Name:

Date:

Water Weed Lab - Virtual Photosynthesis Inquiry

Introduction: In this virtual lab, you will be looking at the production of oxygen as a plant (the waterweed Elodea) undergoes photosynthesis. Oxygen is measured by the number of bubbles produced by the plant. Three factors that influence the rate of photosynthesis can be adjusted in this lab: light intensity, color of light, level of CO₂.

Go to the following link to access the virtual lab. <u>http://www.saddleworth.oldham.sch.uk/science/simulations/waterweed.htm</u>

A. Effect of Light Level on Photosynthesis

Set the simulator to colorless light and CO_2 level to 6.0. Run the experiment at x5. Make adjustments to the level of light. Construct a data table like the one below, and fill in the data.

Light Level Intensity	Number of Oxygen Bubbles (Light = Colorless, CO ₂ = 6.0)
1.0	
2.0	
3.0	
4.0	
5.0	
6.0	
7.0	
8.0	
9.0	
10.0	

1. Based on the data, what light intensity level results in the fastest rate of photosynthesis?

B. Effect of Light Color on the Rate of Photosynthesis

Set the simulator to a 6.0 light level, and 6.0 CO_2 level. Run the experiment at x5.

Construct a data table on your paper like the one below. Only adjust the colors and complete the table.

Light Color	Number of Oxygen Bubbles (Light intensity = 6.0, CO ₂ = 6.0)
Red	
Blue	
Green	
Colorless	

2. Based on the data, what color of light results in the fastest rate of photosynthesis?

C. Inquiry: Effect of CO₂ Level on Photosynthesis

Develop an independent experiment to test **how the level of CO₂ affects the rate of photosynthesis**. Construct a data table that shows the data you collect. Make sure to include information such as the color of light, light intensity, level of CO₂ and the number of bubbles produced (*use the previous experiments as a quide*).

- 3. What is your hypothesis? What level of CO_2 will lead to the most photosynthesis?
- 4. Based on the data, what level of CO_2 results in the fastest rate of photosynthesis?

For part C, you need to write a lab report (*individual reports, not group*). USE **COMPLETE SENTENCES**. Include the following information as you follow the scientific method. Turn <u>this</u> sheet in with it.

- <u>Title</u>: brief, concise, yet descriptive (1 pt)
- **<u>Question</u>**: What are you researching? (1 pt)
- Hypothesis: (3 pts)
 - Write a prediction of the outcome of the experiment (1 pt)
 - Make sure it is a complete sentence. (1 pt)
 - Make sure the statement is testable and that you explain why you think so. (1 pt)
- Materials and Procedure (4 pts)
 - Briefly describe how you will test the hypothesis (reference the simulator) (1 pt)
 - Include the following variables- dependent (responding) variable (1 pt), independent variable (1 pt) and constants (controlled variables) (1 pt).
- <u>Results (Data)</u>: (8 pts)
 - Include <u>table</u> with proper title. (3 pts)
 - Line or bar **graph** with proper labels and title (3 pts)
 - Include any other observations or notes you make during the lab. (2 pts)
- <u>Conclusions</u>: (8 pts)
 - Accept or reject your hypothesis, why? (3 pts)
 - Include a summary of the data- averages, highest, lowest, etc. to help the reader understand your results.
 - What did you learn? (5 pts)
 - List at least one thing you learned and describe how it applies to a real-life situation.
- 5. Why is it important that you keep two variables constant (such as light level and color) while you're testing how a third variable (CO₂ level) affects photosynthesis?
- 6. What settings can you put the simulator on to get the MAXIMUM rate of photosynthesis?