Unit 2 – Cells, Cell Processes, & Cell Specialization Study Guide

1. Differentiate between prokaryotic and eukaryotic cells.
   *Pro-no, Eu-do Prokaryotic do not have membrane bound organelles like a nucleus and Eukaryotic do have membrane bound organelles. Both have cell membrane, ribosomes, DNA, and cytoplasm*

2. Describe the three parts of the cell theory.
   1. All organisms are made of 1 or more cells
   2. The cell is the basic unit of all living things
   3. All cells come from existing cells.

3. Who are the scientists who helped develop the cell theory? (TAG/ADV only)
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4. Compare the organelles for both plant and animal cells.
   *Plant cells have a cell wall, chloroplasts, and a large central vacuole
   Animal cells have small vacuoles/vesicles, no chloroplasts and no cell walls. They both have nucleus, ribosomes, mitochondria, cell membrane, cytoplasm, ER, lysosomes, and Golgi Complex*

5. Why are plant and animal cells different?
   *Plants store energy through photosynthesis and release energy through cellular respiration where animals only release energy through cellular respiration.*

6. What are the functions of each organelle in a eukaryotic cell?
   1. **Nucleus** – control center, directs all cell activity
   4. **Lysosome** – breaks down cell waste, cleans up the cell (Lysol)
   6. **Cell wall (plant)** – tough outer covering for protection, shape and support.
   7. **Chloroplast (plant)** – makes food in a plant cell using chlorophyll
   9. **Mitochondria** – breaks down food and oxygen to release energy for cell activities.
   11. **Cytoplasm** – Cell gel that holds other organelles in place inside the cell membrane.
   12. **Cell membrane** – semi-permeable membrane that allows some particles in and some particles out.

7. How are diffusion and osmosis alike/different?
   *Alike – both passive transport, High to Low, no energy needed, through a cell membrane.
   Different - Osmosis is a type of diffusion through water, it’s all about the water.*

8. Describe the different types of transport across the cell membrane.
   *Passive Transport – High to low concentration, no energy needed, through a cell membrane, Diffusion and Osmosis are examples. Active Transport – Low to High concentration, energy required, through a cell membrane, Endocytosis and Exocytosis are examples*

9. Compare the processes involved with endocytosis and exocytosis.
   *Endocytosis is moving a large particle INTO a cell where Exocytosis is moving a large particle OUT of a cell. Endo – IN, Exo-EXIT Both need energy.*
10. Explain the process of photosynthesis.
   Breaking down water, carbon dioxide and light energy (raw materials) through the chloroplast to produce glucose and oxygen (end products)

11. Explain the process of cellular respiration.
   Breaking down glucose and oxygen (raw materials) in the mitochondria to produce energy for the cell (ATP), carbon dioxide, and water (end products).

12. What are the organelles involved with photosynthesis and respiration?
   Photosynthesis – chloroplast, Cellular Respiration -Mitochondria

13. Describe the relationship between the reactants and products associated with photosynthesis and cellular respiration.
   A cycle between the two processes where the end products of Photosynthesis are the raw materials for cellular respiration and the end products for cellular respiration are the raw materials for photosynthesis.
   Carbon dioxide + water + Light Energy $\rightarrow$ glucose + oxygen
   glucose + oxygen $\rightarrow$ Cellular energy (ATP) + carbon dioxide and water

14. What are producers and consumers?
   Producers are organisms that make their own food mostly by using the sun’s energy (plants).
   A consumer is an organisms that eats other organisms to obtain it’s energy (animals)

15. How is fermentation different from photosynthesis and respiration?
   Fermentation is the breakdown of food without the use of oxygen. In humans, lactic acid is a by-product of fermentation using causing muscles to be sore after a heavy workout.

16. Draw and label the six phases of mitosis (aka the cell cycle).