**Topic Review Guide**: Membrane Transport, Facilitated Diffusion and Mechanisms of Transport (Topics 2.9 & 2.7)

**To Think About**: How are molecules passively transported across a membrane? How are molecules actively transported across a membrane? How does active transport move molecules across the membrane? How are large molecules and large amounts of molecules transported across a membrane? Why are membrane proteins required for diffusion of certain molecules? How do large quantities of water move across the membrane? How do membranes become polarized? What molecules are necessary for active transport to occur? When is metabolic energy (such as ATP) needed for transport of molecules across the membrane? How does Na+/K+ ATPase contribute to membrane potential? How is water passively transported across a membrane?

**Watch:** [AP Daily Video 2.9 Mechanisms of Transport](https://apclassroom.collegeboard.org/d/a9iggb5rjy?sui=6,2)

[AP Daily Video 2.7 Facilitated Diffusion](https://apclassroom.collegeboard.org/d/0r7imqshk0?sui=6,2)

**Read:** Chapter 5.3 - 5.5, Biology in Focus

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

* Guided Notes for [2.6,](https://docs.google.com/document/d/1aPfrhPywEAL3FkGAc79z7ZsH6vbZfOdz0nvwchpKBDc/edit?usp=sharing) [2.7](https://docs.google.com/document/d/1e_RWjupa1OrLNhWspfvaXGA0eBd6gTJrt4WmgpZViSA/edit?usp=sharing), [2.9](https://docs.google.com/document/d/18G_5KcF2645pGQQbZjyrirHOBj71WQmPOZ2CJsHDwhg/edit?usp=sharing)
* [Slideshow Presentation](https://drive.google.com/file/d/11MjeAU0cVA3K3BtZ4KV6JgyDRW9wWhif/view?usp=sharing)
* [Mr. Andersen’s “Transport Across Cell Membranes” video](http://www.youtube.com/watch?v=RPAZvs4hvGA)
* BFW Publishers: [Principles of Life Chapter 5 Online Resources](http://bcs.whfreeman.com/hillis1e/#667501__669665__)
* Crash Course Biology: [In Da Club—Membranes and Transport](http://www.youtube.com/watch?v=dPKvHrD1eS4&list=EC3EED4C1D684D3ADF)
* Pearson BioCoach: [Membrane Structure and Transport](http://www.phschool.com/science/biology_place/biocoach/biomembrane1/intro.html)
* Pearson BioCoach: [Membranes and Communication](http://www.phschool.com/science/biology_place/biocoach/biomembrane2/intro.html)
* McGraw Hill: [Osmosis](http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter2/animation__how_osmosis_works.html)
* Georgia State University Hyperphysics: [Diffusion and Osmosis (from a physicist’s point of view)](http://hyperphysics.phy-astr.gsu.edu/hbase/kinetic/diffus.html)
* Wisc-Online: [Passive Transport-Osmosis (simulation)](http://www.wisc-online.com/objects/ViewObject.aspx?ID=ap11003)
* Northland College: [Active Transport Animation](http://programs.northlandcollege.edu/biology/Biology1111/animations/active1.swf)

**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, it is recommended that you stop in for office hours.

| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
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| Levels of Mastery | | | | *Describe the mechanisms that organisms use to maintain solute and water balance. (Topic 2.6)*  *Describe the processes that allow ions and other molecules to move across membranes. (Topic 2.9)* |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. Using a Venn Diagram, **illustrate** the differences and similarities of the following forms of cellular transport:    1. passive transport    2. active transport |
| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *Describe the mechanisms that organisms use to transport large molecules across the plasma membrane. (Topic 2.6)*  *Describe the processes that allow ions and other molecules to move across membranes. (Topic 2.9)* |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Create** a graphic organizer that illustrates the similarities and differences between endocytosis (including phago- and pinocytosis), exocytosis, receptor-mediated endocytosis. |
| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *Describe the processes that allow ions and other molecules to move across membranes. (Topic 2.9)* |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Explain** why osmosis is considered both passive and facilitated diffusion. |
| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *Explain how the structure of a molecule affects its ability to pass through the plasma membrane. (Topic 2.7)* |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Explain** why membrane proteins are necessary for facilitated diffusion. |
|  |  |  |  | 1. **Explain** how active transport allows for the formation of gradients. |
|  |  |  |  | 1. **Describe** the relationship between ATP and protein pumps and their role in moving large particles across a cell membrane. |

| Learn More: For more information about membrane structure and function, use the links below:   * [OsyOsmosis](http://www.osyosmosis.com/): A game that allows you to control a character, Osy, by controlling how much water she takes up from her environment * [Nobel Prize in Chemistry, 2003](http://www.nobelprize.org/nobel_prizes/chemistry/laureates/2003/announcement.html): Peter Agre and Roderick MacKinnon, “for discoveries concerning channels in cell membranes.” |
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