

Name _____

Period _____

AP Biology

Date _____

REVIEW UNIT 2: CELLS & CELL DIVISION — “TOP TEN”

A. Top “10” — If you learned anything from this unit, you should have learned:

1. Prokaryotes vs. eukaryotes
 - No internal membranes vs. membrane-bound organelles
2. Cell structures & the functions they perform
 - a. Controlling internal environment
 - cell membrane, membrane proteins & cell receptors
 - movement across membrane: diffusion, facilitated diffusion, osmosis, active transport
 - hypertonic, hypotonic, isotonic solutions
 - b. Protein production
 - nucleus & DNA
 - ribosomes
 - ER & vesicles
 - Golgi apparatus & vesicles
 - c. Energy production
 - mitochondria, chloroplasts
 - d. Cell reproduction
 - nucleus & DNA
 - centrioles & spindle fibers
 - e. Digestion
 - lysosomes & vesicle, vacuoles
 - f. Cell connections
 - connecting junctions: plasmodesmata & gap junctions
 - barrier junctions: tight junctions, desmosomes
3. Cell division
 - a. Cell cycle
 - interphase; mitosis: prophase, metaphase, anaphase, telophase; cytokinesis
 - G₀, G₁, S, G₂
 - b. Produces genetically identical clones
 - c. Replication
 - DNA polymerase (I & III), leading strand, lagging strand, helicase, single-stranded binding proteins, ligase, primase, RNA primer, Okazaki fragments, telomeres

- d. Regulation
 - G1/S & G2/M checkpoints, cdKs, cyclins, growth factors
 - cancers are caused by loss of cell cycle control
 - p53, proto-oncogenes, tumor suppressor genes
- 4. Cell Communication
 - a. reception = signal molecule binds to receptor protein in cell membrane causing it to change shape
 - G protein coupled receptor
 - b. transduction = cascade of molecules is activated relaying the signal within the cell
 - signal transduction pathway (ex. G-protein)
 - secondary messenger system (ex. cyclic AMP)
 - c. response
 - transcription factors → turn genes on or off
 - cellular activity → activate enzymes, open cell membrane channels, apoptosis
- 5. Energy Transformations
 - a. ATP is energy currency
 - unstable bonds between phosphates
 - ATP → ADP
 - a. energy coupling (exergonic release of energy powers endergonic reactions)
 - b. phosphorylation alters bonds or shapes of proteins (conformational change)
- 6. Enzyme function
 - a. proteins & RNA
 - b. biological catalysts
 - speed rate of reactions
 - reduce activation energy
 - c. induced fit (lock & key)
 - temporarily bind to substrate
 - shape of active site
 - d. affected by temperature, pH, salinity, concentration of substrate & enzyme

B. Labs

1. Diffusion & Osmosis

Be sure to review the procedures and the conclusions, and understand:

- a. Factors that affect movement of water across a membrane
- b. How water & solutes will move across a membrane under different osmotic conditions
- c. How to measure osmotic concentration of an unknown tissue or solution using solutions of known concentrations

2. Enzyme Catalysis

Be sure to review the procedures and the conclusions, and understand:

- a. Factors that affect enzyme function
- b. How to set up a similar experiment
- c. Controls vs. Experimental

3. Cell Division

Be sure to review the procedures and the conclusions, and understand:

- a. Replication
- b. How chromosomes are distributed during mitosis
- c. The products of mitosis