization based upon your investigation relating a scale factor change of ½ and the resulting volume of a given rectangular prism.

Super Size or Down Size?

Table 3: Investigations with Surface Area (Super Size)

Dimensions of original figure	Dimensions of figure with a scale factor of 2	Surface Area of original figure Process	Surface Area when dimensions are doubled Process	Surface Area of Original Figure	Surface Area when dimensions are doubled
L x W x H	L x W x H				

Write a generalization about the effect of a scale factor change of 2 in the dimensions of a rectangular prism on its surface area.

Super Size or Down Size?

Table 4: Investigations with Surface Area (Down Size)

Dimensions of original figure	Dimensions of figure with a scale factor of one-half	Surface Area of original figure Process	Surface Area when dimensions are halved Process	Surface Area of Original Figure	Surface Area when dimensions are halved
L x W x H	L x W x H				

1. Write a generalization based upon your findings relating a scale factor change of ½ in the dimensions of a rectangular prism and its resulting surface area.

2. Write a generalization relating a change in the dimensions of a 3-dimensional figure by a scale factor ***k*** and the resulting surface area and volume.