

**LAB – First Law of Chemistry – Conservation of Mass
Discovered by Lavoisier (to be done with Ch 3.2) Std 3a**

Name: _____

Lab Station / Group # _____

Period: _____

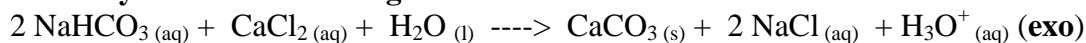
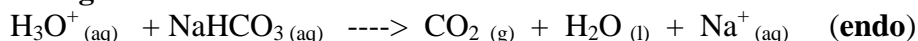
Date: _____

Purpose: Observe both endothermic and exothermic reactions. Mix the reactants (each in their own corner of a plastic bag) of this chemical reaction together with a diluted phenol red solution. Observe the reaction and record everything you see. Practice writing a procedure. Learn the “First Law of Chemistry” (conservation of mass $\text{Mass}_{\text{reactants}} = \text{Mass}_{\text{products}}$) through first hand experience.

Materials:

chemicals: sodium hydrogen carbonate (**NaHCO₃**) 9 g ± 0.5 g
 anhydrous calcium chloride (**CaCl₂**) 7 g ± 0.5 g
 diluted phenol red solution (1:10 dilution with H₂O) 8.5 mL ± 1 mL
 (**red if in base - yellow if in acid**)

equipment: centigram balance
 1 qt Ziploc plastic bag (reaction bag)
 10 mL graduated cylinder
 masking tape (for labeling things)
 filter paper
 goggles

Chemical reactions being observed:**Mimics you stomach making acid****Mimics you taking sodium bicarbonate for excess stomach acid**

NOTE: Share responsibilities within your group. Everyone should have a job. Use filter paper on the pan to weigh out your dry chemicals. Never put chemicals directly on the chrome pan of the balance.

Procedure:

You will write your own procedure. The data table below may be helpful. Your procedure must include step-by-step directions on how you will weigh out **NaHCO₃** with **CaCO₃** and place them in opposite ends of a plastic Ziploc bag . 10 mL of diluted phenol red must be poured into the bag to mix your chemicals so that the bag doesn't lose any gas that is produced. You will have to consider safety precautions for what you will do if too much CO_{2(g)} is formed for the bag to hold.

Observations:

You set up your own observation section that must include:

1. **temperature** – as felt with your hands at each end of the bag
Exothermic reactions produce **heat**.
Endothermic reactions get **colder** (suck up heat).
2. gas formation – where & approximately how much
3. change or lack of change of mass for the bag with everything inside, before and after the reaction.
4. color and texture of chemicals (dry & liquid) before and after the reaction
5. every change that indicated a chemical reaction occurred at any stage of the mixing of the chemicals with the phenol red solution

DATA TABLE

Items	masses (to 3 decimals) volumes (to 2 decimals)
plastic bag – grams	
filter paper – grams	
NaHCO ₃ 9 g ± 0.5 g	
CaCl ₂ 7 g ± 0.5 g	
10 ml grad cylinder - grams	
diluted phenol red 8.5 mL ± 1 mL - mass and vol.	
mass of plastic bag with all chemicals (before reaction starts)	
mass of plastic bag with all chemicals (5 min after reaction starts)	