

## Modeling Cell Surface Area and Volume

This activity presents a model of how quickly cell volume increases relative to the increase in cell surface area. You will use a cube as a model of a cell. This is to simplify the calculations!

1. Fill in Data Chart A on Surface Area and Volume. You will start with a cube that measures 1.0 cm on each side. (The data chart is shown here and is reproduced in the template).

$$\text{formula for surface area: } A = 6s^2$$
$$\text{formula for volume: } V = s^3$$

s = length of side

2. Construct a graph of the data using cell surface area as the independent variable (x-axis) and volume as the dependent variable (y-axis)
3. Describe the shape of the graph.  
Is the relation direct (a straight line) or exponential (increases in an upwards arc)?
4. Write a brief commentary about the relation of cell surface area and volume. Do each increase at the same rate? If no, which increases more rapidly? Relate this to the problem a cell faces of taking in water and nutrients and disposing of cell wastes.

**Data Chart A: Relation of Length, Surface Area, and Volume**

Length (s) (cm)	Surface Area (A) (cm <sup>2</sup> )	Volume (V) (cm <sup>3</sup> )
1.0	6.0	1.0
2.0		
3.0		
4.0		
5.0		
6.0		
7.0		
8.0		
9.0		
10.0		

