

Plants, Tissues and Organs

Key Terms

Cell Specialization

- The process by which cells develop from similar cells into cells that have specific functions within a multicellular organism.

Cell Differentiation

- A stage of development of a living organism during which specialized cells form.

Tissue

- A cluster of similar cells that share the same specialized structure and function.

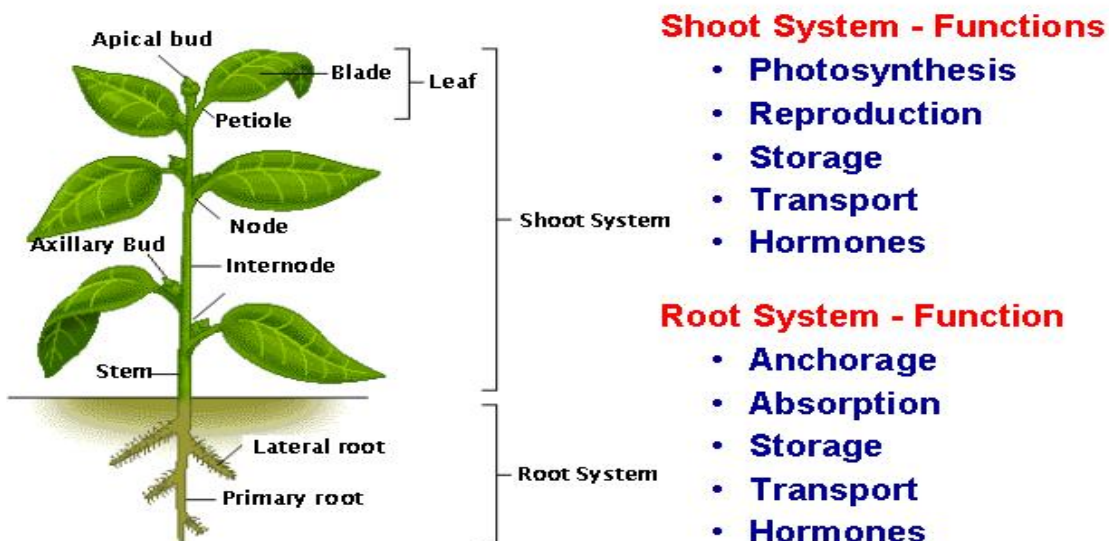
Organ

- A combination of several types of tissue working together to perform a specific function.

Meristematic cell

- An unspecialized plant cell that gives rise to a specific specialized cell.

The Plant Body Consists of the Shoot System and the Root System



Leaf, Root and Stems all have similar tissues to make them up

Protective tissue

- waterproof layer to protect plant
- Cuticle and epidermis

Transport tissue

- phloem transport food
- xylem transport water

Storage tissue

- support plant
- Stores food
- Mesophyll

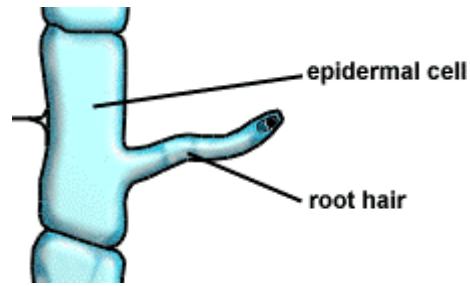
Protective Tissue:

- Covers the plant body and consists of **epidermis** in young plants & non-woody plants that is replaced later by **periderm** in woody plant
- **Epidermis** is made of **parenchyma cells** in a single layer
- **Epidermis on stem and leaves** prevents water loss by transpiration (evaporation of water from leaves) & produces a waxy material called **cuticle**



Epidermis Of a Leaf

- **Epidermal cells on roots** form extensions called **root hairs** to absorb H_2O & **nutrients**



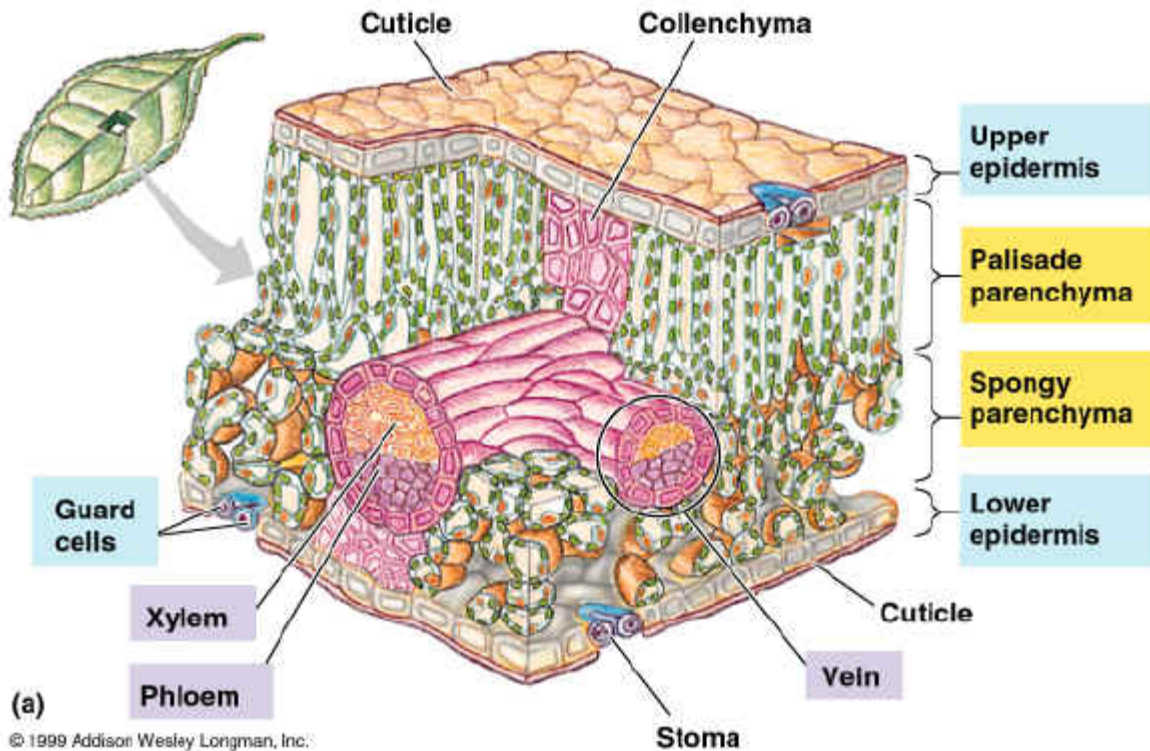
- Openings in the epidermis on the underside of a leaf where gases are exchanged are called **stomata** (stoma, singular)
- Sausage-shaped **guard cells** are found on each side of the stoma to help open and close the pore to prevent water loss



- Dead **cork cells** replace epidermis in woody stems & roots

Storage Tissue:

- Ground tissue constitutes the majority of the plant body and contains parenchyma, collenchyma, and sclerenchyma cells
- Ground tissue of the leaf (called **mesophyll**) uses the energy in sunlight to synthesize sugars in a process known as photosynthesis



Spongy Mesophyll of Leaf

- Ground tissue of the stem (called **pith** and **cortex**) develops support cells to hold the young plant upright
- Ground tissue of the root (also called **cortex**) often stores energy- rich carbohydrates

Transport Tissue:

- Vascular tissues transport water and dissolved substances inside the plant and helps support the stem
- The 2 types of vascular tissue are **xylem** & **phloem**
- **Xylem** carries water and dissolved ions from the roots to stems and leaves
- **Phloem** carries dissolved sugars from the leaves to all other parts of the plant