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## Cell Energy: Photosynthesis Lab

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### Introduction

Green plants use sunlight to make glucose. To do so, the plant must use carbon dioxide and water in a process called photosynthesis. Plants & 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. In water, carbon dioxide dissolves to form a weak acid. As a result, an acid-base indicator such as bromthymol blue can be used to indicate the presence of carbon dioxide. In this lab you will use bromthymol blue to explore the relationship between photosynthesis & respiration.

### Prelab Questions:

1. Why does Bromthymol blue turn yellow when you exhale into it?
2. How many test tubes will your group have, and what goes into each one?
3. What "ingredients" are necessary for photosynthesis?

**Purpose:** Write your purpose into your lab notebook using the following prompts:

The purpose of this lab is to...

We will accomplish this by...

**Hypothesis:** Write your hypothesis in your lab notebook answering the following:

Make a prediction about what will happen to the Elodea in the dark, what will happen to the Elodea in the light, and what evidence will you see to support your prediction.

### Materials

2 Erlenmeyer flasks, graduated cylinder, 4 test tubes, bromthymol blue solution, elodea plants, light source, drinking straw

### Procedure

1. Using a graduated cylinder, measure out 20 ml of bromthymol blue.
2. Pour the bromthymol blue solution into an Erlenmeyer flask
3. Record the color & measure pH.
4. Insert one end of a drinking straw into the Erlenmeyer flask with the bromthymol blue solution & gently blow through the straw until there is a color change. Do not continue blowing through the straw!
5. Record the color & measure the pH.
6. Gently pour the liquid in the Erlenmeyer flask into your test tube.
7. Rinse out the Erlenmeyer flask.
8. Repeat the procedure with the 4 test tubes.
9. Label the test tubes A, B, C, & D.
10. Place a sprig of elodea into test tube A and seal. Place in a well-lighted area.
11. Place a sprig of elodea into test tube B and seal. Place in a dark area.
12. Seal test tube C & place in the lighted area with test tube A (no elodea in test tube C)
13. Seal test tube D & place in the dark area with test tube B (no elodea in test tube D)
14. After 24 hours, examine each test tube. Record the pH & qualitative observation (color is one) in your data table.

## **Data**

Create your own data table

## **Analysis**

1. What was the color of the bromthymol blue solution before you exhaled into it? After you blew into it?
2. What was the pH of the bromthymol blue solution before you exhaled into it? After you blew into it?
3. Why did we use bromthymol blue in this experiment?
4. What difference did you observe between the Elodea in the light and the Elodea in the dark? Why did this occur?
5. What is photosynthesis and how do our results demonstrate the requirements necessary for this process to occur?

## **Conclusion:**

Create a conclusion using all of the following sentence prompts:

The purpose of this lab was to...

The experimental set up tested...

The controls were...

Bromthymol blue was used to...

Our hypothesis about elodea in the light was proved/ disproved because....

Our hypothesis about the elodea in the dark was proved/ disproved because...

The main idea of this lab was...

Possible sources of error are....