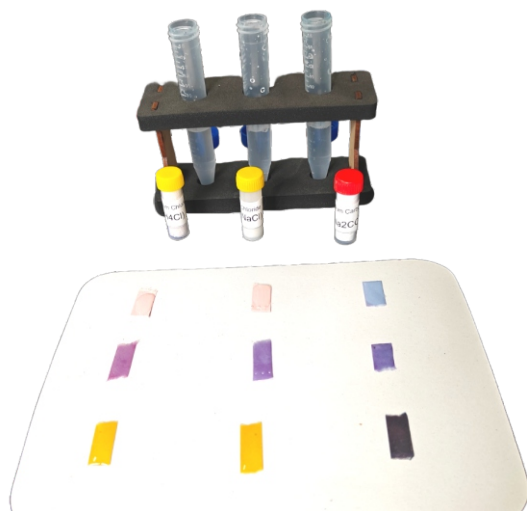


ACIDS BASES AND SALTS



Acids & Bases

Time



40 minutes

Difficulty



High

Warning

10+ Years

WHAT ARE ACIDS BASES AND SALTS

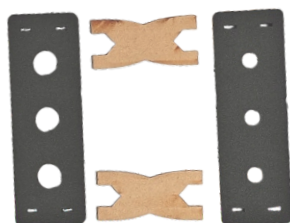
Acids are substances that release hydrogen ions (H^+) and Bases are substances that release hydroxide ions (OH^-) when dissolved in water. Salts are substances formed when an acid reacts with a base

Materials



Lets build

Step 1 - Test tube stand

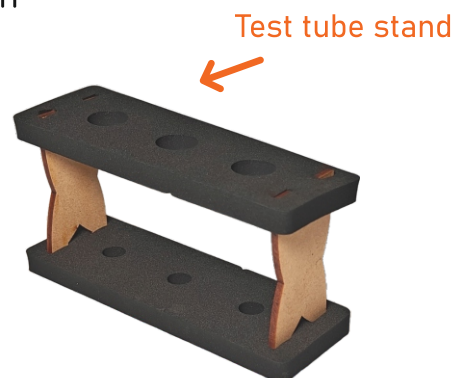


Materials

Repeat with the second wooden frame on the other side



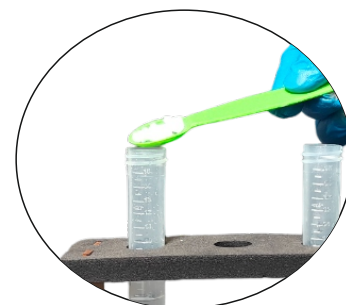
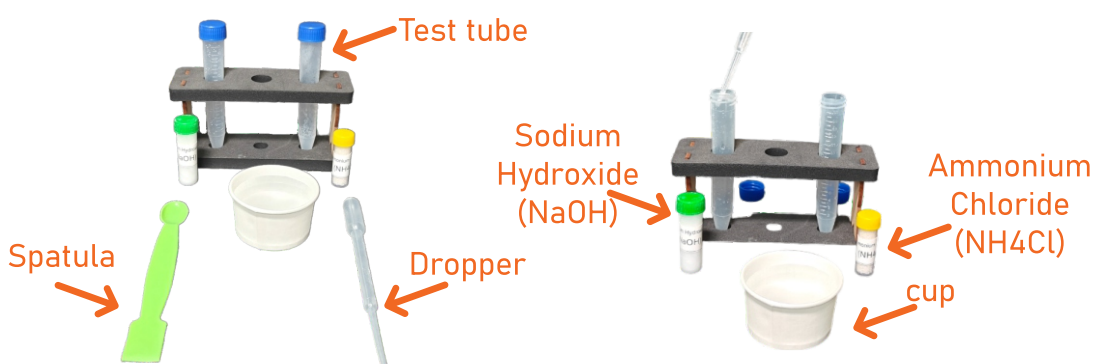
Slide a wooden frame into one foam piece.



Align and insert the second foam piece onto the wooden frames.

Exothermic and Endothermic Reactions

Let's build



Gather the materials

Add 10 ml of water from the cup into both test tube using the dropper

Add a spatula of NaOH powder to one test tube and NH_4Cl powder to the other.

Shake the test tubes separately to dissolve the powders.

NaOH



Feel the temperature of the test tube against your skin. The solution should feel warm, indicating an exothermic reaction.



NH_4Cl

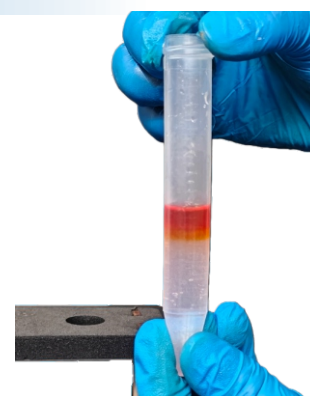


Feel the temperature of the test tube against your skin. The solution should feel cooler, indicating an endothermic reaction.

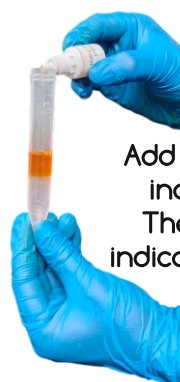
Neutralisation reaction

Let's build

Understand Neutralisation reaction between an acid and a base and the use of indicators to determine the pH of a solution

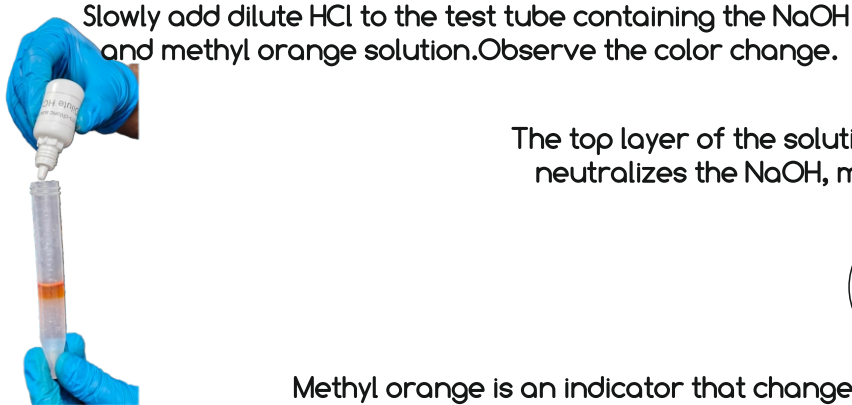


Use the NaOH solution from the Exothermic reaction test tube or Prepare a new solution by adding NaOH and water

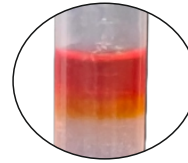


Add a few drops of methyl orange indicator to the NaOH solution. The solution should turn yellow, indicating the basic nature of NaOH.

Next Step - Adding the acid



The top layer of the solution will turn pink as the HCl neutralizes the NaOH, making the solution acidic



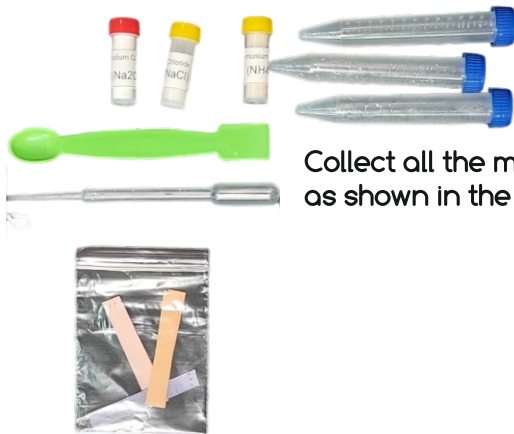
Methyl orange is an indicator that changes color based on the pH of the solution. It turns yellow in a basic solution and red in an acidic solution.

Acids, bases and Ph indicators

Let's build

To prepare solutions of NaCl, Na₂CO₃, and NH₄Cl, and test them using pH paper, blue litmus paper, and red litmus paper

Step 1 - Add water and prepare solutions



Collect all the materials as shown in the image

Add 10 ml of water to each test tube using the dropper. Add a spatula of each of the 3 chemicals

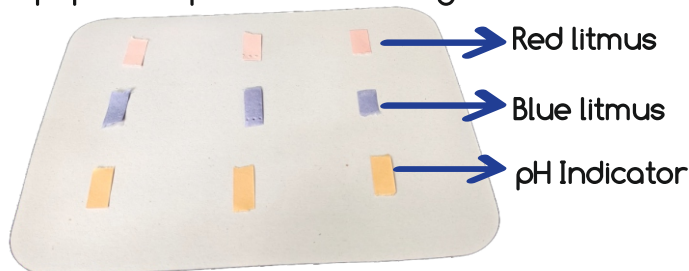


Label the test tubes for each compound

Shake the test tube until the compound dissolves completely

Step 2 - Preparing the Litmus and pH indicator

Cut each indicator paper to 3 pieces and arrange them as shown below.



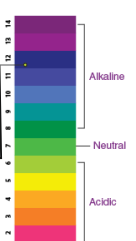
Acidic solution
Blue litmus turns red



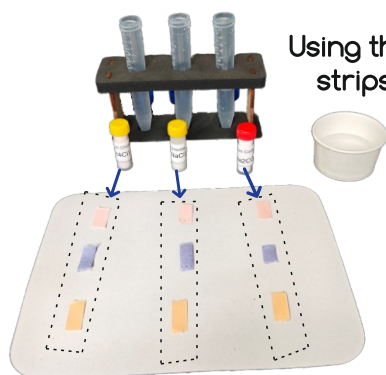
Basic solution
Red litmus turns blue



Basic solution
Solution change colour of pH paper according to its pH



Step 3 - Testing with indicator papers



Using the dropper, drop 2 drops of each solution onto separate strips of pH paper, Blue Litmus Paper and red litmus paper.

Compare the color change to the pH scale provided with the pH paper to determine the pH of each solution.
See the changes as Blue litmus paper turns red in acidic solutions.
Red litmus paper turns blue in basic solutions

Steps to add chemical solutions to indicators



Note

Clean and rinse the dropper every time before use, to clear all previous chemicals

1. Use the dropper to siphon chemicals from the test tube

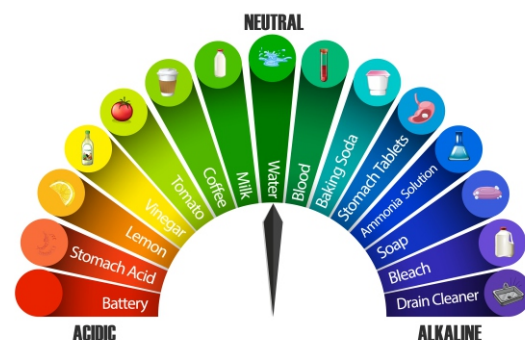
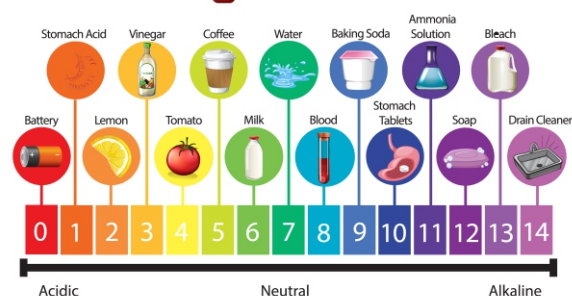


2. Add 2 drops to the Red litmus paper



3. Add 2 drops to the Blue litmus paper

The pH Scale



4. Add 2 drops to the Ph- Indicator paper

Observations:

NaCl solution: Expected to be neutral with no color change on litmus papers and a pH around 7.

Na₂CO₃ solution: Expected to be basic, turning red litmus blue and having a pH greater than 7.

NH₄Cl solution: Expected to be acidic, turning blue litmus red and having a pH less than 7.

