

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## How big should a cell be?

Have you ever thought about why cells are so small? Why do you think that is? Let's investigate the sizes of some boxes to figure out why...

Directions:

1. Measure the height, width and length of the boxes on the sheet at your table, and write the numbers in the table below, corresponding with your box number. Box 5 is 5 cm by 5 cm by 5 cm. **Leave box 6 for now!**

2. Calculate the surface area of the box: A) First measure the **area of one side (height x width)**. Then multiply the number of one side **times 6** (since there are 6 sides). Write your results in the table below.

3. Now calculate the volume of the whole box. **Volume = height x width x length**. Write your results in the table below.

4. Now let's calculate the ratios... Divide the Surface Area by the Volume of your cell. Write your value in the table.

Box Number	Height	Width	Length	Surface Area	Volume	SA/Vol Ratio
1						
2						
3						
4						
5						
6						

After you fill in your chart through box 5, answer the following questions:

1. What happens to the volume of a box when you increase its size? (Hint: How much does it go up each time?)

2. What happens to the surface area?

3. Which surface area or volume gets bigger faster?

4. What happened to the ratio?

5. Imagine you're a slug having to cross the box. You have 10 seconds. Which boxes are you going to be able to cross? Why?

### **What does this have to do with a cell?**

A cell needs to get \_\_\_\_\_ in order to grow and do its job. If the nutrients can't travel through the cell in time, the cell won't get what it needs to do its jobs. In other words, when a cell gets \_\_\_\_\_, the nutrients can't make it to all the parts of the cell and the cell will \_\_\_\_\_. Therefore, cells have a \_\_\_\_\_ surface area to volume ratio (meaning they're \_\_\_\_\_) to allow more nutrients in. Their smaller \_\_\_\_\_ keeps the distances materials have to travel smaller, and the cells get the nutrients they need to work and survive.

**Tomorrow: How cells stay small—by dividing!**