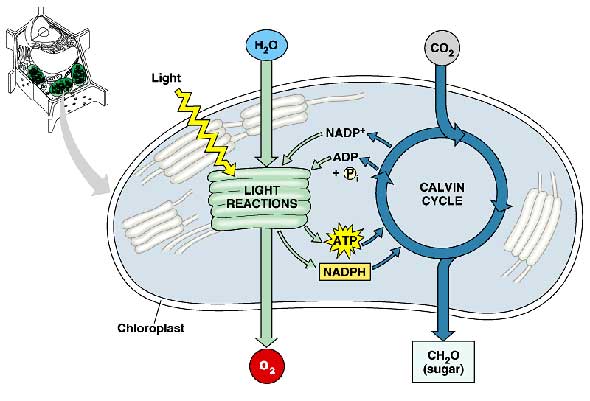
**RAD guide—Chapter 8.2 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Section 2** | **Photosynthesis: An Overview (p. 230-234)** |
| Learning Goal | Understand the process of photosynthesis and its importance to living things. |
| **Key Terms—Use the glossary OR the definition next to the highlighted word in the text to define these terms.**   |  | | --- | | **Pigment**  Light absorbing molecules | | **Chlorophyll**  the pigment used during the light dependent reactions of photosynthesis to absorb light that is used to make the ATP energy providing the energy to fuel the endothermic light independent reactions | | **Thylakoid**  Location of chlorophyll and light reactions inside the chloroplasts | | **Stroma**  Location of enzymes that carry out the light independent reactions | | **NADP+ (or empty electron carrier)**  A molecule that is able to bind electrons and given up by water when it is split, forming NADPH. The electrons and protons carried by NADPH (the loaded electron carrier) are combined with CO2 to synthesize sugar during the dark reactions | | **Light-dependent reactions**  Light energy is converted to chemical potential energy in this first phase of photosynthesis, generating ATP. Also, chlorophyll and water are energized, splitting water and providing electrons and protons for the light independent/dark reactions | | **Light independent reactions**  Phase of photosynthesis in which sugars are synthesized using the products of the light reactions, as well as Carbon dioxide | | **Glucose**  Sugar produced in dark reactions, storing chemical potential energy C6H12O6 | | |
| **Chlorophyll and Chloroplasts**  What role do pigments play in the process of photosynthesis?  Why are plants green?  Why do leaves on trees change colors in the fall?  Describe the parts of a chloroplast:  *Thylakoid:*  *Stroma:*  Draw and label a diagram of a chloroplast.  What is so special about chlorophyll that makes it important for photosynthesis? | Absorb light energy so that water can be split to load NADP+ with electrons and protons and so that light energy can be stored as chemical potential energy in molecules of ATP  Chlorophyll doesn’t absorb or use green light, so green light is reflected to the eyes  Chlorophyll is destroyed before other pigments in the leaves as they prepare to drop off in the fall, so the other pigments which are usually hidden by the more abundant chlorophyll show through; these pigments reflect other colors than green  Thylakoid-where light dependent reactions occur  Stroma—where light independent reactions occur  http://images.tutorvista.com/cms/images/123/chloroplast-diagram.PNG  Chlorophyll can absorb light, then provide it to cell proteins that convert the light energy to ATP chemical energy and that split water so that its electrons and protons can be loaded onto NADP+ for use in the light independent reactions where sugars are produced |
| **High Energy Electrons**  What are electron carrier molecules? Give an example.  What is the job of an electron carrier like NADP+?  What happens during the process of photosynthesis? | NADP+ is an empty electron carrier molecule that bonds with electrons and protons from water split during the light reactions. The loaded electron carriers, NADPH, deliver these electrons and protons to the enzymes that combine them with C and O to build sugar.  See above  Light dependent reactions capture light energy into ATP and capture water’s electrons and protons onto NADPH, then in the light dependent reactions, enzymes of the stroma combine CO2 with these electrons and protons to synthesize carbohydrate monosaccharides, sugars |
| **An Overview of Photosynthesis**  What are reactants & products of photosynthesis?  Write the balanced chemical equation for photosynthesis in **symbols and in words.**  What happens in the light-dependent reactions?  What happens in the light-independent reactions? | Reactants 6CO2  + 6 H2O + light  Products 6O2 + C6H12O6  6CO2  + 6 H2O + light 🡪 6O2 + C6H12O6  6 molecules carbon dioxide reacts with 6 molecules water using energy of light to produce 6 molecules oxygen gas and 1 molecule glucose sugar  Light energy is converted to ATP energy  NADP+ becomes NADPH because electrons and protons lost by water are loaded onto it  NADPH provides electrons and protons (H+) to the enzymes that combine it with CO2 to produce glucose. |

Fill in this diagram”



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