

Title of Lesson Plan	Elodea Lab
Prepared By	Bruce Cameron
City and State	Seattle, WA
Grade Level(s)	9
Keywords (subjects covered)	Photosynthesis, plants
Brief Description	Students put elodea sprigs in water-filled test tubes in the light and dark and use BTB to observe what happens to the amount of CO ₂ .
Total Time Required	1-2 days
Setting	Biology Lab
Lesson Objectives/Goals	To learn what the inputs are for plants conducting photosynthesis.
Materials Needed	2 large test tubes, goggles, small post-it note, Bromothymol Blue, tape, 2 rubber stoppers, 50 ml graduated cylinder, drinking straw, 2 sprigs of Elodea, eyedropper, scissors, aged tap water, fluorescent grow lamp
Standards Addressed	Washington State Essential Academic Learning Requirements: 1.2.Structures: Understand how components, structures, organizations, and interconnections describe systems. 2.1.Investigating Systems: Develop the knowledge and skills necessary to do scientific inquiry.
Procedure	<p style="text-align: center;"><u>Elodea Lab</u></p> <p><u>Investigative Question:</u> Elodea will be placed in two test tubes, each containing water and CO₂. If one test tube is placed in total darkness and the other in bright light, what will happen to the amount of CO₂ in the water?</p> <p><u>Background:</u> Bromothymol blue (BTB) is an indicator for CO₂ (carbon dioxide). When CO₂ gas is present, it will change color: from blue to green, then yellow.</p> <p><u>Fair Test:</u> Write the manipulated, responding, and at least <u>three</u> controlled variables in your comp book.</p> <p><u>Hypothesis:</u> Write a hypothesis about what you think will happen to the CO₂ in the flasks. Use the “If... then..... because.....” format.</p> <p><u>Procedures:</u></p> <ol style="list-style-type: none"> 1. <u>Put on goggles!</u> Send someone to get a sprig

	<p>of Elodea from the front demo station, while someone else gets a small beaker of Bromothymol Blue (BTB) from the front demo station, and a third person measures 40 ml of aged water from the tubs on the front demo station.</p> <ol style="list-style-type: none"> 2. Fill the large test tube with 40 ml of aged water. 3. Use the eyedropper to add 100 drops of BTB to the test tube. Use the straw to mix thoroughly. 4. While covering the top of the test tube with your hand, use the drinking straw to <i>gently</i> blow air into the water just until the water turns yellow. (Check the color of the flask in the front of the room). Do not swallow the water! 5. Using scissors make a diagonal cut across the bottom of the Elodea sprig. Place the sprig of elodea into the test tube. 6. Stopper the test tube and tape a post-it note to it labeled with your lab station # and period. Bring the test tube to one of the grow lamps and place it in one of the test tube racks. 7. The CLASS TEST TUBE will be prepared using the same steps above but will be covered with black paper so no light shines in. 8. Both test tubes will be left in front of a fluorescent grow lamp for several hours. 9. <u>Clean up your lab station:</u> Return the beaker of BTB to the front of the class. Wipe down your lab area with a paper towel and arrange the equipment neatly for the next class. 7. After several hours, check to see if the BTB solution has changed color in either flask. Record these observations in your comp book.
Assessment	<u>Analysis Questions</u> for Elodea Lab

	<p>1. Why did we need to blow into the flasks at the beginning of the experiment? (“To change the color of the BTB” is only PART of the answer!)</p> <p>2. In your own words, what does “photosynthesis” mean? Do NOT look it up in a book or online!</p> <p>3. What happened to the Bromothymol Blue indicator in each flask after the experiment had run for several hours?</p> <p>4. Read the background information again. According to the information there, what happened to the amount of CO₂ in each flask during the experiment?</p>
Literature Cited/References	Colleagues at Canyon Park Junior High, Bothell, WA
Forestry Tour Attended	Pacific Northwest 2008

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