**Bio 1 Exam 1 Study Guide**

Key words or terms and new vocabulary from each lecture, which will likely be used in true or false, or multiple choice questions. **Short answer and short essay questions will come from emboldened topics.** **Long essay questions will come from the emboldened and underlined topics**

**Chapter 1: Intro to Biology**

What are the characteristics that define living organisms? **Know the steps of the scientific method? Be able to briefly describe the purpose of each step.** What must a hypothesis be for it to be considered a good hypothesis? What is a variable? Know the difference between biotic and abiotic variables. What qualifies something as a scientific theory? Why aren’t creationism and intelligent design taught in the science classroom? What is the chief unifying theme in biology?

**Key words and terms:** Variable, biotic, abiotic, falsifiable, scientific theory

**Chapter 2: Basic Chemistry, Water, pH**

Know the different parts of the atom (protons, neutrons, and electrons) and their charges. What is an element? What are the four main elements that make up the human body? Know what the atomic number and atomic mass are and how they differ. What is an isotope? What makes a stable atom? How many electrons are found in each electron shell (1st shell, 2nd shell, etc..). **Be able to draw the structure on an atom when given the atomic number for that given element**. Know the differences between covalent bonds, ionic bonds and hydrogen bonds concerning how they are formed and if the bonds are weak or strong. How does an atom become an ion? What is a polar molecule? Know the properties of water. Cohesion. Difference between hydrophilic and hydrophobic compounds. What is an acid? What is a base? Where are acids and bases found on the pH scale? (Ex: is a solution with a pH of 12 an acidic solution or a basic solution?)

**Key words and terms:** Matter, mass, proton, neutron, electron, element, molecule, compound, atomic number, atomic mass, isotope, covalent bond, ionic bond, hydrogen bond, polar molecule, non-polar molecule, cation, anion, solute, solvent, solution, cohesion, surface tension, specific heat, evaporative cooling, hydrophilic, hydrophobic

**Chapter 3: Macromolecules**

 Know the four major macromolecules and their common monomers and polymers. Know the difference between dehydrations reactions and hydrolysis (what each one does). How does your body store unused energy (glucose) in the short term and in the long term? Know the functions of the different carbohydrate polymers (polysaccharides). What are the functions of lipids? Structure of a triglyceride. Differences between unsaturated and saturated fatty acids. What are hydrogenated fats? Know common types of lipids (sterols, phospholipids and waxes). Know the difference between low-density lipids and high density lipids and which one is “good and which one is “bad” for you. What makes something “essential”? **What do enzymes do? What does it mean when an enzyme has become denatured?** **How can enzymes become denatured? How is the function of an enzyme altered once they become denatured?** Where do substrates bind to an enzyme? What are enzymes made up of?

**Key words and terms:** carboxyl, hydroxyl, phosphate, amino, macromolecule, monomer, polymer, dehydration reaction, hydrolysis, starch, glycogen, cellulose, chitin, fatty acid, triglyceride, saturated, monosaturated and polysaturated fatty acids, steroids, phospholipids, waxes, low-density lipids (LDLs) and high-density lipids (HDLs). Polypeptide, amino acid, active site, denaturing, nucleotide, nitrogenous base

**Chapter 31: Digestion and Excretion**

What are thesix classes of nutrients. Know how many Calories per gram are found in each nutrient. Differences between undernourished, overnourished and malnourished. Know what vitamins are fat soluble and the function of water soluble vitamins. Know the sources and functions of the five major minerals (table). Know the initial and main sites of macromolecule digestion. **Describe the digestion of the lipids, proteins and sugars. Where does initial and main breakdown of each macromolecule occur? What are the functions of the different digestive organs and glands?** What enzyme breaks down proteins? Which macromolecule broken down in the stomach? Difference between large and small intestine. What are the three sections of the small intestine? Which one receives secretions from the digestive glands and which one is the primary site of nutrient absorption? Where does most nutrient absorption occur? Know the role of the different digestive glands. **Be able to explain how a negative feedback loop works using either blood glucose levels or body temperature as an example**.

**Key words and terms:** metabolism,anabolic, catabolic, undernourished, over nourished and malnourished, vitamins, coenzyme, minerals, duodenum, jejunum, ileum, pancreas, liver, gallbladder, insulin, bile, glucagon, homeostasis,

**Chapter 4: The Cell**

 **Why are cells so small? What is the benefit of having a greater surface area to volume ratio?** What are the three domains of life? Which domains are made up of prokaryotic cells and which one has eukaryotic cells? **Know the differences between Prokaryotic and Eukaryotic cells concerning cell size, organization, the nucleus, membrane-bound organelles, and chromosomes.** Know the examples of the different types of Archaea (thermophiles, halophiles and methanogens). **Be able to describe the theories for the origin of organelles (Autogenesis and Endosymbiosis).** Which organelles are believed to have originated through endosymbiosis?Know the different organelles and their functions. Which organelles are involved in protein synthesis? Different types of locomotion in cells (cilia, flagella, cytoplasmic streaming). What are the differences between plant and animal cells? Function of plasmodesmata and gap junctions and the cells they are found in.

**Key words and terms:** Prokaryotic, Archaea, Eukaryotic, extremeophiles, thermophiles, halophiles, methanogens, binary fission, nucleus, organelles, cytosol, cytoskeleton, plasma membrane, autogenesis, endosymbiosis, chromosome, rough endoplasmic reticulum, smooth endoplasmic reticulum, golgi complex, lysosomes, transcription, translation, mitochondria, ATP, cilia, flagella, chloroplasts, central vacuole, cellulose, plasmodesmata, gap junctions,

**Chapter 5: The Plasma Membrane**

Know the structure of a phospholipid. Which side is hydrophilic, which is hydrophobic? Which molecules pass freely through the membrane? Which molecules do not pass freely through the membrane and require membrane proteins? What is the function of membrane cholesterol? What does glycocalyx do? Know the different types of membrane proteins and their function, including structural support proteins, recognition proteins, receptor proteins, and transport proteins. What is diffusion? What is a concentration gradient? When does the net movement of molecules stop? **Be able to describe dynamic equilibrium**. What is osmosis and how is it similar and different from diffusion? Know the terms for the different solute concentrations of a solution (tonicity, hypertonic, isotonic, hypotonic). Know what happens to plant and animal cells wen placed in different solute concentrations (lyse, normal, shriveled, and turgid, flaccid, and plasmolyzed). Be able to predict the direction of osmosis when cells are placed in different solutions. Know the different types of transport through the membrane (passive: simple diffusion, facilitated diffusion, and active transport). Which type of transport requires energy? How do cells move large molecules into and out of the cell? Exocytosis. Endocytosis.

**Key words and terms:** Plasma membrane, phospholipid, hydrophobic, hydrophilic, glycocalyx, diffusion, concentration gradient, dynamic equilibrium, osmosis, tonicity, hypertonic, isotonic, hypotonic, lysis, plasmolysis, passive transport, simple diffusion, facilitated diffusion, active transport, exocytosis, endocytosis

**Chapters 6 and 7: Energy and Cellular Respiration**

 What is the difference between potential and kinetic energy? Know the difference between exergonic and endergonic reaction and whether cellular respiration is considered endergonic or exergonic. What is ATP and ADP? Phosphorylation. What is the difference between oxidation and reduction? How are they related? Redox reaction. Know the different electron carriers and their role (NAD+ and FADH). **Know the steps of cellular respiration, where each step occurs in the cell, the input and output of each step, and the products of each step (Table)** What is the function of the electron transport chain? What is chemiosmosis? What is the final electron acceptor at the end of the electron transport chain? Which pathways are aerobic and which are anaerobic? What is fermentation and what are the two types? Know the different types of thermoregulatory strategies in animals (endothermic, ectothermic, poikilothermic, and homeothermic). **Be able to describe the negative feedback loop using either blood glucose levels or body temperature as an example.** Know the different types of heat gain or loss (conduction, convection, radiation, evaporation).**Be able to explain the process of counter-current heat exchange.**

**Key words and terms**: Potential energy, kinetic energy, exergonic and endergonic reactions, cellular respirations, photosynthesis, ATP, ADP, phosphorylation, oxidation, reduction, NADH, glycolysis, Krebs cycle, electron transport chain, chemiosmosis, anaerobic, aerobic, fermentation, homeostasis, regulators, conformers, endothermic, ectothermic, poikilothermic, and homeothermic.