CHEMISTRY BACKGROUND FOR BIO 121

The objectives on this page are covered in Chemistry 100 and ALR 135 (Modular Supplemental Chemistry Instruction). The student should be able to answer these prior to starting Bio 121.

Measurements and Matter

1. Demonstrate familiarity with metric units for mass, length, and volume in terms of:

   a. symbols and names of basic units and metric prefixes
   b. interconversion of metric units
   c. approximate English system equivalents to metric units.
   d. expression of numbers in scientific notation.

2. Contrast the Celsius and Fahrenheit temperature scales with respect to:

   a. freezing and boiling points of water.
   b. values for typical room temperature and body temperature.

3. Describe how density is calculated.

4. Define matter and discuss it in terms of:

   a. states of matter.
   b. changes in state of matter.
   c. physical and chemical properties of matter.
   d. law of conservation of matter.

5. Define energy and explain the following terms and concepts related to energy:

   a. potential energy
   b. kinetic energy
   c. calorie as a measure of energy
   d. transformation of energy
   e. law of conservation of energy

6. Using examples, distinguish between physical change and chemical change.

7. Describe, using an example: atom, element, molecule, compound, and mixture.

8. Describe the structure of an atom, including the physical properties, location, and function of the fundamental particles of an atom: a) electrons, b) protons, and c) neutrons.

9. Define:

   a. atomic number
   b. mass number
   c. atomic mass(weight) as given on the Periodic Table.

10. Demonstrate how the Periodic Table can be used to give information for: metal vs. nonmetal, atomic number, atomic mass(weight), electron distribution (on Bio 121 Periodic Tables), and elements which have similar chemical properties.

11. Name and recognize the symbol for elements 1 – 20 and 26 on the Periodic Table.

12. Define isotope and show how specific isotopes are symbolized.

CHEMISTRY BACKGROUND FOR BIO 121 2/18/04

The objectives on this page are covered in Chemistry 100 and ALR 135 (Modular Supplemental Chemistry Instruction) The student should be able to answer these prior to starting Bio 121.

Chemical Reactions

1. Demonstrate the ability to read a chemical equation by identifying reactants and products, and explain the difference between coefficients and subscripts.

2. Explain the significance of balancing chemical equations, and be able to read a balanced equation.

3. Using examples, compare the following types or patterns of chemical reactions:

   a. combination
   b. decomposition
   c. single replacement
   d. double displacement

4. Explain the difference between an atom and an ion.

5. Using the Periodic Table, determine the ionic charge for: Ca, Mg, Na, K, Cl, F, H, and O.

6. Using charges, write the formulas for simple ionic compounds.

7. Define and give examples of the following types of chemical bonding:

   a. ionic
   b. covalent

8. Define the following terms:

   a. anion
   b. cation
   c. polyatomic ion

CHEMISTRY BACKGROUND FOR BIO 121 2/18/04

The objectives on this page are *not covered* in Chemistry 100 or ALR 135 (Modular Chemistry Supplemental Instruction). They will be covered rapidly in Bio 121, so it is recommended that the student be familiar with these topics prior to starting Bio 121.

1. Explain what is meant by radioactive isotope, and give the properties of alpha, gamma, and beta types of radiation.

2. Explain how specific gravity is calculated.

3. Define and give an examples of polar and nonpolar types of covalent bonds (covered briefly in Chemistry 100).

4. Define and give examples of oxidation and reduction (covered briefly in Chemistry 100.)

5. Explain how the following factors affect the rate of a chemical reaction:

   a. nature of reacting substance c. presence of a catalyst and effect on activation energy
   b. concentration of reactants d. temperature e. surface area

6. Describe the dipolar nature of the water molecule, and explain the significance of this to the solvent properties of water.

7. Using water as an example, differentiate between hydrogen bonding and covalent bonds.

7. Describe what is meant by the equilibrium condition of a reversible reaction, and explain the effect on equilibrium of: a) catalyst, b) addition or removal of reacting substances or energy.

8. Define solution using the terms solute and solvent, and give the general properties of a solution.

9. Contrast and compare the following ways of expressing the strength of solutions:

   a. dilute vs. concentrated c. percentage e. molarity
   b. saturated vs. unsaturated d. weight/volume

10. Define and describe the following processes and terms relating to solutions:

    a. diffusion b. osmolarity c. osmosis d. osmotic pressure

11. Explain how a cell would be affected if surrounded by a solution which is:

    a. isotonic compared to the cell solution
    b. hypotonic compared to the cell solution
    c. hypertonic compared to the cell solution

12. Contrast the general properties of solutions with those of colloids and suspensions.

12. Define acids and bases and describe the general properties of both.

14. Define pH and demonstrate the use the pH scale in identifying acids and bases.

15. Using scientific notation, explain the relationship between H^+ concentration and pH.