

## 45.4: Procedures

### Warnings

- Some chemicals used and produced in this experiment may irritate skin, can damage the eyes, or may be hazardous to your health if inhaled.
- This reaction may form sodium hydroxide ( $\text{NaOH}$ ) which can cause severe chemical burns.
- Do not open any Ziploc bag in which a gas is produced, unless you are releasing the gas into an operating chemistry hood!

You will investigate various combinations of the three chemicals.

### Safety

- Always read the label and make sure you are obtaining the correct chemical!
- Safety glasses and rubber gloves should be worn for this experiment.

1. Draw a table in which to record your observations. **Do not fill in data until you have read the instructions for obtaining that data; it is very important that you DO NOT COMBINE CHEMICALS until you have read the instructions.**

Table 45.4.1: Data Table

Chemicals Combined	Reaction (yes or no)	Indicators
Baking soda Calcium Chloride		
Baking soda Calcium Chloride Phenol		
Baking Soda Phenol		
Calcium Chloride Phenol		

2. Add 1 spoonful of baking soda ( $\text{NaHCO}_3$ ) in your first quart-size Ziploc bag. Add 2 spoonfuls of calcium chloride ( $\text{CaCl}_2$ ) to the same Ziploc bag. Gently flatten the bag and smooth as much air as possible from the bag, without crushing any calcium chloride pellets, and then seal the bag. Gently mix the two substances being careful not to crush the calcium chloride pellets; the mixing can be accomplished by simply moving the outside of the bag in various directions with your hand. Record whether a chemical reaction occurred, and any indicators of chemical change observed.
3. Use your pipette to obtain phenol red solution from the beaker labeled “phenol”; squeeze the bulb and draw as much liquid as possible into the pipette (note that the pipette will not be completely full). Without allowing any phenol solution to escape the pipette, carefully place the pipette into the Ziploc bag with the solids; no phenol solution should be released into the solid mixture yet. Gently flatten the bag and smooth as much air as possible from the bag, without releasing the phenol solution or crushing any pellets, and then seal the bag.
4. Keep the Ziploc bag sealed. Squeeze the pipette from outside of the sealed Ziploc bag to release the phenol solution. Gently mix the contents in the bag, without crushing the calcium chloride pellets. Record whether a chemical reaction occurred, and any indicators of chemical change observed.

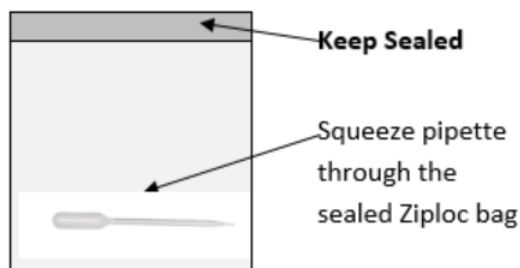


Figure 45.4.1: Chemicals combined in a Ziploc bag

5. If a gas was produced, release the gas from the Ziploc bag into an operating chemistry hood. If there is not a chemistry hood available, then place the sealed Ziploc bag in the container provided by your instructor.
6. Utilizing the same amounts of particular chemicals (1 spoonful baking soda, 2 spoonsful calcium chloride, 1 pipette phenol solution), test various combinations in sealed Ziploc bags; two combinations are listed in the table for you. DI Water may be utilized in place of the phenol solution as a combination, if desired. Write your combinations into the data table. For each combination, record whether a chemical reaction occurred, and any indicators of chemical change observed. **If a gas is produced, do not open the Ziploc bag** unless releasing the gas in a chemistry hood. If there is not a chemistry hood available, then place sealed Ziploc bags in the container provided by your instructor.

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