Matter Unit Study Guide

Chapter 2

1. What are the big four elements that are essential to life?
2. Why is carbon 14 radioactive? What makes it different than carbon-12
3. How do you find the number of neutrons in an element?
4. What is an isotope?
5. What is the difference between polar and nonpolar covalent bonds?
6. What is the difference between covalent and ionic bonds?

Chapter 3

1. What bond forms between water molecules?
2. What type of bonds are formed in a water molecule?
3. Why is water polar?
4. What are the properties and residual effects of those properties?
5. Why is ice less dense than liquid water?
6. What is the difference between hydrophobic and hydrophilic substances?
7. How many times more H+ concentration does a solution with pH of 2 have than a solution with pH of 9?
8. Find pH of solution given H+ or OH- concentration.
9. What is the effect of high CO2 concentrations on seawater? P. 53

Chapter 4

1. What is present in all organic molecules? What makes it so important? How many valence electrons? What types of bonds does it form?
2. What did Stanley Miller’s experiment show?
3. What are structural isomers?
4. Make sure you know the hydroxide, carboxyl, and amine group; including polarity, pH, and structure
5. What are the functional groups found in amino acids?
6. What is cellulose and chitin and where are they found?
7. What are the monomers and polymers of each organic compound?
8. What are the levels of protein structure and how do they work?
9. What is a chaperonin?
10. What are the 3 parts of a nucleotides?

Chapter 6

1. Know the basic structure of a prokaryotic cell
2. Why are the nuclear pores used for?
3. What organelle takes up most of a plant cell?
4. What are the parts of the endomembrane system? In what order does information flow?
5. How did eukaryotic cells arise? Which organelle was first?
6. Match organelles with function.

Chapter 7

1. What model proposes the membrane consist of protein molecules embedded in a fluid bilayer of phospholipids?
2. What is cholesterol’s role in the cell membrane?
3. What are aquaporins?
4. What is diffusion?
5. What is osmosis?
6. What happens when cells are put into pure water? Why?
7. What happens when cells are placed in hypotonic solutions? Hypertonic? Isotonic?
8. What are the solute levels comparatively to those solutions above?
9. What is active transport?
10. What is the difference between pinocytosis, phagocytosis, and receptor-mediated endocytosis?
11. Calculate water potential given formula and determine where water will go?
    1. The value for Ψ in root tissue was found to be -3.3 bars. If you take the root tissue and place it in a 0.1 M solution of sucrose at 20°C in an open beaker, what is the Ψ of the solution, and in which direction would the net flow of water be?
    2. If a cell’s ΨP = 3 bars and its ΨS = -4.5 bars, what is the resulting Ψ?
    3. The cell from question #1 is placed in a beaker of sugar water with ΨS = -4.0 bars. In which direction will the net flow of water be?