2010 RET@ND Lesson Plan

"Affecting Plant Responses"

Submitted by John Bogucki, Clay High School

Activity: Side-lighting seedlings

Materials Supplied	Additional Materials Needed
2 Circle lights	Aluminum Foil
15 petri dishes	Boxes, each large enough to hold a petri dish
Bag of sand	Water
Bag of barley seeds	Scissors
Teacher's Manual	Small pieces of masking tape
Reproducable Student Guide	Markers

Procedure

Two or three days before the lab - START THE SEEDLINGS

1. Add approximately 40 ml of sand to the bottom of a petri dish.
2. Wet the sand with about 15 ml of water or until the sand is completely wet.
3. Place 10 grains of barley seed on top of the sand. The seeds should be in contact with the sand and water, but should not be submerged.
4. Cover each dish with its lid.
5. Set up and illuminate the two circular lights. Place the dishes under the circular lights.
6. Check the dishes daily. Add water, as necessary, to keep the sand wet.
7. When the seeds germinate, remove the lids.
8. Prepare a cardboard box for each lab group to house their seedlings overnight. Make a 1 cm^2 hole on only one side of each box. Each hole should be about 1 inch from the bottom of the box.
9. Write your name or group ID # on the box

The day after you see germination - START THE EXPERIMENT, DAY ONE

1. Use scissors to make three aluminum foil discs, each approx. 1cm in diameter.
2. Fashion each disc into a miniature cap.
3. Fit the foil caps over the tips of three of the seedlings
4. Cut three narrow strips of aluminum foil. Each strip should be a few millimeters less than the height of the seedlings.
5. Roll the strips into hollow tubes

6. Slide these tubes over three of the seedlings to form collars around the seedlings so that a few millimeters of the tip of each seedling will remain visible.
7. The remaining seedlings in the dish will serve as the control group.
8. Write your initials on a small piece of masking tape and place it on the side of your petri dish.
9. Place a small mark on the side of the petri dish, opposite the tape.
10. Place the Petri dish inside the box, beside the hole. Be sure the mark on the side the dish is oriented toward the hole where the light will enter the box.
11. Add water to the sand in the petri dish to keep it sufficiently wet.
12. Close the box and gently place it so that the hole in the box is facing the circle light.
13. Either the light should be lowered or the boxes should be elevated so the circular light is at the same level as the hole in the box.

Check the results, DAY TWO

1. Carefully open your box without jarring its contents.
2. Remove the petri dish and make careful observations of the capped, the collared and the control seedlings.
3. In your lab notebook, describe how each of your groups of seedlings responded to being lit from the side.
4. Auxin is a plant hormone that controls the reaction of a plant to directional light. Can you use the results of your experiment to draw any conclusions about where the light has to hit the seedling to affect the production of the auxin?
5. Based on the results, is auxin concentrated on the lighted side or on the darker side of a seedling?