

Watching Photosynthesis

Summary

Students use Bromothymol Blue Indicator to see how photosynthesis in plants creates invisible gases that alter the color of Bromothymol Blue.

Time Frame

1 class periods of 70 minutes each

Group Size

Pairs

Materials

- [student worksheet](#)
(attached)
- pond plant (Elodea, algae)
- 2 test tubes
- light source
- large beaker(plastic is best)
- 2 stoppers
- drinking straw
- Bromothymol Blue

Background for Teachers

Bromothymol Blue (BB) is blue in a neutral or basic solutions. It turns green then yellow as the acidity increases. When students blow bubbles into the BB solution, the carbon dioxide in their breath creates a weak acid in the solution and it turns green and if they blow long enough, yellow. The plant will absorb the CO₂ as it photosynthesizes and the color will change back to blue. If students blow in too much CO₂ the plant will not be able to consume it all in a class period and they will not see the color change back. Room light, grow lights, or high wattage incandescent light bulbs will give plants just barely enough light to change the color back in 30-40 minutes. In bright sunlight the color should change back in 10-20 minutes. If students place the tubes too close to a bright light, they will bake the plants.

Instructional Procedures

Go over the introduction and procedures with students. Show them the materials that are available.

Give students time to set up the two test tubes and place them in the large beaker.

Ideally it is best to take students outdoor, they will get better results. If this is impossible have lights set-up around the room for them to take their beaker to.

During the time students wait for photosynthesis to occur you can have them take written observations (they may see air bubbles form) or you may have them view part of a video, read or discuss material from their textbook or some other activity.

Collect the plants as students remove them from the test tubes. You may need to reuse them in other classes.

Allow students time to color their test tubes and clean up.

Students probably will not have time to answer the questions. You can assign it as homework or give them time in class the next day.

Extensions

If you wished to show the affect of light on plants vs. no light, add a plant to both tubes and place one tube in the dark and the other in the light.

To add a level of inquiry, ask the student to generate the procedures to the this extension

Assessment Plan

Scoring Guide

:

1. Student participates in activity.....4 pts
2. Student completes observations.....4 pts
3. Student correctly answers analysis questions..4 pts

Answers:

1. CO₂
2. *The gas is produced when sugar is broken down in respiration.*
3. *Answers will vary, usually sunlight is best.*
4. *The intensity of the light will affect photosynthesis.*
5. *The plant absorbs CO₂ turning the color back to blue.*
6. $6\text{CO}_2 + 6\text{H}_2\text{O} = \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
7. *The removal of the CO₂ from the water.*

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)