Chapter 7 – Chemical Reactions

Section 7.1 – Describing Reactions

- In a _____, the substances that _____ change are called _____.
- The _____ formed as a result of that change are called _____.

  _____ → _____

- A _____ is a representation of a chemical reaction in which the _____ are expressed in _____.
- The _____ states that mass is neither _____ in a chemical reaction.
- In order to show that _____ is _____ during a reaction, a _____ must be _____.
- You can _____ a chemical equation by changing the _____, the _____ that appear _____ the formulas.
- As you _____, you should never change the _____ in a formula.
- Balance the following equations.

___Cu + ___O_2 →___ CuO ___H_2 + ___Cl_2 → ___HCl ___H_2O_2 → ___H_2O + ___O_2

___Mg + ___HCl → ___H_2 + ___$MgCl_2$ ___C_2H_4 + ___O_2 → ___CO_2 +___ H_2O

- Balance _____ last.
- Keep _____ together if possible.
- If you have an _____ of atoms on one side, you can multiply by ____ to make it even.
- Because _____ often involve _____ of small particles, chemists use a counting unit called the _____ to measure _____ of substances.

  1 mole =

- This number is called _____.

Section 7.1 Assessment

1. What is the law of conservation of mass?

2. Why does a chemical equation need to be balanced?

3. Why do chemists use the mole as a counting unit?

4. Is the following equation balanced?

   $2Na + Cl_2 \rightarrow 2NaCl$

5. Balance the following equation.

   ___K + ___Br_2 → ___KBr

6. Balance the following equation.

   ___Mg + ___O_2 → ___MgO

Section 7.2 – Types of Reactions

- Some general types of chemical reactions are _____

_____

_____.

- A _____ reaction is a reaction in which _____ substances react to form a _____ substance.

  $A + B \rightarrow AB$ Examples:

- A _____ reaction is a reaction in which a _____ breaks down into _____ simpler substances.

  $AB \rightarrow A + B$ Examples:

- A _____ reaction is a reaction in which _____ takes the place of another element in a _____.

  $A + BC \rightarrow B + AC$ Examples:

- A _____ reaction is one in which two different _____ exchange _____ and form _____ new compounds.

  $AB + CD \rightarrow AD + CB$ Examples:

- A _____ reaction is one in which a substance reacts rapidly with _____, often producing _____.

  $C_xH_y + O_2 \rightarrow CO_2 + H_2O$ Examples:

Section 7.2 Assessment

1. What are five general types of reactions?

2. The synthesis of water is described by the following reaction $2H_2 + O_2 \rightarrow 2H_2O$. How is the decomposition of water related to this reaction?

3. Explain the difference between a single-replacement reaction and a double-replacement reaction.

4. When propane (C_3H_8) undergoes combustion, what products are formed?

5. Identify the following reactions.

   a. $Pb(NO_3)_2 + 2HCl \rightarrow PbCl_2 + 2HNO_3$

   b. $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$

   c. $Ca + 2HCl \rightarrow CaCl_2 + H_2$

   d. $2SO_2 + O_2 \rightarrow 2SO_3$

Section 7.3 – Energy Changes in Reactions

- _____ is the energy stored in the _____ of a substance.
- Chemical reactions involve the _____ in the reactants and the in the products.
- _____ chemical bonds _____ energy.
- The _____ of chemical bonds _____ energy.
- In a _____, energy is either _____.
- A chemical reaction that _____ to its surroundings is called an _____.
- In _____, the energy _____ as the products form is greater than the energy _____ to break the bonds in the reactants.
- A chemical reaction that _____ energy from its surroundings is called an _____.

- In an _____, more energy is _____ to break the bonds in the reactants than is _____ by the formation of the products.
- The _____ states that energy is neither _____ _____ in a chemical or physical process.

Section 7.3 Assessment

1. What happens to chemical bonds as a chemical reaction occurs?

2. How do chemical reactions involve energy?

3. Is the combustion of propane endothermic or exothermic?

4. Is energy created during an exothermic reaction? Explain.

5. What bonds are broken when one molecule of methane reacts with two molecules of oxygen in the following reaction:

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

Section 7.4 – Reaction Rates

- A _____ is the rate at which reactants _____ into products over time.
- _____ tell how _____ a reaction is going.
- Factors that affect reaction rates include _____ _____.
- Chemical reactions are based on the _____ of particles.
- Generally, an increase in _____ will increase the _____, while a decrease in temperature will _____ the reaction rate.
- Increasing the _____ of a substance causes its _____ to move faster which causes more _____.
- An increase in _____ increases the _____ of reactants to one another.
- The greater this _____, the more _____ there are that involve reacting _____.

- _____ the reactants will generally _____ the reaction rate.
- _____ causes the reactants to _____ quickly, which causes more _____.
- _____ refers to the _____ in a given volume.
- Generally, _____ increases as _____ increases.
- The _____ that are present in a given volume, the more opportunities there are for _____ involving those particles.
- A _____ is a substance that affects the _____ without being used up in the reaction.
- Since a _____ is neither a _____, it is written over the _____.

$2SO_2 + O_2 \rightarrow 2SO_3$

Section 7.4 Assessment

1. What does a reaction rate tell you?

2. What five factors affect reaction rate?

3. Explain why reactions take place faster at higher temperatures.

4. How does a catalyst make a reaction go faster?

5. Explain why hamburger meat lasts longer in the freezer than in refrigerator.

6. The reaction between magnesium and hydrochloric acid produces hydrogen. If you increase the concentration of HCl, the reaction takes place faster. Could HCl be considered a catalyst for this reaction? Explain.