Name _____ Class _____ Date _____

SECTION 2-1 REVIEW

THE NATURE OF MATTER

VOCABULARY REVIEW **Define the following terms.**

1. **atom** _____

_____

2. **nucleus** _____

_____

3. **compound** _____

_____

4. **covalent bond** _____

_____

5. **ion** _____

_____

MULTIPLE CHOICE **Write the correct letter in the blank.**

_____ 1. The atomic number of carbon is 6. Therefore, the number of protons in a carbon atom equals

a. 3. b. 6. c. 7. d. 12.

_____ 2. One of the kinds of particles found in the nucleus of an atom is the

a. proton. b. electron. c. ion. d. boron.

_____ 3. What type of electron is available to form bonds?

a. valence b. ionic c. nucleus d. covalent

_____ 4. What type of ion forms when an atom loses electrons?

a. neutral b. negative c. positive d. van der Waals

_____ 5. An example of a compound is

a. water. b. hydrogen gas. c. oxygen gas. d. chloride ion.

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SHORT ANSWER Answer the questions in the space provided.

1. What is the difference between the mass number and the atomic number? (p.36)_____

   _____

   _____

2. Identify the elements and the number of atoms of each element in each of the following compounds: (p.1086)

   BO_2 _____ KCl _____

   $C_6H_{12}O_6$ _____ NH_3 _____

3. Compare protons, electrons, and neutrons with respect to location within atoms, electric charge, and mass.

   (pp.35-36)_____

   _____

   _____

4. Describe the two main types of chemical bonds that are found in compounds. (p.38)_____

   _____

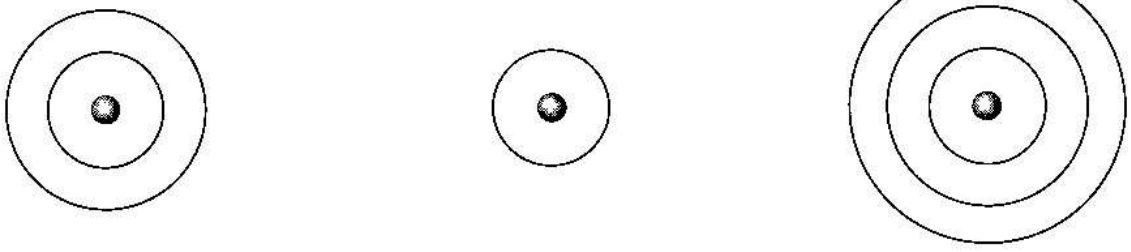
   _____

5. What are van der Waal forces? (p.39)_____

   _____

STRUCTURES AND FUNCTIONS Label each atom in the spaces provided, and complete the models by drawing the correct number of electrons at each energy level. (p.38 shows some different atoms as an example)

The diagrams below represent incomplete models of the atoms helium (atomic number 2), carbon (atomic number 6), and sulfur (atomic number 16). **Note**: The second and third energy levels can hold up to eight electrons each.



a _____ b _____ c _____

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SECTION 2-2 REVIEW

PROPERTIES OF WATER

VOCABULARY REVIEW **Define the following terms.**

1. polar compound _____

_____

2. hydrogen bond _____

_____

3. **cohesion** _____

4. **adhesion** _____

MULTIPLE CHOICE **Write the correct letter in the blank.**

_____ 1. Ice floats on water because

a. of cohesion.
b. ice is less dense than water.
c. ice has a higher density than water.
d. water shrinks when it freezes.

_____ 2. An example of a base is

a. pure water.
b. vinegar.
c. ammonia.
d. urine.

_____ 3. When water occasionally ionizes, it forms equal amounts of

a. H^+ ions and H_2O.
b. H^+ ions and OH^- ions.
c. H^+ ions and H_3O^+.
d. OH^+ ions and H_3O^-.

_____ 4. When a glass is filled to the brim with water, the water appears to bulge from the sides of the glass due to

a. capillarity.
b. thermal energy.
c. humidity.
d. cohesion.

_____ 5. A solution with a pH above 7 is

a. logarithmic.
b. neutral.
c. acidic.
d. alkaline.

_____ 6. When salt is dissolved in water, water is the

a. reactant.
b. solvent.
c. solute.
d. solution.

Name _____ Class _____ Date _____

SHORT ANSWER Answer the questions in the space provided.

1. What property makes water a good solvent? (p.42)_____

   _____

2. What are the two types of mixtures and how do they differ from each other? (p.42)_____

   _____

   _____

3. What property of water allows it to stick to a dry surface, such as your skin or clothes? (p.41)_____

   _____

4. If a solution has a pH of 7.0, what would be its new pH if the acidity in the solution were increased by 100 times?

   Explain your reasoning. (p.43)_____

   _____

5. Explain why water forms large, round drops as it falls from a faucet with a slow leak. (p.41)

   _____

   _____

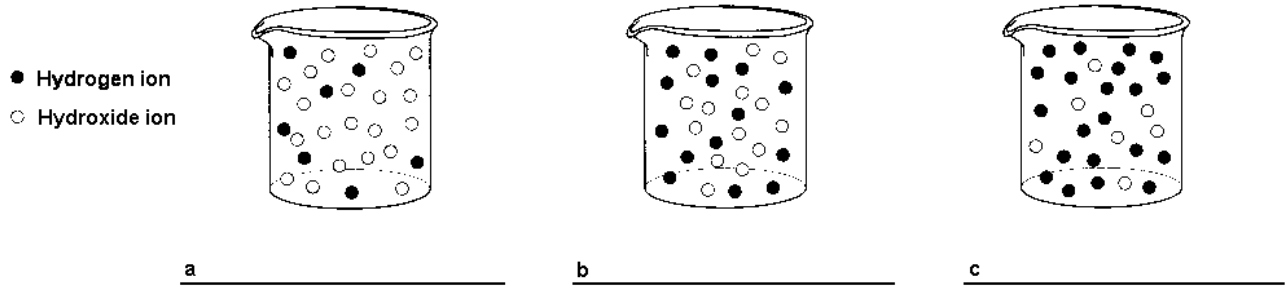
6. How are buffers important to the functioning of living systems? (p.43)_____

   _____

   _____

STRUCTURES AND FUNCTIONS In the space below each solution, indicate whether that solution is acidic, alkaline, or neutral. (pp.42-43)

The diagram below represents three solutions with different relative amounts of hydrogen and hydroxide ions.



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SECTION 2-3 REVIEW

CARBON COMPOUNDS

VOCABULARY REVIEW **Define the following terms and provide one example for each.**

1. organic chemistry _____

_____

2. **polysaccharide** _____

_____

3. **monosaccharide** _____

_____

4. **amino acid** _____

_____

5. **polymer** _____

_____

MULTIPLE CHOICE **Write the correct letter in the blank.**

_____ 1. The different shapes and functions of different proteins are determined by

a. the R groups of the amino acids they contain.
b. the carboxyl groups of the amino acids they contain.
c. the amino groups of the amino acids they contain.
d. whether or not they contain any amino acids.

_____ 2. The number of single covalent bonds a carbon atom can form is

a. 1. b. 2 c. 4. d. 8.

_____ 3. Glycogen is a(n) _____ and is found in your liver and muscles

a. amino acid b. monomer c. nucleotide d. polysaccharide

_____ 4. Which of the following organic compounds is the main source of energy for all living things?

a. carbohydrates
b. proteins
c. steroids
d. deoxyribonucleic acids

_____ 5. Which of the following is not a function of a protein?

a. help to fight disease
b. to control the rate of chemical reactions
c. to store and transmit hereditary information
d. to allow substances into or out of a cell

Name _____ Class _____ Date _____

SHORT ANSWER Answer the questions in the space provided.

1. What are the storage and quick energy forms of carbohydrates found in animals, and how are these structurally related to each other? (pp.45-46)_____

   _____

2. Arrange the following in order of size, from smallest to largest: polymer, monomer, carbon atom, macromolecule. (p.45)_____

3. No other element can form the amount and variety of molecules that carbon can form. What characteristic does carbon have that would explain this fact? (p.44)_____

4. What organic compound forms most of a cell's membrane, can store large amounts of energy, act as chemical messenger, and even serve as an insulator to conserve body heat? (p.46)_____

5. Name the two types of nucleic acids? (p.47)_____

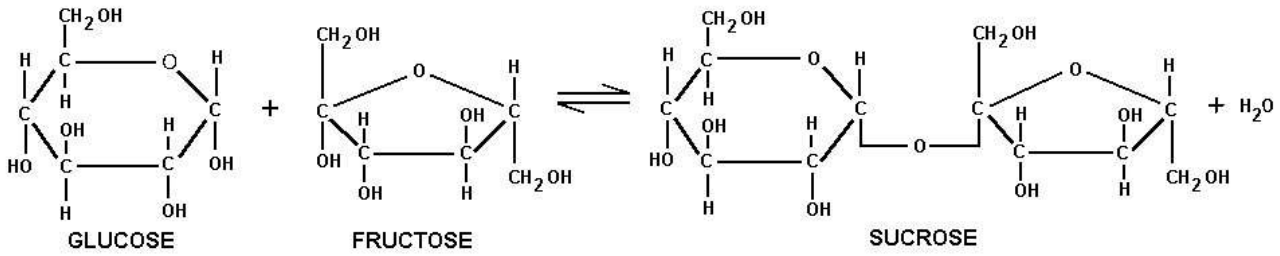
   What are the names of the sugars that form the main part of their nucleotides? (p.47)_____

   _____

6. Insects that live on land have a coating of wax on the outer surface of their body. What function might this wax serve for these animals? (p.46)_____

STRUCTURES AND FUNCTIONS Use the figure to answer the following questions. (p.49)

The formation of sucrose from glucose and fructose is represented by the chemical equation shown below. Notice that this reaction can proceed in either direction.



1. What are the reactants and products of the forward (left to right) reaction? _____

   _____

2. What are the reactants and products of the reverse (right to left) reaction? _____

   _____

Name _____ Class _____ Date _____

SECTION 2-4 REVIEW

CHEMICAL REACTIONS AND ENZYMES

VOCABULARY REVIEW **Distinguish between the terms in each of the following pairs of terms.**

1. **substrate**, **product** _____

_____

2. active site, **enzyme** _____

_____

3. spontaneous reaction, **activation energy** _____

_____

MULTIPLE CHOICE **Write the correct letter in the blank.**

_____ 1. If a reaction in one direction releases energy, the reaction in the opposite direction

a. also releases energy. b. destroys energy. c. absorbs energy. d. cannot occur.

_____ 2. Every chemical reaction involves

a. a change in the state of matter.
b. a net release of free energy.
c. the transfer of energy from one form to another.
d. the breaking and forming of bonds between atoms.

_____ 3. Enzymes

a. increase the amount of energy released.
b. reduce the amount of activation energy.
c. catalyze only energy releasing reactions.
d. decrease the amount of energy released.

_____ 4. In chemical reactions, the number of each kind of atom in the reactant(s) is

a. the same as in the product(s).
b. less than in the product(s).
c. less if the reaction is stable.
d. more if the reaction is unstable.

_____ 5. Enzymes affect the reactions in living cells by changing the _____ of the reaction.

a. products b. speed c. temperature d. pH

_____ 6. A substance that speeds up the rate of a chemical reaction is called

a. an activist. b. DNA. c. a lipid. d. catalyst.

_____ 7. What is the term used to describe the energy needed to get a reaction started?

a. adhesion energy b. cohesion energy c. activation energy d. free energy

Name _____ Class _____ Date _____

SHORT ANSWER Answer the questions in the space provided.

1. In the chemical reaction shown below, write *R* over the reactants and *P* over the products: (p.49)

$$C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$$

2. What role do catalysts play in chemical reactions? (p.51)_____

_____

_____

3. How do most cells regulate the activity of enzymes? (p.53)_____

_____

4. In an enzyme-catalyzed reaction, what role does the active site play in the reaction? (p.53)_____

_____

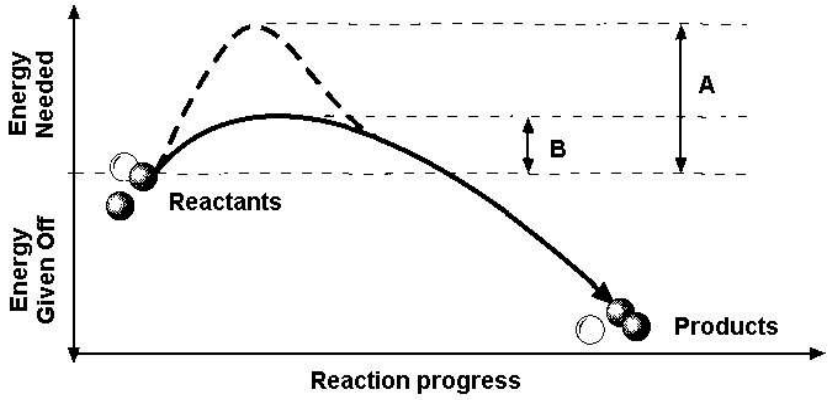
5. Sucrose, or table sugar, can react with water to form two other compounds, glucose and fructose. However, when you add sugar to a glass of water, this reaction proceeds extremely slowly. Why does it proceed slowly, and what else is needed to speed up the reaction? (p.50)_____

_____

_____

STRUCTURES AND FUNCTIONS Use the figure to answer the following questions. (p.50)

The graph below represents the energy changes that occur as a chemical reaction progresses.



1. What is represented by arrow *A*? _____

2. What is represented by arrow *B*? _____

3. Is this reaction releasing energy or absorbing it? Explain your answer. _____

_____

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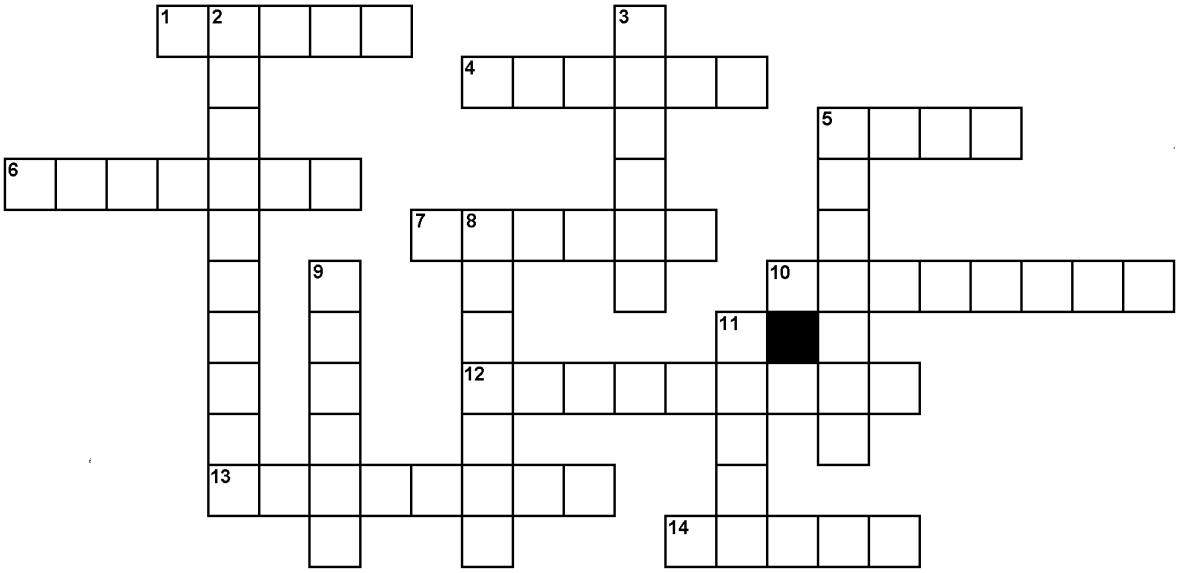
VOCABULARY - CHAPTER 2

The crossword puzzle is a simple way to master some of the more important vocabulary terms in this chapter.



Across

1. a reaction that involves a reduction and oxidation of the reactants is abbreviated as a _____ reaction
4. a substance that is dissolved by a solvent
5. composed of electrons, protons, and usually neutrons
6. a pure substance made of one type of atom
7. _____ is any substance that has mass and volume
10. bond formed by sharing a pair of electrons
12. reaction that gives off free energy
13. substances composed of two or more different atoms
14. the rule of eight is also called the _____ rule

Down

2. reaction that does not give off free energy
3. a substance that resists changes in pH
5. a common base used sometimes as a window cleaner
8. word that pertains to water
9. usually a protein that speeds up a chemical reaction
11. the bond formed when two ions of opposite charge are attracted to each other

The following terms are **not** used in this chapter but are found in this puzzle. Use a reference source and look up their meanings so you can complete this vocabulary puzzle. **matter, exergonic, endergonic, aqueous, octet, and redox**.