Name _____ Date _____ Period _____

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# Surface Area to Volume Ratio

Biology

Answer in complete sentences. Show your work for calculations.

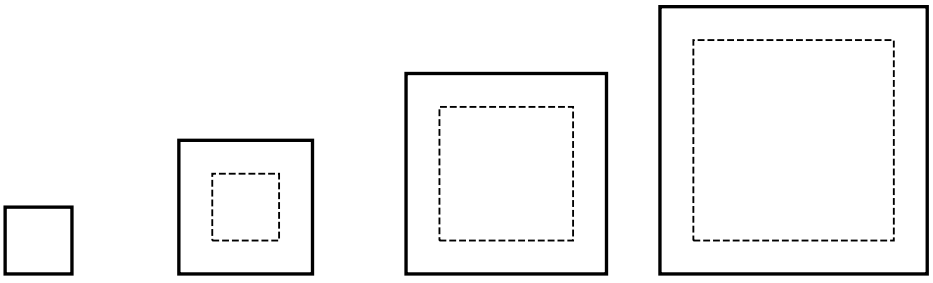
**1.** Model three cells as cubes. Complete the table.

| Side of cube (μm) | SA = 6 $s^2$ ($μm^2$) | V = $s^3$ ($μm^3$) | SA : V |
|---|---|---|---|
| 2 | | | |
| 5 | | | |
| 10 | | | |

**2.** Look at your table. What happens to the SA : V ratio as the cube gets larger?

**3.** Agar cubes of different sizes were soaked in dye. The dye reached 0.5 cm in from every face. The drawings show a slice of each cube (sample data).

**Slice through agar cubes after the dye reaches 0.5 cm in from every face**



*dashed line: edge of the part the dye has not reached*

**1 cm cube**
100% colored

**2 cm cube**
87.5% colored

**3 cm cube**
70.4% colored

**4 cm cube**
57.8% colored

Write a claim, evidence, and reasoning about how cube size affects the part of the cube the dye reaches.


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**4.** A cube-shaped cell grows from a side of 10 μm to a side of 20 μm.

(a) By what factor does its surface area increase?

(b) By what factor does its volume increase?

(c) Does its SA : V ratio increase or decrease? Explain.

**5.** Explain how microvilli help an intestinal cell absorb nutrients more quickly.


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