Name _____ Class _____ Date _____

Section 1: Atoms, Ions, and Molecules

Study Guide A

KEY CONCEPT

All living things are based on atoms and their interactions.

VOCABULARY

atom	ion	molecule
element	ionic bond	
compound	covalent bond	

MAIN IDEA: Living things consist of atoms of different elements.

Draw lines to connect the parts of an atom with their descriptions.

1. nucleus	particle with a positive electrical charge
2. neutron	particle with a negative electrical charge
3. proton	particle with no electrical charge
4. electron	dense center of an atom

Circle the word or phrase that best completes the sentence.

5. Water (H_2O) and carbon dioxide (CO_2), are examples of *compounds / elements.*

6. *Elements / Compounds* are made up of only one type of atom.

MAIN IDEA: Ions form when atoms gain or lose electrons.

Choose whether the statement is true or false.

7. *true / false* An atom becomes an ion when its number of protons changes.

8. *true / false* Some ions are positively charged, and some ions have no charge.

9. *true / false* The formation of an ion results in a full outermost energy level.

10. *true / false* Ions usually form when electrons are transferred from one atom to another.

Name _____ Class _____ Date _____

Section 2: Properties of Water

Study Guide A

KEY CONCEPT

Water's unique properties allow life to exist on Earth.

VOCABULARY

hydrogen bond	solution	acid
cohesion	solvent	base
adhesion	solute	pH

MAIN IDEA: Life depends on hydrogen bonds in water.

Choose whether the statement is true or false.

1. *true / false* Polar molecules have two regions with a slight positive charge.
2. *true / false* Water is a polar molecule.
3. *true / false* Slightly charged regions of water molecules form hydrogen bonds.

Choose the best answer for the question.

4. Which property allows water to resist changes in temperature?
   a. high specific heat
   b. cohesion
   c. adhesion
   d. polarity
5. Which property causes water to form beads?
   a. high specific heat
   b. cohesion
   c. adhesion
   d. polarity
6. Which property of water helps plants to transport water from their roots to their leaves?
   a. high specific heat
   b. cohesion
   c. adhesion
   d. polarity

Name_____ Class _____ Date _____

Section 3: Carbon-Based Molecules

Study Guide A

KEY CONCEPT

Carbon-based molecules are the foundation of life.

VOCABULARY

monomer	lipid	amino acid
polymer	fatty acid	nucleic acid
carbohydrate	protein	

MAIN IDEA: Carbon atoms have unique bonding properties.

Choose whether the statement is true or false.

1. *true* / *false* Carbon atoms form the building blocks of most living things.
2. *true* / *false* Carbon's outer energy level is full.
3. *true* / *false* Carbon atoms can form covalent bonds with up to four other atoms.
4. *true* / *false* The three basic structures of carbon-based molecules are straight chain, bent chain, and ring.
5. Choose one of the three basic structures of carbon-based molecules to sketch in the space below. Label your sketch with the name of the basic structure.

Name_____ Class _____ Date _____

Section 4: Chemical Reactions

Study Guide A

KEY CONCEPT

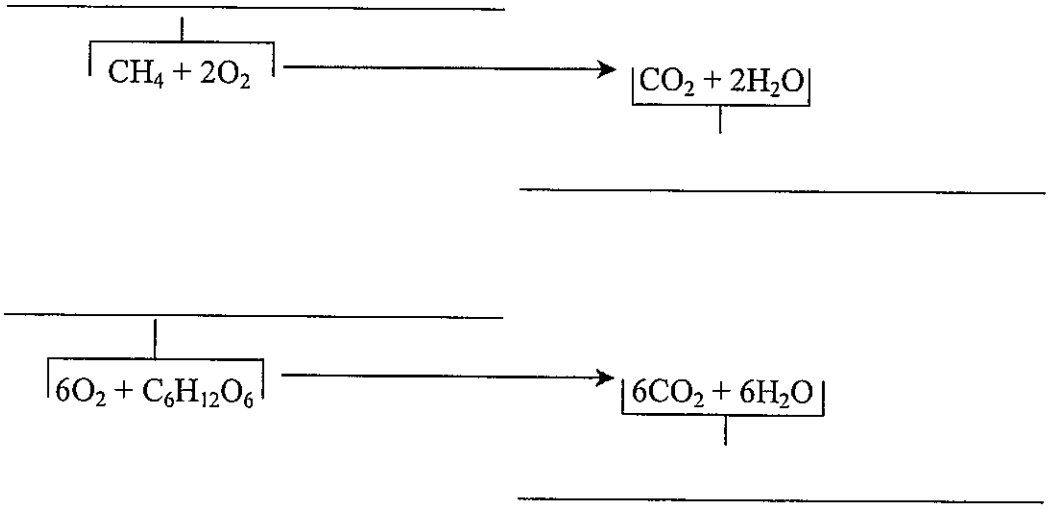
Life depends on chemical reactions.

VOCABULARY

chemical reaction	bond energy	exothermic
reactant	equilibrium	endothermic
product	activation energy	

MAIN IDEA: Bonds break and form during chemical reactions.

1. Label the reactants and products in the chemical reactions shown below.



Circle the word or phrase that best completes the sentence.

2. During a chemical reaction, *chemical bonds / solutes* break and reform.
3. *Reactants / products* are the substances changed during a chemical reaction.
4. Bond energy is the amount of energy it takes to break a bond between two *atoms / ions*.
5. Equilibrium occurs when reactants and products are made at *the same rate / different rates*.

Name _____ Class _____ Date _____

Section 5: Enzymes

Study Guide A

KEY CONCEPT

Enzymes are catalysts for chemical reactions in living things.

VOCABULARY

catalyst	substrate
enzyme	

MAIN IDEA: A catalyst lowers activation energy.

Choose the best answer to the question.

1. Activation energy is the energy required to
   a. complete a chemical reaction.
   b. start a chemical reaction.
   c. produce a catalyst.
   d. produce the reactants.

2. Which of the following can reduce the amount of energy needed for a chemical reaction to take place?
   a. reactant
   b. product
   c. catalyst
   d. hydrogen bond

3. What happens to the speed of a chemical reaction when a catalyst is present?
   a. It speeds up.
   b. It slows down.
   c. It stays the same.
   d. It becomes erratic.