

Transport in Plants

Objectives:

- 1) Understand how the forces of adhesion and cohesion and the process of transpiration aid in the transportation of water through the plant
- 2) Recognize the form and function of stomata

Materials:

Glass tube
Celery Stalks
Microscopes, slides, and cover-slips
Food coloring
2 glass beakers

Scalpel
Scotch tape
Clear nail polish
Leaves from plants

PART 1:

1. Observe the large glass tube at the front of the room. What will happen when Mr. Kuenzli puts the bottom of the tube in the dyed water? Why?

2. Now, obtain a stalk of celery. How is this celery stalk similar to the glass tube? How is the movement of water in the tube similar to the movement of water in the celery?

3. Why did the water rise so high in the leaves but not in the glass tube?

4. Is celery a monocot or a dicot? How do you know?

5. Carefully cut a VERY thin cross-section slice of celery from the stalk. Make it as thin as possible and try to keep the thickness the same throughout. (Think a really thin slice of bread you're about to toast. You don't want the thickness to vary so that one part might get crispier than another. We would all rather have a homogenous level of toastiness, wouldn't we? Yes we would.)

6. Now, check it out under a microscope. **Start on LOW power, and if necessary crank it up to MEDIUM. NOT HIGH POWER!!!** In the space below, draw your celery slice. Indicate and label all of the structures you can see. If you need to, reference the stem cross-section images in your (or another) textbook.

7. What cells are stained more than others? Why?

PART 2:

8. Paint a small section of the underside of a leaf with clear nail polish. Let it dry completely. When dry, peel the polish off the leaf by pressing scotch tape to it. If done carefully, the polish should stay attached to the tape as you peel it away from the leaf. Affix the tape to a slide and search for the imprint of stomata in the polish.

9. Compare how many stomata are located on the underside of the leaf versus the top of the leaf.

Number of stomata on top of leaf	Number of stomata on bottom of leaf

10. Why do you see the differences above?

11. Explain in detail how the forces of adhesion and cohesion and the process of transpiration aid in the transportation of water through the plant.

12. Predict what would happen to a plant if all of its stomata became plugged by a substance that prevented the passage of matter into and out of the leaves. Provide an explanation for your prediction.