

**Ted Ed: What is the biggest single-celled organism?** Name \_\_\_\_\_ Date \_\_\_\_\_

1. How do you find the surface area : volume ratio? What does the surface area represent in a cell? What does the volume represent in a cell?
2. What happens to the surface area : volume ratio of a cell as it grows? Why?
3. What would likely happen to a huge cell? Why?
4. What are some ways cells increase their surface area so they can grow larger?
5. In summary, why don't we get large unicellular organisms, like unicellular whales?

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**Surface Area : Volume Simulation** Name \_\_\_\_\_ Date \_\_\_\_\_

*Question: How do surface area, volume, and the area:volume ratio change as a cell gets bigger?*

Use the Surface Area / Volume Simulation to complete the chart below by testing a wide range of radii:

Radius ( $\mu\text{m}$ )	Surface area ( $\mu\text{m}^2$ )	Volume ( $\mu\text{m}^3$ )	Area/Volume Ratio ( $\mu\text{m}^{-1}$ )

1. What happens to the surface area as the cell gets bigger? \_\_\_\_\_
2. What happens to the volume as the cell gets bigger? \_\_\_\_\_
3. Which value – surface area or volume – grows more quickly as the radius gets closer to  $6.5 \mu\text{m}$ ?  
\_\_\_\_\_
4. What happens to the area/volume ratio as the cell gets bigger? \_\_\_\_\_
5. What type of cell do you think would be more efficient – a large cell, or a small cell? Explain your answer.  
\_\_\_\_\_

**Surface Area : Volume Simulation** Name \_\_\_\_\_ Block \_\_\_\_ Date \_\_\_\_\_

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1. What happens to the surface area as the cell gets bigger? \_\_\_\_\_
2. What happens to the volume as the cell gets bigger? \_\_\_\_\_
3. Which value – surface area or volume – grows more quickly as the side gets closer to  $10 \mu\text{m}$ ?  
\_\_\_\_\_
4. What happens to the area/volume ratio as the cell gets bigger? \_\_\_\_\_
5. What type of cell do you think would be more efficient – a large cell, or a small cell? Explain your answer.  
\_\_\_\_\_