**Topic Review Guide**: Photosynthesis (Topic 3.5)

**To Think About**: The highly complex organization of living systems requires a constant input of energy and the exchange of macromolecules.

**Watch:** AP Daily Video Photosynthesis [Video 1](https://apclassroom.collegeboard.org/d/132pi818de?sui=6,3) and [Video 2](https://apclassroom.collegeboard.org/d/2gqj3fn9h9?sui=6,3)

**Read:** Chapter 8, Biology in Focus

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

* Guided Notes [Video](https://docs.google.com/document/d/1peOB4FsG0IPFWm05U5OYa6hF5bzgT4KHk5CVpuqcnWQ/edit?usp=sharing) 1 and [Video 2](https://docs.google.com/document/d/1i6MLyhsZcyU5n2gD_PKtEpMZyexB9KxyTC6BLcc27rY/edit?usp=sharing)
* Hillis et al.: [Electron Transport and ATP Synthesis animated tutorial](http://bcs.whfreeman.com/hillis1e/#667501__674135__)
* Hillis et al.: [Glycolysis and Fermentation tutorial](http://bcs.whfreeman.com/hillis1e/#667501__708804__)
* Hillis et al.: [Photophosphorylation](http://bcs.whfreeman.com/hillis1e/#667501__674136__)
* Sumanas, Inc.: [Cellular Respiration Animation](http://www.sumanasinc.com/webcontent/animations/content/cellularrespiration.html)
* Virtual Cell Animation: [Glycolysis, Step by Step](http://vcell.ndsu.nodak.edu/animations/glycolysis_overview/first.htm)
* Virtual Cell Animation: [Photosynthesis (Light Reactions)](http://vcell.ndsu.nodak.edu/animations/photosynthesis/index.htm)
* Wiley’s Interactive Concepts in Biochemistry: [Photosynthesis](http://www.wiley.com/college/boyer/0470003790/animations/photosynthesis/photosynthesis.htm)
* University of Vermont: [Photosynthesis Animation](http://dendro.cnre.vt.edu/forestbiology/photosynthesis.swf)
* PHSchool.com: [Cellular Respiration Animation](http://www.phschool.com/atschool/phbio/active_art/cellular_respiration/index.html)

**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.

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| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *I can describe the photosynthetic processes that allow organisms to capture and store energy. (Topic 3.5)* |
| **N** | **A** | **M** | **E** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Describe** the process of photosynthesis using a word equation. |
| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *I can describe the photosynthetic processes that allow organisms to capture and store energy. (Topic 3.5)* |
| **N** | **A** | **M** | **E** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. In plants, the light-dependent reactions occur on thylakoid membranes inside the chloroplast.  **Describe** what happens during the light-dependent reaction. |
|  |  |  |  | 1. **Explain** the role of chlorophyll and other pigments in the photosynthetic process. |
|  |  |  |  | 1. **Explain** what happens when a photon of light strikes a chlorophyll molecule on a chloroplast. |
|  |  |  |  | 1. **Identify** the source of electrons for the photosynthetic process. |
|  |  |  |  | 1. Using the Z-diagram provided, **explain** what happens to the electrons that travel from Photosystem II to Photosystem I at each numbered step. |
| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *I can explain how cells capture energy from light and transfer it to biological molecules for storage and use. (Topic 3.5)* |
| **N** | **A** | **M** | **E** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. Both photosynthesis and respiration utilize electron carriers (coenzymes) to accomplish the task of energy transfer. **Describe** the activity of these coenzyme molecules in the following processes:    1. Light Dependent Reactions    2. Light Independent Reactions (Calvin Cycle) |
| **Essential Knowledge:**  What You Absolutely Must Know and Understand | | | | |
| Levels of Mastery | | | | *I can explain how cells capture energy from light and transfer it to biological molecules for storage and use. (Topic 3.5)* |
| **N** | **A** | **M** | **E** | **Questions You Should Be Able to Answer** |
|  |  |  |  | 1. **Compare and contrast** the electron transport chains of photosynthesis to those in cellular respiration. |
|  |  |  |  | 1. **Explain** where the source of energy for the Calvin Cycle (light-independent reactions) comes from. |

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| Learn More: For more information about energy exchanges and how they make the world go round, check out the links below:   * NOVA—[Illuminating Photosynthesis: Help the process of photosynthesis along in this game](http://www.pbs.org/wgbh/nova/nature/photosynthesis.html) * John Kyrk: [Glycolysis Animation](http://www.johnkyrk.com/glycolysis.html) * John Kyrk: [Oxidative Phosphorylation Animation](http://www.johnkyrk.com/mitochondrion.html) * John Kyrk: [Krebs Cycle Animation](http://www.johnkyrk.com/krebs.html) |