**Topic Review Guide**: Cell Size (Topic 2.3)

**To Think About**: Why are cells typically small? How is the surface area to volume ratio calculated? What are some examples of structural modifications of cells that increase surface area? How does the surface area to volume ratio affect the rate of heat exchange with the environment? How are specialized structures and strategies used by cells and organisms for the efficient exchange of molecules with the environment?

**Watch:** [AP Daily Video 2.3 Cell Size (Video 1)](https://apclassroom.collegeboard.org/d/6i8vabtaid?sui=6,2); [AP Daily Video 2.3 Cell Size (Video 2)](https://apclassroom.collegeboard.org/d/c3q1fxqsgd?sui=6,2)

**Read:** Chapter 4.2, Biology in Focus

**Supplementary Resources**: Click the links below for more information to help you learn more about this lesson.

* Guided Notes 2.3 ([Video 1](https://docs.google.com/document/d/1xg64rfydkQCtj6SL1Ergcu4-jNFPtL5VmT-KAV5Ssys/edit?usp=sharing)), ([Video 2](https://docs.google.com/document/d/1Gd78V2s0b4VcOOBMhT8KfkzVey-uib-nLy7K7fsM_Oc/edit?usp=sharing))

**Recall and Review:** Use the lecture in the video and your textbook to help you answer these questions in your BILL. Before you start, mark your level of understanding. After you have completed the questions, then check to see what level of understanding you have achieved. If you’re still at a level N or level A after in-class activities and before quizzes, it is recommended that you stop in for office hours.

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| Levels of Mastery | | | | *Explain the effect of surface area-to-volume ratios on the exchange of materials between cells or organisms and the environment. (*Topic 2.3) |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Explain** why cells must be small, but cannot be too small. |
|  |  |  |  | 1. In hypothetical cube shaped cells which have sides measuring 0.25, 0.5 and 1 cm respectively, **predict** which cell would be most efficient at transporting materials. **Justify** your prediction. |
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| Levels of Mastery | | | | *Explain how specialized structures and strategies are used for the efficient exchange of molecules to the environment. (Topic 2.3)* |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Explain** the reason why a large surface area to volume ratio is favorable for a cell’s survival. |
|  |  |  |  | 1. **Explain** how the following modifications to cell structure could increase efficiency of materials exchange between the cell and its environment:    1. The cell is thin and flat    2. The cell has extensions such as villi on the membrane of intestinal cells    3. The cell uses vesicles to move materials |
|  |  |  |  | 5. **Describe** specialized structures and strategies by organisms to maximize efficiency in:   1. Heat exchange 2. Obtain nutrients 3. Eliminate waste |

| Learn More: For more information about cell structure and function, use the links below:   * [CellCraft](http://www.carolina.com/teacher-resources/Interactive/online-game-cell-structure-cellcraft-biology/tr11062.tr): a game that lets you build a cell from scratch and then attempt to keep it alive * [Unlocking the Secrets of our Cells](http://www.nobelprize.org/mediaplayer/index.php?id=1781): a documentary from the Nobel Prize Foundation about discoveries relating to the structure and function of our cells * [The Cell and Its Organelles](http://www.nobelprize.org/educational/medicine/cell/game/): a game from the Nobel Prize Foundation that tests your knowledge of cell organelles * Mr. Andersen’s [“A Tour of the Cell” video](http://www.bozemanscience.com/a-tour-of-the-cell) * [1974 Nobel Prize in Physiology and Medicine](http://www.nobelprize.org/nobel_prizes/medicine/laureates/1974/): awarded for “discoveries concerning the structural and functional organization of the cell.” |
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