

Activity #4: Chemical Reactions

Purpose:

- Observe five major types of chemical reactions.
- Record any observations that would indicate a chemical reaction has taken place.
- Be able to write different kinds of balance chemical equations.
- Demonstrate the ability to describe a chemical reaction from a particle perspective.

SAFETY NOTE – You **MUST READ** the entire procedure of each section before doing the reactions.

Part A: Combination (Formation or Synthesis) Reaction:

Materials:

Magnesium Metal Ribbon
Evaporating Dish

Bunsen Burner & Striker
Tongs

Procedure:

1. Examine the magnesium ribbon and record any appropriate observations.
2. Light the Bunsen burner to make a blue flame. Place the evaporating dish next to the burner.
3. Using the tongs, bring the magnesium into the flame. As soon as the metal is ignited, bring the tongs over the evaporating dish. DO NOT LOOK AT THE REACTION DIRECTLY.
4. Shut down the Bunsen burner. Examine the resulting products in the dish. Record all relevant observations.

Part B: Decomposition (Deformation) Reaction:

Materials:

Baking Soda
Wooden Splint

Bunsen Burner & Striker
Test Tube and Test Tube Tongs

Ring Stand
Scoopula

Procedure:

1. Place a small amount of baking soda into the test tube using a scoopula.
2. Examine the baking soda and record any appropriate observations.
3. Light the Bunsen burner to make a blue flame.
4. Using the test tube tongs, bring the bottom of the test tube into the flame. POINT THE MOUTH OF THE TEST TUBE AWAY FROM YOU AND OTHERS.
5. Examine the top of the test tube. Make note of any relevant observations.
6. Quickly light the wooden splint with the Bunsen burner and place it into the mouth of the test tube. Write down what happened.
7. Place the hot test tube with the tongs on the base of the ring stand. DO NOT PLACE ANYTHING HOT DIRECTLY ON THE TABLE.
8. Turn off the Bunsen burner.

Part C: Single Replacement Reaction:**Materials:**

0.1 M of Silver Nitrate Solution	Test Tube & Test Tube Stand	Beaker
Small Piece of Copper Wire	Beral Pipet	Safety Gloves

Procedure:

1. Students who are going to handle the chemicals must wear safety gloves. Silver nitrate solution will make stains on the skin.
2. Examine the copper wire and the silver nitrate solution. Record any appropriate observations.
3. Place the copper wire into the test tube.
4. Using the beral pipet, transfer the silver nitrate solution to the test tube half way up the copper wire.
5. Make note of any relevant observations.
6. When finished, bring the test tube to the test tube stand in the fume hood.

Part D: Double Replacement Reaction:**Materials:**

0.1 M of Calcium Nitrate Solution	Test Tube & Test Tube Stand	Beakers
0.1 M of Sodium Carbonate Solution	Beral Pipets	

Procedure:

1. Examine the two solutions. Record any appropriate observations.
2. Using the beral pipet, transfer about 1.5 mL of calcium nitrate solution to the test tube. (There are volume markings on the pipet.)
3. Using a different beral pipet, transfer about 1.5 mL of sodium carbonate solution to the test tube. Make note of any relevant observations.
4. When finished, bring the test tube to the test tube stand in the fume hood.

Part E: Hydrocarbon Combustion Reaction:**Materials:**

Bunsen Burner and Striker	Wooden Splint	150 mL or 250 mL Beaker
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Procedure:

1. Light the Bunsen burner and set it to a blue flame. Make a drawing of the shape and colour of the flame.
2. Turn the barrel (clockwise) so a yellow flame appears. Make a drawing of the shape and colour of the flame.
3. Invert the beaker and hold it closely over the flame for 15 to 30 seconds. Make an observation of the inner wall of the beaker.
4. Light the wooden splint with the Bunsen Burner. Repeat the last step. Quickly lift the beaker and place the lit splint inside the beaker. Record any relevant observations.
5. Turn off the Bunsen burner when finished.

Questions to Ponder Before Writing the Statement of Understanding:

1. What are the reactants and products for each type of reactions? Write the balanced chemical equations for these reactions.
 - a. For Part B, research what is the chemical formula for baking soda and its decomposition.
 - b. For Part C and Part D, also include the complete-ionic and net-ionic equations.
 - c. For Part E, research what is the main component of natural gas and use it as a reactant for the chemical equation. The blue flame and the yellow flame are two different chemical reactions. What are they and why are they different?
2. Using scientific principles you have learned so far along with any supporting tables, explain why you cannot claim chemical reactions have taken place using only the macroscopic observations you made. Think about these reactions from the particle perspectives, how can they strengthen your arguments that chemical reactions had happened?

Statements of Understanding: (Choose Two Reactions from Above and One of them must be either a Single or Double Replacement Reaction.)

When writing the paragraphs, make sure you address the following:

1. What is the phenomenon you are investigating for each of these two reactions?
2. How can you explain the phenomenon using the evidences you collected (please list those evidences)? (**Particle Reasoning** please! Include any relevant **balance chemical equations** and **particle drawings** of what really happened.)
3. What claims are you making from your explanations?

Hand in the observations along with your statements of understanding! A Title is also highly appropriate.