



Science kit

Science Kit is a collection of materials from your home and surroundings in order to conduct science experiments. Materials to be kept in the Science Kit to conduct the experiments in this unit are transparent glass tumblers, pink coloured water obtained by water boiled with pathimugam, vinegar, tamarind water, lemon juice, salt, ash, lime, baking soda and buttermilk.

properties of acids

Experiment 1

Aim: To find the presence of acids in given materials.

Materials required: glass tumblers, pink coloured water obtained by water boiled with

pathimugam, vinegar, tamarind water, lemon juice, salt, ash, lime, baking soda and buttermilk.

Procedure:

Take out the glass tumblers from your Science Kit and arrange them on the desk. Add two or three drops of vinegar, tamarind water, lemon juice, salt solution, buttermilk, ash suspension and baking soda solution into separate tumblers. Pour half a glass of pathimugam water into each tumbler.

Observation : The pink coloured pathimugam water in the following solution like vinegar, tamarind water, lemon juice, buttermilk turned their pink colour to yellow.

Inference : All the substances that turned pathimugam water into yellow have a sour taste. The sour taste is due to the presence of some acids in them.

Experiment 2

Aim: To know the properties of acids.

Materials required

Soap water, Lemon juice, Clear baking soda solution, Clear lime water, Vinegar, Buttermilk, Tamarind water, Clear ash suspension, glass tumblers, red and blue litmus papers.

Procedure: Fill half portion of each glass with a different liquid from the list given above. Dip blue and red litmus papers in these liquids.

Observation:

Liquid	Colour Changes Observed
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	Blue litmus	Red litmus
Vinegar	Turned in to red	
Lemon juice	Turned in to red	
Clear lime water		Turned in to blue
Soap water		Turned in to blue
Tamarind_water	Turned in to red	
Butter milk	Turned in to red	
Clear ash suspension		Turned in to blue
Baking soda solution		Turned in to blue

Which liquids turned blue litmus into red?

- Lemon juice
- buttermilk
- Tamarind water
- Vinegar

Which liquids turned red litmus into blue?

- Lime water
- Clear ash suspension
- Soap solution
- Baking soda solution

Acids and Bases

Acids are substances that turn blue litmus into red. Substances that turn red litmus into blue are bases.

Indicators

Indicators are substances that help to identify acids and bases by changing their colour. Litmus paper is an indicator.

Laboratory Indicators

commonly used in laboratories are **Phenolphthalein** and **Methyl Orange**.

- ☐ What change can we observe when we add two or three drops of Phenolphthalein and Methyl Orange to various acids and bases.? Tabulate the colour change.

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Liquid Tested	Phenolphthalein	Methyl Orange
Vinegar	No colour change	Pale pink
Clear Lime water	Pink	Pale yellow
Lemon juice	No colour change	Pale pink
Soap water	Pink	Pale yellow
Clear baking soda solution	Pink	Pale yellow

- ☐ Which substances can be used as indicators of acids?

Methyl Orange, blue litmus paper, blue hibiscus paper.

- ☐ Which substances can be used as indicators of bases?

Methyl Orange, phenolphthalein, red litmus paper, red hibiscus paper.

Common properties of acids and bases.

Acids	Bases
• Have sour taste • Turn blue litmus red	• All bases have alkaline taste. • Turn red litmus blue. • Slippery in nature

- ☐ Which among the following substances can turn blue litmus red? List them.

- Orange juice
- Rice soup
- Black tea
- Bilimbi (Irumban puli) juice
- Grape juice
- Tomato juice
- Coconut water

In my opinion, liquids that can turn blue litmus red	Reason
Orange juice Black tea Bilimbi Grape juice Tomato juice Coconut water	Acid contains in them

Acids in food

All food items with sour taste have acids in them. Most fruits contain more than one acid.

Food item	Main acid present
Buttermilk	Lactic acid
Curd	Acetic acid
Vinegar	Citric acid
Lemon	Tartaric acid
Tamarind	Malic acid
Apple	Ascorbic acid
Gooseberry	Oxalic acid
Tomato	

- ☐ How does milk turn acidic when it becomes curd?

We add a little curd to the milk which is boiled and cooled in order to turn it into curd. Curd contains a bacteria called Lactobacillus. The lactic acid that is produced when these bacteria nourish themselves with milk, gives curd its sour taste..

Acids and Bases in Laboratories

Acids in food items are weak. But many acids and bases commonly used in laboratories are strong.

Acids	Bases
• Hydrochloric acid • Nitric acid • Sulphuric acid • Acetic acid	• Calcium hydroxide (Lime) • Sodium hydroxide (Caustic soda) • Potassium hydroxide (Caustic pot)

- ☐ What precautions should we take to avoid accidents while handling chemicals?

- Avoid spilling on body parts
- Don't touch with hands
- Don't smell
- Don't taste
- Use a dropper while taking out acid from a bottle
- Use a holder while using a test tube

- ☐ Strong acids can cause burn if they get spilled on the body. Why? What is the remedy for it?

Strong acids can absorb water and liberate heat, so they cause burn. Pouring cold water on the affected area for a long time is the first aid for this. If the burn is severe, the person should be taken to hospital.

Experiments by diluting some acids and bases in the

laboratory.

- ☐ What are changes occur when various indicators are added to some acids and bases.?

Indicators	Colour change on adding indicators			
	Hydrochloric acid	Sulphuric acid	Sodium hydroxide	Potassium hydroxide
Methyl orange (orange)	Pale pink	Pale pink	Pale yellow	Pale yellow
Phenolphthalein (Colourless)	No colour change	No colour change	Pink	Pink
Blue litmus paper	Red	Red	Blue	Blue
Red litmus paper	Red	Red	Blue	Blue

Acids and Metals

Experiment note 2

Aim : To find out what will happen when acids reacts with metals.

Materials required : Hydrochloric Acid,zinc,magnesium ribbon test tube.

Procedure:Fill a quarter of a test tube with vinegar (dilute acetic acid). Put three or four small strips of magnesium ribbon into it. Note down your observation. Close the mouth of the test tube with your thumb for a while.

Observation:Here a gas was produced when the acid reacted with metal,and the gas that produces bubbles up and pushes at the thumb.whenever we bringing a burning matchstick to the mouth of the test tube,the gas burned up with a pop sound.

Inferences:

When acids react with metals,

hydrogen is produced. Hydrogen is a flammable gas.

- ☐ **Metal containers are not used to store pickles.why?**

OR

Earthen vessels are commonly used to cook dishes with curd and buttermilk

Acids react with metals.

. Some of the substances produced by the reaction of metal with acid can cause health problems.That is why metal containers are not used to store pickles, Or any other acidic food items.

General properties of acids

- > HAVE SOUR TASTE
- > TURN BLUE LITMUS PAPER IN TO RED
- > REACTS WITH METALS TO PRODUCE HYDROGEN

Uses of Acids

Acids	Uses
Acetic acid	Pickles
Formic acid	Coagulating agent in rubber latex.
Nitric acid	To make chemical fertilizers, paints and dyes
Sulphuric acid	In motor vehicle batteries and for manufacturing chemical fertilisers
Citric acid	To make drinks
Tanic acid	To make leather and acid
Carbonic acid	In the preparation of soft drinks.

Uses of bases

Bases	Uses
Calcium hydroxide	Glass manufacturing, to reduce the acidity of soil
Sodium hydroxide	To make soap, paper and rayon
Potassium hydroxide	To make soft soap
Aluminium hydroxide, Magnesium hydroxide	In medicines

- Which is the base used to make soap?
 - Sodium hydroxide, Potassium hydroxide.
- Which are the bases used in medicines?
 - Aluminium hydroxide, Magnesium hydroxide.
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Soap making

Materials required (To make 20 soaps)

Caustic soda 180 gram, coconut oil 1 Kilogram, water 350 millilitre, Sodium silicate 100 gram, stone powder 100 gram, colour and perfume.

Procedure

Take water in a steel bowl and dissolve caustic soda in it. A large amount of heat is liberated when caustic soda dissolves in water. After the solution cools down, slowly pour it in a flat vessel containing coconut oil. Stir it well while pouring. Then add sodium silicate and stone powder one by one to increase the hardness and quantity of the soap. Colour and perfume can be added to the soap to make it more attractive and fragrant. Stir the mixture continuously till it gets thickened. Pour the thick mixture into the mould. After solidification, remove the soap from the mould. It can be used after two weeks.

Natural indicators