Biology
Lab: Photosynthesis

Problem: Is photosynthesis taking place in the aquatic plant *Elodea*?

Green plants use sunlight to make glucose. To do so, the plant must use carbon dioxide and water in a process called photosynthesis. Plants and animals use the glucose made by plants as a source of energy. To release the energy contained in the bonds of glucose, the glucose must be converted to ATP. The process by which ATP is made from glucose is called cellular respiration. Respiration also produces waste products including carbon dioxide and water, which are the same substances that served as raw materials for photosynthesis.

Pre-lab Questions: (Read Procedure before answering.)

1. How and what will we measure to see if photosynthesis is taking place?

2. Why would we use an aquatic plant for this experiment instead of a terrestrial plant?

Materials: (per group)

Sprig of *Elodea*
Distilled Water w /Baking Soda
Graduated Cylinder or Test Tube
Timer or Watch
60 watt Spotlight
Safety Goggles

Procedure:

1. Fill test tube with distilled water. Add ***0.5 g.*** of baking soda.
2. Cut the end of the sprig of *Elodea.*
3. GENTLY crush the freshly cut end.
4. Place the *Elodea* in the Graduated Cylinder or test tube. Be sure the freshly cut end of the Elodea is toward the top of the tube or cylinder.
5. With the light off, observe the freshly cut end of *Elodea*. Count the number of oxygen bubbles that are released in a minute. Record for each minute for 10 minutes.
6. Now place the *Elodea* in front of the light and turn it on. Wait a few minutes. Over the next ten minutes count the number of bubbles that are released each minute. Record the results.

Analysis: Graph your results. I will give some examples on the board for graph construction.

Questions:

1. Illustrate in the space below the steps of the Calvin cycle. Once complete, go back and explain what is happening in each main step.

2. How many molecules of carbon dioxide enter the Calvin cycle? Explain your answer.

3. What is the summative formula for photosynthesis? Explain for each component the following information:
    - What are the reactants of photosynthesis?
    - What are the products of photosynthesis?
    - The reaction it is present in photosynthesis: Light-dependent reaction or Calvin cycle

Its role in photosynthesis – Why is it present?