

Unit 2 Chemistry of Life

Chemistry of Life (pgs 148-174)

Online Textbook <http://www.glencoe.com/ose> Access Code: DAD47D351D

Learning Targets

- I can draw atom models and identify the proton, neutron, and electron number in an atom.
- I can differentiate between ionic and covalent bonds.
- I can identify the 6 most common elements in living things.
- I can identify the specific elements in each of the organic macromolecules.
- I can describe the individual subunits in each of the organic molecules.
- I can recognize the structural formulas of each organic molecule.
- I can identify examples of the organic macromolecules.
- I can summarize the major functions of each organic macromolecule.
- I can predict what would happen to my body if certain organic macromolecules were not available.
- I can describe hydrolysis and dehydration.
- I can differentiate between reactants and products in a chemical reaction.
- I can identify how organic molecules are broken down and made.
- I can describe the polar property of water.
- I can summarize the importance of water.
- I can explain why hydrogen bonds form.
- I can differentiate between acids and bases.
- I can summarize the functions of enzymes.
- I can create a model showing how enzymes function.
- I can explain how pH and/or temperature affects enzyme function.

Unit 2 Vocabulary http://quizlet.com/_fpm6z

1. **acid:** any substance that forms hydrogen ions (H^+) in water, pH below 7; sour taste; turns blue litmus red; phenolphthalein remains clear; example: lemon juice

2. **activation energy:** the amount of energy needed to begin a chemical reaction

3. **amino acid:** building blocks of proteins; 20 amino acids

4. **atom:** smallest particle of an element that still retains the same characteristics of the element; made of neutrons, protons and electrons

5. **base:** any substance that forms hydroxide ions in water (OH^-); pH above 7; bitter taste; slippery; turns red litmus blue; phenolphthalein turns pink; example: soap

6. **buffers:** substances that maintain certain pH levels
7. **carbohydrate:** macromolecule composed of carbon, hydrogen, and oxygen in a ratio of two hydrogen atoms to one carbon atom to one oxygen atom; starch, glycogen and cellulose
8. **catalyst:** substance that speeds chemical reactions by lowering the activation energy
9. **chemical reaction:** process that rearranges atoms to form different substances (reactants to products)
10. **compound:** composed of atoms of two or more different elements that are chemically combined; can be either covalent or ionic
11. **covalent bond:** a bond formed between two or more atoms by the sharing of electrons forming a molecule; examples include lipids, proteins and water
12. **dehydration:** a process that removes -OH from one monomer and H⁺ from another monomer to create water and a polymer
13. **element:** a substance that cannot be broken down into simpler chemical substances; composed of the same type of atoms
14. **enzyme:** protein, biological catalyst, that increases the rate of a chemical reaction; is not changed in reaction; affected by heat and pH; become denatured and will not function properly
15. **hydrogen bond:** weak chemical bond formed by the attraction between polar molecules
16. **hydrolysis:** a process that breaks bonds of a polymer to the individual monomers by taking the -OH and H⁺ from a water molecule and adding them to each monomer
17. **ion:** charged particle formed when one or more atoms gain or lose electrons
18. **ionic bond:** attractive force between two ions of opposite charge; example: salt, NaCl; Na⁺ has a positive charge and Cl⁻ has a negative charge
19. **isotope:** atoms of the same element that have different number of neutrons; has the same number of protons; can be radioactive
20. **lipid:** macromolecule composed mostly of carbon and hydrogen atoms with a few oxygen atoms; examples include waxes, fats, oils and steroids; insoluble in water; make up part of cell membrane
21. **macromolecules:** large molecules, polymers, that are found in organisms (carbohydrates, lipids, proteins, nucleic acids)
22. **metabolism:** all of the chemical reactions that occur within an organism
23. **mixture:** combination of substances in which the individual components retain their own properties; example - sugar in water or salt in water
24. **molecule:** group of atoms held together by covalent bonds; examples: glucose and water
25. **monomer:** building blocks of polymers; examples include monosaccharides, amino acids, nucleotides
26. **nucleic acid:** macromolecule that stores cellular information in the form of a code made of nucleotides; DNA and RNA are examples
27. **nucleotide:** monomers consisting of carbon, hydrogen, oxygen, nitrogen and phosphorus; building blocks of nucleic acids; three parts: nitrogenous base, simple sugar and a phosphate group
28. **nucleus:** center of an atom; contains the protons and neutrons; positively charged. Atomic mass is the combination of the neutrons and protons, atomic number is the number of protons only
29. **peptide bond:** covalent bond formed between amino acids; creates proteins

30. **pH:** measure of how acidic or basic a solution is; pH scale is from 0 to 14. 0 to 7 is acidic; 7 to 14 is basic; 7 is neutral
31. **polar molecule:** molecule with an unequal distribution of charge, resulting in the molecule having a positive end and a negative end. example - water
32. **polymer:** large molecule formed when many smaller molecules bond together; can be formed by dehydration
33. **product:** substance(s) that are created as a result of a chemical reaction
34. **protein:** macromolecule composed of carbon, hydrogen, oxygen, nitrogen and sometimes sulfur; building blocks are amino acids; enzymes; created at ribosomes
35. **reactant:** substances needed to start a chemical reaction
36. **solution:** a mixture in which one or more substances (solute) are distributed evenly in another substance (solvent); water is the universal solvent; example: sweet iced tea
37. **substrate:** reactants that bind to an enzyme
38. **van der Waals forces:** attraction between the positive and negative regions of molecules that hold them together (weak attraction)

Michigan HSCE for Biology

- B2.2A Explain how carbon can join to other carbon atoms in chains and rings to form large and complex molecules.*
- B2.2B Recognize the six most common elements in organic molecules (C, H, N, O, P, S).*
- B2.2C Describe the composition of the four major categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids).*
- B2.2D Explain the general structure and primary functions of the major complex organic molecules that compose living organisms.*
- B2.2E Describe how dehydration and hydrolysis relate to organic molecules.*
- B2.2f Explain the role of enzymes and other proteins in biochemical functions (e.g., the protein hemoglobin carries oxygen in some organisms, digestive enzymes, and hormones).*
- B2.3A Describe how cells function in a narrow range of physical conditions, such as temperature and pH (acidity), to perform life functions.*
- B2.5A Recognize and explain that macromolecules such as lipids contain high energy bonds.*