Lab 6, Biol-1, C. Briggs, revised Winter 2017

Plant structures

Objectives
Become familiar with the structures and functions of roots, stems, leaves, flowers, and seeds.

Roots
1. Use iodine to investigate a root vegetable.
2. Draw the germinating seedlings, as you see them under a microscope.
3. Draw what you see on the prepared root slide, as viewed through a microscope.

Stems
1. Determine how old the tree was when it was cut down.
2. Assuming the tree was cut this year, what year was the wettest for the tree?

Leaves
1. Use the celery to determine where liquid is moving through the plant.
2. View the underside of a piece of *Zebrina* leaf on a wet mount, under a microscope. Find the stomata, and draw what you see.

Flowers
Based on the model, draw a diagram of a flower, with labels for petals, stigma, style, ovary, carpel, anther, filament, stamen, sepal, and ovule. (Note: The ovary can develop into a fruit, and the ovule into a seed.)

Seeds
Use iodine to investigate a lima bean. Draw what you find, labeling the seed coat, embryonic plant, and cotyledons.

Colors of Light Plants Use

Objectives
Determine what colors of light are used by plants.

Instructions
1. Use a spectroscope to examine white light.
2. Obtain some chlorophyll extract, and determine what colors of light travel through the extract.

Absence of Light

Objectives
Detect whether a leaf produces starch in the absence of light.

Instructions
1. Make a drawing of where the mask is located on the leaf.
2. Stop the leaf's cellular processes.
3. Remove the chlorophyll.
4. Try to detect starch, and draw what you find.

Effects of Varying Light Intensity

Objectives
Determine whether amount of light influences photosynthetic rate.

Instructions
1. Write your null hypothesis and alternative hypothesis.
2. Learn how to set up the *Elodea* in a tube with sodium bicarbonate (NaHCO3).
3. Measure how much gas is produced in ten minutes, with the light far away.
4. Repeat with the light placed closer, for a total of two readings at different distances.
5. Report your results, and record class averages.

Lab 6 Assignment

Regarding Lab 6:

Plant Structures:
1. Attach your original drawings of the germinating seedlings, the prepared root slide, the *Zebrina* leaf, the flower parts, the lima bean, and the final appearance of the masked leaf.
2. How do you explain your findings with the iodine and the root?

Photosynthesis:
3. What colors of light seemed to be most absorbed by the chlorophyll extract?
4. What was the effect of light intensity on photosynthetic rate?

General questions: (#5 - 9 adapted from Schmidt *et al.* 2007. Life All Around Us.)
5. Maple syrup is made by collecting and concentrating the sap from trees in New England in the spring. Why might this sap contain so much more sugar than at other times of year?
6. You accidentally pull up a plant in your garden. The big roots look intact, so you replant it. However, despite extra care, the plant dies. Why do you think the plant died?
7. Many desert plants evolved to have no leaves, and instead have photosynthetic, succulent stems. Explain how this might be helpful to a plant living in a dry environment.
8. Grasses use wind to move their pollen from flower to flower. Explain why grasses would produce so much more pollen than other plants that use insects or birds to move their pollen.
9. Vegetables in parts of Alaska can grow to enormous size during the summer. Given that this has nothing to do with soil type or plant genetics, why might this tremendous growth happen?

Preparing for Lab 7:
10. How many species of living things are on Earth?
11. How many species become extinct and disappear forever each year?