

Name: _____

Photosynthesis (Chapter 8) Test Review

1.) What is the difference between autotrophs and heterotrophs?

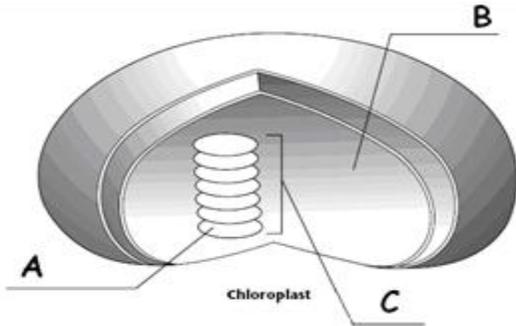
Autotrophs can make their own food using sunlight (via photosynthesis), whereas heterotrophs have to get their energy from the foods they consume (eating plants or animals).

2.) What is the main pigment involved in photosynthesis? What wavelengths does it absorb/reflect?

Chlorophyll is the main pigment in the plant photosystems. It absorbs the blue-violet (400-525 nm) and red (625-750 nm) wavelengths well. It reflects the green region (525-625nm). LOOK AT FIGURE 8-5. This is why plants are green....it's the light they REFLECT!

3.) Use the letters in the diagram to identify the following:

 B Stroma A Thylakoid C Granum



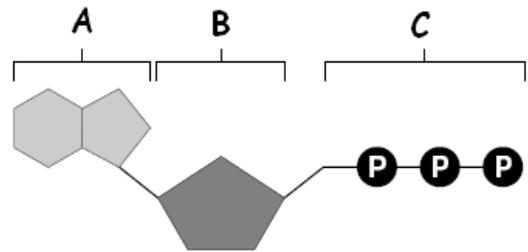
4.) What is the name of the whole chemical compound shown below (cells use it as an energy source)? ATP

Label the parts that compose this molecule:

A: Adenine

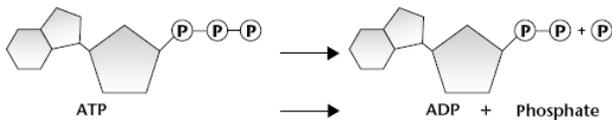
B: **5-carbon sugar (ribose) *Notice it has 5 corners!***

C: 3 phosphate groups

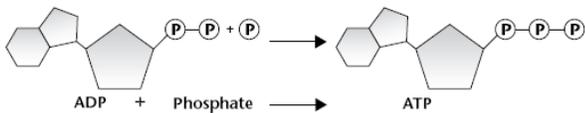


5.) Use the words: ENERGY STORING and ENERGY

RELEASING to label what is happening in the reactions shown below:



Breaking down ATP= ENERGY RELEASING



Adding phosphate to ADP= ENERGY STORING

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6.) Name three cellular activities that use ATP:

- Active Transport across the cell membrane (particles going from low to high concentrations)
- Synthesis of proteins and nucleic acids
- Provides energy to motor proteins that move organelles throughout the cell
- Muscle contraction

7.) Plants gather the sun's energy with light-absorbing MOLECULES called pigments/chlorophyll__

8.) A student conducts an experiment by collecting gas given off by a green plant in a sunny room. The gas being collected is probably _____Oxygen (O₂)_____

9.) Where are photosystems I and II (chlorophyll molecules) found?

In the membrane of the thylakoids (thylakoids are INSIDE a chloroplast...they look like pennies)

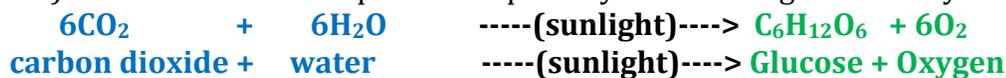
10.) Circle ALL that are TRUE about the light-dependent reaction:

- a. High-energy electrons move through the electron transport chain. -True
- b. Pigments in photosystems II and I absorb light. -True
- c. ATP synthase help H⁺ ions in the thylakoid space to pass through the membrane to the stroma. -True
- d. ATP and NADPH are used to produce high-energy sugars. -False (**ATP and NADPH are made in the light-dependent reactions.....the high-energy sugars are ACTUALLY FORMED in the Calvin Cycle**)

11.) Circle ALL that are TRUE about the Calvin cycle:

- a. ATP is produced by ATP synthase and oxygen is released. -False. **That's the light-dependent reactions!**
- b. It is also called the light-independent reactions- True
- c. ATP and NADPH from the light-dependent reactions are used here. -True
- d. High-energy sugar compounds are made from CO₂. -True

12.) Write the chemical equation for photosynthesis using chemical symbols AND words:



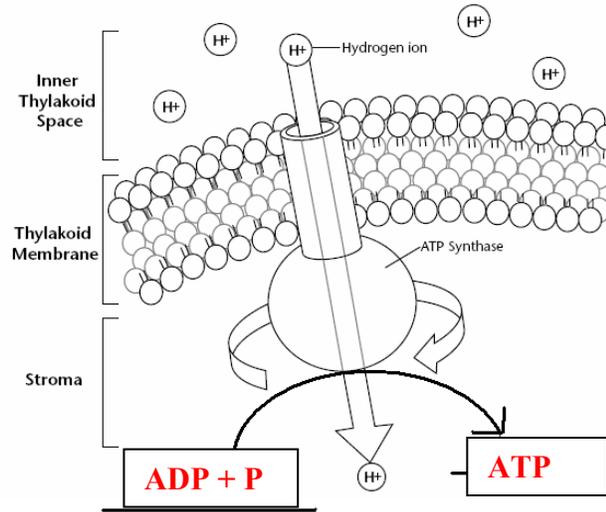
13.) Fill in the chart below (use #12 for help!):

	Light-Dependent Reaction	Calvin Cycle
Location in Chloroplast	Thylakoid Membrane	Stroma
Reactant(s)	H ₂ O (light, NADP ⁺ , ADP)	Carbon Dioxide (ATP, NADPH)
Product(s)	O ₂ (ATP, NADPH)	Glucose (NADP ⁺ , ADP)
Require Light?	Yes! Light- DEPENDENT	No! Light- INDEPENDENT

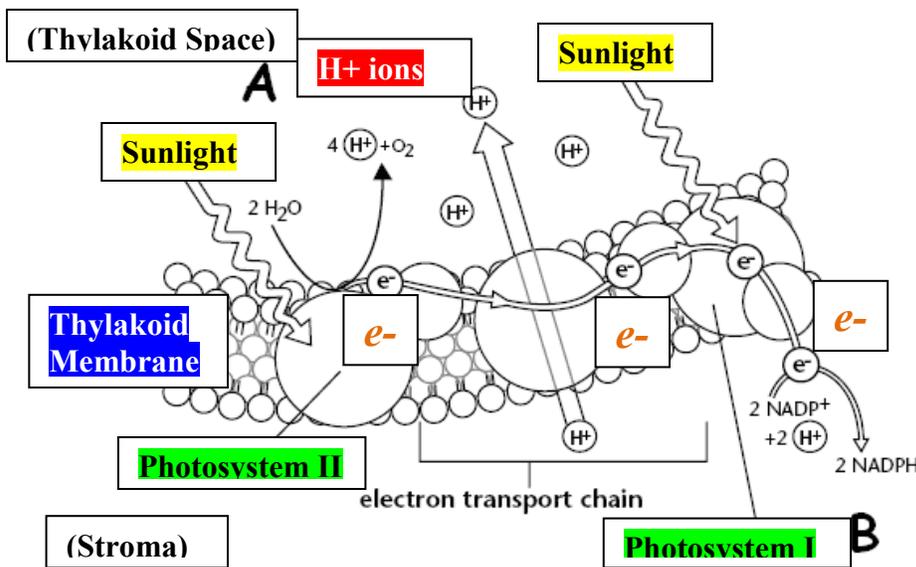
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14.) Using the diagram below, answer the following questions:

- Where does the production of ATP occur? **Stroma** Inner Thylakoid Space
- Where do the excess H^+ ions come from? **When water is split in photosystem II, H^+ ions from it are pumped into the thylakoid space using the energy from the excited electrons going down the electron transport chain**
- Add an equation to the diagram in the correct location that show the formation of ATP from ADP.



16.) Complete the diagram below. You will need to identify these structures on the exam!



COLOR THE DIAGRAM AS DESCRIBED:

Color the energy from sunlight **YELLOW**

Color the two places where light energy enters the reactions **GREEN**

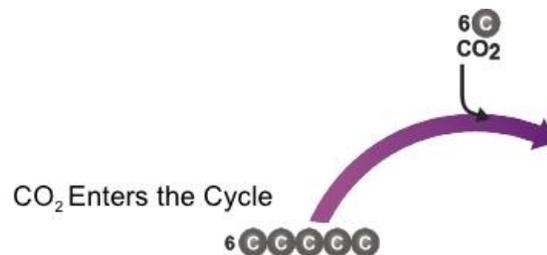
Color the hydrogen ions **RED**

Color the electrons **ORANGE**

Color the thylakoid membrane **BLUE**

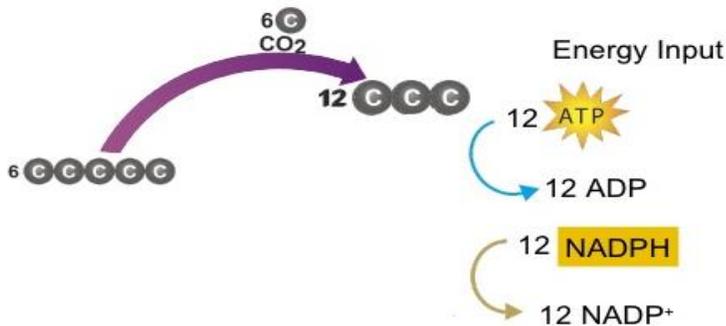
17.) Write down the main steps of the Calvin Cycle:

- Step 1: **Carbon dioxide** enters the cycle from the atmosphere and **combines with other carbon molecules**.



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- Step 2: Combining carbon dioxide with other carbon molecules results in the **formation of twelve 3-carbon molecules**.
 - ATP and NADPH supply the energy** for this.



- Step 3: **Two 3-carbon molecules are removed** from the cycle.
- These molecules will **form sugars**, lipids, amino acids and other compounds.
- Step 4: The ten remaining **3-carbon molecules** are converted back into **5-carbon molecules**.
- Energy (ATP) is required for this conversion.
- The process begins again.

