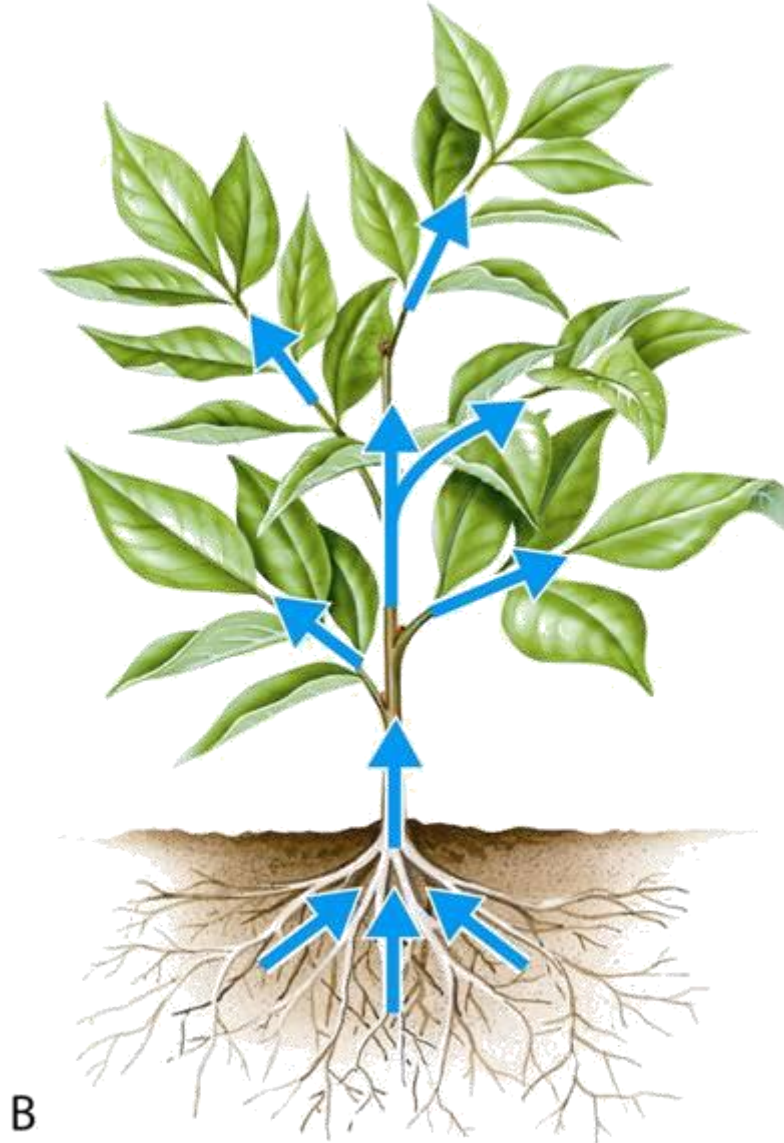


# 23-5 Transport in Plants





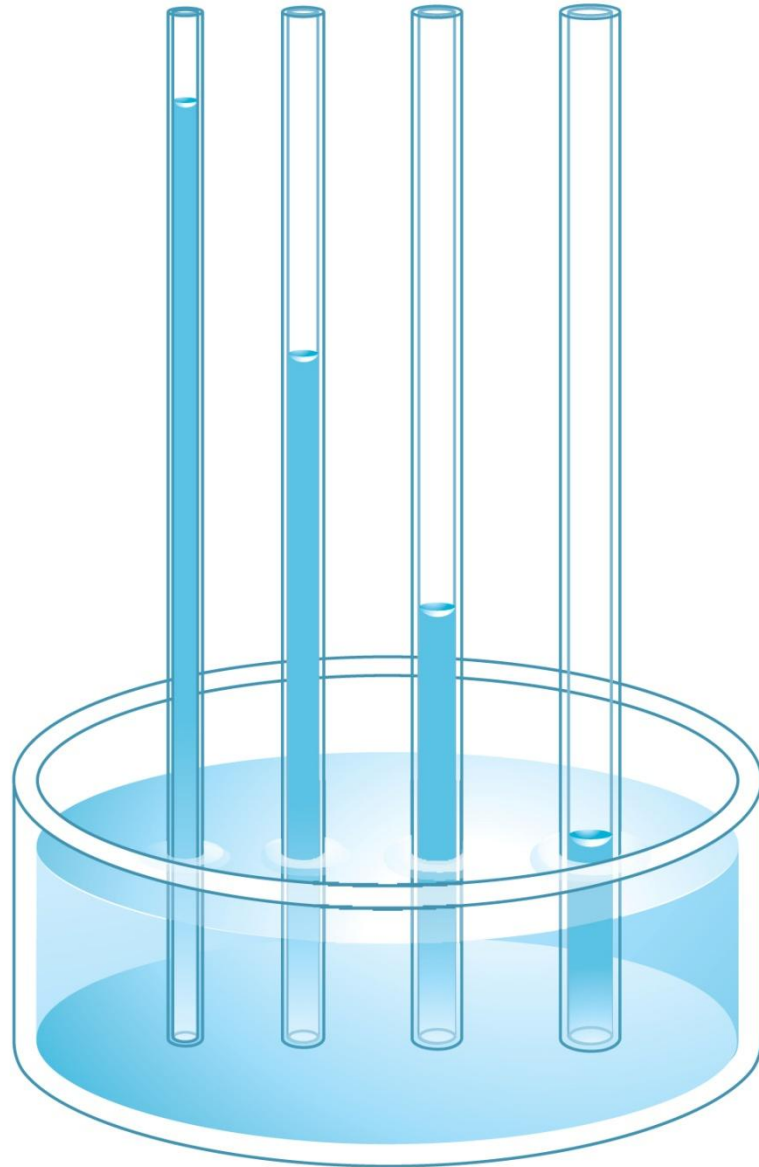
**The combination of root pressure, capillary action, and transpiration provides enough force to move water through the xylem tissue of even the tallest plant.**

**Cohesion** is the attraction of molecules of the same substance to each other.

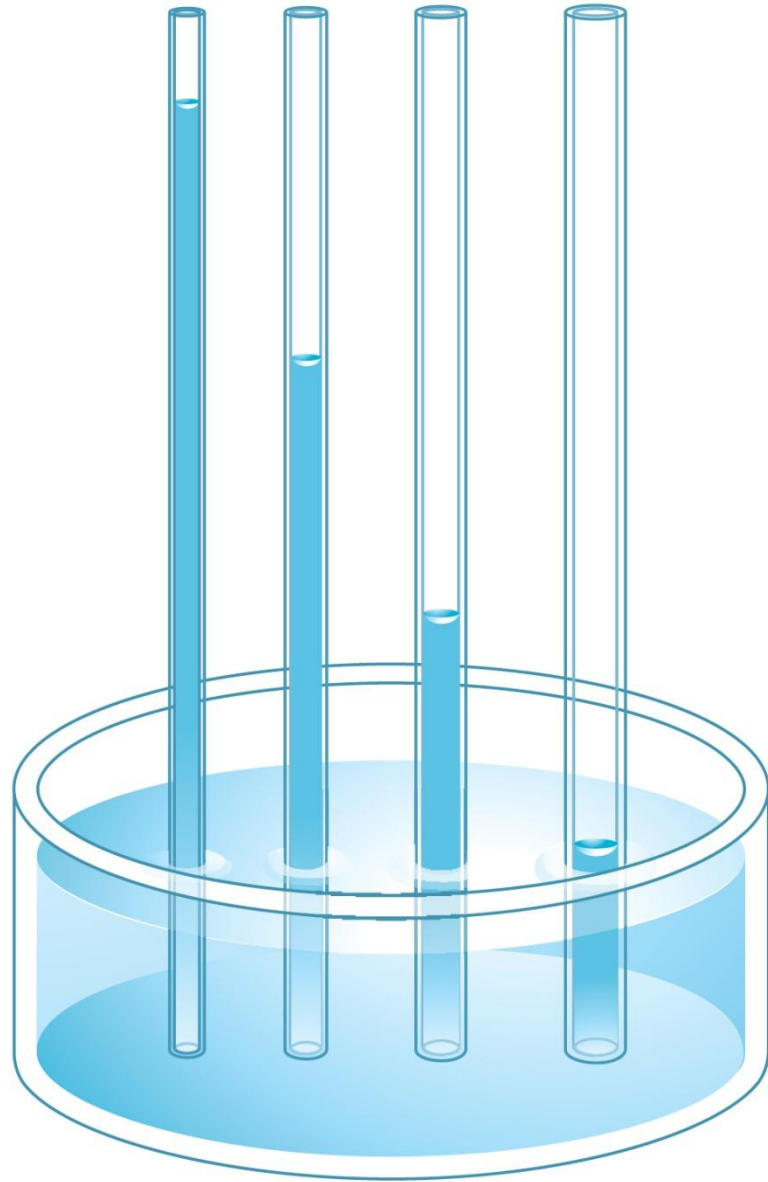
**Adhesion** is the attraction between unlike molecules.

The tendency of water to rise in a thin tube is called **capillary action**.

Water is attracted to the walls of the tube, and water molecules are attracted to one another.



Capillary action causes water to move much higher in a narrow tube than in a wide tube.



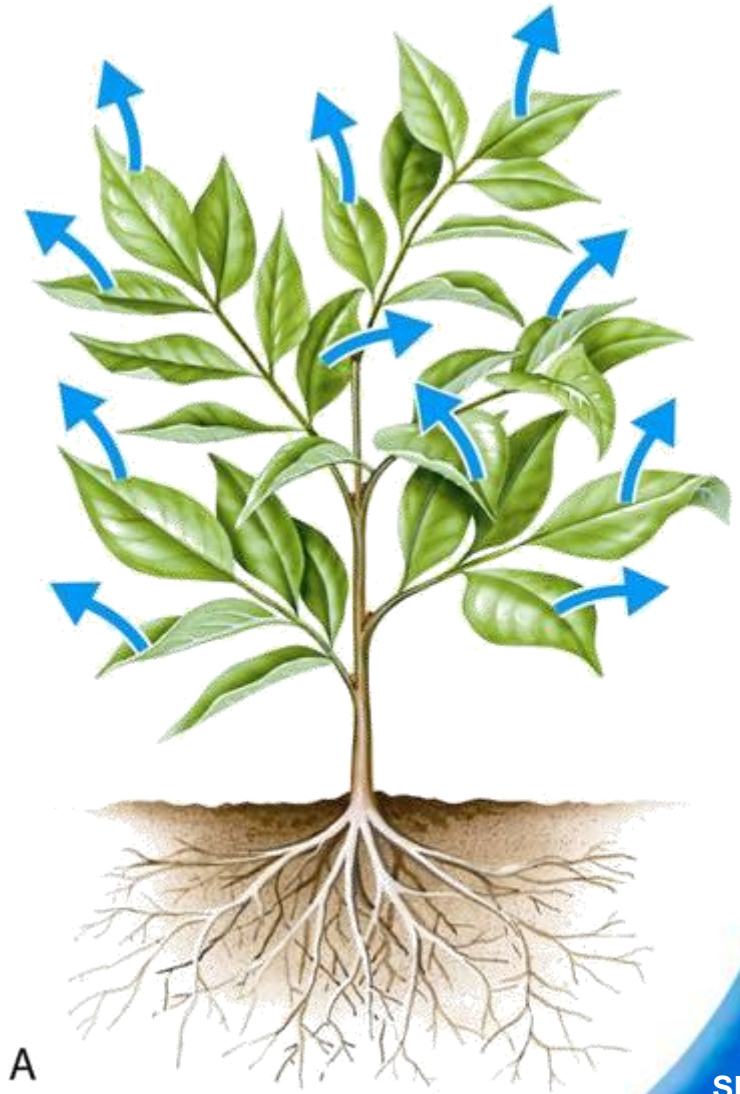
Tracheids and vessel elements form hollow connected tubes in a plant.

Capillary action in these structures causes water to rise well above the level of the ground.

## Transpiration

In tall plants, the major force in water transport comes from the evaporation of water from leaves during transpiration.

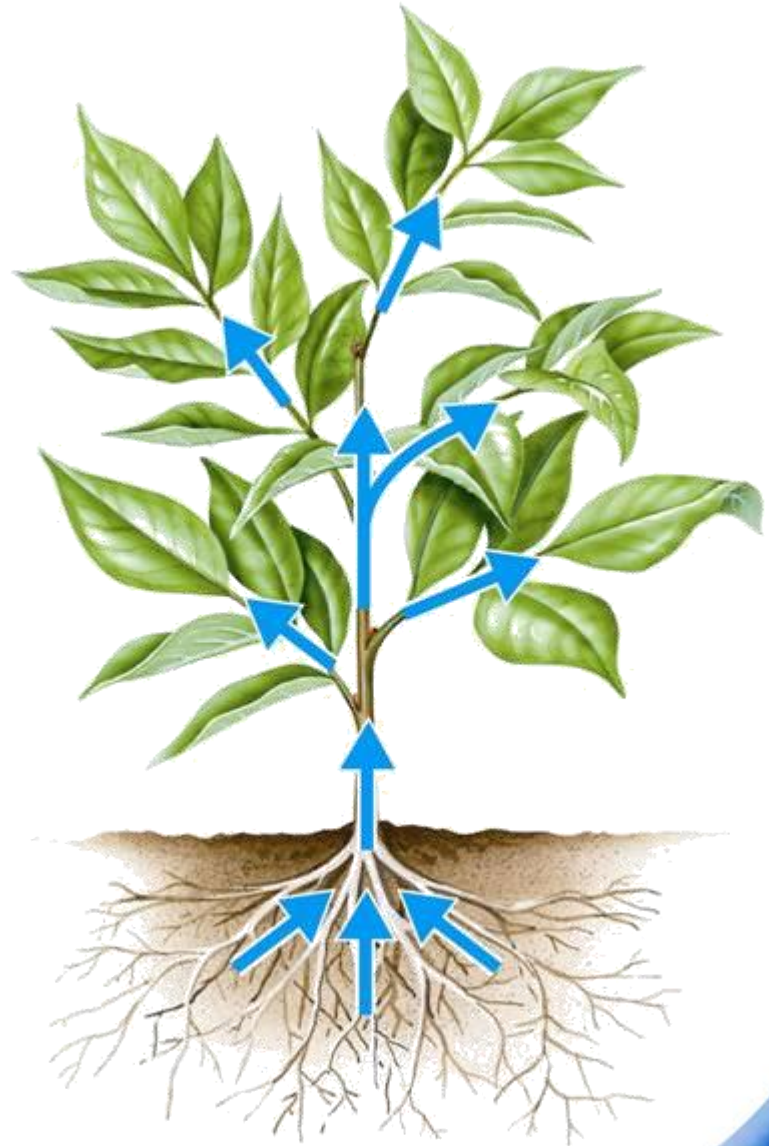
When water is lost through transpiration, osmotic pressure moves water out of the vascular tissue of the leaf.





The movement of water out of the leaf “pulls” water upward through the vascular system all the way from the roots.

This process is known as transpirational pull.





## Controlling Transpiration

The water content of the leaf is kept relatively constant.

When there is a lot of water, water pressure in the guard cells is increased and the stomata open.

Excess water is then lost through the open stomata by transpiration.

When water is scarce, the opposite occurs.

Water pressure in the leaf decreases. The guard cells respond by closing the stomata.

This reduces further water loss by limiting transpiration.

When too much water is lost, wilting occurs. When a leaf wilts, its stomata close and transpiration slows down. This helps a plant conserve water.

## 23-5 Section QUIZ

Continue to:

**Section QUIZ**

- or -

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**1** In a plant stem, water moves from

- a. leaves to roots through xylem.
- b. roots to leaves through xylem.
- c. leaves to roots through phloem.
- d. roots to leaves through phloem.

**2** Which of the following is NOT involved in the movement of water in xylem tissue?

a. cohesion

b. osmosis

c. capillary action

d. adhesion

5

In very tall trees, which of the following is primarily involved in moving water to the top of the tree?

a. transpirational pull

b. capillary action

c. root pressure

d. osmosis