CHAPTER 2 The Chemical Basis of Life

OBJECTIVES

Atoms and Molecules
Introduction

Explain how the rattlebox moth uses and transfers defensive substances throughout its life cycle.
2.1 Describe the levels of organization from an actin molecule to a complex insect flight muscle.
2.2 Define matter, an element, and a trace element.
2.3 Define a compound and explain how compounds in living organisms are different from compounds in nonbiological materials.
2.4 Describe the structure of an atom.
2.4 Define the atomic number and mass number of an atom.
2.4 Define an isotope and explain what makes some isotopes radioactive.
2.5 Explain why radioactive isotopes are important to biologists.
2.6 Explain how the electron configuration of an atom influences its chemical behavior.
2.7-2.9 Distinguish among nonpolar covalent, polar covalent, and ionic bonds noting their relative strengths and functions and the methods by which they are diagrammed.

The Properties of Water
2.10-2.14 Describe the special properties of water that make it vital to living systems. Explain how these properties are related to hydrogen bonding.
2.14 Define a solute, a solvent, and a solution.
2.15 Explain how acids and bases directly or indirectly affect the hydrogen ion concentration of a solution.
2.15 Explain the basis for the pH scale.
2.15 Explain how buffers work.
2.16 Describe the causes of acid precipitation and explain how it adversely affects the fitness of the environment.

Rearrangements of Atoms
2.17 Define a chemical reaction and distinguish between the reactants and products.