LS 11 **EVIDENCE OF PHOTOSYNTHESIS LAB**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Partner(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Introduction**

Photosynthesis is the process in which green plants use energy from the sun and combine carbon dioxide and water to make its own food in the form of glucose.

The light used in photosynthesis is absorbed by a green pigment called chlorophyll, which is found in the chloroplasts in leaf cells.

Animals gain their energy from eating other organisms. The process of creating this energy is called *cellular respiration* and occurs in the mitochondria. Carbon dioxide is given off in the process.

*Bromothymol blue* solution, BTB, is a blue pH indicator that changes colour in acidic conditions. When a person exhales, *carbon dioxide* is released. When carbon dioxide mixes with water it forms *carbonic acid.* Depending upon the amount of carbon dioxide, BTB will change to green or yellow. Yellow indicates more carbon dioxide.

**Materials:**

4 large test tubes, test tube rack, 4 stoppers, 250ml flask, bromothymol blue indicator, water, 2 pieces of aquatic plant, foil, drinking straw

**Procedure:**

1. Add about 150ml water to flask.
2. Add few drops of bromothymol blue. Swirl to mix. Colour should be blue.
3. Introduce carbon dioxide into the solution by blowing through a straw to into the solution until it turns yellow.
4. Place a piece of aquatic plant in *two* of the tubes.
5. Pour the BTB solution EVENLY into four test tubes. Make sure plants are submerged.
6. Stopper all tubes. Make sure there is no air space in the tubes.
7. With foil, completely cover: one plant tube and one no-plant tube.
8. Label the 4 test tubes with tape as per chart below.
9. Place the test tubes in their rack or a beaker and set on a sunny window sill. Allow the plants to sit undisturbed for 2-3 days.
10. After 2-3 days, compare the colors of the solutions by removing the plants and holding the tubes in front of a white background. Record the final colors of all tubes.
11. After all observations have been completed, discard plants to garbage, peel tape off, rinse out your glassware and put away.

**Observations:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | BTB + PlantUncovered | BTB + PlantCovered (foil) | BTB, No PlantUncovered | BTB, No PlantCovered (foil) |
| Starting colour on Day 0 |  |  |  |  |
| Resulting colour on Day 2Other observations |  |  |  |  |

**Analysis:**

1. In this investigation, what does a color change *directly* indicate? What does it *indirectly* indicate?
2. In this investigation, the independent variable is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the dependent variable is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and some controlled variables are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Conclude and Apply:**

1. From your observations, when does a green plant carry on photosynthesis. Claim: Green plants carry out photosynthesis \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The evidence is: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_What evidence do you have that it doesn’t? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Why did we stopper the test tubes rather than leave them open?
2. Some tubes had bubbles in them. Where did the air come from?
3. What Characteristic of Living Things was demonstrated in this lab?

**Extending:**

1. How could elements from this experiment be used to show evidence of cellular respiration in plants.