

Observing Chemical and Physical Changes

In this laboratory activity you will observe chemical and physical changes that occur within a zip lock plastic bag containing various substances. You will then construct and carry out experiments that will allow you to make deductions as to the cause of the heat you will observe being generated during this activity.

When you make observations of chemical changes you should look for:

- any temperature changes (either an increase or a decrease in temperature)
- any color changes
- the formation of any precipitates (a solid forms within a solution - the solution may become cloudy, appear to become thick like jello, you may see a solid substance form and collect at the bottom of the solution)
- the formation of a gas as evidenced by the generation of bubbles

Materials

Calcium Chloride (CaCl_2)

Sodium Bicarbonate (NaHCO_3) a.k.a. baking soda

Phenol red solution (an acid-base indicator meaning it will change color in different pH environments)

Plastic Bag and Plastic Vial

Step One: Observation

Take a very careful look at each substance and describe the substance in as much detail as you can - note physical state: gas, liquid, solid, note any color or absence of color, note texture: size of crystals, shape of crystals, note any odors **but be VERY careful smelling chemicals - never put anything directly under your nose!**

Step Two: Chemical Reaction

1. Add one level teaspoon of baking soda to the plastic bag.
2. Add two level teaspoons of calcium chloride to the plastic bag.
3. Pour about 15 mL of phenol red solution into the plastic vial.
4. Carefully place the vial inside the bag without allowing it to tip over and mix with the solids.
5. Close the bag. It should be sealed. Push extra air out of the bag as you close it.
6. Turn the bag upside down spilling the phenol red solution into the mixture of solids.
7. Watch very carefully and take notes in your laboratory notebook. Record all of your observations carefully. Note the time the ingredients are mixed and the time required for any chemical changes to occur.

Step Three: Designing Your Own Experiment

In Step Two you should have observed the evolution of heat. It is now up to you to determine which chemicals cause the heat to be released. How can you determine this? Think of a way to answer this question and describe experiments that will allow you to obtain the data you need. Carry out your experiments making careful observations.

Step Four: Answer the Following Question

Which chemicals cause the heat to be generated?