Lesson 2: Where is the Carbon in the Leaf?

Science Lessons | Grades 6-8

CALIFORNIA ARBOR WEEK
MARCH 7 - 14

Overview:
This activity helps students learn how a leaf stores carbon after the photosynthesis process.

Materials:
- 3 small potted plants of the same type
- 1 plastic liter bottle with the top cut off
- 1 cup of vinegar and 2 tbsps baking soda
- beaker or glass jar
- ethyl alcohol
- iodine solution
- burner and sauce pan
- tweezers
- shallow dish

Instructions:
1. Put one plant in the dark for 24 hours; leave the other 2 on a windowsill.
2. Cover 1 of the window plants with a liter bottle. Quickly place a cup of vinegar with 2 tbsps baking soda undernetah the cover with the plant. This will trap and increase the carbon dioxide in the air around the plant.
3. After 24 hours, put some ethyl alcohol in a heat proof beaker and place in a saucepan full of water. Take a sample leaf from each plant.
4. Heat the pan until the ethyl alcohol begins to boil. **Remove from the heat** (remember that alcohol is flammable!).

Placed in darkness | Placed under a liter bottle with CO2 ** | Placed in sunlight

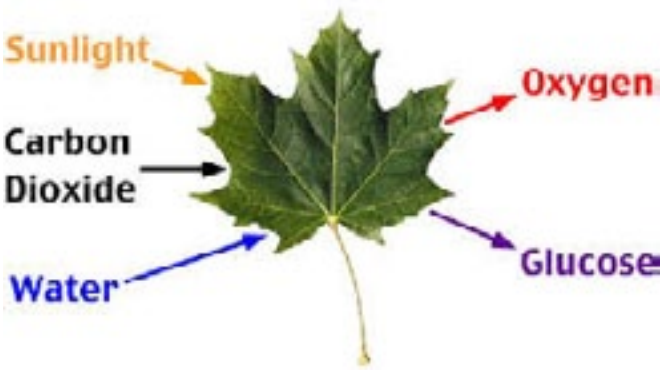
5. Use tweezers to dip each of the leaves in boiling water (not the alcohol) for 60 seconds. This will kill the leaf.
6. Place the leaves in the beaker of ethyl alcohol for two minutes, or until they turn almost white.
7. Set them in a shallow dish.
8. Cover the leaves with iodine solution and watch. The blue areas are the starch.

What is happening?

The hot water kills the leaf and the alcohol breaks down the chlorophyll, taking the green color out of the leaf. When you put iodine on the leaves, some of them will turn blue-black and the others will be a reddish-brown. Iodine is an indicator that turns blue-black in the presence of starch. **Starch = glucose = a product of photosynthesis!**

Lab Questions:

- What happens to a leaf in the sunlight?
- ...in the darkness?
- ...with added carbon dioxide?
- When a leaf has more blue areas after testing, what process has taken place?
- Does the leaf with extra carbon dioxide have more starch?



Take It Further:

- Would it be possible to test different types of plants to see how they respond differently?
- Would a tree be affected the same way as a plant?

California ReLeaf is funded in part by the California Department of Foresty and Fire Protection and the National Urban and Community Forestry Program of the USDA Forest Service. This institution is an equal opportunity provider.