

Experiment: Growth In A Root Tip
(B. Science 10-P-15)

Purpose: To examine the roots of seedlings and to determine how roots grow.

Materials: slide - Zea mays root hair origin
corn seeds growing in a petri dish
microscope x.s, monocot & dicot root
longitudinal section of root tip (Allium)

Methods:

Part A: Observation of a Root Hair

1. Draw a sketch of a germinated corn seed.
2. Observe the root and its root hairs under the microscope. Are the root hairs composed of cells?
3. Explain root hair arrangement in reference to the epidermal cells of the root.
4. From what cells do the root hairs project?
5. Suggest how the root hairs absorb water.

Part B: Growth of Root Tip

1. Examine a prepared slide of a longitudinal section of the young root tip (Allium, onion) under low power. Use your diagrams to locate the various regions of the root tip. Move the slide and examine all areas, draw in the cells in the outline of a root found in results section. In the outline in results, locate and label the four regions of the root (use the brackets supplied on the picture). The four regions are: the root cap, meristematic region, elongation region, and maturation region.
2. Are root hairs present at the growing tip of the root?
3. If not (2), explain their absence.
4. Locate the root cap at the tip of the root. What function does it serve?
5. Cells on the surface of the root cap are worn off as it pushes through the soil. Why doesn't the root tip cap disappear entirely in time?
6. Where are the smallest cells of the root tip located?
7. Examine these cells closely. What important activity is carried on in this region?
8. Why is this activity important to the root?
9. Move the slide from the tip upward toward the next older region (not all the way to the top). What noticeable changes occur in the size of the cells?
10. What term applies to this region of the root?
11. Why is the activity of this region important to a root?
12. Why are the regions of the root not clearly defined?
13. Of the four root regions, what region of the root does the root hairs originate?

Part C: Cross section of Monocot & Dicot Root

1. Observe the slide of a monocot and dicot root and draw a sketch of it. (Label epidermis, endodermis, xylem, phloem, pith, and cortex).

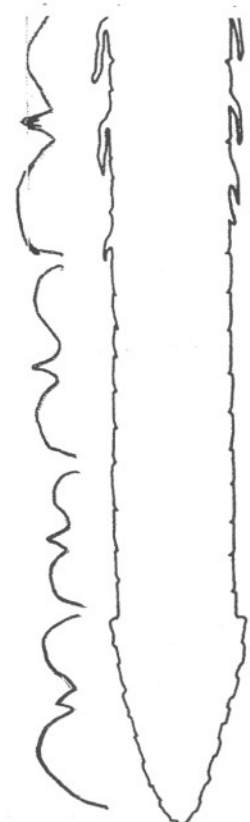
Results:

Part A: Observation of a Root Hair

- 2. cells: _____
- 3. arrangement: _____
- 4. cells: _____
- 5. absorb: _____

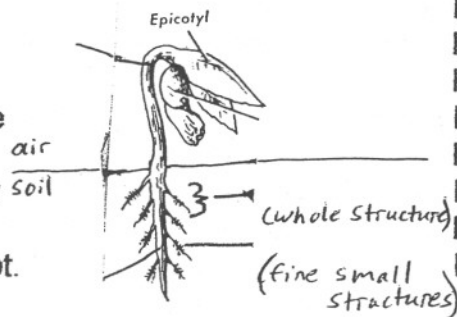
Part B: Growth of Root Tip

- 2. present: _____
- 3. absence?: _____
- 4. function: _____
- 5. disappear: _____
- 6. smallest cells: _____
- 7. activity: _____
- 8. important: _____
- 9. change: _____
- 10. term: _____
- 11. important: _____
- 12. defined: _____
- 13. originate: _____



Conclusions:

- 1. On the figure label: primary root, secondary root, root hair, seed coat, shoot.



Part C: Monocot & Dicot

Discussion:

- 1. On the basis of your observations of the root tip, explain how roots grow longer.
- 2. According to Jeremiah 17: 7 - 8, what analogy is Jeremiah making about the roots that grow deep into the soil by a stream?
- 3. The type of soil will determine the success of how a plant will grow. A soil profile can be made when you cut a trench in the ground, and observe the different layers in the soil that correspond to different kinds of soil. To the right draw and label a soil profile to include humus, topsoil, subsoil, and bedrock. (See textbook).