

# EXOTHERMIC AND ENDOTHERMIC REACTIONS

*Answer all the questions below and then check your answers*

1. Define an exothermic reaction.
2. Define an endothermic reaction.
3. Which of the following is an exothermic reaction?  
A) Photosynthesis                      B) Combustion of methane  
C) Melting of ice                        D) Electrolysis of water
4. When ammonium nitrate dissolves in water, it absorbs heat from the surroundings, making it an \_\_\_\_\_ reaction.
5. A chemical reaction warms the surroundings, what type of reaction is this?
6. Which type of reaction is **MOSTLY** associated with sports injury packs?  
Exothermic or endothermic reactions?
7. Explain why a self-heating can is an example of an exothermic reaction.
8. Fill in the Gap: In an exothermic reaction, the temperature of the surroundings \_\_\_\_\_ because energy is \_\_\_\_\_.
9. Describe the energy changes that occur during an endothermic reaction.

10. Which of the following scenarios demonstrates an endothermic process?

A) Burning wood in a fireplace

B) Mixing vinegar and baking soda

C) Melting ice cubes

D) Freezing water into ice

11. Straight Question: Compare and contrast endothermic and exothermic reactions in terms of energy transfer, examples, and practical applications.

12. In sports injury packs, an endothermic reaction occurs when chemicals like ammonium nitrate are dissolved in water. This process absorbs heat from the surroundings, causing the pack to become \_\_\_\_\_.



13. Explain how a hand warmer works, stating the type of reaction that happens.

14. Explain why sports injury packs can feel both hot and cold, depending on how they are used.

15. Self-heating cans are used to warm drinks. Explain how this works, and why it is important for the can to be well-insulated.



16. Design an experiment to investigate whether a reaction is exothermic or endothermic.

Include the equipment you would use, the steps involved, and how you would determine the type of reaction

## Answers

1. Define an exothermic reaction.

*An exothermic reaction releases energy to the surroundings.*

2. Define an endothermic reaction.

*An endothermic reaction absorbs energy from the surroundings.*

3. Which of the following is an exothermic reaction?

A) Photosynthesis

B) Combustion of methane

C) Melting of ice

D) Electrolysis of water

*Answer: B) Combustion of methane*

4. When ammonium nitrate dissolves in water, it absorbs heat from the surroundings, making it an \_\_\_\_\_ reaction.

*Answer: endothermic*

5. A chemical reaction warms the surroundings, what type of reaction is this?

*Answer: Exothermic reaction*

6. Which type of reaction is **MOSTLY** associated with sports injury packs?  
Exothermic or endothermic reactions?

*Answer: Endothermic*

7. Explain why a self-heating can is an example of an exothermic reaction.

Answer: A self-heating can is considered an exothermic reaction because it releases heat to the surroundings when the chemicals inside react. This reaction increases the temperature of the can, making it warm.

8. Fill in the Gap: In an exothermic reaction, the temperature of the surroundings \_\_\_\_\_ because energy is \_\_\_\_\_.

Answers: increases; released

9. Describe the energy changes that occur during an endothermic reaction.

Answer: During an endothermic reaction, energy is absorbed from the surroundings into the system. This absorption of energy results in a decrease in the temperature of the surroundings. The energy taken in is used to break bonds in the reactants, which leads to the formation of products.

10. Which of the following scenarios demonstrates an endothermic process?

- |                                |                                   |
|--------------------------------|-----------------------------------|
| A) Burning wood in a fireplace | B) Mixing vinegar and baking soda |
| C) Melting ice cubes           | D) Freezing water into ice        |

Answer: C) Melting ice cubes

11. Straight Question: Compare and contrast endothermic and exothermic reactions in terms of energy transfer, examples, and practical applications.

Answer: Endothermic reactions absorb energy from the surroundings, resulting in a temperature decrease. Examples include photosynthesis and dissolving ammonium nitrate in water. They are used in sports injury packs to reduce swelling. Exothermic reactions release energy to the surroundings, leading to a temperature increase. Examples include combustion of fuels and neutralisation reactions. They are used in self-heating cans and hand warmers.

12. Explain how a hand warmer works, stating the type of reaction

Hand warmers contain chemicals that undergo an exothermic reaction when activated. This releases heat, warming your hands.

13. Describe the energy changes that occur in both exothermic and endothermic reactions.

In an exothermic reaction, the reactants have more energy than the products, so energy is released. In an endothermic reaction, the reactants have less energy than the products, so energy is absorbed.

14. Explain why sports injury packs can feel both hot and cold, depending on how they are used.

Some sports injury packs use chemicals that can undergo either exothermic or endothermic reactions. Activating one reaction releases heat, while activating the other absorbs heat, providing cooling.

15. Self-heating cans are used to warm drinks. Explain how this works, and why it is important for the can to be well-insulated.

Self-heating cans contain a separate compartment with chemicals that undergo an exothermic reaction when mixed. This releases heat, warming the drink. Insulation prevents heat loss to the surroundings, ensuring the drink gets hot and stays hot.

16. Design an experiment to investigate whether a reaction is exothermic or endothermic. Include the equipment you would use, the steps involved, and how you would determine the type of reaction.

A detailed answer would include specific chemicals, like dissolving ammonium nitrate in water for an endothermic reaction, or reacting magnesium with hydrochloric acid for an exothermic one.

The experiment would involve measuring temperature changes using a thermometer over time to identify whether heat is released or absorbed. The reactions should take place in insulated containers with lids to prevent heat loss or heat entering the system.