**PLANT BIOLOGY: INTRODUCTION**

**Uses for Plants in Our Society (From P3)**

* Fuel (ethanol from corn)
* Medicine (aloe vera, med. marijuana)
* Tools (wood, toxins in wood to kill fish, weapons)
* Food
* Construction
* Alcohol (potato 🡪 vodka; grapes 🡪 wine)
* Voodoo
* To breathe!
* Shade
* Fragrances
* Composting
* Narcotics
* Clothing (ex. Hemp, cotton)
* Dyes, tattoos, henna
* Paper
* Soaps
* Flour, mint, herbs, tea, spices
* Make-up, cosmetics, beauty and skin care, jewelery

**Kingdom Plantae**

* Plants evolved about 500 million years ago from simple green algae that lived in the ocean.
* All plants are autotrophic and some, like the famous Venus fly-trap, can *also* be heterotrophic.
* All plants are eukaryotic and multicellular.

**Plant Cells**

* Like animal cells, plant cells contain a nucleus and organelles, but they have two distinguishing features:
  + **Cell wall** (made of cellulose, a complex carbohydrate, provides rigid structural support; difficult to digest)
  + **Chloroplast** (organelle that conducts photosynthesis)
  + Animal cells have lysosomes that release the cellular equivalent of digestive enzymes. Why don’t plants need these?
  + How can plants stand up straight without a skeleton?

**Plant Diversity**

* Currently over 350 000 species of plants, including:
  + Mosses
  + Ferns
  + Conifers
  + Flowering plants
* Most plants live on land and can withstand a wide variety of climates. Cacti live in arid, dry areas whereas mosses need to be in moist environments to survive.

**Classifying Plants**

* Plants are classified based on the presence or absence of vascular tissue
* **Vascular tissue** can be compared to arteries and veins: a network of specialized cells that allows plants to transport water, minerals and sugar throughout the plant
* What would you expect a non-vascular plant, without vessels to transport nutrients and water, to look like?

**Functions of Stems**

1. Support system for plant body
2. Transport system carries water & nutrients (through vascular tissue!)
3. Holds leaves & branches upright

**Functions of Leaves**

1. Main photosynthetic organ
2. Broad, flat surface increases surface area for light absorption
3. Have systems to prevent water loss
   * **Stomata** open in day but close at night or when hot to ***conserve water***
   * Waxy **cuticle** on surface
4. System of gas exchange: Allows CO2 in and O2 out of leaf

**Leaf Structures**

1. **Cuticle**: waxy layer; covers upper surface
   * Protects leaf against water loss
2. **Veins:** transports water, nutrients and food
   * Made of xylem and phloem vascular tissue
3. **Mesophyll**: contains cells that perform photosynthesis

b/c they contain **chloroplasts**.

1. **Guard cells:**
   * Cells that open and close the stoma
   * Conserve water by preventing excess water transpiration
2. **Stomata:** openings in leaf’s surface; when open:
   * **GAS EXCHANGE**: Allows CO2 in & O2 out of leaf
   * **TRANSPIRATION:** Allows excess H2O out of leaf

**Function of Roots**

1. Anchor & support plant in the ground
2. Absorb water & minerals
3. Hold soil in place

**Structure of Roots**

1. **Root Hairs:** increase surface area for water & mineral absorption
2. **Meristem**: region where new cells are produced
3. **Root Cap:** protects tip of growing root

Question: How do you suppose roots grow?