

Transport in Plants

- **Complex permanent** - Made up of more than one type of cell. These tissues constitute vascular bundles. Types of complex permanent tissues are
 - **Xylem**
 - Conducts water and minerals from the roots to the different parts of the plant
 - Composed of four different types of cells – Tracheids, vessels, xylem parenchyma and xylem fibres. Except xylem parenchyma all other xylem elements are non- living.
 - **Phloem**
 - Conducts food material from the leaves to the different parts of the plant
 - Composed of four different types of cells – Sieve tubes, companion cells, phloem parenchyma, and phloem fibres. Except for phloem fibres, all other phloem cells are living.

Transport in plants

Plants have specialised vascular tissues called xylem and phloem for the transport of water, minerals and food respectively to all parts.

Transport of Water

- Plant roots have hair that increase the surface area for absorption of water and minerals.
- Root hairs are deficient in water as they continuously supply the absorbed water to the stems and leaves.
- The concentrated cell sap inside the root hairs and semi-permeable nature of plasma membrane helps in the inward movement of water from the soil through osmosis.
- The absorption of minerals occurs through active transport, from a region of lower concentration to a region of higher concentration.

Transportation of food

- Leaves prepare food for plant by the process called photosynthesis.
- The prepared food is transported to remaining parts of the plants by a specialised vascular tissue known as phloem.
- The phloem forms a network of channels that transports food to the stem and to the roots of the plant.
- Plants get rid of the excess of water by **transpiration**.
- In transpiration water evaporates into the atmosphere through stomata.
- Stomata are the tiny openings or pores on the surface of leaves which help in the gaseous exchange and transpiration.
- Transpiration helps in cooling the plant and in maintaining the concentration of cell sap in the plant cells.
- Various atmospheric factors affect the rate of transpiration:
 - Sunlight
 - Temperature
 - Wind
 - Humidity
- **Transportation** is a life process where substances synthesized or absorbed in one part of the body are carried to other parts of the body.
- **Transportation in plants**
 - The transportation system in plants moves the energy stored in leaves to different parts. It also helps in moving raw materials absorbed from the roots to various organs of the plant.
 - **Xylem** conducts water and minerals obtained from soil (via roots) to the rest of the plant.
 - Transport of water occurs due to transpiration pull, root pressure and difference in pressure gradient.
 - **Phloem** transports food materials from the leaves to different parts of the plant body.
 - Transport of food (translocation) through phloem requires energy.