Photosynthesis Paper Clips

Name: _____ Hr: _____

1. Use all the carbon clips and as many oxygen clips as needed to make as many CO_2 molecules as possible. Fill this number into the equation below.

   * From this activity you might notice that plants need CO_2 as a reactant for photosynthesis. How do you think carbon dioxide enters the plant?

   _____

2. Use the hydrogen clips and the remaining oxygen clips to make as many H_2O molecules as possible. Fill this number into the equation below.

   * You might now realize that water is another reactant needed for photosynthesis. Explain how you think water is carried to the leaves of the plant.

   _____

3. Rearrange the H_2O and CO_2 molecules to construct the product glucose (sugar) molecules, $C_6H_{12}O_6$. Fill the number of sugar molecules you made into the equation below.

4. a. What is left over after the product sugar is made? _____

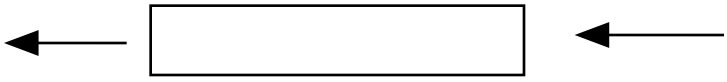
   b. Fill in these number of atoms in the equation.

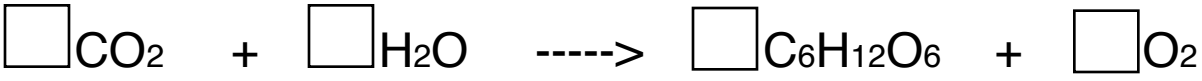
   c. What happens to this left over substance after the product sugar is made?

   _____

5. Steps 1-4 model the process of **photosynthesis**. Fill in the box near the equation that correctly shows the direction of photosynthesis using the word photosynthesis.

   Photosynthesis is a series of chemical reactions that convert light energy into chemical energy contained in a glucose (sugar) molecule. This process occurs in structures called chloroplasts. Inside each chloroplast is the green pigment chlorophyll. Chlorophyll captures light energy from the sun and uses it to rearrange the atoms in molecules of carbon dioxide and water to produce glucose. Some of this chemical energy in the glucose is used by the plant right away and some of it is stored as a long chain of sugars called starch.





6. Now take the sugar molecule apart and reassemble the same number of carbon dioxide and water molecules as you filled in the equation. What substance is needed to allow the molecules to be rebuilt?

   _____

7. Step 6 models the process of **cellular respiration**. Fill in the box near the equation that correctly shows the direction of respiration using the word respiration.

   Cellular respiration takes place in a structure called a mitochondria. Inside the mitochondria glucose is broken down releasing energy, carbon dioxide and water. The energy that is released is used by the cell to perform the processes that keep the cell alive.

8. THINK! What is the relationship between photosynthesis and cellular respiration?

   _____

9. Look Back! Name the structure where photosynthesis takes place. _____

10. Look Back! Name the structure where cellular respiration takes place?

    _____

11. During photosynthesis _____ is converted to _____ energy.

12. THINK! Explain why plants need carbon dioxide but animals do not.

    _____

    _____

13. a. Do plants need oxygen to live? _____

    b. Explain your answer.

    _____

    _____

14. THINK! Energy is stored during (photosynthesis / respiration) and released during (photosynthesis / respiration).
    circle one circle one