

Lab Report

Photosynthesis Rates at Various Temperatures

Purpose:

Hypothesis:

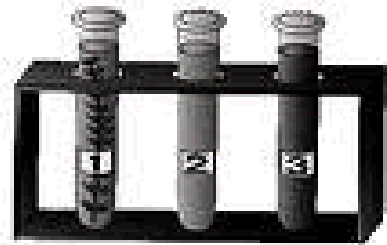
Materials (per group):

- 1- 9 ml test tube
- 1- red liquid thermometer
- 1- 100 ml graduated beaker
- 1- 1 ml plastic transfer pipette
- 50 ml phenol red (diluted 1:100)
- 3- Elodea sprigs
- 1- CO₂ generator (125 ml Erlenmeyer flask with a 2-hole rubber stopper and plastic tubing)
- 1- 30 ml Syringe
- 1- single edge blade
- 1- TblSp baking soda
- 30 ml vinegar

Procedure:

Follow the steps below to successfully complete the lab.

1. Make a CO₂ generator:
 - a. fill the bottom of a 125 ml flask with 1 TblSp of baking soda.
 - b. Place the two-hole rubber stopper (containing the plastic tubing) on the flask.
 - c. Fill the beaker with 50 ml of phenol red.
 - d. Submerge the opposite end of the plastic tubing into the phenol red.
 - e. Slowly inject 30 ml of vinegar into the flask through the rubber stopper using a 30 ml syringe.



- *CO₂ will bubble through the solution turning the phenol red acidic. The color changes from red to orange-yellow. **(The more acidic the phenol red, the longer it will take the Elodea plant to absorb the CO₂).**
2. Fill the test tube $\frac{3}{4}$ full with the acidic phenol red solution.
 3. Set the test tube with solution and thermometer at one of the lab stations (i.e. hot, room temperature, or cold)
 4. Submerge a sprig of Elodea (3" in length) upside down into the test tube once your solution has reached the appropriate temperature.
 5. Record the time you first see the bubbles.

6. Observe and record the number of bubbles generated every minute for five minutes.
7. Repeat steps 2-7 at two more lab stations.
8. Record all data in the table below and answer the discussion question that follow.

Data:

Table 1. Number of bubbles observed in 5 minutes at three different temperatures.

	Hot Temperature ____ °C	Room Temperature Temperature ____ °C	Cold Temperature ____ °C
Start Time			
Time of First Bubble			
# of bubbles in 1 st minute			
# of bubbles in 2 nd minute			
# of bubbles in 3 rd minute			
#of bubbles in 4 th minute			
# of bubbles in 5 th minute			
Color change			

Results:

9. Calculate the rate of photosynthesis in # of bubbles per second at room temperature, cold, and hot.

$$\text{Rate of photosynthesis} = \frac{\text{number of bubbles}}{\text{Time}}$$

10. Graph your results. Place time on the x-axis and bubble count on the y-axis. Create three lines, one for each temperature and label each one accordingly.
11. Calculate the time it took for each sample plant to begin photosynthesizing using the equation: First bubble time – Start time.

