**RATES OF PHOTOSYNTHESIS**

Photosynthesis converts some of the energy absorbed from sunlight into the chemical energy of sugars. The process is also the major source of oxygen in Earth’s atmosphere. In this lab, you will design an experiment to determine the effect of different light sources on the rate of photosynthesis in leaves.

**Problem:** How does a light source affect the rate of photosynthesis?

Read the materials and procedures on pg. 106 and 107. Just for reference… baking soda’s chemical formula is NaHCO3

For your experiment, you have decided to test different colors on light and the effect they have on the rate of photosynthesis. You will test the time it takes for 5 disks to float to the surface of the water.

Why do the disks float to the surface? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How does this show that photosynthesis has occurred? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Below is the data you have collected:**

Trial 1: Time for 5 disks to float to surface

Red light: 35 seconds

Blue light: 26 seconds

Green light: 116 seconds

Trial 2: Time for 5 disks to float to surface

Red light: 32 seconds

Blue light: 20 seconds

Green light: 85 seconds

Trial 3: Time for 5 disks to float to surface

Red light: 39 seconds

Blue light: 35 seconds

Green light: 95 seconds

**Analysis and Conclusions:**

1. a. What is the independent variable in this experiment?

b. What is the dependent variable in this experiment?

1. Find the average time (from the 3 trials) it took for 5 disks to float to the surface in each color of light.

Average time for red light: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Average time for blue light: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Average time for green light: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Determine the mean rate of photosynthesis in each condition of your experiment. To calculate the rate of photosynthesis, use the formula below:

 5 (# of disks floating)\_\_\_

ave. total time (seconds) = \_\_\_\_\_\_\_ disks/second

 Mean rate for red light: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Mean rate for blue light: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Mean rate for green light: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a. Determine the best type of graph to use to represent your data.

b. Explain your choice and construct the graph on the graph paper provided. Be sure to carefully label the axes of the graph.

5. Based on your data, what can you conclude about how your independent variable affects the rate of photosynthesis?

6. Why do you think baking soda was used in this experiment? (Hint: Think about the equation for the overall process of photosynthesis.)

7. What are possible sources of unavoidable error in this experimental design?

8. What are other things you could have tested besides colors of light? Name 2.

Read the Data Analysis: Interpreting Graphs section on page 116 in your book. Answer the 2 questions posed below.

1.

2.