

ENDOTHERMIC AND EXOTHERMIC REACTIONS

I. Endothermic Reaction

Materials: ammonium chloride (NH_4Cl), thermometer, 50 ml beaker, graduated cylinder, water, spatula, balance, stirring rod, safety goggles, weighing paper

Procedure:

1. Put on safety goggles.
2. Place 25 ml of water in the beaker using a graduated cylinder.
3. On five pieces of weighing paper, obtain five 1 gram samples of ammonium chloride.
4. Measure the temperature of the water. Remove the thermometer and record the temperature of the water in the table on page 3.
5. Add 1 gram of ammonium chloride to the beaker. Stir carefully with **STIRRING ROD** until the chemical dissolves. **(DO NOT USE THE THERMOMETER FOR STIRRING.)**
6. Measure the temperature. Remove the thermometer. Record the temperature in the table on page 3.
7. Repeat **STEPS 5 AND 6** for the remaining four samples of ammonium chloride.
8. Construct a **LINE GRAPH** to illustrate the experimental results.
HINT: Mass values and labels (independent variable) on X - axis
Temperature values and labels (dependent variable) on Y - axis
Title the graph

II. Exothermic Reaction

Materials: sodium hydroxide (NaOH), thermometer, 50 ml beaker, watch glass, water, graduated cylinder, stirring rod, forceps, safety goggles

Procedure:

1. Put on safety goggles.
2. Measure out 25 ml of water in the graduated cylinder. Pour it into the beaker.
3. Using your forceps, select 10 sodium hydroxide pellets that are nearly the same size. Place them on the watch glass. **CAUTION: SODIUM HYDROXIDE BURNS. DO NOT GET ANY ON YOUR SKIN.**
4. Measure the temperature of the water. Remove the thermometer. Record the temperature of the water in the table on page 4.
5. Using the forceps, place 2 pellets in the beaker.
6. **STIR WITH THE STIRRING ROD ONLY UNTIL THE PELLETS DISSOLVE.** Hold the beaker on the lab table with your hands while stirring. NaOH pellets dissolve slowly.
7. Measure the temperature in the beaker. Record the temperature in the table on page 4.
8. Add two more pellets to the beaker. Stir until they dissolve.
9. Measure the temperature in the beaker. Record the temperature.
10. Repeat STEPS 8 AND 9 until all the pellets have been added.
11. Construct a **LINE GRAPH** to illustrate the experimental results.
HINT: Number of pellets and labels (independent variable) on X - axis
Temperature values and labels (dependent variable) on Y - axis
Title the graph

Name _____

Period _____

I. DATA TABLE AND QUESTIONS FOR ENDOTHERMIC REACTION EXPERIMENT:

Mass of NH_4Cl in grams	Temperature in $^{\circ}\text{C}$
0	
1	
2	
3	
4	
5	

1. Define the term: endothermic.
2. Using your graph, how can you tell this was an endothermic reaction?
3. Why was the temperature taken at the beginning of the experiment?
4. Using your graph, what would the temperature be with 1.5 grams of NH_4Cl ?
5. Using your graph, what would the temperature be with 7 grams of NH_4Cl ?
6. Define the term: dependent variable.
7. What was the dependent variable in endothermic lab?
8. Define the term: independent variable.
9. What was the independent variable in the endothermic lab?

II. DATA TABLE AND QUESTIONS FOR EXOTHERMIC REACTION EXPERIMENT:

Number of NaOH pellets	Temperature in °C
0	
2	
4	
6	
8	
10	

1. Define the term: exothermic.
2. Using your graph, how can you tell this was an exothermic reaction?
3. Why was the temperature taken at the beginning of experiment?
4. Using your graph, what would the temperature be for 7 NaOH pellets?
5. Using your graph, what would the temperature be for 12 NaOH pellets?
6. What was the dependent variable in exothermic lab?
7. What was the independent variable in the exothermic lab?

Title _____

Name _____

Period _____

A large grid of graph paper consisting of 20 columns and 30 rows, intended for recording data.

variable

Variable

Name _____

Title _____

Period _____

Variable

A large grid of graph paper consisting of 20 columns and 30 rows of small squares, intended for plotting a graph.

Variable