Cells Part 2 Study Guide (Photosynthesis, Respiration, Mitosis, and Cell Specialization)

**Chromosomes**

* Contain all DNA
* Shaped like an X when all DNA has been copied (each half of the X is a chromatid and it is identical to the other half of the X)

**Mitosis**

* Once cell doubles everything inside, and then splits into two new cells (new cells = daughter cells)
* The daughter cells are identical to the original cell
* The daughter cells have identical DNA to each other and to the original cell
* Also called “asexual reproduction”
* Cancer results when cells divide rapidly and uncontrollably – known causes of cancer include smoking and genetic influences
* Phases of mitosis
	+ Interphase (cell growth, repair, eliminate wastes)
	+ Prophase – cell preparing for division
	+ Metaphase (middle) – chromosomes line up in middle of cell
	+ Anaphase (apart) – Chromosomes are pulled apart
	+ Telophase (two) – cell splits into two new cells
		- Cytokinesis – vocab word for cell splitting in two (if cytokinesis did not occur, the original cell would have two nuclei!)
			* In plant cells – a cell plate forms to split cell in two
			* In animal cells – the cell membrane pinches closed



**←**Plant cells undergoing mitosis

4, 5, 6…Interphase

2 – Prophase

10 – Metaphase

18 – Anaphase

3 – Telophase

**Cellular Respiration vs. Photosynthesis**

* ALL CELLS (including autotrophs and heterotrophs) carry out cellular respiration.
* ONLY AUTOTROPHS carry out photosynthesis

**Photosynthesis**

* Chloroplasts are only found in plant cells because plant cells capture light energy from the sun to make their own food.
* Plant cells capture light with the chlorophyll inside the chloroplasts
* Plants take in carbon dioxide and let off oxygen (which can show up as bubbles on the leaves)

Reactants: carbon dioxide & water

Products: Glucose & oxygen

**Cellular Respiration**

* ATP is the source of energy for all cell activities in all cells
* Must have mitochondria to make energy (ATP) from glucose
* Aerobic vs. anaerobic respiration
* Aerobic – uses oxygen, makes lots of ATP (36) to use for energy
	+ Most organisms perform aerobic than anaerobic because it makes more ATP!
	+ Takes place in mitochondria of cells
* Anaerobic – does NOT use oxygen, only makes 2 ATP
	+ Takes place in cytoplasm of cells



**Cell specialization**

* All cells from your body start from a single cell (fertilized egg) and then specialize into different types of cells
* Different cells all have the same DNA, but they can turn into different types of cells (liver, heart, brain) by turning off different genes in the DNA
* The original cells are stem cells, which can then develop into many different tissue types (and be used to treat diseases)
* Heart cells have more mitochondria than cells in other body parts because heart cells require a lot of energy to keep pumping.

**General Information**

* Ribosomes – make proteins by bonding amino acids together
* Active transport requires ATP, which is made in the mitochondria
* Homeostasis – when body organs work to keep every balanced in the body
* Prokaryotic cells – NO membrane bound organelles
* Cell membranes made primarily of lipids
* Plants are autotrophs (organisms that makes it own glucose)