**Topic Review Guide**: Tonicity and Osmoregulation (Topic 2.8)

**To Think About**: What are the different ways to describe the relative tonicity of environments? How do differences in osmolarity impact the movement of water in a cell? How does the constant movement of molecules across a membrane maintain growth and homeostasis? What is osmoregulation and how does it contribute to the health and survival of organisms? How does water potential impact the movement of water? How does solute potential impact the movement of water? How do organisms maintain water balance?

**Watch:** AP Daily Video 2.8 Tonicity and Osmoregulation [Video 1](https://apclassroom.collegeboard.org/d/vnamkvzu30?sui=6,2), [Video 3](https://apclassroom.collegeboard.org/d/mtoi6igmsq?sui=6,2)

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

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

* Guided Notes for 2.8 [Video 1](https://docs.google.com/document/d/1FDZxIxzxED_NVB-L5sCTruTsyeuM3zKqSblIuITPbQ4/edit?usp=sharing), [Video 3](https://docs.google.com/document/d/1iImpmccmYxry4rtsTGYLJFFakQ1goPrMsq0MfRL4fw8/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 | | | | *Explain how concentration gradients affect the movement of molecules across membranes. (Topic 2.8)* |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. Explain how the osmolarity of water determines the direction of its movement across a semipermeable membrane. |
| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *Explain how osmolarity mechanisms contribute to the health and survival or organisms. (Topic 2.8)* |
| **N** | **A** | **E** | **M** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Create** a graphic organizer to differentiate between hypotonic, hypertonic and isotonic solutions. |
|  |  |  |  | 1. Osmoregulation is critical to water balance in plants. **Describe** how varying environmental solutions can affect a plant. |
|  |  |  |  | 1. Osmoregulation is critical to water balance in animal cells. **Describe** how varying environmental solutions can affect an animal cell. |
|  |  |  |  | 1. **State** the formula for water potential and solute potential. Be sure to **state** what each variable means. |

| 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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