

The Importance of Chemistry

The following are the themes, concepts and terms the student is expected to be familiar with before attempting Human Anatomy & Physiology. These are covered in Chapters 2 & 3 of the text, and are the topics of the course “Cellular Chemistry”. I do not expect you to have this memorized, but it is important that you can use these terms and concepts after a slight review of the book. If more than 30% of these terms and concepts are completely unfamiliar to you, it is STRONGLY suggested that you enroll in “Cellular Chemistry”.

This list IS NOT inclusive!

Note the following key: **Basic concepts**, ***Absolutely must know***, Please review soon.

Chapter 2 Chemistry

General Chemistry

1. **Define Chemistry.**
2. **Describe an atom. Describe its subatomic particles, including their charges.** Explain a valence shell. Describe an element. Give the **elemental symbols**, names and basic physiological functions of the first 15 elements.
3. Explain the following concepts: atomic number, atomic mass, atomic weight, Avogadro's number, **element, isotope, mole, molarity, concentration, solution, mixture.**
4. Discuss the following concepts: define energy, name the **types of energy, define potential, define kinetic.** Explain how energy is converted. Describe a force.
5. Discuss the following concepts: **mass**, conversion of mass, **gravity, conservation of mass, physical properties, physical states, solute, solvent, internal kinetic energy.**
6. Explain **chemical bonding.** Describe bonding & valence. Describe the types of bonding, and how they relate to electrons. **Define polar, nonpolar, hydrogen, covalent, ionic,** peptide, double bond, triple bond. **Give the basic characteristics of each type of bond.**
7. **Describe a chemical reaction.** Describe the different types of chemical reactions. Define the following: **compound, molecule, endothermic, exothermic, reactant, product, metabolism, catabolism, decomposition, synthesis, anabolism, exchange, compound, concentration, activation energy, concentration, enzyme, catalyst.** Describe the factors **affecting the rate of chemical reactions.**

Biochemistry

1. Explain the following concepts: **organic, inorganic, compound, molecule, aqueous, electrolyte, colloids, suspension.**
2. Explain and describe the following terms: **hydrogen donor, hydrogen acceptor, pH, Sorenson, base, alkaline, acid, buffer, carbonic acid, sodium hydroxide, hydrochloric acid.** Explain how buffers control pH.
3. Explain what is meant by the term **“macromolecule”**, and name them. Explain the function of each macromolecule. **List the ingredients of each macromolecule. Name their “building blocks”.** Define isomer, **polymer, dehydration synthesis, hydrolysis,** phosphate, sulphate.
4. Describe and define the following: **carbohydrate, sugar, starch,** monosaccharide, **polysaccharide, hexose, pentose, glucose, glycogen.** Describe the physiological roles of the hexoses vs. the pentoses. Name the common hexoses and pentoses in the body, and define their roles.
5. Define and describe the following: **lipids, fats, fatty acids, cholesterol, phospholipid, steroids, monounsaturated, polyunsaturated, saturated.** Describe plant vs animal fats.
6. Describe the classes and functions of proteins. Define and describe the following: **enzymatic, hormone, immune, channel, transport protein, amino acid, polypeptide, antibody, substrate, active site, primary structure, quaternary structure, denaturation.**

7. Describe and define the following: **nucleic acid, nucleotide**, nitrogenous base, purine, pyrimidine, **guanine, adenine, thymine, cytosine, uracil, RNA, DNA, code**, codon, anticodon, **gene, chromosome**, chromatid, **transcription, translation**.
8. Describe and define: ATP, AMP, phosphorylation, cellular respiration.
9. Describe how nitrogenous wastes accumulate in the body.

Chapter 3 The Cell (this chapter will be covered in class!!)

1. Define and describe the following: **cytology, somatic, plasma membrane, nucleus, cytoplasm, cytosol, matrix, gap junctions, desmosomes**.
2. **Describe the role of the plasma membrane, and the fluid mosaic model. Describe its role in transport & maintenance of a membrane potential.** Describe the classes of proteins and carbohydrates found in the plasma membrane. Explain the following: channels, peripheral proteins, glycocalyx, glycoproteins, proteoglycans, glycolipids, receptors, enzymes, anchoring proteins.
3. **Describe diffusion and osmosis.** Include the following: permeability, semi-permeable, **selectively permeable, hypertonic, hypotonic, isotonic, equilibrium, dynamic, gradient, facilitated**, osmotic pressure, osmotic, osmolality.
4. Define and describe the following: **active transport, endocytosis, exocytosis, phagocytosis, pinocytosis, membrane potential, resting membrane potential, polarity, current, voltage**.
5. Describe the role of the following: RER, SER, lysosome, **Golgi, cytoskeleton, ribosome, microvilli**, microtubule, centriole, centrosome, flagella, **cilia**, mitochondria, **nucleus, nuclear envelope, nuclear pores**.
6. Describe mitosis. Explain the following terms: **G1, S, G2, mitotic spindles, sister chromatids, replication, DNA polymerase, mutation, prophase, metaphase, anaphase, telophase, cytokinesis**.