I. Introduction to Organic Compounds

A. Carbon “backbone”
   --enables attachment of many other molecules

B. Organic compounds serve important functions in living things
   1. structure of cells
   2. provide energy for cell functions
   3. store and transmit information

C. Types of organic compounds

   1. carbohydrates
   2. lipids
   3. proteins
   4. nucleic acids

Chapter 4

II. Chemistry of Carbon

A. Chemical bonds with carbon

   1. 4 valence electrons
      a. 1 pair participates in covalent bond
      b. can form covalent bonds with different atoms
      c. can form bonds with other carbon atoms

   2. shape of carbon molecules: chains or rings

B. Functional groups

   1. way to form many kinds of organic compounds
   2. can attach different “groups” of atoms to same backbone
   3. can change the chemical reactivity of molecules

Six functional groups important in chemistry of life
   – Hydroxyl  ——OH
   – Carbonyl  ᴛ CO
C. Structure of carbon molecules

1. isomers
   a. structural isomers
   b. geometric isomers
   c. enantiomers

Chapter 5

D. Complex organic compounds--Macromolecules

1. individual units, monomers, can be linked to form polymers

2. forming (synthesizing) polymers
   --condensation or dehydration synthesis

3. breaking apart polymers
   --hydrolysis

III. Four Main Types of Organic Compounds in Organisms

A. Carbohydrates

1. monosaccharides
2. disaccharides
3. polysaccharides
   a. starch
   b. glycogen
   c. cellulose
   d. chitin

B. Lipids
1. neutral fats
   a. saturated

   b. unsaturated

2. phospholipids
   --amphipathic

3. carotenoids

4. steroids

C. Proteins

1. formed by linking together amino acids
   --peptide bond, polypeptides

2. protein structure--conformation
   a. primary structure
      --amino acid sequence

   b. secondary structure
      --coiling or folding of peptide chain

   c. tertiary structure
      --overall shape of polypeptide chain

   d. quaternary structure
      --aggregation of 2 or more polypeptide chains

   denaturation

D. Nucleic acids

1. contains hereditary information and information for making proteins
   DNA--deoxyribonucleic acid
   RNA--ribonucleic acid

2. made up of nucleotides
   a. 5 C sugar, nitrogenous base, phosphate group

   b. phosphodiester linkages
c. some nucleotides are important energy molecules
   ATP--adenosine triphosphate