

Activity 2 Overview

This activity will allow the students to gain a better understanding of chemical reactions and how to determine when a chemical reaction has taken place.

Safety Requirements

In the margins of the student pages you will find safety warnings that should be rigorously followed.

- Gloves
- Aprons
- Provide gloves when needed

Preparation and Materials Needed

Preparation

Set aside some time to prepare all of the solutions prior to this activity. Wear gloves because some of these chemicals could cause skin irritations.

Materials/Chemicals needed

For each lab group

- Test-tube racks if test tubes are used
- 28 small test tubes or 2 microscale plates (24 wells) or piece of plastic that will work for the 28 reactions
- 0.1 M $\text{Ba}(\text{NO}_3)_2$ (2.61g of $\text{Ba}(\text{NO}_3)_2$ dissolved in 100 mL of water) Store in a small dropping bottle/dropper for each group
- 0.1 M NaOH (0.4 g of NaOH dissolved in 100 mL of water) Store in a small plastic dropping bottle for each group
- 0.1 M NaHCO_3 (0.84g of NaHCO_3 dissolved in 100 mL of water) Store in small dropping bottle/dropper for each group
- 0.1 M CuSO_4 (2.5 g of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ dissolved in 100 mL of water) Store in small dropping bottle/dropper for each group
- 0.1 M KI (1.66 g of KI dissolved in 100 mL of water) Store in small dropping bottle/dropper for each group
- 0.1 M AgNO_3 (1.7 g of AgNO_3 dissolved in 100 mL of water) Store in a dark small dropping bottle/dropper for each group
- 0.1 M $\text{Fe}(\text{NO}_3)_3$ (4.04 g of $\text{Fe}(\text{NO}_3)_3 \cdot 9 \text{H}_2\text{O}$ in 100 mL of water) Store in small dropping bottles/dropper for each group
- 0.1 M HCl (1 mL of conc. HCl dissolved in 119 mL of water) Store in small dropping bottle/dropper for each group
- Calcium chloride
- Baking soda

- 1 quart-size zipper seal bag
- Phenol red indicator solution (Dissolve 0.1 g of phenol red, sodium salt in 400 mL of distilled water and then dilute to 500 mL. Alternatively, if you have phenol red but not the sodium salt, then dissolve 0.1 g of phenol red in 400 mL of 95% ethanol and then dilute to 500 mL with ethanol. In both cases you will have a 0.2% solution)
- Saturated solution of calcium hydroxide (Approximately 1 g of calcium hydroxide dissolved in 500 mL of water. Stir and keep adding small amounts of calcium hydroxide until the solution is saturated)
- Straw
- 8 small beakers
- Bunsen burner or hot plate

Learning Strategies for Students with Limited English Proficiency

1. Point out new vocabulary words in context and practice using the words as much as possible throughout the activity.

Interaction	Overlook	Contamination	In this fashion	Deduce
Submerged	Diagnostic	Extinguished	Distinctive	Emitted
Highlight	Gather	Filament		

2. Students often have difficulty describing chemical changes because they cannot understand why new materials would come into existence. Instead, they will insist that those materials must have been present to begin with, but only hidden. It is for this reason that they cannot identify reactants and products in a chemical reaction. To help students break down these concepts into simpler steps, it is helpful to ask students to consider a reaction on a timeline, listing properties of the starting materials and properties of the ending materials before identifying these materials. For example, for the reaction of $\text{Ba}(\text{NO}_3)_2$ and NaOH , the timeline might look like the diagram on the next page.

