



Plant Growth – Response to Light

Annotation:

By conducting their own experiments with tools that they construct, students will understand the effect of gravitropism on plant growth.

Problem

How do plants respond to light?

Primary Learning Outcomes

By the end of this lesson the student will be able to:

- Construct their own low-cost experimental equipment
- Set up an experiment, make predictions, and observe and analyze results.
- Identify which color of light plant growth responds to.

Assessed GPS

Habits of Mind

SCSh2, SCSh3, ScSh4, SCSh5, SCSh6

Content

SB4

Duration

30 minutes day one. 15 minutes per day for three days.

Materials

Black film canisters

Floral foam disks cut from floral foam

Germination strips

Fast Plant seeds

Water bottle

Forceps (plastic)

Hand held hole punch

2cm wide clear adhesive tape

2cm wide black electrical tape

1.5 cm squares of colored transparent Mylar film or saran wrap or acetate

Background

A plants response to light has been well documented and studied. It is known to be due to differential elongation of the cells in the plant stem. Stem cells away from the light elongate in response to special auxins (growth hormones) causing the plant stem to bend towards the light. In this exercise we will attempt to determine what color of light plants respond to when bending towards light. We know that white light is all colors of the visible spectrum mixed. But what color of light triggers the plants growth towards light response?

Procedure

1. Prepare grid strips and wicks according to the attached instructions
2. Combine these to make a grid strip according to the instructions given.
3. Punch 3 holes in the black film cans using the hole punch. These should be 1.5cm from the edge of the can and at 120 degree angles from each other.
4. Use 10cm strips of clear tape to cover each window with a colored square.
5. Place a moist floral foam disk in the bottom of the canister.
6. Set up 3 germination strips equi-distance between each of the colored windows in the cans. Make sure the germination strips are below the rim of the can.
7. Place two seeds oriented with the micropyle down on the germination strips in each can, about 2cm from the top.
8. Make a top drawing of your experiment and label all of the parts.
9. Close lids and place in the growth chamber for 48 to 72 hours.

Assessment

1. Make a top drawing of your chamber with labels after the experiment is completed.
2. What do the plants look like now? Which light do they seem to grow towards?
3. Put your data in the histogram on the board with the rest of the class. Average the class data and record your results. Did your results agree with the class results? Why or Why not?
4. After seeing the class data, which light color do you now think plants grow towards?
5. What color do you think tells a plant which way is up? Is this the same for humans? What makes you think so?
6. What happened to the plants when no blue light was present?