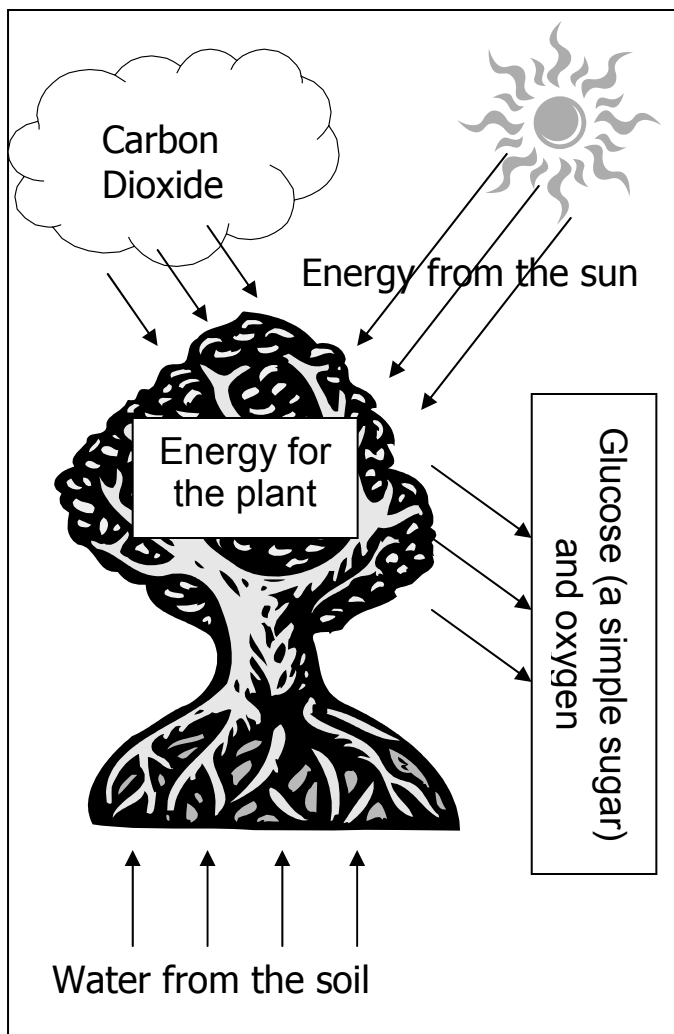
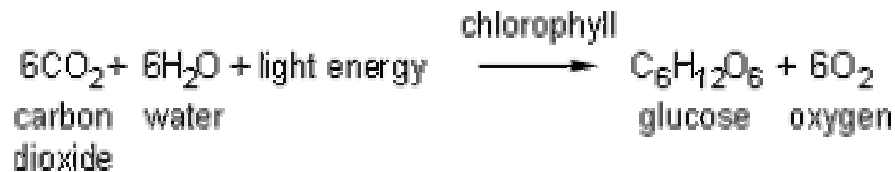


Name _____

Photosynthesis

Background Information: PHOTOSYNTHESIS is the process during which a plant's chlorophyll traps light energy and sugars are produced. In plants, photosynthesis occurs only in cells with chloroplasts. The chemical reaction for photosynthesis is:



Green plants use energy from light to combine carbon dioxide and water to make food. Light energy is converted to chemical energy and is stored in the food that is made by green plants. The light used in photosynthesis is absorbed by a green pigment called chlorophyll. Each food-making cell in a plant leaf contains chlorophyll in small cells called chloroplasts. In chloroplasts, light energy causes water drawn from the soil to split into molecules of hydrogen and oxygen. In a series of chemical reactions, the hydrogen combines with carbon dioxide from the air, forming a simple sugar. Oxygen from the water molecules is given off in the process. From sugar, along with nutrients from the soil, green plants can make starch, fat, protein, vitamins, and other complex compounds necessary for life. Photosynthesis supplies the chemical energy needed to produce these compounds.

Problem: To observe evidence of photosynthesis in a water plant.

Materials:

1 sprig of Elodea	Distilled water	Test tube with stoppers
Chemical indicator solution	Straw	Masking tape
NaHCO ₃	Plant lights	Test tube racks

Part 1

Procedure:

1. Read the procedure carefully. What will you be observing?
Make a chart in the data section to record this data.
2. Observe as a classmate blows through a straw into the flask of indicator solution. Record your observations.
3. Use the masking tape to label 3 test tubes with 1, 2, 3 and your group number.
4. Fill 3 test tubes $\frac{1}{2}$ way with the indicator solution.
5. Put a sprig of Elodea in test tubes 1 and 2. Do not put anything in test tube 3.
6. Stopper all three test tubes.
7. Place test tubes 1 and 3 in bright light. Place test tube 2 in the dark.
8. Leave the test tubes overnight; record your observations the following day.

Data:

Data Analysis:

1. Which test tube(s) showed a color change in this investigation?

2. What does a color change indicate in this investigation?

Conclusion:

1. Write a short paragraph explaining the results of this investigation. Provide evidence from the investigation to support what you say

Questions:

1. What is an indicator?

2. Why did the indicator solution change colors?

3. List –
 - a. Independent variable _____
 - b. Dependent variable _____

Part 2

Procedure:

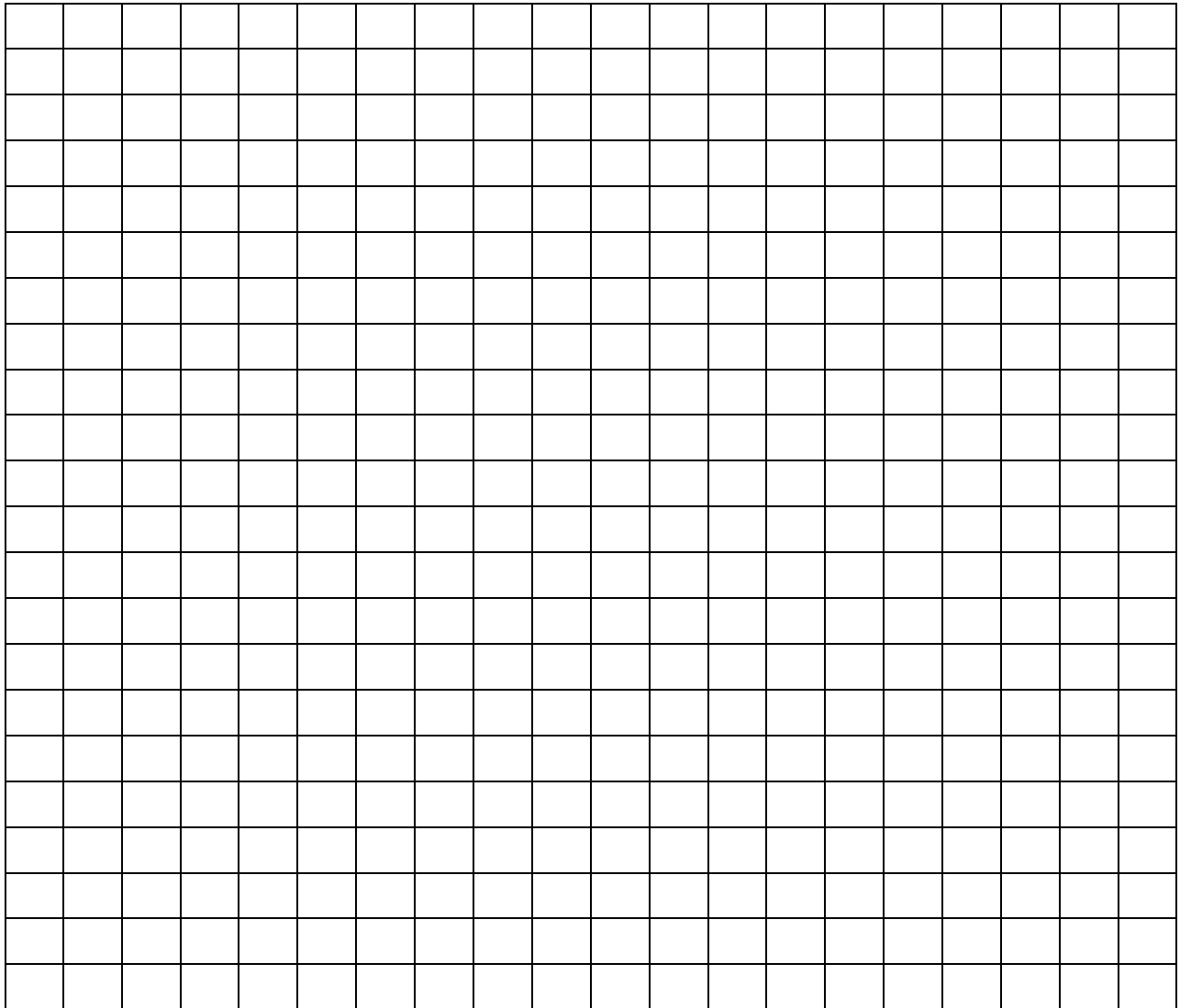
1. Obtain a sprig of Elodea.
2. Remove several leaves from around the end of the stem. Cut the stem at an angle. Lightly crush the end of the stem.
3. Fill a large test tube $\frac{3}{4}$ full of distilled water. Add a pinch of baking soda.
4. Put the Elodea in the test tube, stem side up.
5. Set the test tube in a test tube rack.
6. Place a 40 watt lamp 5 cm from the plant.
7. After 1 minute, count and record the number of bubbles coming from the crushed end of the Elodea stem. Count the bubbles produced each minute for 5 minutes. Record your results.
8. Make *qualitative* observations during this investigation. Record these results.
9. Record the results for each group in the class.
10. Move the lamp so that it is 20 cm from the plant. After 1 minute, count and record bubbles produced each minute for 5 minutes.
11. Make *qualitative* observations during this investigation. Record these results.
12. Record your results. Record the results of your classmates.

Data:

Number of bubbles produced at 5 cm from light								
Time in Minutes	Number of Oxygen Bubbles Produced							
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Ave.
1								
2								
3								
4								
5								
Qualitative Observations:								

Number of bubbles produced at 20 cm from light								
Time in Minutes	Number of Oxygen Bubbles Produced							
	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Ave.
1								
2								
3								
4								
5								
Qualitative Observations:								

Make a double line graph to show the averages data. REMEMBER TITLES & LABELS!!



Questions:

1. What is the independent variable in this investigation?
2. What is the dependent variable in this investigation?
3. What are some controlled variables in this investigation?
4. Why did we average all the trials in the class to analyze the data?
5. Describe the *photosynthesis equation* in words.