Chapter 8/Transport in plants

Part 1 :PLANT STRUCTURE AND FUNCTION

Structure of a typical plant

Terminal bud

- A bud at the tip of the shoot.
- When it grows it will continue the upward growth of the stem.

Lateral bud

- A bud on the sides of the plants.
- When they grow they will produce branches.

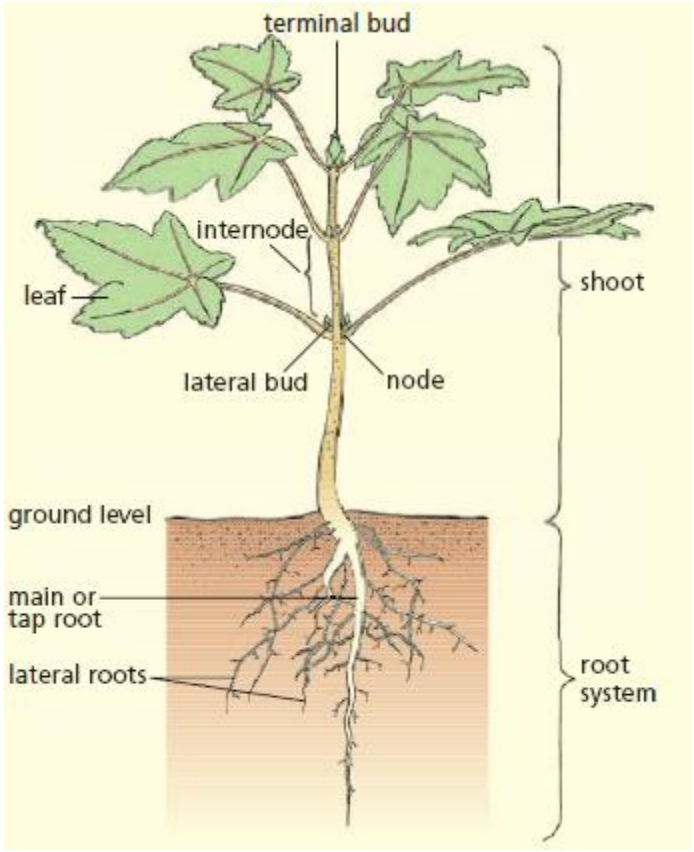
Note: the lateral buds and terminal buds may also produce flowers.

Node

- A region of stem from which leaves and buds arise.

Internode

- A region of stem between two nodes.



Function of leaves

- To make sugar by photosynthesis and pass it back to the stem.

Function of stem

- Carries food from leaves to all parts of a plant.
- Carries water and mineral salts from roots to the leaves and flowers.
- Supports and spaces the leaves so that can receive sunlight and absorb carbon dioxide for photosynthesis.
- Holds the flowers above the ground for pollination and help seed dispersal later on.

Function of roots

- Anchor the plant;
- Absorb water from the soil by osmosis;
- Takes up mineral salts by active transport;
- Some stores food.

External structure of a leaf

Leaf stalk

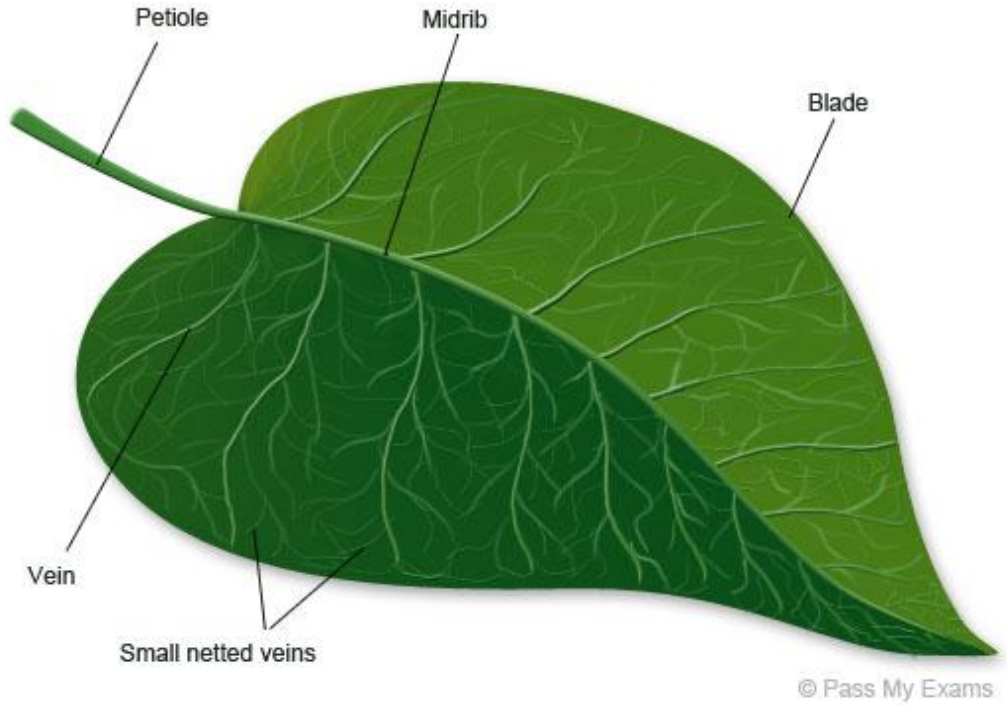
- attaches leaf to stem.

Midrib

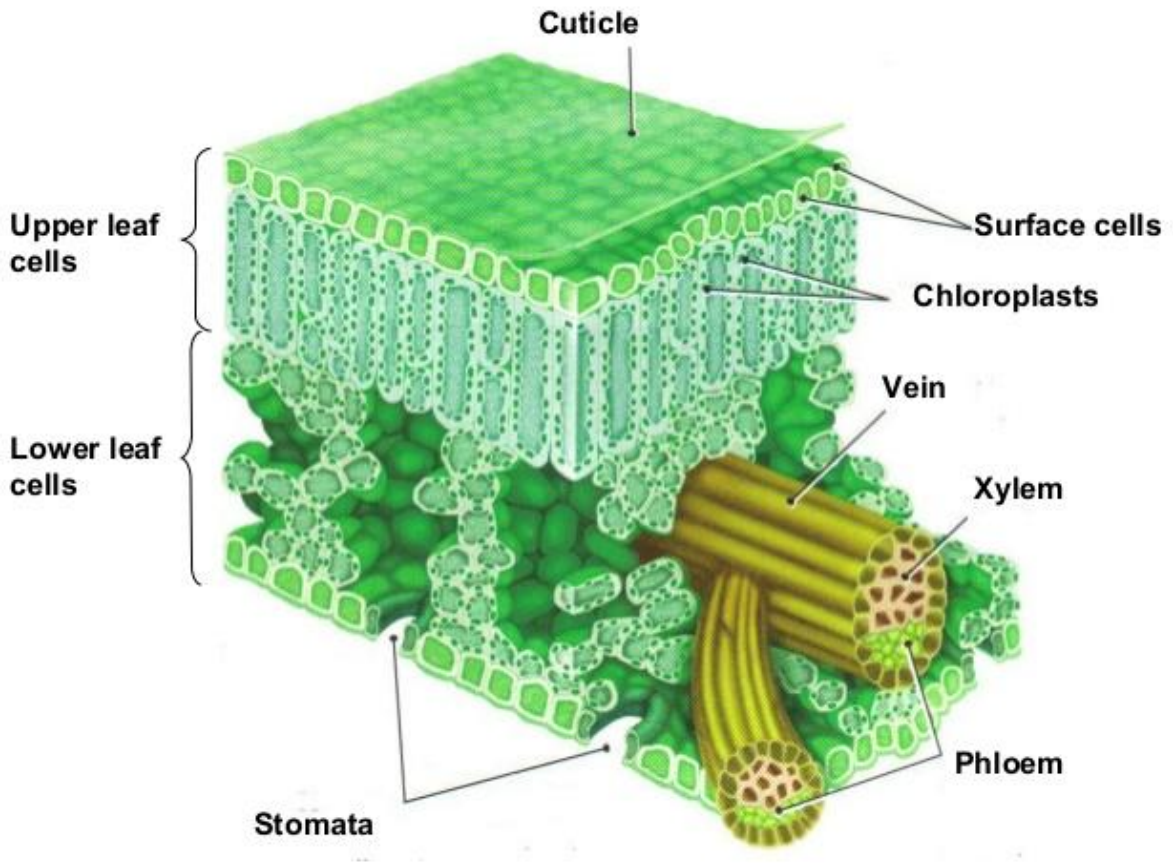
- continuation of leaf stalk in the leaf.

Veins

- branching network from midrib.
- Form a skeleton which supports the softer tissues of leaf blade, and deliver water and salts to the leaf cells, and carry away the food made in the leaf.



Transverse section through a leaf, go back to chapter 6.



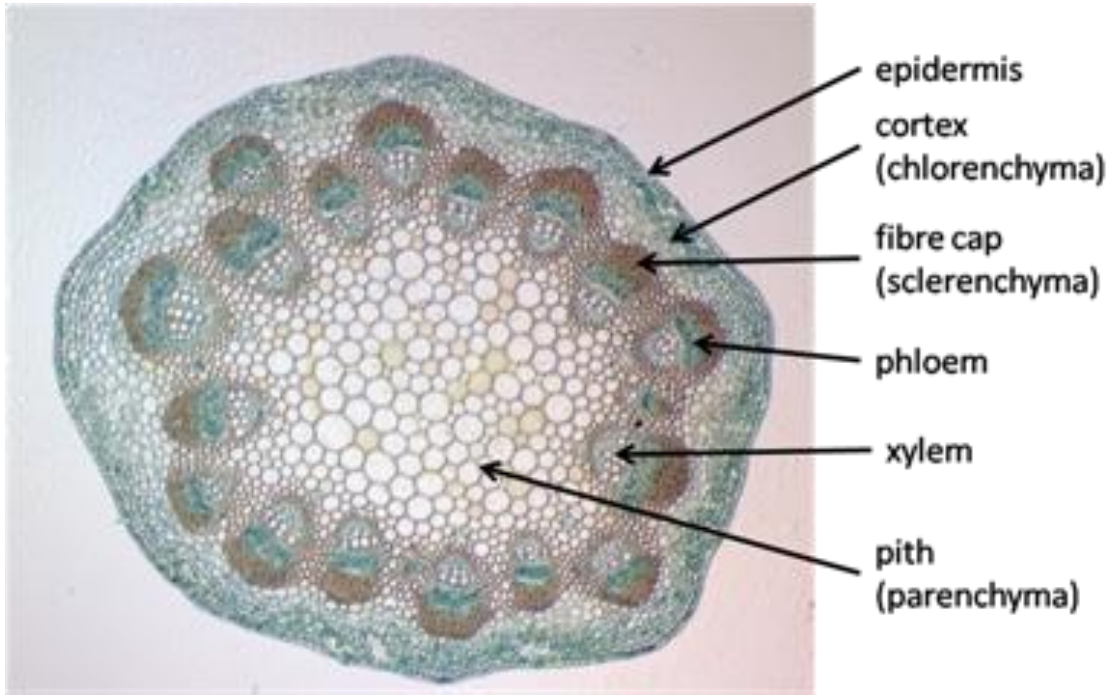
Stem

Transverse section

- Epidermis, a single layer of cells.

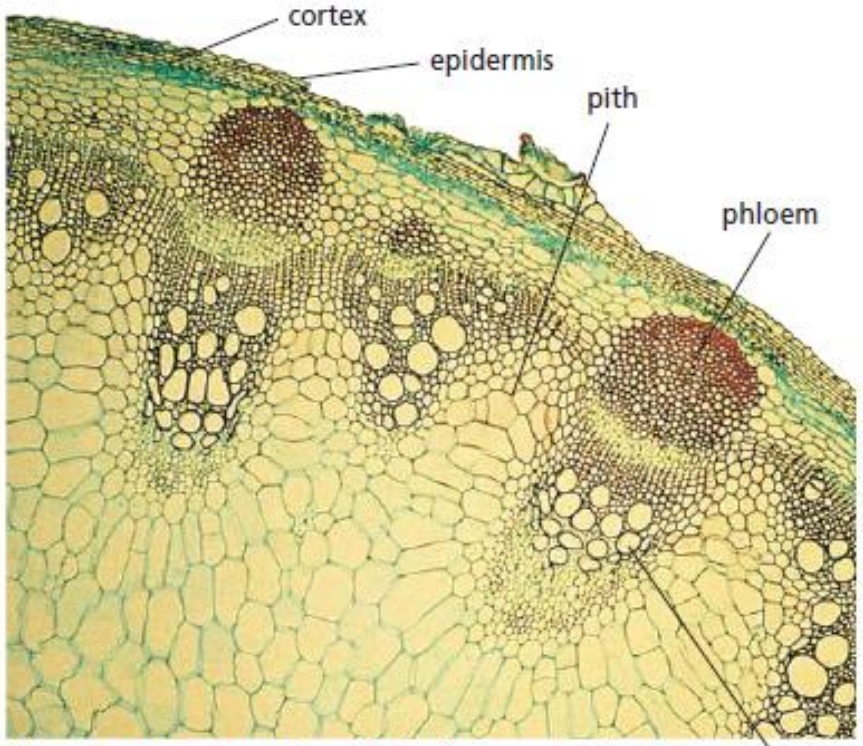
Function

- Keeps the shape of the stem.
- Cuts down the loss of water vapour.



Vascular bundles

- The two main tissues in a vascular bundle of a stem are xylem and phloem.
- ***Xylem*** lies in the inner part of vascular bundle.
  - It transports water and mineral salts to the leaves.
- ***Phloem*** lies in the outer part of vascular bundle.
  - It transports sucrose, amino acids from leaves upward or downward the stem to any part of the plant, which is using or storing it.



(b) transverse section through sunflower stem (x40)

Cortex and pith

- ***Cortex***: the tissue between the vascular bundle and the epidermis.
- ***Pith***: the central tissue of the stem.

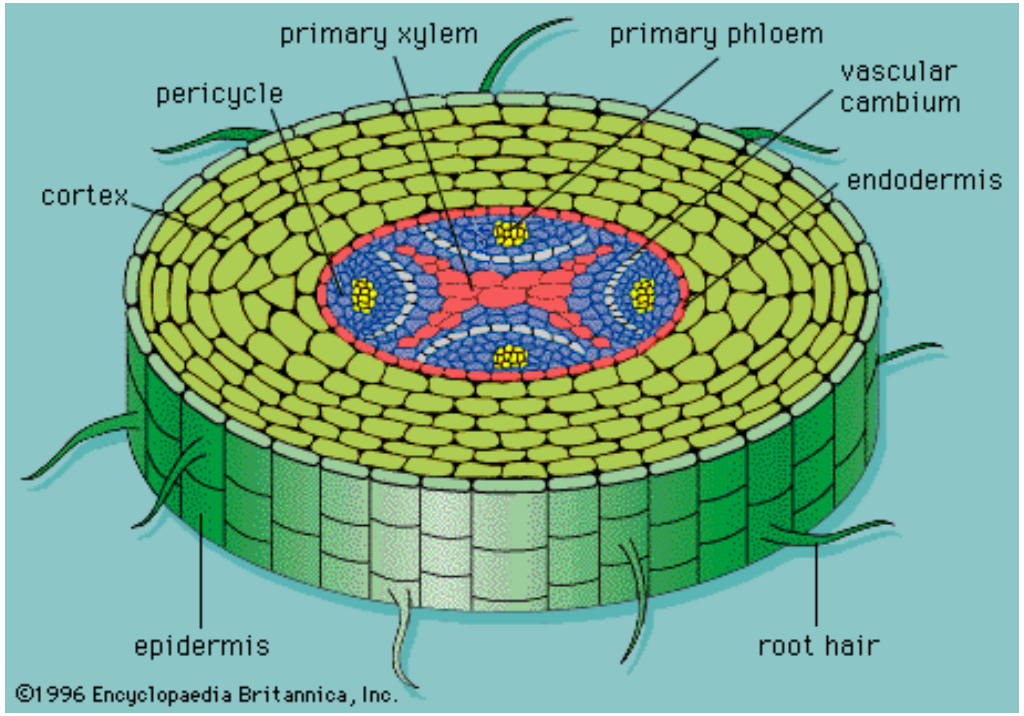
Function of cortex and pith

- Cortex cells often store starch.
- Some cortex cells contain chloroplast and make food by photosynthesis.
- Cortex and pith help to support the stem.

Root

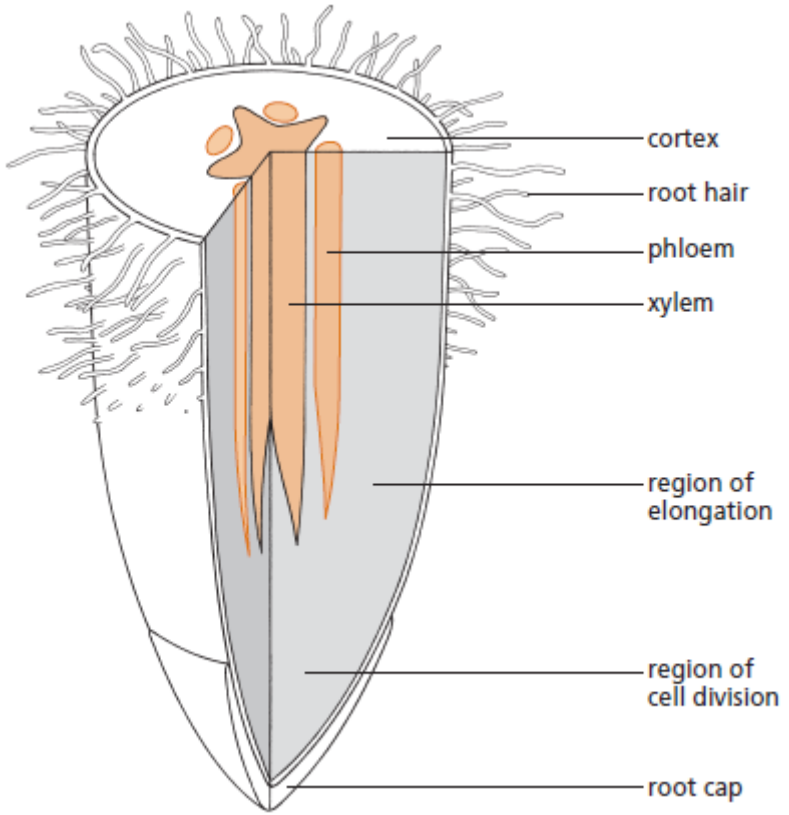
Transverse section

- Epidermis with root hairs.
- Cortex.
- Xylem which occupies the central region of root.
- Phloem which alternates with xylem;
- In many roots there are no pith.



Longitudinal section

- All layers shown in transverse section plus:
- Region of elongation, where new cells grow in size before differentiation.
- Region of cell division: new cells are produced by Mitosis(cell division).
- Root cap: covers the region of cell division and protects it from damage as the root grows and passes between soil particles.



Root hair cell

Function

- The root hairs absorb water from the soil by osmosis, and take up mineral salts by active transport.

Adaptation of root hair cell to its function

- A root hair cell has a long extension called root hair, which increases the absorbing surface area of the root.
- There are many mitochondria in its cytoplasm which produce energy by aerobic respiration.