



Answer the following questions then check your answers.

1. Which of the following factors does NOT affect the rate of a reaction?

A. Temperature B. Pressure (for gases) C. Concentration

D. Mass of the reaction vessel

2. What is the minimum energy required for a reaction to occur called?

A. Activation energy B. Potential energy C. Kinetic energy

D. Heat energy

3. How does increasing the concentration of reactants generally affect the rate of a reaction?

A. Increases the rate B. Decreases the rate C. Has no effect

D. Initially increases then decreases the rate

4. A catalyst increases the rate of a reaction by:

A. Increasing the energy of the reactants B. Lowering the activation energy

C. Increasing the concentration of reactants D. Decreasing the temperature

5. Which of the following is NOT a way to increase the frequency of collisions between reactant particles?

A. Increasing the temperature

B. Increasing the surface area of a solid reactant

C. Adding a catalyst

D. Decreasing the concentration of reactants

6. Complete the sentences by filling in the gaps:

a. Collision theory states that for a reaction to occur, particles must collide with _____ energy and the correct _____.

b. Increasing the _____ of a gas increases the rate of reaction by increasing the frequency of _____.

c. A _____ is a substance that increases the rate of a reaction without being used up in the process.

7. Describe how the concentration of reactants affects the rate of reaction, giving an example.

b. What is activation energy and how does it relate to the rate of a chemical reaction?

8. Explain how increasing the temperature affects the rate of a reaction.

9. Describe the difference between a successful and unsuccessful collision.

10. How can you increase the surface area of a solid reactant to increase the rate of a reaction? Give an example.

11. Explain the role of activation energy in a chemical reaction. How do catalysts affect activation energy?
12. Describe an experiment to investigate the effect of concentration on the rate of a reaction. Include a possible method and expected results.
13. What happens to the rate of reaction when the temperature is increased?
- a. It decreases b. It stays the same c. It increases d. It stops
14. Which factor does not affect the rate of a chemical reaction?
- a. Concentration of reactants b. Pressure (for gases) c. Volume of container
- d. Presence of a catalyst
15. What is the role of a catalyst in a chemical reaction?
- a. It increases the activation energy b. It decreases the activation energy
- c. It gets consumed in the reaction d. It changes the reactants
16. Complete the sentence below by filling in the gaps:
- a. Increasing the concentration of reactants in a solution will _____ the rate of reaction because there are more _____ for collisions.
- b. A reaction that occurs faster at higher temperatures does so because the particles have more _____ energy, leading to more frequent and _____ collisions.

Answers

1. Which of the following factors does NOT affect the rate of a reaction?

- A. Temperature B. Pressure (for gases) C. Concentration
D. Mass of the reaction vessel

Answer: D

2. What is the minimum energy required for a reaction to occur called?

- A. Activation energy B. Potential energy C. Kinetic energy
D. Heat energy

Answer: A

3. How does increasing the concentration of reactants generally affect the rate of a reaction?

- A. Increases the rate B. Decreases the rate C. Has no effect
D. Initially increases then decreases the rate

Answer: A

4. A catalyst increases the rate of a reaction by:

- A. Increasing the energy of the reactants B. Lowering the activation energy
C. Increasing the concentration of reactants D. Decreasing the temperature

Answer: B

5. Which of the following is NOT a way to increase the frequency of collisions between reactant particles?

- A. Increasing the temperature
- B. Increasing the surface area of a solid reactant
- C. Adding a catalyst
- D. Decreasing the concentration of reactants

Answer: D

6. Complete the sentences by filling in the gaps:

- a. Collision theory states that for a reaction to occur, particles must collide with **sufficient** energy and the correct **orientation**.
- b. Increasing the **pressure** of a gas increases the rate of reaction by increasing the frequency of **collisions**.
- c. A **catalyst** is a substance that increases the rate of a reaction without being used up in the process.

7. Describe how the concentration of reactants affects the rate of reaction, giving an example.

Increasing the concentration of reactants increases the rate of reaction. This is because there are more particles per unit volume, leading to a higher frequency of collisions between reactant particles. For example, in the reaction between hydrochloric acid and magnesium ribbon, increasing the concentration of hydrochloric acid results in more frequent collisions with magnesium atoms, increasing the rate at which hydrogen gas is produced.

b. What is activation energy and how does it relate to the rate of a chemical reaction?

Activation energy is the minimum amount of energy that reactant particles need to collide with in order for a reaction to occur. It represents the energy barrier that must be overcome for reactants to be transformed into products. The rate of a chemical reaction depends on the number of particles that have enough energy to overcome this barrier. A lower activation energy means that more particles will have sufficient energy to react when they collide, resulting in a faster reaction rate.

8. Explain how increasing the temperature affects the rate of a reaction.

Increasing temperature increases particle kinetic energy, leading to more frequent and higher energy collisions.

9. Describe the difference between a successful and unsuccessful collision.

Successful collisions have sufficient energy and correct orientation, unsuccessful do not.

10. How can you increase the surface area of a solid reactant to increase the rate of a reaction? Give an example.

Increasing surface area by grinding, crushing, or using a powder. For example, using powdered magnesium instead of magnesium ribbon.

11. Explain the role of activation energy in a chemical reaction. How do catalysts affect activation energy?

Activation energy is the minimum energy required for a reaction, catalysts lower it.

12. Describe an experiment to investigate the effect of concentration on the rate of a reaction. Include a possible method and expected results.

Experiment: e.g., reacting magnesium with hydrochloric acid of different concentrations, measuring time taken for a set volume of gas to be produced.

Expected results: Higher concentration leads to faster reaction rate.

13. What happens to the rate of reaction when the temperature is increased?

- a. It decreases b. It stays the same c. It increases d. It stops

Answer: c. It increases

14. Which factor does not affect the rate of a chemical reaction?

- a. Concentration of reactants b. Pressure (for gases) c. Volume of container
d. Presence of a catalyst

Answer: c. Volume of container

15. What is the role of a catalyst in a chemical reaction?

- a. It increases the activation energy b. It decreases the activation energy
c. It gets consumed in the reaction d. It changes the reactants

Answer: b. It decreases the activation energy

16. Complete the sentences below by filling in the gaps:

- a. Increasing the concentration of reactants in a solution will _____ the rate of reaction because there are more _____ for collisions.

Answer: increase, particles

- b. A reaction that occurs faster at higher temperatures does so because the particles have more _____ energy, leading to more frequent and _____ collisions.

Answer: kinetic, energetic