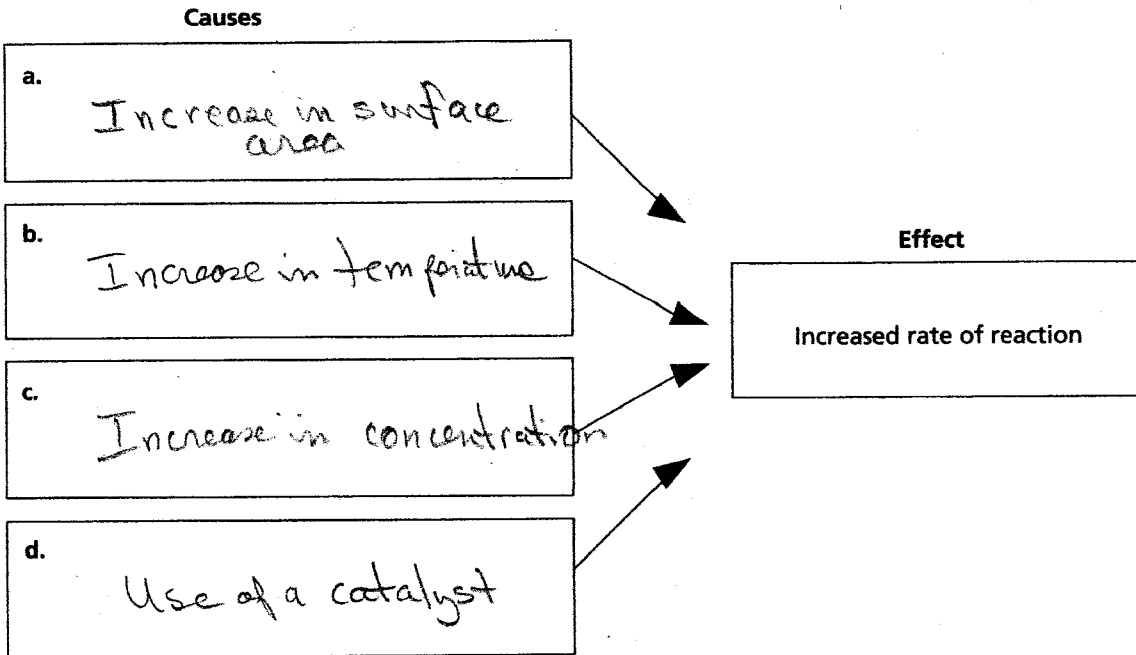


Controlling Chemical Reactions (pp. 66-71)

This section explains how energy is related to chemical reactions. It also describes how the rates of chemical reactions can be controlled.

Use Target Reading Skills

As you read, identify the factors that can cause the rate of a chemical reaction to increase. Write the information in the graphic organizer below.



Chemical Reactions

Energy and Reactions (pp. 67-68)

- The Activation energy is the minimum amount of energy needed to start a chemical reaction.
- Is the following sentence true or false? All chemical reactions need a certain amount of activation energy to get started.
TRUE
- In a reaction that makes water from hydrogen gas and oxygen gas, where does the activation energy come from?
The activation energy can be a spark
- A reaction that releases energy is called a(n) Exothermic reaction
- A reaction that absorbs energy is called a(n) Endothermic reaction

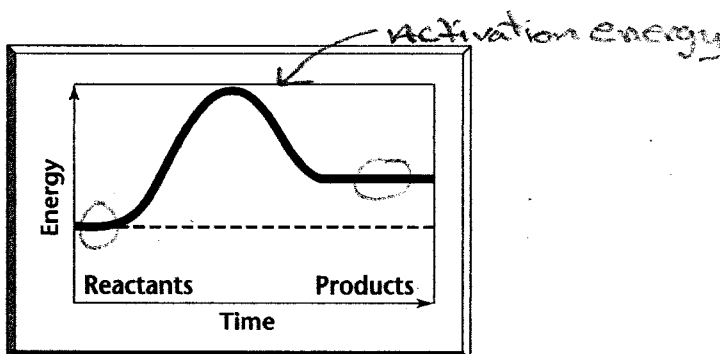
Chemical Reactions • Guided Reading and Study**Controlling Chemical Reactions** (continued)

6. Why does an exothermic reaction need activation energy?

For the reaction to start, a tiny amount of activation energy is needed. Once a few molecules react, the rest will quickly follow because the first few reactions provide "activation energy" for more molecules to react.

7. On the graph below, how does the energy of the products compare with the energy of the reactants?

The energy of the products is greater than the energy of the reactants.



ENDOTHERMIC

8. Label the graph above as either an exothermic or endothermic reaction.

9. What part of the graph in question 7 represents the activation energy for the reaction?

The peak of the curve.

Rates of Chemical Reactions (pp. 69-71)

10. What are five factors that affect the rate of a chemical reaction?

① Surface area ② Temperature ③ Concentration, ④ use of a catalyst or ⑤ use of an inhibitor

11. Why does surface area of a reactant influence the rate of the reaction?

Increasing the surface area allows more particles of a substance to react, and this increases the rate of the reaction.

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12. In what way is temperature related to chemical reaction rates?

Reaction rates are faster at higher temperatures

13. Circle the letter of each of the following that would increase the rate of a reaction.

- (a) Add heat. b. Decrease the surface area.
(c) Increase the surface area. d. Reduce heat.

14. The amount of substance in a given volume is called concentration.

15. To increase the rate of a reaction, why would you increase the concentration of the reactants?

I increasing the concentration of the reactants supplies more particles to react

16. Is the following sentence true or false? Another way to control the rate of a reaction is to change the activation energy needed.

True

17. What is a catalyst?

A catalyst is a material that increases the rate of a reaction by lowering the activation energy.

18. Is the following sentence true or false? Catalysts are always permanently changed in a reaction. False

19. A biological catalyst is called a(n) enzyme.

20. Why must living things rely on catalysts for chemical reactions necessary for life?

Many chemical reactions necessary for life happen at temperatures that would kill living things. Enzymes are necessary to allow these reactions to occur at safe temperatures.

Chemical Reactions

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Controlling Chemical Reactions (*continued*)

21. What is an inhibitor?

An inhibitor is a material used to decrease
the rate of a reaction

22. How do most inhibitors work?

Most inhibitors work by preventing reactants
from coming together