

## The Activity of Guard Cells

In this activity you will observe the action of guard cells in response to their environment. This will be done by locating stomata and guard cells on a leaf and observing them in different conditions. It will also help you to explain how guard cells help plants maintain homeostasis in a changing environment.

### Materials

|                     |                  |
|---------------------|------------------|
| paper towel         | medicine dropper |
| compound microscope | scalpel          |
| glass slide         | 4% salt solution |
| coverslip           | geranium leaf    |
| forceps             |                  |

### Procedure

1. Read all instructions for this laboratory activity before you begin your work.
2. Remove a piece of the lower epidermis of a geranium leaf. Break the leaf with a snapping action. This will leave the two parts connected at the bottom by a transparent layer, which is the lower epidermis. Using forceps carefully peel away one half of the leaf from the epidermis attached to the other half of the leaf. Cut a 1 cm x 1 cm piece of the epidermis and prepare a wet mount.
3. Using the microscope, locate the stomata and the guard cells surrounding them. Draw and label a single stoma and its surrounding guard cells. Note the structures present in the guard cells.
4. Place a couple of drops of salt solution at the edge of the coverslip of your slide. Use a small piece of paper towel to draw the salt solution across the slide. Observe this slide under the microscope again. Draw the stoma and guard cells and note any changes in their appearance.

### Questions

1. What difference(s) did you notice before and after the addition of the salt solution?
1. How does the structure of a guard cell aid the plant?
2. What would happen if too much water left the plant?
3. How do stomata prevent water from leaving the plant?
4. How did the addition of salt water change the concentration of water in the guard cells? How did the guard cells respond to this change?
5. How do the guard cells help the plant to maintain homeostasis?
6. a) What effect did salt solution have on the guard cells?  
b) After adding salt water to the slide, which way does water flow, into the guard cells or out of the guard cells? Explain.