

Probing Photosynthesis

Summary

Students will use a CO₂ probe to measure the rate of photosynthesis. They will use inquiry skills to design the activity and measure different variable that could affect the rate.

Time Frame

1 class periods of 90 minutes each

Group Size

Small Groups

Materials

- [student sheet](#)
(attached)
per group:
a CBL
a TI-73 calculator
CO₂ probe (if you are a teacher in Jordan School District, these probes are available by contacting Barbara Gentry)
plant (geraniums work well and can be cut off a larger plant, placed in a beaker of water and will photosynthesis just fine. Aquatic plants can also be used.)
light source
cover for plant (plastic bag, pop bottle with bottom cut out)

Student Prior Knowledge

Students should have some knowledge of the formula for photosynthesis and how the reactants in a formula combine to form the products. They should also know that CO₂ is a colorless gas found in small quantities in the atmosphere.

Instructional Procedures

Program the CBLs and calculators to collect 3 minutes of data every 10 seconds. Set up the CO₂ probes on parts per million.

If students have never used this probes before, give them an opportunity to breathe on the probe to see what the level of CO₂ is in their breath.

Go over the introduction on the student sheet. Read the procedures with students.

Describe the experiment. They will set up a plant, light source and CO₂ meter and run it for 3 minutes. Variables for the experiment include: the amount of plant material (count the leaves, strands or stems), the distance and strength of the light source, the type of plants used. Have students generate the variable and write them on the board. Describe to students how you calculate the slope of the line by choosing two points on the line and using the slope formula. Remind them that the larger the number is for slope, the faster the rate.

Have students run the control experiment and write down their data.

Then ask students to change one variable for their experiment. For example, they could place the light closer to the plant. Or they could use a plant with more leaves or add CO₂ to the pop bottle with their breathe beforehand. If you have time, have each group write their hypothesis on the board. Make sure no two groups have the same one.

When ready, have students collect their data on the experiment. If time has run out, save the

analysis for the next day.
Have each group of students report their findings.

Assessment Plan

Scoring Guide:

1. Students write correct hypothesis.....4
2. Students set-up experiment that tests hypothesis.....4
3. Students record data and graph it.....4
4. Students correctly answer analysis questions:.....4
 - How did your experiment differ from the control? Answers will vary
 - Why do you think it did? Answer should reflect an understanding of photosynthesis.
 - Which experiment in class produced the greatest rate of photosynthesis? Probably the experiments with more light, closer light or more plant material.
 - Why do you think it did? These factors are all encourage photosynthesis.
 - Which experiment in class produced the lowest rate of photosynthesis? Probably less light, farther away light or less plant material.
 - Why do you think it did? These factors are needed by photosynthesis.
 - What affect might raised CO₂ have on plants? Plants may grow more abundantly.
 - You could add more CO₂ by blowing into the bottle.
5. Conclusion thoughtfully written and complete.....4

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

[Utah LessonPlans](#)