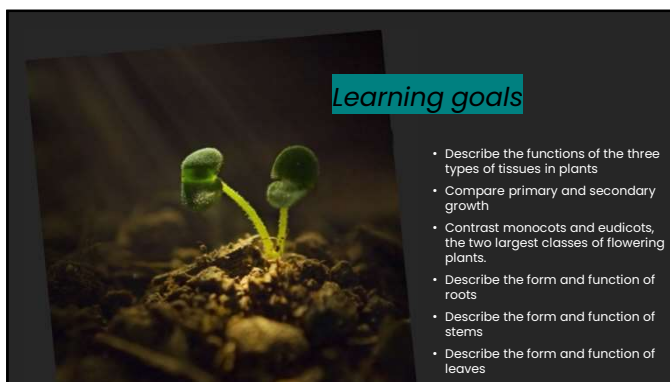


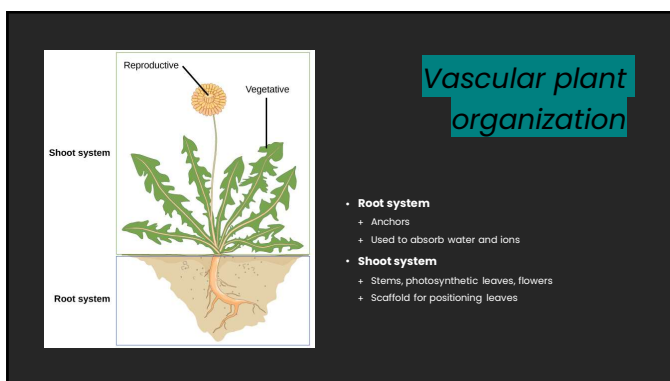


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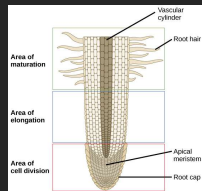
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- Describe the functions of the three types of tissues in plants
- Compare primary and secondary growth
- Contrast monocots and eudicots, the two largest classes of flowering plants.
- Describe the form and function of roots
- Describe the form and function of stems
- Describe the form and function of leaves



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- **Root system**
 - + Anchors
 - + Used to absorb water and ions
- **Shoot system**
 - + Stems, photosynthetic leaves, flowers
 - + Scaffold for positioning leaves



Meristems

- Undifferentiated cells that can divide indefinitely and give rise to many types of differentiated cells.
- Extension of shoot and root produced by **apical meristems**
- Increase in shoot and root diameter produced by **lateral meristems**

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Plant tissue types

Dermal

- outer protective cover

Ground

- function in storage, photosynthesis, and secretion

Vascular

- conducts fluids and dissolved substances

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Roots

- **Roots** anchor the plant and absorb nutrients and water from the soil. Some are also used for carbohydrate storage.
- **Taproot system:** single large root with small branch roots
- **Fibrous root system:** many small roots of similar diameter
- Roots may also be modified for a particular environment



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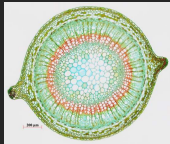
Examples of modified roots



- **Adventitious roots** arise from any place other than the plant's root
- **Prop roots:** Keep the plant upright
- **Aerial roots:** Obtain water from the air
- **Pneumatophores:** Facilitate oxygen uptake
- **Contractile roots:** Pull plant deeper into soil
- **Parasitic roots:** Penetrate host plants
- **Buttress roots:** Provide considerable stability

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Stems

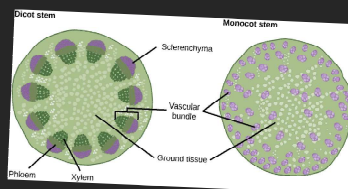


- **Stems** are the aboveground portion of the plant that the leaves and flowers attach to

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Monocots vs. eudicot stems

- **Monocot** vascular bundles are usually scattered throughout ground tissue system
- **Eudicot** vascular tissue is arranged in a ring with internal ground tissue (pith) and external ground tissue (cortex)



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Examples of specialized stems

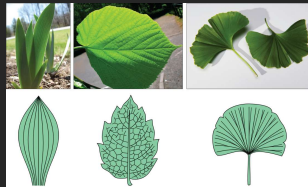
- **Bulbs:** swollen underground stems, consisting of fleshy leaves
- **Rhizomes:** horizontal underground stems, with adventitious roots
- **Tubers:** swollen tips of rhizomes that contain carbohydrates
- **Tendrils:** twine around supports and aid in climbing



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Examples of leaves

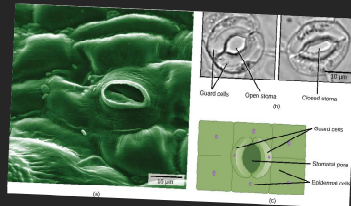
- **Leaves** are the primary photosynthetic organ on plants and contain the **stomata**.
- **Flowers** are modified leaves



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Leaf surface

- The leaf's surface is covered by transparent epidermal cells, most have no chloroplasts
- Epidermis has a waxy cuticle, different types of glands and trichomes may be present
- Lower epidermis contains numerous **stomata** flanked by guard cells



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Examples of modified leaves



- **Floral leaves** (bracts): surround true flowers and behave as showy petals
- **Spines**: reduce water loss and may deter predators
- **Reproductive leaves**: plantlets capable of growing independently into full-sized plant
- **Shade leaves** – larger in surface area but with less mesophyll than sun-lit leaves
- **Insectivorous leaves** – trap insects
- Pitcher plants have **cone-shaped leaves** that accumulate rainwater
