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LAB 24
OBSERVATION

PHYSICAL CHANGE OR CHEMICAL CHANGE?

STUDENT BOOK	Chapter 2, page 58
TOOLBOX	Pages 18–19, 32, 39–40

Goal

Distinguish between a physical change and a chemical change.

Observation criteria

1. What is a physical change?

_____

_____

2. What is a chemical change?

_____

_____

3. What observation indicators help to identify a chemical change?

_____

_____

_____

Materials

- test tube (18 mm × 150 mm) and stopper (No. 1)
- test-tube rack
- balance (accurate to 0.01 g)
- wash bottle of distilled water
- 10-mL graduated cylinder
- thermometer
- cobalt chloride paper strips
- container of nickel chloride solid ($NiCl_2$)
- spatula
- weighing pan
- watch glass
- hot plate
- crucible tongs
- container of sodium hydroxide solution (NaOH)
- neutral litmus paper strips
- container of nickel chloride solution ($NiCl_2$)
- 250-mL beaker
- 25-mL graduated cylinder
- 125-mL Erlenmeyer flask and one-hole stopper
- nickel-chromium wire (5 cm)
- Bunsen burner
- tongs
- magnesium ribbon (5 cm)
- container of hydrochloric acid (HCl)
- container of magnesium powder
- glass stirring rod

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Procedure

Reaction A

1. Weigh and record the mass of the test tube and the stopper.
2. Measure into the 10-mL graduated cylinder 5 mL of distilled water.
3. Observe and note the colour.
4. Pour the water into the test tube and seat the stopper.
5. Weigh and record the mass of the stoppered test tube and contents.
6. Calculate the mass of the water.
7. Measure and note the temperature of the water.
8. Dip a cobalt chloride paper strip into the water and note the colour.
9. Weigh 0.10 g of $NiCl_2$ solid and record the mass.
10. Observe and note the colour.
11. Add the $NiCl_2$ to the test tube.
12. Stopper the test tube and shake it until dissolution is complete.
13. Observe and note the colour.
14. Weigh and record the mass of the stoppered test tube and contents.
15. Calculate the mass of the solution.
16. Measure and note the temperature of the solution.
17. Weigh and record the mass of the watch glass.
18. Pour the contents of the test tube into the watch glass.
19. Dip a cobalt chloride paper strip into the solution and note the colour.
20. Heat the watch glass on the hot plate until evaporation is complete. Turn off the hot plate when the solution disappears.
21. Observe and note the colour of the residue.
22. Weigh and record the mass of the watch glass and residue.
23. Calculate the mass of the residue.
24. Clean up.

Reaction B

1. Measure into the 10-mL graduated cylinder 5 mL of NaOH solution.
2. Observe and note the colour.
3. Dip a neutral litmus paper strip into the solution and note the colour.
4. Pour the solution into the test tube.
5. Measure and note the temperature of the solution.
6. Measure into the 10-mL graduated cylinder 5 mL of $NiCl_2$ solution.
7. Observe and note the colour.
8. Dip a neutral litmus paper strip into the solution and note the colour.
9. Pour the solution into the test tube.
10. Stopper the test tube and shake it well.

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11. Measure and note the temperature of the solution.
12. Observe and note the colour.
13. Dip a neutral litmus paper strip into the solution and note the colour.
14. Decant into the beaker.
15. Observe and note the colour of the residue.
16. Clean up.

Reaction C

1. Measure into the 25-mL graduated cylinder 25 mL of distilled water.
2. Dip a cobalt chloride paper strip into the water and note the colour.
3. Pour the water into the Erlenmeyer flask.
4. Close the flask with the one-hole stopper.
5. Place the flask on the hot plate.
6. Heat the water to the boiling point.
7. Pass a cobalt chloride paper strip through the vapour escaping from the stopper and note the colour.
8. Clean up.

Reaction D

1. Take a piece of nickel-chromium wire.
2. Observe and note the colour.
3. Light the Bunsen burner.
4. Hold the wire with the tongs in the blue part of the flame for 30 seconds.
5. Observe and note the colour.
6. When the wire is cool, observe and note the colour.
7. Clean up.

Reaction E

1. Take a piece of magnesium ribbon.
2. Observe and note the colour.
3. Light the Bunsen burner.
4. Hold the ribbon with the tongs in the blue part of the flame until it ignites, then quickly remove it and extinguish the flame.
5. Record your observations.
6. When the wire is cool, observe and note the colour.
7. Clean up.

Reaction F

1. Measure into the 25-mL graduated cylinder 25 mL of HCl solution.
2. Pour the solution into the beaker.
3. Dip a neutral litmus paper strip into the solution and note the colour.
4. Measure and note the temperature of the solution.
5. Weigh and record the mass of 0.06 g of magnesium powder.
6. Add the magnesium to the beaker.

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7. Mix with the glass stirring rod until dissolution is complete.
8. Record your observations.
9. Measure and note the temperature of the solution.
10. Dip a neutral litmus paper strip into the solution and note the colour.
11. Clean up and put away materials.

Observations

Record your observations in the table below. Give the table a title.

Title:

Reaction	Characteristic	Before change	After change
A	Mass (g)		
	Colour		
	Temperature (C)		
	Test with cobalt chloride paper		
B	Colour		
	Test with neutral litmus paper		
	Temperature (C)		
C	Test with cobalt chloride paper		
D	Colour		
E	Colour		
	Observations		
F	Test with neutral litmus paper		
	Temperature (C)		
	Observations		

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Reflecting on your observations

1. Do your observations help you to better understand physical changes and chemical changes? Explain your answer.

2. Which reactions are physical changes? Explain your answer.

3. Which reactions are chemical changes? Explain your answer.

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4. Name the change occurring during reactions A, B, C and E.

5. How could you improve the protocol for this lab?