Assignment: 1

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour:\_\_\_\_

**Photosynthesis: Life from Light and Air**

**Energy needs of life**

* All life needs a constant input of energy  
    
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Animals)
    - Get their \_\_\_\_\_\_ from “\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
      * Eat food = other organisms = \_\_\_\_\_\_\_\_\_\_\_\_ molecules
    - Make energy through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Plants)
    - \_\_\_\_\_\_\_\_\_\_\_ their own \_\_\_\_\_\_\_\_\_\_\_\_ (from “self”)
    - Convert energy of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ molecules (CHO) from CO2
    - Make energy and synthesize sugars through photosynthesis

**Important Vocabulary**

* \_\_\_\_\_: Adenosine \_\_\_\_phosphate
  + \_\_\_\_\_\_\_\_\_\_ phosphates attached, energy is \_\_\_\_\_\_\_\_\_\_ between the \_\_\_\_\_\_\_\_\_\_\_ bonds
* \_\_\_\_\_: Adenosine \_\_\_\_phosphate
  + \_\_\_\_\_\_\_ phosphates attached

**How are they connected?**

**Heterotrophs** (Do \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to produce \_\_\_\_\_\_\_\_\_\_\_)

* Making energy and organic molecules from ingesting organic molecules

**Cellular Respiration Equation:**

**In words:**

**In chemical formula:**

**Autotrophs** (Do \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to store sunlight energy into glucose, the do cellular respiration)

* Making energy and organic molecules from light energy

**Photosynthesis Equation:**

**In words:**

**In chemical formula:**

**What does it mean to be a plant?**

Need to…

* Collect \_\_\_\_\_\_\_\_\_\_ energy
  + Transform it into \_\_\_\_\_\_\_\_\_\_\_\_ energy
* Store light energy
  + In a \_\_\_\_\_\_\_ form to be \_\_\_\_\_\_\_\_\_\_\_ around the plant or \_\_\_\_\_\_\_\_\_
* Need to get \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ from the environment
  + C, H, N, O, P, S, K, Mg
* Produce all \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ needed for growth
  + Carbohydrates, proteins, lipids, nucleic acids

**Plant Structure**

Obtaining raw material

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Leaves = solar collectors
* \_\_\_\_\_\_\_
  + Stomates = gas exchange
* \_\_\_\_\_\_\_\_
  + Uptake from roots
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + N, P, K, S, Mg, Fe…
  + Uptake from roots

**Pigment Molecules**

* Pigment molecules give organisms their \_\_\_\_\_\_\_\_\_\_\_ because of \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + The color they \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the color they \_\_\_\_\_\_\_\_\_\_\_
* Plants have pigment molecules called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in them
* Examples of pigment molecule that animals have are \_\_\_\_\_\_\_\_\_\_ in human \_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ in human \_\_\_\_\_\_\_

**Plant Structure**

* Chloroplasts
  + Double membrane
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Fluid-filled interior
  + \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Thylakoid membrane contains
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules
  + \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  + ATP synthase
    - H+ gradient bult up within thylakoid sac

**Photosynthesis – 2 Parts**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   1. Light \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions
   2. Energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions
      1. Convert solar energy to chemical energy
      2. ATP and NADPH
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_’
   1. Light \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions
   2. Sugar \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions
      1. Uses chemical energy (ATP and NADPH) to turn CO2 into \_\_\_\_\_\_\_\_\_\_\_\_\_ (glucose)

**Light Reactions**

**Electron Transport Chain**

* \_\_\_\_\_\_\_\_\_\_\_\_\_ (proteins) in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ membrane called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ light waves
* \_\_\_\_\_\_ all \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of light are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Photosynthesis gets energy by \_\_\_\_\_\_\_\_\_\_\_\_ wavelengths of light
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Absorbs best in \_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ wavelengths and least in \_\_\_\_\_\_\_\_\_\_\_\_
  + Accessory pigments with different structures absorb light of different wavelengths
    - Chlorophyll b, carotenoids, xanophylls

So, why are plants green?

**Light Reactions**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_ molecules absorb \_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_
2. This \_\_\_\_\_\_\_\_\_\_ of light \_\_\_\_\_\_ a \_\_\_\_\_\_\_\_\_\_ molecule inside the membrane into \_\_\_\_\_\_\_\_\_\_\_ gas and strips off \_\_\_\_\_\_\_\_\_\_\_\_\_ from the hydrogen to be passed on
3. The electron gets \_\_\_\_\_\_\_\_\_\_\_ within the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and passed on to the next protein
4. The proteins in the electron transport chain raise the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_
5. As the \_\_\_\_\_\_\_\_\_\_\_\_\_ gets passed along one of the proteins it passes through generates \_\_\_\_\_\_
6. Eventually it gets passed on through all the proteins and the energy fill electron get \_\_\_\_\_\_\_\_\_\_\_\_ as \_\_\_\_\_\_\_\_\_\_\_\_ (money in the bank… aka we will be using this later)

**Summary Questions – Part 1**

1. Why do plants appear green?
2. What are the light absorbing pigments in plants called?
3. Where does oxygen that plants give off come from?
4. Why are light reactions called light reactions?
5. Where do the light reactions occur?
6. What do chlorophyll molecules do to electrons?