



BAKER COLLEGE
STUDENT LEARNING OUTCOMES

CHM2310 Biochemistry
3 Semester Credit Hours

Student Learning Outcomes and Enabling Objectives

1. Use the metric system to measure physical dimensions and convert between units of measurement.
 - a. Identify the SI and base units of time, temperature, length, measurement, volume, and mass.
 - b. Calculate density, mass, and volume.
2. Explain the structure and properties of atoms and molecules
 - a. Identify the mass number and atomic number when given the standard isotopic notation.
 - b. Identify symbol, atomic number, and atomic weight in the periodic table.
 - c. Classify elements as metals, non-metals, metalloids, halogens, noble gases, representative elements, or transition elements.
 - d. Determine the number and properties of protons, neutrons, and electrons in an atom.
 - e. Classify ions and identify their role as electrolytes in solution.
3. Discuss the structure, nomenclature, and perform chemical calculations for simple compounds
 - a. Classify chemical bonds as covalent, polar covalent, or ionic
 - b. Identify the names and formulas of ionic and covalent compounds.
 - c. Determine the empirical formula, molecular formula, and molar mass of a compound.
 - d. Use the mole to convert between products and reactants in a chemical reaction.
 - e. Calculate the concentrations of solutions in percent mass-volume, molarity, and molality, and calculate how these change upon dilution.
4. Assess the properties that distinguish gases, liquids, and solids from one another.
 - a. Explain the three phases of matter.
 - b. Describe phase changes.
 - c. Differentiate between the physical and chemical properties of water.
 - d. State the gas laws and perform calculations illustrating them.
5. Differentiate properties of acids, bases, and buffers.
 - a. Identify the characteristics of acids and bases according to both the Bronsted-Lowry and Arrhenius definitions.
 - b. Identify common strong acids and bases.
 - c. Identify common weak acids and bases, emphasizing organic acids and bases.
 - d. Discuss equilibrium reactions and buffers.
6. Discuss the basic structure, properties and nomenclature of organic compounds
 - a. Define the following:
 - i. Alkanes

- ii. Alkenes
 - iii. Aromatics
 - iv. Alcohols
 - v. Aldehydes
 - vi. Ketones
 - vii. Carboxylic Acids
 - viii. Esters
 - ix. Amines
 - x. Amides
7. Differentiate between the major categories of compounds involved in biochemical reactions.
- a. Classify carbohydrates, monosaccharides, and polysaccharides and describe their basic composition, and structure.
 - b. Classify proteins.
 - i. Discuss the different amino acids observed in living systems and how their common structure contributes to the formation of peptide bonds.
 - ii. Discuss how the amino acid sequence determines the structure and function of polypeptides.
 - iii. Identify the levels of protein structure.
 - iv. Identify enzymes and vitamins
 - v. Describe the behavior and regulation of enzymes in metabolic reactions (protein catalysis).
 - vi. Differentiate between kinetics and thermodynamics of enzymatic reactions.
 - c. Classify lipids and describe their basic composition, structure and function.
 - d. Classify nucleic acids and describe their basic composition, structure and function.
 - i. Identify the five nucleotides that make up nucleic acids.
8. Analyze the roles of lipids and proteins in biological membranes.
- a. Describe the following
 - i. Diffusion
 - ii. Osmosis
 - iii. Passive transport
 - iv. Active transport
 - v. Selective permeability
9. Differentiate among metabolism, catabolism, and anabolism.
- a. Describe the following metabolic pathways involved in energy transfer:
 - i. Glycolysis
 - ii. Citric acid cycle
 - iii. Electron transport chain
 - iv. Anaerobic respiration and the formation of lactic acid
10. Explain DNA replication, transcription, and translation.
- a. Identify the major proteins needed for DNA replication, transcription, and translation.
 - b. Discuss the implications of these processes to homeostasis and their relation to gene expression
 - c. Compare genetic material of eukaryotes, prokaryotes, and viruses.
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These SLOs are not approved for experiential credit.

Effective: Fall 2019