

**DO NOT WRITE ON THIS LAB SHEET: ANSWER ALL QUESTIONS ON ANOTHER  
PIECE OF PAPER**



**CHEMICAL REACTION LAB**

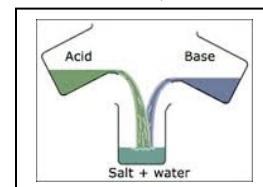
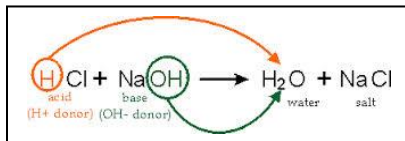
**Introduction:**

We experience many chemical reactions all around us daily: car engine burning up gasoline, leaves changing color, and cooking are a few such examples. A chemical reaction occurs when atoms recombine in different ways to produce a new substance. Evidence or clues that chemical reactions are taking place include

- 1) Color change
- 2) Energy released or gained
- 3) Gas production
- 4) Precipitate formed (liquid → solid)
- 5) Change in properties (solid becomes gas, liquid becomes gas, etc)

In order to make sense of the thousands of chemical reactions that occur within and around us, scientists have grouped chemical reactions into different types. Two types of chemical reactions include exothermic (heat releasing) and endothermic (heat absorbing) reactions. Another type of chemical reaction is a neutralization reaction which is a reaction between an acid and a base. A reaction between an acid and a base is called a neutralization reaction because the reactants (acid & base) are always neutralized into water and a salt. So, the products of neutralization reaction are always water and some type of salt.

For example, the reaction between HCl (a strong acid) and NaOH (a strong base) makes water and the salt NaCl (table salt):



The reaction observed today is between calcium chloride and baking soda (sodium bicarbonate). The chemical formula is



Calcium chloride and baking soda react to form calcium carbonate, sodium chloride (salt), water and carbon dioxide. To produce this reaction, calcium chloride and baking soda, which are both solid, are mixed together in water, which provides a solvent for the chemical reaction to occur.

**Objectives:**

- 1) Identify reactants and products in a chemical reaction
- 2) Recognize evidence of a chemical reaction.
- 3) Identify types of chemical reactions.

**Materials:** Calcium Chloride (CaCl<sub>2</sub>), Baking Soda (Sodium Bicarbonate-NaHCO<sub>3</sub>), 10 ml Phenol Red (water solvent with acid/base indicator), Ziploc bag, small cup (to hold phenol red) and a scoopula.

**Safety:**

Be careful when handling acids and other solutions.

**Procedure**

- 1) Read the Lab Introduction above. Copy the data table (with the TITLE) onto your lab write up.
- 2) Place 1 tsp of sodium bicarbonate into one corner of bag.
- 3) Place 1 tsp of calcium chloride into the other corner of bag.
- 4) Add 10 mL of Phenol Red to bag. Zip bag up quickly to avoid gas escaping. Set bag on table. Observe.
- 5) Pass the bag around and have your lab group look at and feel the contents of the bag.
- 6) Record Observations.
- 7) Answer the post-Lab questions as part of your lab write up.

## Observations of the Chemical Reaction between Calcium Chloride and Sodium Bicarbonate

Evidence of Chemical Reaction:	Color Change	Energy released to environment (gets hot)	Energy gained from environment (gets cold)	Gas produced (bubbles)	Solid produced	Change in property (liquid to gas, etc)
Observations:						

### ***Requirement:***

#### **For each reaction:**

1. Observe reactants (color, bubbles, etc). Use the data table to write down your observations.
2. Indicate which type of evidence for chemical reaction there is by writing yes or no on the table.
3. Answer the post-Lab questions as part of your lab write up.

**Post-Lab Questions-** Use your notes and the Lab Introduction to answer the following questions:

1. In a chemical equation, where are the reactants written? What were the reactants in this lab?
2. In a chemical equation, where are the products written? What were the products in this lab?
3. What must be added to break a chemical bond?
4. What happens when chemical bonds are broken?
5. What must be added to create new chemical bonds?
6. What is Activation energy?
7. What is the type of chemical reaction called that **releases** energy in the form of **heat** called?
8. What is the type of chemical reaction called that **absorbs** energy and becomes **cooler** called?
9. What type of reaction was produced in this activity? Support your answer with evidence obtained from your observations.