**Biology - Unit 3 Cells, Part 1 Study Guide**

Microscopes

* Calculate total magnification by **multiplying** eyepiece power times the objective lens power

Cell Theory

1. All cells come from cells
2. All organisms (living things) are made of cells
3. Cells are the basic unit of structure and function in living things

Level of organization

* Least complex to most complex: organelles → cells → tissues → organs → systems
* Organelles are cell components that perform specific functions

**ALL CELLS (PLANT AND ANIMAL) HAVE…**

Plasma Membrane

* Made of phospholipids
	+ Phosphate head is hydrophilic (loves water) and polar (positive and negative charges)
	+ Lipid tails are hydrophobic (scared of water) and non-polar (no charges)
	+ Phosphate heads are on outside of membrane, so the outside is hydrophilic
* Phospholipid bilayer, has proteins embedded in it
* Controls what enters/leaves cell – only allows some substances to enter
* Proteins – transport large molecules into and out of cell

Nucleus

* Contains genetic information (DNA) for cell

Ribosomes

* Small dots in cell that make proteins (remember that proteins include enzymes)
* Making proteins involves bonding amino acids together

**ONLY FOUND IN PLANT CELLS**

Cell walls

* Only found in plant cells
* Necessary to provide structure and support for plants
* Composed of cellulose

Central vacuole

* Only found in plant cells, visible with microscope
* Maintains internal water pressure (keeps cells from collapsing)

Chloroplasts

* Organelles that transform light energy into food (glucose)

Eukaryotes vs. Prokaryotes

* Eukaryotes are bigger than prokaryotes
* Prokaryotes = bacteria, no membrane-bound organelles, no nucleus (so DNA just floats around in cell) – so all cells do NOT have a nucleus!
	+ Bacterial cells are prokaryotes so they do NOT have a nucleus
* Eukaryotes have membrane-bound organelles

Cell Transport

* Semi-permeable membrane – lets some things across, but not others
	+ Passive Transport – requires a concentration gradient (more of substance on one side than the other)
		- Diffusion – molecules spread out or move across a plasma membrane (move from high concentration to low concentration)
			* Facilitated Diffusion – large molecules need to move through a protein channel to enter/leave a cell (such as glucose)
			* Diffusion – small molecules can move through plasma membrane without any help
		- Osmosis – water moving across a semi-permeable membrane
	+ Active Transport – requires energy (ATP) to move molecules across the plasma membrane
* Equilibrium - when there is the same concentration of a particle on both sides of the plasma membrane (molecules keep moving across, but move at same rate on both sides)
* When put cells in salt-water – they shrink because water moved out of cell into the salt water where there are more particles
* When put cells in distilled water (no salt) – they swell because water moves into cells where there are more particles

