

CHANGES IN MATTER

Activity No. _____

Matter undergoes two types of changes - the physical and chemical changes. A physical change may involve a change in size, shape, or physical state but no new substance is formed. Hence, the substance retains its identity. In a chemical change, the original substances are transformed into new substances. A new substance is formed as the original properties disappear and different properties are observed.

Certain signs can tell you when a chemical change has taken place. In this activity, you will identify some of the signs that indicate when a chemical change has taken place.

Objectives

At the end of the activity, you should be able to

1. Make careful observations on the changes that take place in matter,
2. Determine whether a material undergoes physical or chemical change, and
3. Differentiate between physical and chemical changes.

Materials

- | | | |
|---|--|---|
| <input type="checkbox"/> test tubes | <input type="checkbox"/> spatula | <input type="checkbox"/> conc. sulfuric acid |
| <input type="checkbox"/> test tube rack | <input type="checkbox"/> droppers | <input type="checkbox"/> denatured alcohol |
| <input type="checkbox"/> test tube holder | <input type="checkbox"/> vials or film cases | <input type="checkbox"/> $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$ |
| <input type="checkbox"/> tripod | <input type="checkbox"/> bottle caps | <input type="checkbox"/> mossy zinc |
| <input type="checkbox"/> wire gauze | <input type="checkbox"/> matches | <input type="checkbox"/> dilute HCl |
| <input type="checkbox"/> alcohol lamp | <input type="checkbox"/> table sugar | <input type="checkbox"/> potassium iodide solution |
| <input type="checkbox"/> evaporating dish | <input type="checkbox"/> table salt | <input type="checkbox"/> lead nitrate solution |
| <input type="checkbox"/> watch glass | | |

Procedure

The following experiments should be performed carefully. Answer the following questions for each experiment.

- [Q1] Examine each material used before and after a change has taken place.
[Q2] Observe what takes place during the experiment such as evolution of gas, emission or absorption of heat (by feeling the test tube/bottle), change in color, formation of a precipitate, etc.
[Q3] After careful analysis of the observations, determine whether the change is physical or chemical.
[Q4] State your reasons for identifying a change as physical or chemical.
[Q5] Write the chemical equation for the chemical changes identified.

Write down your observations on the tables provided in the Data Sheet.

1. Dissolve a spatulaful of table salt in a clean evaporating dish containing 5 mL of water. Evaporate the solution over a low flame until a solid particle (residue) is obtained. Take note of the solid particles formed.
2. Place a pinch of sugar in a bottle cap. Place two drops of concentrated sulfuric acid. Observe what happens.

CAUTION: Be careful in handling sulfuric acid. It is highly corrosive.

3. Heat a pinch of sugar placed in a bottle cap until a black substance is produced.
4. Place 2-3 drops of alcohol in a watch glass. Set aside. Observe again after 5 minutes.
5. In an evaporating dish, place 5 drops of alcohol. Carefully ignite the alcohol with a lighted match stick. Observe.
6. Heat a pinch of copper (II) sulfate pentahydrate crystals in a dry test tube. Take note of the change in color and cool.
7. To the cooled crystals in procedure #6, add one to two drops of water. Note the change in color.
8. Place 2 mL lead nitrate solution in a test tube. Add two drops of potassium iodide solution. Describe what happens.
9. Place a small piece of mossy zinc into 5 mL of dilute hydrochloric acid. Describe what happens.

Activity No. _____ **PHYSICAL AND CHEMICAL CHANGES**

Name _____

Co-workers _____

Date Started _____

Date Finished _____

Group/Section _____

DATA AND RESULTS

Table 1. OBSERVATIONS

Material	Before	During	After
1. table salt		adding to water heating of solution	
2. table sugar		adding sulfuric acid	
3. table sugar		heating	
4. alcohol		left for 5 minutes	
5. alcohol		igniting	
6. copper sulfate crystals		heating	
7. cooled copper sulfate crystals from procedure 6		adding water	
8. lead nitrate		adding potassium iodide	
9. mossy zinc		adding to dilute acid	

Table 2. CLASSIFYING THE CHANGES

	Type of Change	Explanation
1.a adding table salt to water		
1.b heating the salt solution in 1.a		
2. adding sulfuric acid to sugar		
3. heating sugar		
4. alcohol left for 5 minutes		
5. igniting alcohol		
6. heating copper sulfate crystals		
7. adding water to heated copper sulfate crystals		
8. adding potassium iodide to lead nitrate		
9. adding mossy zinc to dilute acid		