

Study Guide for Unit 1 Test

September 10 & 11, 2015

Unit 1: Biochemistry

Chapter 2: The Chemistry of Life

1. **Essential Elements for Life** (examples)
2. **Compound** (meaning & examples)
3. **Structure of Atoms** and the **Subatomic Particles** (charges & locations)
4. **Ionic Bonds** (how they occur & what ions are/why ions are charged)
5. **Covalent Bonds** (how they occur)
6. **Properties of Water**
 - a. Water's **Structure**
 - b. **Polarity** (meaning & how water is polar & what its polarity leads to)
 - c. Water's **Density** in its different forms
 - d. Water's **High Specific Heat** (what this means)
 - e. *HONORS ONLY*: Water's ability to dissolve other substances
7. **pH scale**
 - a. Purpose of the pH scale
 - b. **Acids** vs. **Bases** (Which pH levels are acidic? Which are basic?)
 - c. *HONORS ONLY*: H^+ ions vs. OH^- ions (How do they play a role in determining pH?)
 - d. *HONORS ONLY*: **Buffers** (purpose)
8. **Carbon**
 - a. Type and Number of **Bonds** Carbon can Form
 - b. **Carbon Skeletons** (meaning & types)
 - c. **Organic Compounds** (meaning)
9. **Monomers** vs. **polymers** (meaning & difference between the two)

10. Carbohydrates

- a. Understand a carbohydrate's **Function**
- b. Know a Carb's **Monomer** Unit
- c. Know what a **Disaccharide** is
- d. Know what a **Polysaccharide** is
- e. *HONORS ONLY*: Know the different **Types** of Carbohydrates and Information about Each Type (3)

11. Lipids

- a. Understand a lipid's **Function**
- b. Know the different **Types** of lipids
- c. Know examples of **Unsaturated Fats** and **Saturated Fats**

12. Proteins

- a. Understand a protein's different **Functions**
- b. Know a protein's **Monomer** unit (name and how to tell each apart)
- c. **Denaturation** (meaning & examples)
- d. **Catalysts & Enzymes** (purpose, what affects each, & how they affect chemical reactions)

13. Nucleic Acids

- a. Examples

14. Chemical Reactions (reactant vs. product & what happens to atoms)

- a. **Dehydration Reaction** vs. **Hydrolysis Reaction** (meaning & difference between the two)
- b. **Activation Energy** (meaning)

Study Guide for Unit 2 Exam

TEST OCTOBER 7 / 8, 2015

Unit 2: Cells

Chapter 6: The Cellular Basis of Life

1. **Principles of the Cell Theory** (3)
2. **Types of Cells** (*Be able to compare and contrast the different types of cells and describe the theory in which more complicated cells evolved.*)
3. **Cell Organelles** (*Be able to (1) identify the following organelles in a diagram and (2) understand the function of each organelle and its importance to the cell.*)
 - a. **Nucleus**
 - b. **Lysosome**
 - c. **Endoplasmic Reticulum** (& the differences between the two types)
 - d. **Ribosome**
 - e. **Cell Wall**
 - f. **Mitochondria** (& the role of ATP)
 - g. **Chloroplast** (& its location)
 - h. **Cytoskeleton** (Microfilaments)
 - i. **Cytoplasm**
 - j. **Golgi apparatus**
 - k. **Vesicle** (& the processes of **endocytosis** & **exocytosis**)
 - l. **Cilia/Flagella**
 - m. **Vacuole**
 - n. **Cell Membrane** (& parts of it)

4. **Movement of Molecules** across the Cell Membrane
 - a. **Diffusion** (meaning (in terms of concentration levels) & how molecules move when in equilibrium)
 - i. **Osmosis** (meaning)
 - b. **Hypertonic, Hypotonic, and Isotonic** (Be able to identify each type and describe the direction in which molecules will move across the membrane to reach homeostasis)
 - c. **Passive vs. Active Transport** (meaning)
5. Understand the **pathway of the endomembrane system** in the cell (the sequence of making and transporting a protein)

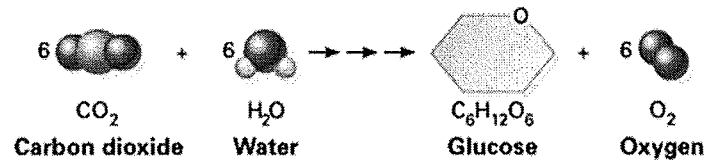
Study Guide for Unit 3 Test

Biology, November 4, 2015

Unit 3: Matter and Energy

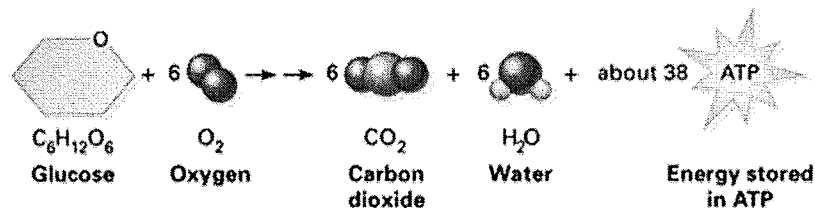
Unit 3A – Chapter 4: Photosynthesis and Cellular Respiration

1. **Chemical Energy** (meaning & how it is found in cells)
2. **ATP Cycle** (how ATP forms & breaks down) (also: how ATP releases energy)
3. **Types of Cellular Work** (3) (names & examples of each)
4. **Photosynthesis**



- a. **Overall Equation** for Photosynthesis
- b. **Wavelengths** (how they relate to energy)
- c. **Pigments**
 - i. How pigments give objects color
 - ii. Types of pigments in plants (3)

5. Cellular Respiration



- a. **Aerobic vs. Anaerobic** (definitions)
- b. **Overall Equation** of Cellular Respiration (including how much ATP is made)
- c. **Metabolism** (meaning)

6. Fermentation

- a. Types (2)
- b. What each type makes

Unit 3B – Chapter 13: Principles of Ecology

1. **Energy flow** (meaning & how it works)
2. **Chemical cycling** (meaning & how it works)
3. Understand how to read a **food web** or **food chain**
4. **Trophic levels** (meaning)
 - a. Name the levels
 - b. Understand the roles of each level in the food web
 - c. Understand what each level does (what they eat/what processes they are known for/what level carries the most energy)
5. **Energy pyramids** (types of & what they show a biologist)
6. **10% rule** (meaning & how it works)
7. **Water cycle** (overall process and the steps of it)
8. **Carbon cycle** (overall process and the steps of it)
9. **Nitrogen cycle** (overall process and the steps of it)
 - a. Understand what two key processes happen in this cycle, what their role in the cycle is, and what organisms typically undergo each process

Study Guide for Unit 4 Test

Biology, December 9, 2015

Unit 4: Cell Division

Chapters 5 & 6: Mitosis and Meiosis

1. **Asexual Reproduction vs. Sexual Reproduction** (process of each – i.e. how they happen, what DNA new cells contain, advantages to each, etc.)
2. **Parts of a Chromosome**
 - a. **Chromatin** (what it is made of)
 - b. **Sister Chromatids** (what it is & what its structure looks like)
 - c. **Centromere** (what it is & where it is found)
3. **Cell Cycle** (definition)
 - a. **Interphase** (events of & length)
 - b. **Mitosis**
 - i. **Overview of Mitosis** (what the process looks like)
 - ii. **Spindle Fiber** (definition/purpose & structure)
 - iii. **Centrioles** (definition/purpose & structure)
 - iv. **Cytokinesis** (in plants vs. animals)
 - v. **Purpose** (What is the purpose of mitosis? What does it make?)
4. **Cancer** (definition)
 - a. **Malignant Tumor** (definition & what occurs if untreated)
 - b. **Metastasis** (definition)
 - c. **Cancer Treatment** (3 types – what occurs in each type & the goals of each type)

5. Meiosis

- a. **Ploidy** (Haploid vs. Diploid – difference of each & when you see each in meiosis)
- b. **Gamete** (definition, haploid or diploid, 2 types in humans, & process that makes them)
- c. **Zygote** (definition, haploid or diploid, & process that makes it)
- d. **Homologous Chromosomes** (what they are, what they look like (on a karyotype display), and how many pairs humans have)
- e. **Sex Chromosomes** (where you see them on a karyotype & which types (X or Y) males/females have)
- f. **Karyotypes** (know how to read them)
- g. **Tetrad (Homologous Pair)** (definition & structure)
- h. **Crossing Over** (definition and what purpose it has – think genetic diversity & what it looks like)
- i. **Genetic Recombination** (definition & when it occurs)
- j. **Purpose** (What is the purpose of meiosis? What does it make?)
- k. **Life Cycle** (how mitosis, fertilization, and meiosis all take a role in the life cycle of a human)

Chapter 8: DNA

1. **Scientists who Helped Discover DNA** (know what they studied & what they *concluded*)
 - a. **Watson & Crick**
 - b. **Rosalind Franklin**
2. **4 Macromolecules of Life** (know what they are & examples of each) (*Think back to Unit 1!*)
3. **Structure of DNA**
 - a. **DNA's Full Name & Definition**
 - b. **Nucleotide** (know the 3 parts)
 - c. **Nitrogenous Bases**
 - i. Know the difference between **purines** and **pyrimidines**
 - ii. Know **complementary base pairs** (& be able to pair them)
 1. Know **what causes these bases to pair** with one another (*Think about bonding!*)
 - d. Understand what makes DNA's **backbone**
 - e. Know DNA's **shape/structure** & the **name** of this structure
4. **DNA Replication**
 - a. **Overall purpose** (*Why does everything happen?*)
 - b. **When it occurs in cell cycle**
 - c. **"Template" mechanism**
 - d. Know the difference of **parent stand** vs. **daughter strand**
 - e. Understand the **overall process** (*How does everything happen?*)
 - f. Know its **reactants & products** (*What does it start with? What does it end with?*)

