Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Pre-AP Photosynthesis Lab - Elodea & Bromothymol Blue**

**Background:**

In this lab, you will investigate the process of photosynthesis. More specifically, you will learn how the amount of light affects photosynthesis. In order to do this, you will use an **Elodea plant**, the chemical **Bromothymol Blue** (which acts as an indicator to show if photosynthesis is occurring). Bromothymol blue works because it is able to detect the presence of **CO2** (needed for photosynthesis) and **O2** (released during photosynthesis) in solution.

In a test tube, you will see that:

* bromothymol blue + CO2 = *green color*
* bromothymol blue + O2 = *blue color*

**Equation:**

Write the equation for photosynthesis.

**Hypothesis:**

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**Procedure:**

1. Pour 75 mL of water into a 250 mL beaker.
2. Add 2 mL of bromothymol blue to the water. It should be a blue solution.
3. Using a straw, GENTLY blow into the solution causing it to bubble for approximately 1 minute.
4. Label 3 large test tubes: 1, 2, & 3
   * Tube 1 will be the control (no Elodea)
   * Tube 2 will be the Elodea in the dark
   * Tube 3 will be the Elodea in the light
5. Pour 25 mL of the bromothymol blue + water solution into each of the three test tubes.
6. Cover Tube 1 with aluminum foil (there is no Elodea in Tube 1) and place it in the test tube rack
7. Add a 7 cm piece of Elodea to Tube 2. Using your straw, GENTLY push the Elodea to the bottom of the test tube. Then cover Tube 2 with tinfoil and place it in the test tube rack.
8. Add a 7 cm piece of Elodea to Tube 3. Using your straw, GENTLY push the Elodea to the bottom of the test tube. Cover the test tube with plastic wrap or a stopper. Then place it in the test tube rack.
9. Place the entire test tube rack under a light source and allow to sit overnight.

**Tube 1 Tube 2 Tube 3**

**No Elodea Elodea Elodea**

**+ + +**

**Covered in tinfoil Covered in tinfoil In the light**

**Pre-Lab Questions:**

Predict what will happen to the color of the solution when you blow into the straw (causing the bromothymol blue + water solution to bubble). Explain your prediction. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict what color Tube 1 will be after the experiment. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict what color Tube 2 will be after the experiment. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict what color Tube 3 will be after the experiment. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Results:** Record your results in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **No Elodea +**  **Tinfoil (Control)** | **Elodea +**  **Tinfoil** | **Elodea +**  **Light** |
| **Color Before Experiment** |  |  |  |
| **Color After Experiment** |  |  |  |

**Conclusions:** Write 2 to 3 sentences based on your results.

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**Post-Lab Analysis:**

What color does the bromothymol blue solution turn after you exhale into it? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Explain your answer. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What happened to the color in Test Tube 1? Explain why you obtained the results that you did. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What happened to the color in Test Tube 2? Explain why you obtained the results that you did. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What happened to the color in Test Tube 3? Explain why you obtained the results that you did. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the purpose of the control? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Compare the Elodea in the dark to the Elodea in the light. How do you account for any differences in color? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What gas (or gases) can bromothymol blue serve as an indicator for? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What gas do you exhale? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What gas do plants give off? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

List three things that a plant needs to undergo photosynthesis.

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

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Write the overall equation for photosynthesis.

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