Photosynthesis – Using Light to create sugar

http://www.mhhe.com/biosci/bio\_animations/02\_MH\_Photosynthesis\_Web/

**Where does the energy come from for photosynthesis?**

Light is both a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Light from the Sun is a wide range of wavelengths, called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_. The type of light used in photosynthesis is the \_\_\_\_\_\_\_\_\_\_\_\_\_ light spectrum.

**Where does photosynthesis take place?**

Pigments in leaves absorb and reflect different types of visible light.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light are reflected, causing us to see leaves as a particular color. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are absorbed, transferring energy to chemical bonds.

Plant cells have an organelle where photosynthesis takes place. These are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Inside these structures are thin disk like structures called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These are surrounded by space called the \_\_\_\_\_\_\_\_\_\_\_\_\_.

**How does photosynthesis happen?**

Photosynthesis has two types of reactions. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ happens in the stroma. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions happen in the inner membrane of the thylakoid.

Light Dependent Reaction take place in sets of proteins called photosystems.

Photosystem II – called two because it was discovered second

1. \_\_\_\_\_\_\_\_\_\_\_\_ is broken up and dumps e- into the photosystem

2. \_\_\_\_\_\_\_\_\_\_\_\_ energizes the e-  
3. \_\_\_\_\_\_\_\_\_\_\_\_ move from the stroma to inside the thylakoid

Photosystem I – Called one because it was discovered first but it uses materials from photosystem 2.

1. \_\_\_\_\_\_\_\_\_\_\_\_ are re-energized by light  
2. \_\_\_\_\_\_\_\_\_\_\_\_ picks up e- and H+ to become \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ATP Synthase – molecule that creates ATP**

\_\_\_\_\_\_\_\_\_\_\_\_ move through this molecule to create \_\_\_\_\_\_\_\_

**In summary …**The Light Dependent Reaction produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**The Calvin Cycle**, which was often called the Dark Reactions in the past, does not need light, but it uses the products of the Light Dependent Reactions. There are three steps.

1. Carbon Fixation – carbon from \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is put into molecules that will eventually become either sugar or other molecules the plant uses.

1. Reduction - \_\_\_\_\_\_\_\_\_\_\_ from NADPH and ATP create more rearrangements of atoms, creating more molecules. One in particular, G3P (glyceraldehyde 3- phosphate) will become very important.
2. Regeneration of RuBP - the molecule that CO2 combines with at the start of the Calvin cycle called RuBP (Ribulose 1,5-biphosphate) is regenerated to start the cycle again.

Not all of the G3P is used to make RuBP. For every 3 G3Ps made, one is taken out of the cycle. Two are used to make \_\_\_\_\_\_\_\_\_\_\_\_\_. It takes \_\_\_\_\_\_\_\_\_\_\_\_ times through the Calvin cycle to produce one molecule of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**The Big Idea equation for Photosynthesis is**

Chemical formula:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Words:

**The Big Idea equation for Cellular Respiration is**

Chemical formula:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Words:

1. Compare and contrast cellular respiration and photosynthesis.
2. Cellular respiration occurs in BOTH plants and animals. Why do plants need cellular respiration?
3. Plants produce carbon dioxide as a product of cellular respiration. But you know that plants release oxygen, not carbon dioxide. Develop a logical argument for how this is possible.
4. Plants can make their own food through photosynthesis and then break it down for usable energy through the process of cellular respiration. Analyze how your life might be different if you could make your own food through photosynthesis.