Modeling Photosynthesis & Cellular Respiration

**Equations:**

In the boxes below, you will find the chemical reactions for photosynthesis & cellular respiration. Use these equations to help you model the molecules for each reaction on your desk.

**Materials:**

Obtain a bag of props from Mrs. Marshall. Make sure that you have the following in your bag:

* 6 carbon (C) atoms
* 12 hydrogen (H) atoms
* 18 oxygen (O) atoms
* 1 sun
* 3 “+” signs
* 1 arrow
* 1 carbon dioxide
* 1 water
* 1 glucose
* 1 ATP
* 1 Oxygen

**Procedure:**

1. Position the atoms (letters) to represent the **reactants of photosynthesis**. Use the equation above to help you do this.
2. Position the atoms (letters) to represent the **products of photosynthesis**. Use the equation above to help you do this.
3. Position the words, arrows, and symbols to represent the **reactants & products of photosynthesis.** Use the equation above to help you do this. Once you are confident in your answer, call Mrs. Marshall over to verify.
4. Now, Position the atoms (letters) to represent the **reactants of cellular respiration**. Use the equation above to help you do this.
5. Position the atoms (letters) to represent the **products of cellular respiration**. Use the equation above to help you do this.
6. Position the words, arrows, and symbols to represent the **reactants & products of cellular respiration.** Use the equation above to help you do this. Once you are confident in your answer, call Mrs. Marshall over to verify.

**Analysis Questions:**

1. Compare the **reactants of the photosynthesis** equation with the **products of respiration**. What do you notice? Answer in a complete sentence!

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1. Compare the **reactants of the respiration** equation with the **products of photosynthesis**. What do you notice? Answer in a complete sentence!

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1. How many molecules of water are needed for plants to make one molecule of sugar? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which product of photosynthesis remains in a plant for use as a building material or a source of energy? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Which product of photosynthesis is released as a gas into the atmosphere by plants? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Which reactant of respiration is broken down as a source of energy? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Which waste products of respiration are released into the environment and may be later used during photosynthesis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Respiration can also mean breathing. This process allows animals to take in oxygen. Why is this necessary in order for cellular respiration to take place in animal cells? *Hint: Look at the equation for cellular respiration on page #1.*

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1. Label the following to pictures as either a chloroplast or a mitochondria.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Does photosynthesis take place in the chloroplast or mitochondria? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Plants carry out photosynthesis **during the day / at night / always.**
3. Plants and animals carry out Cellular Respiration **during the day / at night / always.**
4. The atoms used in photosynthesis/cellular respiration are recycled. True or false? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. During photosynthesis, \_\_\_\_\_\_\_\_\_\_\_ energy is converted into energy that is stored in \_\_\_\_\_\_\_\_\_ molecules.
6. During cellular respiration, the energy stored in sugar molecules is transferred to \_\_\_\_\_\_ molecules.