

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
    - G<sub>0</sub>, G<sub>1</sub>, S, G<sub>2</sub>
  - 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 &amp; 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