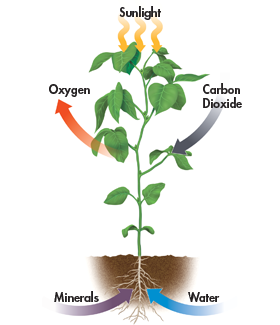
PLANTS Chapter 22-23 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per\_\_\_\_\_

**What are plants?**



- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (have a nucleus)

- Have cell walls made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

- Carry out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ using the pigment chlorophyll a and chlorophyll b

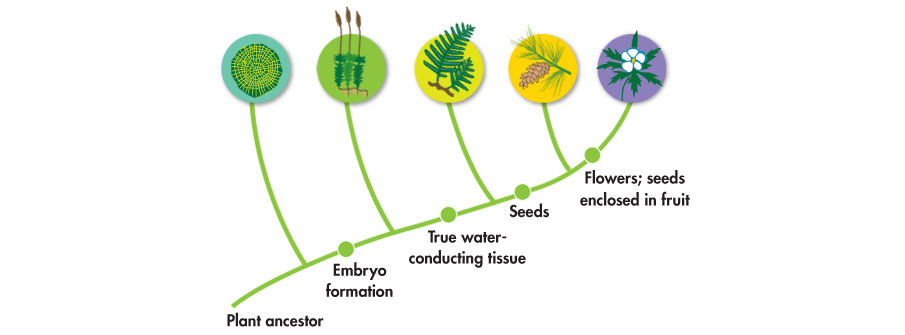
- Belong to the kingdom \_\_\_\_\_\_\_\_\_\_\_\_\_\_

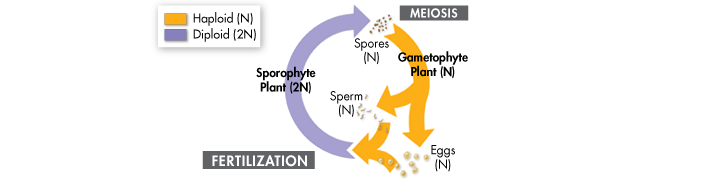
**What do plants need to survive?**

* \_\_\_\_\_\_\_\_\_\_\_\_ – make food through photosynthesis
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (CO2 and O2)
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Plant evolution**

* The ancestor to today’s plants were similar to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Plants are divided into \_\_\_\_\_\_\_\_\_\_\_ major groups





**Alternation of generations**

* The lifecycle of plants has 2 phases
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (haploid – N)
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (diploid – 2N)
* During evolution – the size of the gametophyte decreased and sporophyte increased

**Types of plants**

1. **Green Algae**

* Mostly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Found in fresh water, seawater, and moist areas
* Absorb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from surroundings
* Many form colonies
  + Spirogyra
  + Volvox

**2) Bryophytes**

* Found in damp places
* Have specialized reproductive cells that require \_\_\_\_\_\_\_\_\_\_\_\_\_ for reproduction.
* Lack **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – water/nutrient carrying tissue supported by lignin
  + Lack support to grow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Moss life cycle pg 642

**3) Ferns and relatives – pg 643**

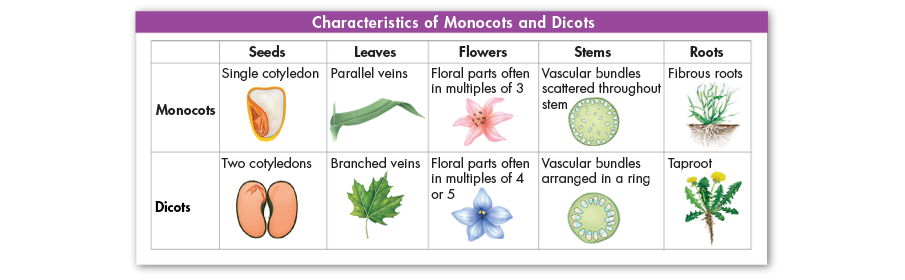
* Have vascular tissue which makes it possible to move fluids through the plant (against gravity)
  + **\_\_\_\_\_\_\_\_\_\_\_\_** = carries nutrients
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_** = carries water
* Do \_\_\_\_\_\_\_\_\_\_ have seeds – reproduce through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Reproductive cells need \_\_\_\_\_\_\_\_\_\_\_\_\_ for fertilization

1. **Gymnosperms – cone bearing plants**

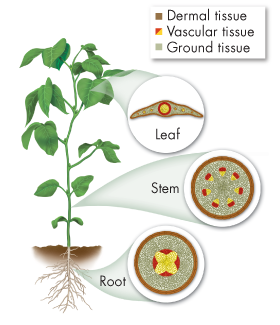
* First \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plants – allows the plant to
  + Reproduce without \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ the embryo in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Provide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the embryo
* Reproduction occurs through pollination
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (the male gametophyte) is transferred to the female cone

**5) Angiosperms – flowering plants**

* Reproduce sexually through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_ in flowers develop into \_\_\_\_\_\_\_\_\_\_\_\_\_ to help disperse seeds
  + Flowers attract pollinators and reproduction is more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than the wind pollination of gymnosperms
* Monocot vs. dicot



* Annuals, biennials, perennials (pg 654)



**Chapter 23 Plant Structure and Function**

**Plants have tissues and organs too!!!!!**

* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ = dermal, vascular and ground
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = Roots, stems and leaves

**3 Types of tissue**

**1) Dermal tissue** = the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ outer covering in a plant

* + **Epidermis** – outer layer of cells
  + **Cuticle** – waxy covering

**2) Vascular Tissue**  = \_\_\_\_\_\_\_\_\_\_\_ the body and transports water and nutrients

* + **Xylem** – transports \_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Tracheids (**lignin** in cell wall to give structure)and vessel elements
  + **Pholem** – transports \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Sieve tube elements and companion cells

**3) Ground Tissue**  = produces and stores \_\_\_\_\_\_\_\_\_\_\_\_ and contributes to the support of the plant

* + Parenchyma = thin cell walls, contain a large vacuole, in leaves have chloroplasts
  + Collenchyma = thicker cell walls (make up “strings” of celery
  + Sclerenchyma = thickest cell walls – nutshells, seed coats

**Where do plants grow????**

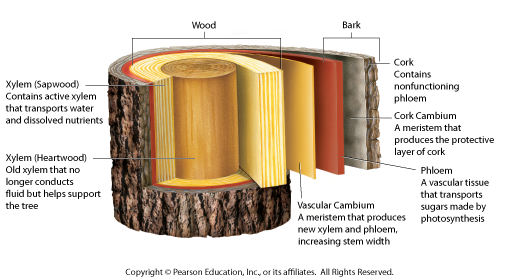
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** = regions of cells in which mitosis produces new cells that are ready for differentiation
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_ meristem** = rapidly growing regions at the tip of the stem and roots

**Roots**

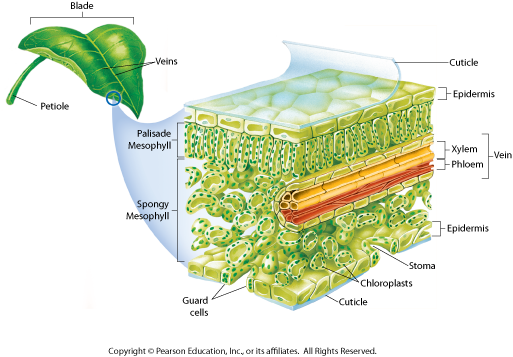
* Root Function
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ a plant
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ it to the ground
  + Store \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Absorb \_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the soil
  + Absorb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the soil
* Types of roots
  + **Taproot** – carrots, beets, dandelions
  + **Fibrous root** - grasses
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – roots actively pump nutrients into the root. Water moves in by osmosis. This causes a pressure that causes water to move up the plant into the stem

**Stems**

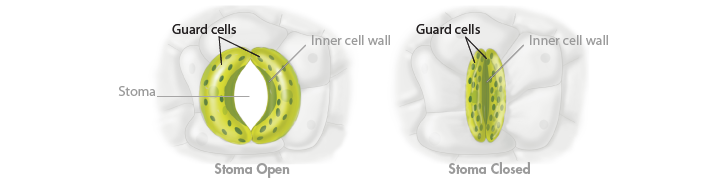
* Functions of stems
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ leaves, branches and flowers
  + Hold up the leaves to the \_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ substances throughout the plant
* Formation of wood and tree rings



**Leaves (pg.681)**

****

* Anatomy of a Leaf - Leaves are optimized to absorb light and carry out photosynthesis
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – waxy cover to protect/prevent water loss
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – where photosynthesis occurs
* **\_\_\_\_\_\_\_\_\_\_\_\_\_** – openings in the leaf that allow CO2, water, and O2 to diffuse in and out of the leaf
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** = cells that surround the stomata and regulate their opening and closing



**Homeostasis and stomata**

* Plants keep stomata open just enough so that gas exchange can occur for photosynthesis but not so much that they lose too much water
* When water is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ water flows into the leaf. This increases water pressure in the guard cells and \_\_\_\_\_\_\_\_\_\_\_\_ them.
* When water is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, pressure decreases and the stomata \_\_\_\_\_\_\_\_\_\_\_\_\_\_

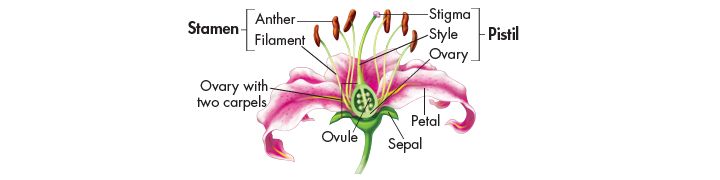
**Water transport in plants**

* **Transpiration** = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Water leaves through open \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Dry cell walls pull water from deeper in the leaf and pulls water from the roots, stem and leaf through xylem
  + Water “sticks” to water (cohesion) and other molecules (adhesion)
  + Even small trees can lose 100L of water/day
  + What conditions increase transpiration???
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **\_\_\_\_\_\_\_\_\_\_\_\_\_ action** – the tendency of water to rise in a thin tube

CHAPTER 24

**Reproduction in flowering plants**

* Parts of a flower
  + **\_\_\_\_\_\_\_\_\_\_\_\_** = enclose the flower before the bud opens and protects the flower
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_** = attract pollinators to the flower often brightly colored inside the sepals
  + **Stamen** = \_\_\_\_\_\_\_ parts of the flower



* + - **Anther** – produce \_\_\_\_\_\_\_\_
    - **\_\_\_\_\_\_\_\_\_\_\_\_** – a stalk that holds up the anther
  + **Carpels** (pistil) = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ parts of the flower
    - **\_\_\_\_\_\_\_** – sticky structure designed to capture pollen
    - **\_\_\_\_\_\_\_\_\_\_\_\_** – a stalk that holds up the stigma

Angiosperm gamete production - Figure 24-3 pg. 699

Angiosperm lifecycle - Figure 24-6 pg. 701

**Fruit and seed development**

* **Fruit** = a thickened \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that encloses seeds
* Seed Dispersal =
  + \_\_\_\_\_\_\_\_\_\_\_\_ = seeds with tough coats are encased in a sweet fleshy fruit
    - Apples, grapes
  + \_\_\_\_\_\_\_\_\_ = lightweight fruits that allow them to be carried in the air
    - Dandelions
  + \_\_\_\_\_\_\_\_\_\_\_ = buoyant fruits that allow them to float
    - coconuts

**Seed Dormancy and Germination**

* **Dormancy** = the embryo is \_\_\_\_\_\_\_\_\_\_\_\_ but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** = growth of the plant embryo following dormancy
  + Advantages of Dormancy
    - Allows for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dispersal
    - Allows seeds to germinate in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Some seeds only germinate under \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions
      * Some pine cones remain sealed until the high temps generated by forest fires cause the cones to open

**Plant Hormones**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** = chemical signals produced by an organism that affect the growth, activity, and development of cells and tissues
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_** – stimulate cell elongation and growth of roots
    - Produced in the shoot apical meristem and transported
    - When light hits a part of a plant, auxins build up in the shaded region, causing the plant to bend toward the light
    - Growth of lateral buds is inhibited by auxin (if you cut off the top of a plant, the lateral buds grow more quickly.
  + **\_\_\_\_\_\_\_\_\_\_\_\_** - hormones produced in the growing roots and developing fruits and seeds.
    - Often produce effects opposite of auxins
    - Stimulate cell division
    - Interact with auxins to balance root and shoot growth
    - Stimulate regeneration of tissues damaged by injury
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - Found in meristems of shoot, root, and seed embryo
    - Stimulate growth, promote germination
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - Found in terminal buds and seeds
    - Inhibits cell division
    - Promotes seed dormancy
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - Found in fruit tissues and aging leaves and flowers
    - Stimulates fruits to ripen
    - Causes plants to seal off and drop leaves

**Tropisms**

* Tropism = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Phototropism – tendency of a plant to grow toward \_\_\_\_\_\_\_\_\_\_\_\_\_
  + Gravitropism – response of a plant to \_\_\_\_\_\_\_\_\_\_\_
  + Thigmotropism – response of a plant to \_\_\_\_\_\_\_\_\_\_\_\_\_



**Rapid responses**

* Some plants can also adjust quickly to their environment
  + Venus fly trap
  + Mimosa (folds leaflets in a few seconds when touched)

**Response to seasons**

* + How do plants know when to flower, drop leaves, etc?

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** = the number of hours of light/dark a plant receives (pigment phytochrome)

* + **Winter Dormancy -** 
    - Deciduous plants turn off photosynthetic pathways
    - Transport materials from leaves to roots
    - Seal off leaves
    - Chlorophyll breaks down allowing other pigments to be seen (brown, yellow, etc.)