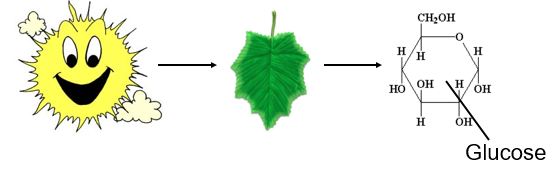
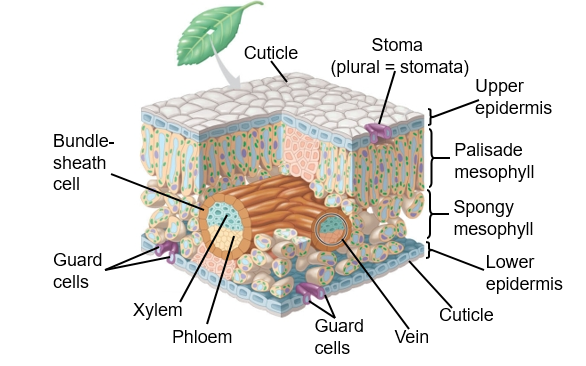
**Photosynthesis Notes Name: Period:**

**Overview: The Process That Feeds All Living Things**

**Photosynthesis** (photo = light, synthesis = to make, put together)

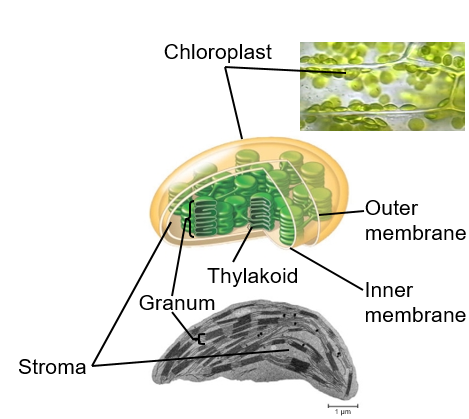
* Overall Definition: the process that converts \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (photons) into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (glucose)
* Plants are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* They are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an ecosystem.
  + - Plants use energy from the sun to produce the food that feeds the ecosystem
    - Some bacteria (ex. blue-green algae) and some protists are also photosynthetic

**Chemosynthesis**

* Certain types of bacteria and fungi use energy from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (such as hydrogen sulfide) instead of light energy to produce food.
* This process is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Leaf Anatomy**

**Photosynthesis Occurs Within the Cells of Plant Leaves**

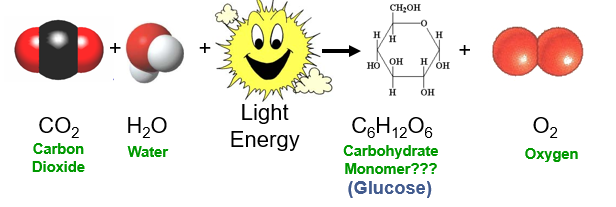
* Nutrients and water, can get into and out of leaves:
  + \_\_\_\_\_\_\_\_\_\_\_\_: Carries \_\_\_\_\_\_\_\_\_ and dissolved \_\_\_\_\_\_\_\_\_\_\_\_ upward from roots into the stems and leaves
  + \_\_\_\_\_\_\_\_\_\_: Transports \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ex. sugars) from where they are made to where they are needed
  + \_\_\_\_\_\_\_\_\_\_ (singular): allows \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_(transpiration) to enter and leave the leaves. Plural = \_\_\_\_\_\_\_\_\_\_\_\_
* Photosynthesis converts light energy to the chemical energy of food
  + The leaves of plants are the sites of photosynthesis

**Chloroplasts: The Sites of Photosynthesis**

* The organelles in which photosynthesis occurs
* Contain **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, grana, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + - \_\_\_\_\_\_\_\_\_\_\_\_\_\_= disk-shaped sac in the stroma of a chloroplast
    - \_\_\_\_\_\_\_\_\_\_ = layers or stacks of thylakoids
    - \_\_\_\_\_\_\_\_\_\_ = the thick fluid contained in the inner membrane of a chloroplast; made of water and enzymes
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** The Green Pigment Inside Chloroplasts
  + - Chlorophyll is a pigment.
    - A pigment is any substance that absorbs light.
    - The color of the pigment comes from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (in other words, those not absorbed).
    - Chlorophyll is green because it reflects green light.

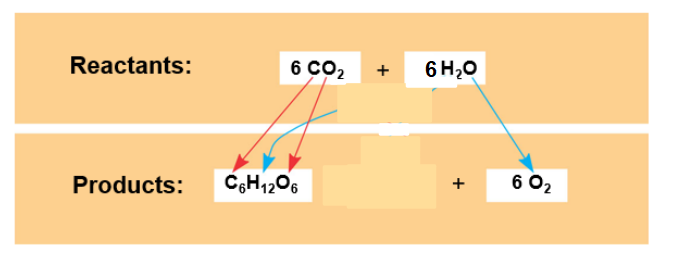
**The Chemical Reaction of Photosynthesis**

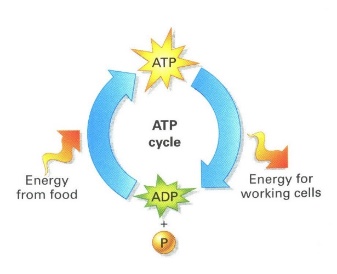
* Photosynthesis is summarized by the following chemical reaction:

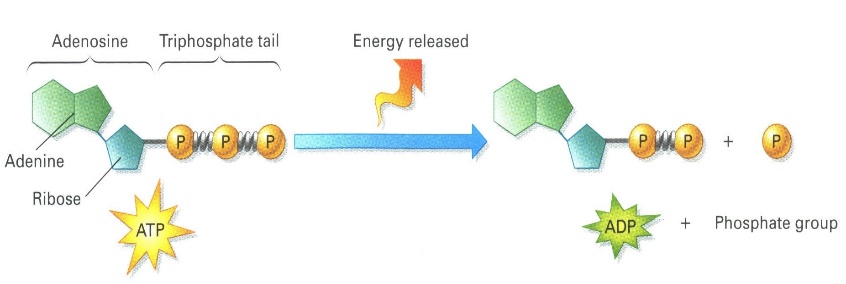


**The Balanced Chemical Equation:**

\_\_CO2 + \_\_H2O + Light Energy → C6H12O6 + \_\_O2

* Chloroplasts split carbon dioxide and water
  + To make sugar molecules, oxygen, and water
  + The\_\_\_\_\_\_\_\_\_\_\_\_\_ we breath comes from **\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + The **\_\_\_\_\_\_\_\_\_\_\_**in our food, comes from **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

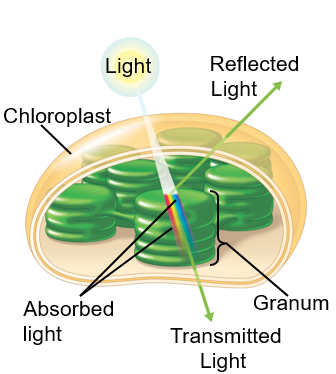
**Adenosine Triphosphate (ATP)**

* ATP is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ source for cell processes
* Energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when ATP is converted to ADP (Adenosine Diphosphate)
  + Tri = \_\_\_\_\_\_ Di = \_\_\_\_\_\_\_\_\_\_\_
* ADP can be converted into ATP again using energy from food to reform bonds.
* ATP is made of three components
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**The Two Stages of Photosynthesis**

* Photosynthesis consists of two processes
  + The light (dependent) reactions
  + The dark (light-independent) reactions; also called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cycle

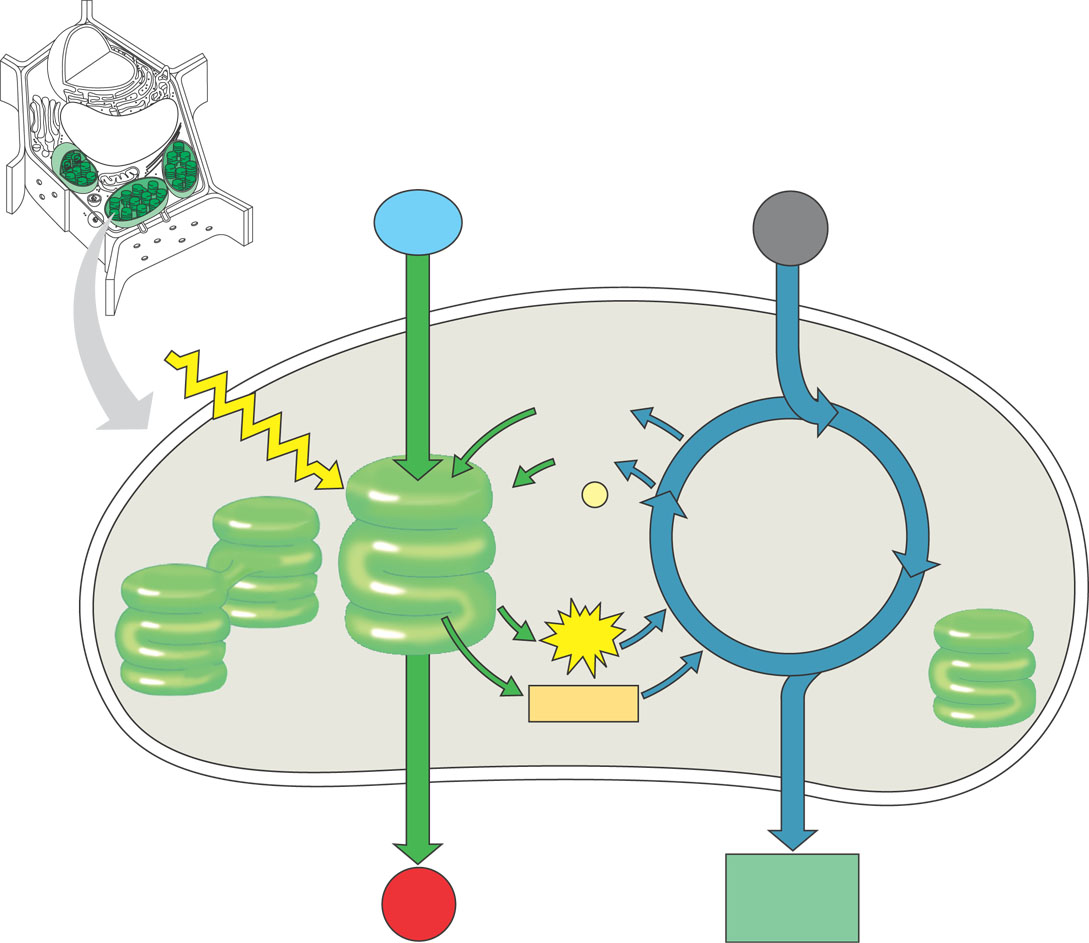
**The Light Reactions**

* Occur in the \_\_\_\_\_\_\_\_\_
  + Split \_\_\_\_\_\_\_\_\_
  + Release \_\_\_\_\_\_\_\_\_\_\_\_
  + Produces \_\_\_\_\_\_\_\_\_ (energy)
  + Produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(carries H+ from the light reactions to the Calvin cycle)

**The Calvin Cycle (Light Independent Reactions)**

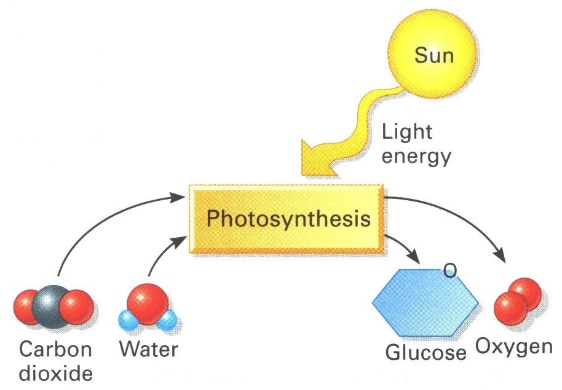
* Occurs in the \_\_\_\_\_\_\_\_\_\_\_\_\_
  + Forms \_\_\_\_\_\_\_\_\_\_\_\_\_ from carbon dioxide
  + Uses \_\_\_\_\_\_\_\_\_\_\_ for energy
  + Also uses \_\_\_\_\_\_\_\_\_\_\_\_

**Putting the two reactions together**

****

**Summary of Photosynthesis**

* **The overall chemical equation:**

****

**\_\_CO2 + \_\_H2O + Light Energy → C6H12O6 + \_\_O2**

|  |  |  |
| --- | --- | --- |
|  | **Light Reactions** | **Calvin Cycle** |
| **Takes place in the….** |  |  |
| **Reactants are….** |  |  |
| **Products are….** |  |  |

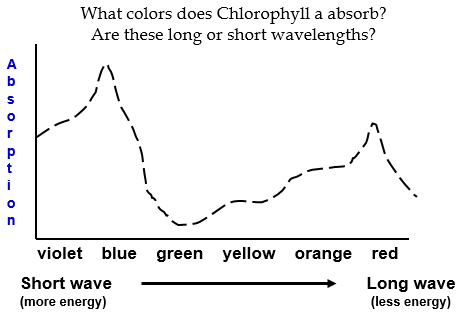
**The Nature of Sunlight**

* Light reactions convert \_\_\_\_\_\_\_\_\_\_\_ energy to the \_\_\_\_\_\_\_\_\_\_\_\_energy stored in the \_\_\_\_\_\_\_\_ of glucose molecules.
* Sunlight is a form of electromagnetic energy, which travels in waves

**The visible light spectrum**

* Includes the colors of light we can see
* Includes the wavelengths (colors of light) that power photosynthesis

**Pigments**

* Substances that \_\_\_\_\_\_\_\_\_\_\_\_\_ visible light AND \_\_\_\_\_\_\_\_\_ light, which include the colors we see\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the most abundant pigment in plants.

**The absorption spectra of chloroplast pigments**

* Provide clues to the relative effectiveness of different wavelengths for driving photosynthesis
* Green has the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ absorption and the most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ making plants appear green