

Activity I Overview

This activity leads the students through a series of tests in which they determine whether the changes they observe are chemical or physical in nature.

Safety Requirements

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

- Goggles
- Aprons

Preparation and Materials Needed

Preparation

Prepare solutions before the laboratory period. Microscale well plates can be used with small dropping devices. If necessary, you could also use beral pipettes or small polyethylene dropping bottles with screw-on caps.

The supersaturated solution of sodium acetate must be prepared in advance. Cover the flask after supersaturating the solution and allow it to cool slowly.

Materials/Chemicals needed

For each lab group

- Hot plate
- Microcell well plate (24 cells)
- 15 small test tubes
- Test-tube racks
- 2 small beakers
- Ice cube
- Lemon juice (class)
- Milk (class)
- Table salt or sodium chloride
- Vinegar (class)
- Baking soda (class)
- Table sugar (class)
- Starch

- Iodine/potassium iodide solution (Dissolve 15 g of potassium iodide in 125 mL of water; add 3 g of iodine; stir to dissolve, then dilute to 1 L. Store in a dark bottle.) Use small dropping bottles/droppers for each group
- Zinc (small piece)
- 0.1 M HCl (1 mL of conc. HCl added to 119 mL of water)
- Phenolphthalein (Dissolve 1 g of phenolphthalein in 50 mL of 95% ethanol, then dilute to 100 mL with 95% ethanol.) Use small dropping bottles/droppers for each group
- 0.1 M NaOH (Dissolve 0.4 g of NaOH in 100 mL of water and store in a plastic container)
- 0.1 M Na_2CO_3 (1.24 g of $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$ dissolved in 100 mL of water) Provide small dropping bottles/droppers for each group
- 0.1 M NaHSO_4 (1.38 g of $\text{NaHSO}_4 \cdot \text{H}_2\text{O}$ dissolved in 100 mL of water) Provide small dropping bottles/droppers for each group
- Household ammonia (class)
- 0.1 M CuSO_4 (2.50 g of $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$ dissolved in 100 mL of water) Provide small dropping bottles/droppers for each group
- Wood splints
- Bunsen burner
- Candle wax
- Scoopula to melt wax
- Chalk
- Pencil
- 3 Styrofoam[®] cups
- Sodium polyacrylate (class)
- Disposable diaper containing sodium polyacrylate
- 100 mL graduated cylinder
- 250 mL Erlenmeyer flask
- Sodium acetate (class)
- 100 mL sodium silicate solution (called water-glass solution – purchase prepared solution because it is difficult to make)
- Large jar
- Crystals of:
 - Cobalt chloride
 - Copper (II) chloride
 - Nickel chloride
 - Iron (III) chloride
 - Manganese chloride