Honors Biology Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
NDHS Per: \_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Plant Transport**

**Plant**: terrestrial (mostly), multicellular, photoautotrophic, eukaryote, true tissues and organs

Plant Structure:

Tissue Basic Tissue Types: give rise to specialized cells

**Dermal** - outer coat – **protection  
Vascular** – **transport tubes**  
**Ground** – between Dermal and Vascular

**Dermal Tissue**:

* **Epidermis**Function: **protection**: secretes the **cuticle (waxy coat on leaves)**

**Vascular Tissue**:

**Xylem**: **Water movement** – unidirectional (up)  
**Phloem**: **Sugar movement** – bidirectional

**Ground Tissue**:

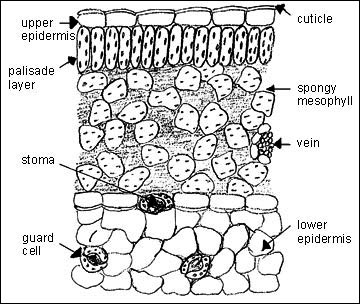
* Occupies the space between the vascular tissue and the dermal tissue  
  Functions:  
  **Storage** – roots and stems  
  **Support** – stems  
  **Photosynthesis** – leaves and some stems

**Plants Roots, Leaves, and Stems:**

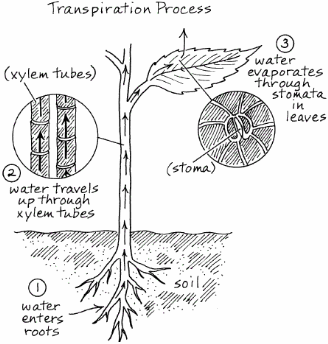
**Roots**:   
Functions:  
 - **absorb water, nutrients and minerals**  
 - **anchor plant in soil**  
 - **store food and water**  
 - **support the plant**

**Stems**:  
Function:   
 - **support** leaves and flowers  
 - **photosynthesis** (non-woody plants – herbaceous)  
 - **storage**: food (tubers – potato) and water (cactus)

**Leaves**:   
Functions:  
 - **photosynthesis**  
 - **storage** (succulent leaves, Aloe)  
 - **protection**: spines, toxins, trichomes  
 - **reproduction**: flowers (modified leaves)



**Transpiration**:

* Transpiration: **Moving water from the roots to the leaves through the xylem**
  + regulation of the **photosynthesis/transpiration compromise** by the **guard cells and stomata**- Proper **gas exchange** **causes the loss of water** from the air spaces in the spongy mesophyll  
    **- pulls water out of the mesophyll** which gets the water **from the xylem**
* Transpirational pull results from the properties of **cohesion and adhesion**
  + As one water molecule moves out of the xylem **it** **tugs on the water molecule behind it** because they are **bound to each other (cohesion).**
  + Water does not move down the xylem because it is **sticks to the sides of the xylem (adhesion).**
  + 
* **Factors Affecting Transpiration:**Temperature: **Hotter = more**  
  Humidity: **Higher = less**  
  Air flow (wind): **Higher = more**

**Regulation of Transpiration**

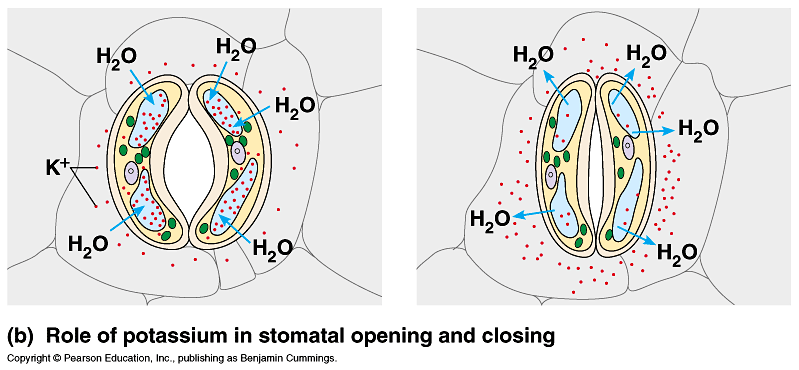
* **Guard Cells**: Regulate the **size of stomata for gas exchange** – responsible for the photosynthesis/transpiration compromise

**Anatomy of Guard Cell**:

* + **unevenly thickened cell walls** (stomatal side is thicker)

**Physiology of Guard Cell**:

* **Potassium ions are pumped into the vacuole** of the guard cell from surrounding cells
* **Higher concentration of K+ causes an influx of water**
* More water causes the **cell to swell**
* Uneven thickness of the cell wall causes the **cell to curve and open**



**Translocation in Phloem**

* Movement from **Source to Sink**
  + **Source**: Location of **Sugar Production**
    - Photosynthesis: **Leaves (summer and fall)**
    - Starch Metabolism: **Roots (spring)**
  + **Sink**: Location of **Sugar Consumption or Storage**
    - **Fall (Roots)**
    - **Spring (buds for leaf and stem growth)**
* Sugar is produced and **pumped into phloem**
* **Water follows the sugar**
* **Builds** **pressure** inside of the cell
* **Pushes the solution** through the cells to the sink

