

Review and Reinforce

Observing Chemical Change

Understanding Main Ideas

Complete the following table. Describe changes in properties that you might notice during each process and state whether the changes are chemical or physical.

Changes in Matter		
Event	Observable Changes	Type of Change
Baking a cake	1.	2.
Burning a log	3.	4.
Freezing water	5.	6.

Building Vocabulary

Fill in the blank to complete each statement.

7. Any change that alters a substance without changing it into another substance is a(n) _____ change.
8. _____ is anything that has mass and takes up space.
9. A reaction that releases energy in the form of heat is called a(n) _____ reaction.
10. A(n) _____ reaction is a reaction in which energy is absorbed.
11. A chemical change is also referred to as a(n) _____
12. A(n) _____ is a solid formed from liquid reactants during a chemical reaction.

Lesson Quiz

Observing Chemical Change

Write the letter of the correct answer on the line at the left.

1. ____ Which of the following is true about chemical reactions?
A They are accompanied by changes in energy.
B They form new substances with new properties.
C both A and B
D neither A nor B
2. ____ In an endothermic reaction, energy is
A absorbed
B released
C converted to mass
D synthesized
3. ____ Which of the following is NOT a physical property?
A melting point
B state of matter
C density
D flammability
4. ____ Substances formed as a result of a chemical reaction are called
A catalysts
B precipitates
C products
D reactants

If the statement is true, write *true*. If the statement is false, change the underlined word or words to make the statement true.

5. _____ In an exothermic reaction, products have more energy than reactants.
6. _____ Water boils at 100°C. This is an example of a chemical property.
7. _____ Substances that enter into a chemical reaction are called products.
8. _____ The ability to react with oxygen is an example of a chemical property.
9. _____ Another name for a chemical change is a chemical bond.
10. _____ In a physical change, some of the physical properties of the substance may be altered and the chemical composition remains the same.

Review and Reinforce

Describing Chemical Reactions

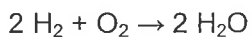
Understanding Main Ideas

Complete the table. Balance each equation. Then indicate whether the reaction is a synthesis, decomposition, or replacement reaction.

	Given Equation	Balanced Equation	Type of Reaction
1.	$\text{FeS} + \text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2\text{S}$	a.	b.
2.	$\text{Na} + \text{F}_2 \rightarrow \text{NaF}$	a.	b.
3.	$\text{HgO} \rightarrow \text{Hg} + \text{O}_2$	a.	b.

Answer questions 4 and 5 on a separate sheet of paper.

4. Describe in words the reaction represented by the equation and include a description of the composition of each kind of molecule.



5. Use the law of conservation of mass to explain why the equation in question 4 is balanced.

Building Vocabulary

Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

- | | |
|--------------------------------|---|
| 6. ____ chemical equation | a. substance present after a reaction |
| 7. ____ decomposition reaction | b. reaction in which substances combine to form a more complex compound |
| 8. ____ coefficient | c. principle that states that matter is not created or destroyed during a chemical reaction |
| 9. ____ product | d. reaction in which one element replaces another in a compound |
| 10. ____ reactant | e. substance present before a reaction |
| 11. ____ synthesis reaction | f. number telling how many molecules of a substance are involved in a chemical reaction |
| 12. ____ replacement reaction | g. reaction in which compounds are broken down into simpler substances |
| 13. ____ conservation of mass | h. uses symbols and formulas to show chemical reactions |

Lesson Quiz

Describing Chemical Reactions

Write the letter of the correct answer on the line at the left.

- ____ In a balanced chemical equation,
 - atoms are conserved
 - coefficients are equal
 - molecules are equal
 - energy is not conserved
- ____ When the equation $\text{Al} + \text{Br}_2 \rightarrow \text{AlBr}_3$ is balanced, the coefficient for Al is
 - 1
 - 2
 - 3
 - 4
- ____ The reaction in which hydrogen and oxygen are produced by running an electric current through water is an example of
 - single replacement
 - decomposition
 - synthesis
 - double replacement
- ____ A reaction that has two compounds as reactants and two compounds as products is most likely a
 - synthesis reaction
 - single replacement reaction
 - double replacement reaction
 - decomposition reaction

Fill in the blank to complete each statement.

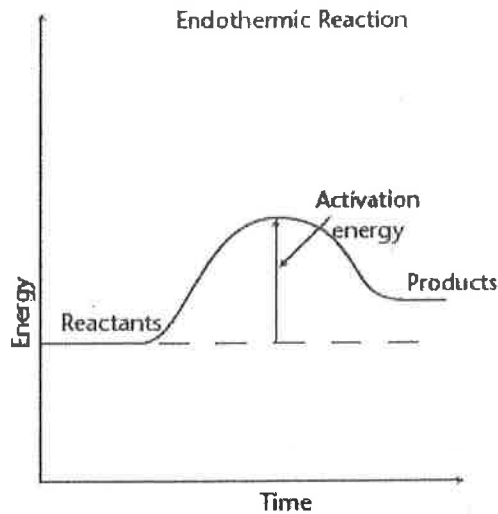
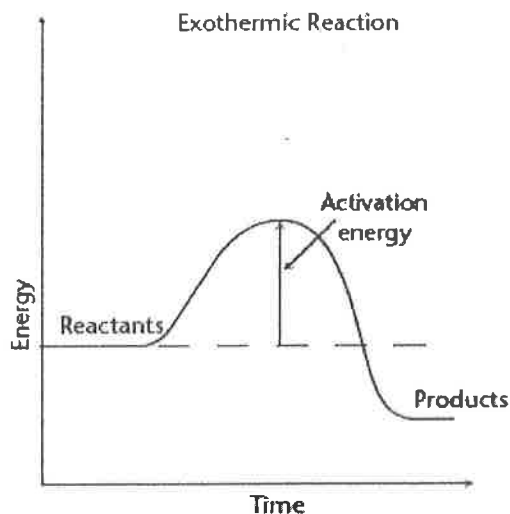
- A number written in front of a chemical formula is a(n) _____.
- The principle that states that matter is neither created nor destroyed during a chemical reaction is called the law of _____.
- The production of carbon dioxide during the burning of a fuel is an example of a(n) _____ reaction.
- In a chemical equation, the arrow is read as _____.
- In the balanced chemical equation for the formation of ammonia (NH_3) from nitrogen (N_2) and hydrogen (H_2), the sum of the coefficients is _____.
- The law of conservation of mass was first demonstrated by the French chemist _____.

Review and Reinforce

Controlling Chemical Reactions

Understanding Main Ideas

Use the figures below to answer questions 1–3. Write your answers on a separate sheet of paper.



1. Use what you know about endothermic and exothermic reactions to explain the differences in the graphs above.
2. Why is the activation energy pictured as a hill in the two diagrams?
3. Explain how adding heat to the reactions shown in the diagram would change the rate of these chemical reactions. Name two other ways to change the rate of a chemical reaction.

Building Vocabulary

Write a definition for each of these terms on the lines below.

4. concentration _____

5. enzyme _____

6. inhibitor _____

Lesson Quiz

Controlling Chemical Reactions

If the statement is true, write *true*. If the statement is false, change the underlined word or words to make the statement true.

1. _____ Increasing the surface area of the reactants will decrease the rate of the reaction.
2. _____ The amount of a substance in a given volume is the concentration of the substance.
3. _____ The effect of a catalyst on a reaction is to raise the activation energy.
4. _____ Only some reactions require activation energy.
5. _____ A(n) inhibitor decreases the rate of a reaction.

Fill in the blank to complete each statement.

6. The burning of fuels, such as coal, natural gas, or oil, involves a(n) _____ reaction.
7. In an endothermic reaction, the energy of the products is _____ than the energy of the reactants.
8. Increasing the temperature of a reaction will _____ the rate of the reaction.
9. The amount of a substance in a given volume is called _____.
10. Biological catalysts in the human body are called _____.

Balancing Equations Worksheet

- 1) ___ Na_3PO_4 + ___ KOH \rightarrow ___ NaOH + ___ K_3PO_4
- 2) ___ MgF_2 + ___ Li_2CO_3 \rightarrow ___ MgCO_3 + ___ LiF
- 3) ___ P_4 + ___ O_2 \rightarrow ___ P_2O_3
- 4) ___ RbNO_3 + ___ BeF_2 \rightarrow ___ $\text{Be}(\text{NO}_3)_2$ + ___ RbF
- 5) ___ AgNO_3 + ___ Cu \rightarrow ___ $\text{Cu}(\text{NO}_3)_2$ + ___ Ag
- 6) ___ CF_4 + ___ Br_2 \rightarrow ___ CBr_4 + ___ F_2
- 7) ___ HCN + ___ CuSO_4 \rightarrow ___ H_2SO_4 + ___ $\text{Cu}(\text{CN})_2$
- 8) ___ GaF_3 + ___ Cs \rightarrow ___ CsF + ___ Ga
- 9) ___ BaS + ___ PtF_2 \rightarrow ___ BaF_2 + ___ PtS
- 10) ___ N_2 + ___ H_2 \rightarrow ___ NH_3
- 11) ___ NaF + ___ Br_2 \rightarrow ___ NaBr + ___ F_2
- 12) ___ $\text{Pb}(\text{OH})_2$ + ___ HCl \rightarrow ___ H_2O + ___ PbCl_2
- 13) ___ AlBr_3 + ___ K_2SO_4 \rightarrow ___ KBr + ___ $\text{Al}_2(\text{SO}_4)_3$
- 14) ___ CH_4 + ___ O_2 \rightarrow ___ CO_2 + ___ H_2O
- 15) ___ Na_3PO_4 + ___ CaCl_2 \rightarrow ___ NaCl + ___ $\text{Ca}_3(\text{PO}_4)_2$
- 16) ___ K + ___ Cl_2 \rightarrow ___ KCl
- 17) ___ Al + ___ HCl \rightarrow ___ H_2 + ___ AlCl_3
- 18) ___ N_2 + ___ F_2 \rightarrow ___ NF_3
- 19) ___ SO_2 + ___ Li_2Se \rightarrow ___ SSe_2 + ___ Li_2O
- 20) ___ NH_3 + ___ H_2SO_4 \rightarrow ___ $(\text{NH}_4)_2\text{SO}_4$

Another Balancing Equations Sheet!

Balance these equations!

- 1) ____ AlBr_3 + ____ K \rightarrow ____ KBr + ____ Al
- 2) ____ FeO + ____ PdF_2 \rightarrow ____ FeF_2 + ____ PdO
- 3) ____ P_4 + ____ Br_2 \rightarrow ____ PBr_3
- 4) ____ LiCl + ____ Br_2 \rightarrow ____ LiBr + ____ Cl_2
- 5) ____ PbBr_2 + ____ HCl \rightarrow ____ HBr + ____ PbCl_2
- 6) ____ CoBr_3 + ____ CaSO_4 \rightarrow ____ CaBr_2 + ____ $\text{Co}_2(\text{SO}_4)_3$
- 7) ____ Na_3P + ____ CaF_2 \rightarrow ____ NaF + ____ Ca_3P_2
- 8) ____ Mn + ____ HI \rightarrow ____ H_2 + ____ MnI_3
- 9) ____ Li_3PO_4 + ____ NaBr \rightarrow ____ Na_3PO_4 + ____ LiBr
- 10) ____ CaF_2 + ____ Li_2SO_4 \rightarrow ____ CaSO_4 + ____ LiF
- 11) ____ HBr + ____ $\text{Mg}(\text{OH})_2$ \rightarrow ____ MgBr_2 + ____ H_2O
- 12) ____ LiNO_3 + ____ CaBr_2 \rightarrow ____ $\text{Ca}(\text{NO}_3)_2$ + ____ LiBr
- 13) ____ AgNO_3 + ____ Li \rightarrow ____ LiNO_3 + ____ Ag
- 14) ____ $\text{Si}(\text{OH})_4$ + ____ NaBr \rightarrow ____ SiBr_4 + ____ NaOH
- 15) ____ NaCN + ____ CuCO_3 \rightarrow ____ Na_2CO_3 + ____ $\text{Cu}(\text{CN})_2$