



Activity 16. Water movement in plants

Aims

To carry out two simple experiments that will provide evidence of how water travels through plants.

Background

Despite the variety in plants, all flowering plants have the same basic structure. The main parts of the flowering plant are the roots, stems, leaves and flowers. Each of these parts carries out its own special functions, so that the plant as a whole is able to grow and reproduce itself.

The principal function of the roots is the absorption of water and dissolved substances from the soil. These dissolved substances are called mineral salts. The solutions are conducted up the stems to the leaves through a system called xylem (pronounced zy-lem) vessels.

A living plant does not retain all the water it receives from the soil; much of it evaporates into the atmosphere through tiny openings in the leaves called stomata. This process is called transpiration. It is essential to the life of the plant since this water movement helps to pull solutions up the stem, providing rigidity for the plant. If the leaves are removed, the roots absorb water at a much slower rate.

Materials required

- freezer bags with ties rubber bands
- rubber bands
- coffee jars
- celery stalks
- food dye
- water
- single edged razor
- pot plant (optional)
- blades

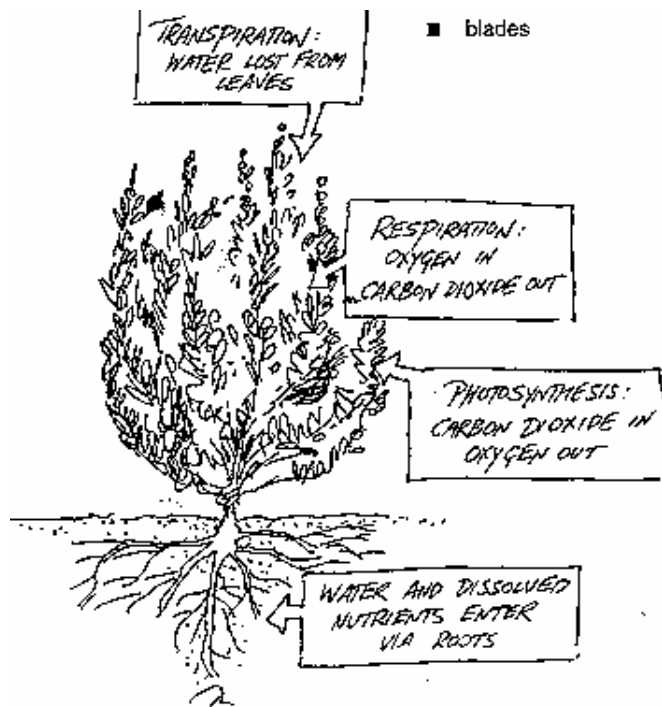


Figure 1. Water movement in plants

Procedure

1. Set up the following experiments

Experiment A.

- a. At the start of the lesson, place a dry freezer bag over part of a plant in the school garden and secure with a twist tie.



Alternatively, place the freezer bag over a pot plant and secure with a twist tie.



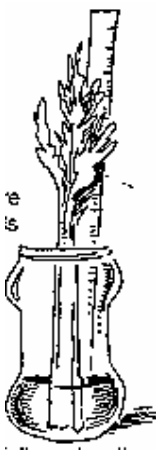
- b. Next day observe the bag, and carefully remove it. Record your observations.
- c. Draw a series of sketches to show how you carried out this experiment. Include an explanation of what you did.

Experiment B.

- a. Obtain a stick of celery and carefully cut Remove celery, straight across the base.



- b. Place this end into a coffee jar containing food dye or ink dissolved in water. Ensure that the celery stick stands upright. Leave overnight.



- c. Carefully make slices of the stem.



- d. Draw a sketch and colour it in the same as the sections you see below.



- e. Examine the leaves, sketch and colour what you see. Cut them into smaller pieces if you wish.
- f. Complete your observations with brief notes.

Experiment questions

Study your observations carefully and answer the following questions:

- a. What did you find in the freezer bag when you returned the next day?
- b. Where might this have come from?
- c. How does water travel from the roots to the leaves?
 - (i) What effect might the large-scale removal of trees and other deep-rooted plants in a catchment have on the moisture (water) content of soil?
 - (ii) Suggest how this action could contribute to a salinity problem in the catchment.