



UNIT A
ENERGY AND MATTER
IN CHEMICAL CHANGE

Science 10 : Evidence of Chemical Change : Activity A3 Inquiry Lab

The Question:

What observable changes happen when a chemical reaction occurs?

SAFETY REMINDER:

Wear protective equipment (gloves, apron, goggles) while handling chemicals. Acids and bases can burn. If any spill, wash immediately with cold water.

Materials:

- 1 piece zinc metal
- dilute hydrochloric acid (**danger: corrosive**)
- sodium hydroxide (**danger: corrosive**)
- phenolphthalein indicator
- 2 pieces of magnesium metal strip (**danger: flammable**)
- dilute sulfuric acid (**danger: corrosive**)
- bromothymol blue indicator
- sodium chloride solution
- silver nitrate solution (**danger: oxidizing and corrosive**)
- iron(III) chloride solution
- vinegar
- 7 test tubes in test tube rack
- candle
- matches

Procedure:

Step 1:

Read through the procedure and make a data table that includes space for the eight reactions in step 2. For each reactant, you will record its observable characteristics before the reaction, including colour and state (solid, aqueous). In your table, you will also record changes that you observe when you mix the reactants. Remember to give your table a title.

Step 2:

For each of the following pairs of reactants, record your observations about each reactant. Then, for (a) to (g), carefully mix each pair in its own test tube. For (h), carefully light the candle. Observe the results, and record as many observations about chemical change as you can.

- a) zinc metal and hydrochloric acid
- b) sodium hydroxide solution and phenolphthalein indicator
- c) magnesium metal strip and dilute sulfuric acid
- d) hydrochloric acid and bromothymol blue indicator
- e) sodium chloride solution and silver nitrate solution
- f) iron(III) chloride solution and sodium hydroxide solution
- g) magnesium metal strip and vinegar
- h) candle wax and oxygen

Step 3:

Your teacher may instruct you to add some tests by mixing any two of the substances in the materials section in combinations that were not tried in step 2. Do not mix any substances unless instructed by your teacher. Record observations that may indicate that a reaction, if any, has occurred.

Analyzing and Interpreting:

1. Consider those reactions in which a metal was placed in an acidic solution, such as reaction (a). Were the reactions similar in any way?
2. Consider any reaction in which a solid (or cloudiness) was produced. Is there anything similar about the reactants in each reaction?
3. What evidence is there that a burning candle involves a chemical reaction?

Forming Conclusions:

4. List the types of observations you made in this activity that indicated that a chemical reaction had taken place.

Extending:

5. List other types of measurements or experiments that could be done with the products to indicate that a reaction was occurring or that new substances had been produced.