

Objective 1: Students will be able to describe the structure and function of the cell membrane, nucleus, nucleolus, rough ER, smooth ER, Golgi apparatus, lysosomes, and mitochondria.

1. The _____ contains the hereditary information (DNA), which directs all cellular activity.
2. The _____ checks and transports proteins, as well as produces enzymes when needed.
3. The _____ produces ribosomal subunits, which unite to form ribosomes.
4. The smooth endoplasmic reticulum produces _____.
5. The mitochondria takes _____ (nutrient you get from food) and converts it into _____; an energy molecule that your cells can use.
6. _____ are referred to as the trash can of the cell b/c it contains digestive enzymes which destroy waste.
7. The _____ determines what enters and exits the cell.
8. The _____ model of the cell membrane describes the cell membrane as a biphospholipid layer with proteins floating within the membrane.
9. The powerhouse of the cell is the _____.
10. The function of the Golgi apparatus is to _____.
11. The inside of the cell membrane is _____ (polar/non-polar), while the outside (phosphate ends) is _____ (polar/non-polar).

Objective 2: Students will be able to compare the structure and function of cilia, flagella, and microvilli.

1. Cells along the respiratory tract contain _____ which sweep away from the lungs the mucus and any debris caught within the mucus. Smoking Damages these and causes “smoker’s cough.”
2. The sperm cell is the only human cell that contains a _____, which allows it to “swim.”
3. _____ increase the surface area of cells. Therefore cells where absorption is important (intestine, kidneys) contain many of these.

Objective 3: Students will be able to describe the various ways in which substances are able to move across the cell membrane, including endocytosis and exocytosis.

1. If oxygen is moving directly through the cell membrane, from high to low concentration, this is called _____.
2. If sodium is being pumped outside of the cell, where there is already a high concentration, this is an example of _____.

3. If the cell membrane brings a solid substance into the cell by enclosing it with part of the membrane, which requires energy/ATP, this type of endocytosis is called _____.
4. If a concentration gradient is established, then that substance (such as sodium) diffuses back through the membrane using a channel carrier and at the same time brings with it a second substance, such as glucose, this is an example of _____.
5. Show the diffusion of A in Figure 1, by using arrows
6. Show active transport of Na^+ outside of the cell in Figure 4, by using arrows and adding/subtracting Na^+ ions

Objective 4: Students will be able to explain osmosis and determine the direction of water flow with hypertonic, hypotonic, isotonic solutions.

1. Osmosis is the diffusion of _____.
2. A solution that contains less solute than pure water is _____, which is freshwater.
3. A solution that contains equal amounts of solute and water is _____.
4. A solution that contains more solute is _____, such as salt water.
5. If a man drowned and during your evaluation you saw that the lung tissue had shrunk, what could you conclude about where the man drowned (freshwater or saltwater?) **Explain!**

Objective 5: Students will be able to explain how proteins are produced, including transcription and translation.

1. Please describe the process of protein synthesis, starting and ending with the cell membrane. Include the processes of transcription and translation. At each organelle, you must describe what happens. You may choose to write a paragraph or construct a flow chart. (+2)
2. In sickle-cell anemia the protein, hemoglobin, does not function normally. Therefore, the red blood cells become sickle-shaped and can plug up blood vessels. Sickle-cell anemia results from changing one nucleotide in DNA. Explain how this change/mutation results in an abnormally functioning protein. (+2)

Objective 6: Students will be able to compare mitosis and meiosis as well as explain the purpose of each.

1. During mitosis, _____ new daughter cells are produced.
2. During meiosis, _____ new daughter cells are produced.
3. The daughter cells produced in mitosis have _____ chromosomes.
4. The daughter cells produced in meiosis have _____ chromosomes.
5. The daughter cells in meiosis are _____ (identical or not identical).
6. A purpose of mitosis is _____.
7. A purpose of meiosis is _____.

8. In meiosis, _____ allows for genetic diversity, which takes place in prophase 1.
9. During _____, the chromosomes are aligned in the middle/equator of the cell.
10. During _____, the sister chromatids separate and move towards opposite ends of the cell.
11. _____ is the division of the cytoplasm.
12. _____ is referred to as the “resting phase.”
13. Mitosis has _____ division(s) while meiosis contains _____ division(s).
14. A full set of chromosomes is referred to as _____.
15. The female sex chromosomes are _____ whereas the males’ are _____.
16. DNA is replicated in _____ of mitosis.
17. The gamete cells are _____ (diploid or haploid).
18. Draw a brief diagram comparing mitosis and meiosis, include the # of chromosomes and describe the differences between males and females. +3

Objective 7: Students will be able to compare and explain aerobic and anaerobic respiration.

1. _____ respiration takes place when oxygen is available.
2. _____ fermentation takes place in our muscle cells when oxygen is not available.
3. _____ ATP are produced anaerobically.
4. _____ ATP are produced aerobically.
5. _____ is the waste product produced during the Krebs Cycle, that you exhale from your body.
6. _____ is the final electron acceptor during the electron transport chain, and therefore once the electrons reach this substance, aerobic respiration ends.
7. The waste product of the electron transport chain is _____.
8. _____ is responsible for making us feel sore after a workout as well as causes the burning sensation in our muscles during a workout.
9. Which would be more efficient if you were a soccer player or cross-country runner, aerobic or anaerobic respiration?
10. Which process would be active if you were a wrestler, hockey player, football player, or sprinter; aerobic or anaerobic respiration?