

## Investigation of Properties and Changes—Physical and Chemical

### Introduction

Changes can be classified as either physical or chemical. When a physical change occurs, the physical properties of a substance—such as size, shape, density, or state—are altered, but its chemical composition remains the same. Examples of physical changes include melting ice, crushing gravel, tearing paper, grinding pepper, and boiling water. No new substances are formed as a result of these changes.

Chemical changes, also known as chemical reactions, result in the formation of one or more new substances with different chemical properties and compositions from the original material. Examples of chemical changes include plants dying, leaves changing color, paper burning, bananas ripening, bread baking, or iron rusting. Some signs of chemical changes include a change in color, the formation of a precipitate, the production and release of gas, or a change in temperature.

### Purpose

To recognize and differentiate between properties and changes for physical and chemical.

### Procedure 1: Paper

1. Tear a small piece of paper into tiny pieces, and place the pieces on a watch glass.
2. Carefully ignite the paper with matches. Allow the paper to burn completely.
3. Record your observations in the Data Table.

### Procedure 2: Sodium Chloride and Silver Nitrate

1. Add 30 drops of 5mL of sodium chloride solution, NaCl, to a test tube.
2. Add 20 drops of silver nitrate solution, AgNO<sub>3</sub> to the test tube.
3. Record your observations in the Data Table.

### Procedure 3: Magnesium Ribbon

1. Obtain a small piece of magnesium ribbon and place in a test tube.
2. Add 10-15 drops of hydrochloric acid, HCl, to the test tube.
3. Touch the outside of the test tube with your fingertips.
4. Record your observations in the Data Table.

### Results and Conclusions

1. Indicate whether the following changes are physical or chemical. Support your answers with examples from the lab.
  - a. tearing paper
  - b. burning paper
  - c. dissolving NaCl
  - d. mixing NaCl and AgNO<sub>3</sub>
  - e. cutting Mg ribbon
  - f. adding HCl to Mg
2. Name two possible indications that a chemical change has occurred, using examples from the lab.
3. A change in color does not always indicate chemical change. Explain why it could be the result of a physical change.
4. Based on what you have learned in this investigation, write a short story (on a separate piece of paper) in which you include as many physical and chemical changes as possible. Underline the physical changes and circle the chemical changes.
5. Cooking involves both physical and chemical changes. Provide 2 examples of each.