

Name:

Date:

Period:

Student Handout: Visualizing Photosynthesis and Cellular Respiration

Directions: Color code the following chemical equations as specified by the information provided in the classroom handout.

I. PHOTOSYNTHESIS

Step 1:

Reactant Bond Energy _____

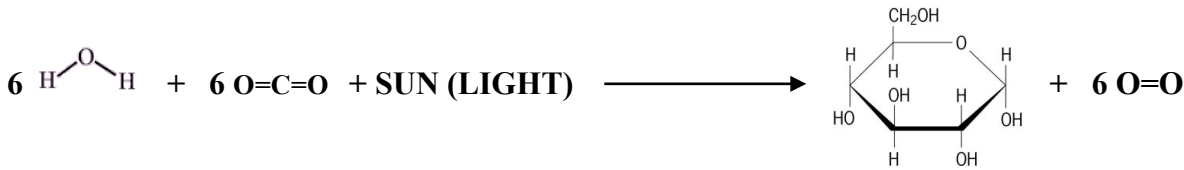
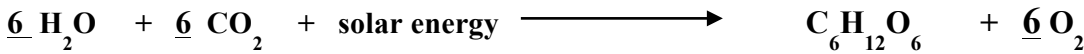
Product Bond Energy _____

Heat of Reaction = Energy In - Energy Out _____

Endothermic or Exothermic (circle one)

Why is light needed for this reaction to occur?

Potential Energy Profile



II. CELLULAR RESPIRATION

Step 2:

Reactant Bond Energy _____

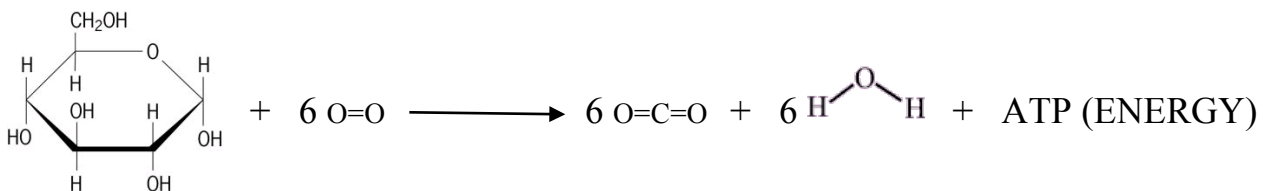
Product Bond Energy _____

Heat of Reaction = Energy In - Energy Out _____

Endothermic or Exothermic (circle one)

Why is light not needed for this reaction to occur?

Potential Energy Profile



III. MODELING

PHOTOSYNTHESIS

- Use a molecular model kit to simulate the processes of **Photosynthesis**.
- Begin by constructing **6 carbon dioxide** molecules and **6 water molecules**. (Remember, this is done in the Chloroplasts of plant cells)

Step 3: _____ (Instructor's initials) **Reactants of Photosynthesis**. Once this has been signed move on to cellular respiration.

- Using only the reactants you made, construct **1 molecule of glucose**; this is the process of photosynthesis. If you do this correctly, you should have exactly **6 oxygen molecules** left.
- Once you have constructed your molecule of glucose and your molecules of oxygen, raise your hand, and explain the process to your instructor.

Step 4: _____ (Instructor's initials) **Photosynthesis has been successfully completed**. Once this has been signed move on to cellular respiration.

CELLULAR RESPIRATION

- Use your models to simulate the processes of **Cellular Respiration**. (This should be ready to go if you did photosynthesis correctly ☺)
- Breaking these molecules apart, use the Carbon Oxygen and Hydrogen to construct the products of Cellular Respiration. (This is done in the mitochondria.)
- Once you have constructed your molecules of Water and Carbon dioxide raise your hand, and explain the process to your instructor.

Step 5 : _____ (Instructor's initials) **Cellular Respiration has been successfully completed**. Once this has been signed move on to analysis questions.

ASSESSMENT

1. What is the source of the carbon in the sugars made by plants?
2. The oxygen released by plants comes from what reactant in photosynthesis?
3. Inside what organelle does photosynthesis occur?
4. Where does cellular respiration occur in **both plants and animals** (organelle name)?
5. What waste gas is given off during cellular respiration, and how does this help plants?

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6. The energy used for the process of photosynthesis comes from the _____ and the energy created from cellular respiration is _____.

7. Answer this question in the table provided below:

What materials are required for photosynthesis and cellular respiration?

	Photosynthesis	Cellular Respiration
INPUTS		
OUTPUTS		