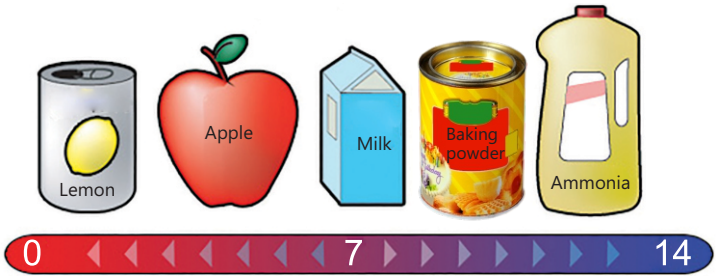
Chapter 6



ACIDS, BASES/ALKALIS AND SALTS

STUDENTS' LEARNING OUTCOMES

After studying this chapter, students will be able to:

- ☑ Define the terms acid, alkali and salt.
- ☑ Describe the properties of acids, alkalis and salts.
- ☑ Explain the uses of acids, alkalis and salts in daily life.
- ☑ Define indicators.
- ☑ Use indicators to identify acids, alkalis and neutral substances.
- ☑ Investigate the colour changes in the extracts of various flowers and vegetables by adding acids and alkalis.

You have already read that a large number of compounds can be made by the combination of various elements. More than three million compounds are known to the scientists. It is practically impossible for anyone to learn about each of these compounds. Therefore, all these compounds are divided into different groups to make their studies easier. In this chapter, you will learn about acids, bases and salts, their properties and uses. pH, its range in aqueous medium and indicators would also be discussed.

6.1 Acids

The word acid is derived from Latin word 'acidus' means sour. In chemistry, the term acid has been used to name a group of compounds that have sour taste. Acids can be defined as the compounds which produce hydrogen ions (H^+) in their aqueous solutions. Citrus fruits (Figure 6.1) have

Figure 6.1: Citrus fruits

sour taste due to citric acid. Hydrochloric acid is an important mineral acid. It is also found in gastric juice of the stomach. It acts as an antiseptic and is helpful in digestion of proteins.

Sources of Common Acids

Generally, acids are obtained from two different sources. Some acids occur in plants and animals and are known as organic acids while others are obtained from minerals and are called mineral acids. Some common organic acids and their sources are given in table 6.1.

Table 6.1: Some important acids obtained from animals or plants

Name	source	Name	Source
Formic acid	Ant's sting	Tartaric acid	Tamarind, grapes
Acetic acid	Vinegar	Lactic acid	Yoghurt
Oxalic acid	Tomatoes	Malic acid	Apples
Citric acid	Citrus fruit	Stearic acid	Fats

Some examples of the acids which are prepared from mineral elements are given in Table 6.2.

Table 6.2: Some important mineral acids and their formulae

Mineral acid	Formula
Hydrochloric acid	HCl
Nitric acid	HNO_3
Sulphuric acid	H_2SO_4
Phosphoric acid	H_3PO_4

Properties of Acids

Let us now study the properties, which are common to all acids.

(i) All acids have a sour taste.

Activity 6.1

Apparatus / Material required:

Test tube, water, dilute acetic acid

Procedure:

- Take a clean test tube half full of water.
- Put a few drops of vinegar in it.
- Close the mouth of the test tube with your thumb and shake it well.
- Taste the wet thumb.

How does it taste and why?

(ii) All acids turn blue litmus solution and methyl orange solution red.

Activity 6.2

Apparatus / Material required:

Test tubes (3), dilute hydrochloric acid or dilute sulphuric acid, blue litmus, methyl orange, phenolphthalein

Procedure:

- Take a little dilute HCI or H_2SO_4 solution in three separate test tubes.
- Label them as 1, 2 and 3.
- Add two to three drops of blue litmus, methyl orange and phenolphthalein in the test tubes 1, 2 and 3 separately.

What changes in the colour of the solution do you observe?

Activity 6.3

Apparatus / Material required:

Test tube, vinegar, litmus solution, sodium hydroxide solution

Procedure:

- Take 2cm^3 of vinegar in a test tube.
- Add two drops of blue litmus solution to it and observe the change, if any.
- Then add carefully sodium hydroxide solution and observe the changes taking place in the solution.

What do you infer from this activity?

(iii) Strong acids are corrosive liquids. They burn skin and destroy fabrics and animal tissues.

(iv) Aqueous solutions of acids are good conductors of electricity.

(v) Acids react with reactive metals (Mg, Zn) to form salt and evolve hydrogen gas.

$$Mg_{(s)} + 2HCl_{(aq)} \longrightarrow MgCl_{2(aq)} + H_{2(g)}$$

Magnesium + Hydrochloric acid → Magnesium chloride + Hydrogen

$$Zn_{(s)} + H_2SO_{4(aq)} \longrightarrow ZnSO_{4(aq)} + H_{2(g)}$$

Zinc + Sulphuric acid → Zinc sulphate + Hydrogen

Hydrogen gas produced in the reaction burns with pop sound (Figure 6.2). This is a test for identification of hydrogen gas.

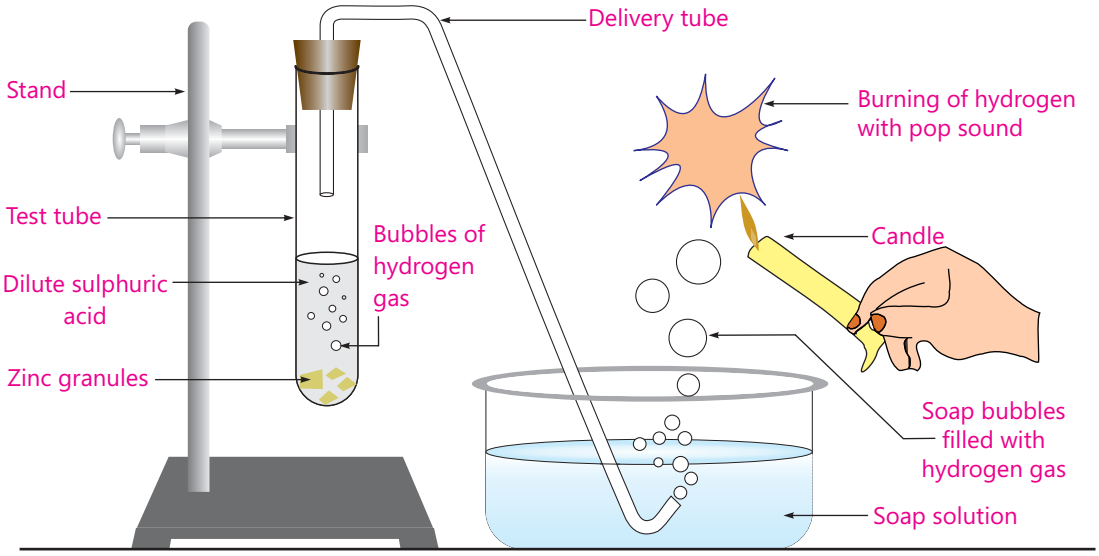


Figure 6.2: Reaction of zinc with dilute acid

(vi) Acids react with metal carbonates and metal hydrogen carbonates to liberate carbon dioxide.

$$CaCO_{3(s)} + 2HCl_{(aq)} \longrightarrow CaCl_{2(aq)} + H_2O_{(\ell)} + CO_{2(g)}$$

Calcium carbonate + Hydrochloric acid → Calcium chloride + Water + Carbon dioxide

$$NaHCO_{3\,(S)} + CH_3COOH_{(aq)} \longrightarrow CH_3COONa_{(aq)} + H_2O + CO_{2\,(g)}$$

Sodium hydrogen carbonate — Acetic acid — Sodium acetate — Water — Carbon dioxide

Carbon dioxide produced in the reaction turns lime water milky (Figure 6.3). This is a test for identification of carbon dioxide gas.

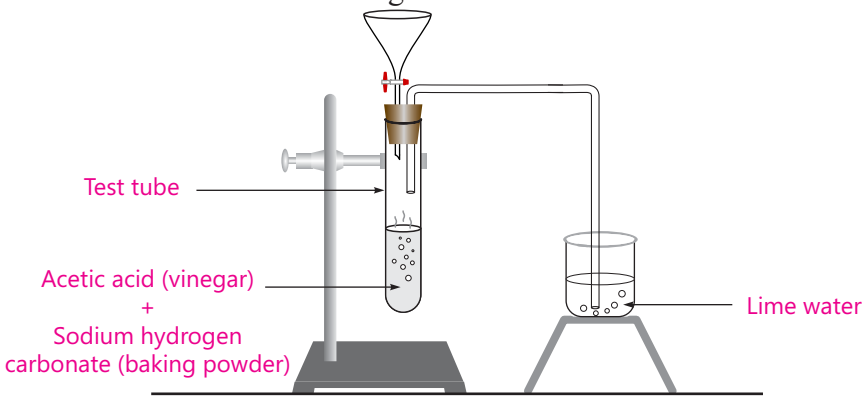


Figure 6.3: Reaction of acetic acid with sodium hydrogen carbonate

(vii) Acids react with bases to form salt and water. This process is called neutralization.

$$H_2SO_{4\,(aq)} + 2NaOH \longrightarrow Na_2SO_{4\,(aq)} + 2H_2O$$

Sulphuric acid — Sodium hydroxide — Sodium sulphate — Water

Uses of Acids

A very brief idea of the uses of mineral acids is given below:

Hydrochloric Acid

Hydrochloric acid is used :

(i) for cleaning rust from the surface of metals.

(ii) for purification of common salt (NaCl).

(iii) to make Aqua Regia ($3HCl + HNO_3$) used to dissolve noble metals such as gold.

(iv) for making glucose from starch.

(v) for the proper digestion of food in our stomach.

Nitric Acid

Nitric acid is used:

(i) in the manufacture of fertilizers like ammonium nitrate.

(ii) for the manufacture of explosives.

(iii) in the manufacture of dyes, plastics and artificial silk.

(iv) for etching designs on metals like copper, brass and bronze.

Sulphuric Acid

Sulphuric acid is used:

(i) as a dehydrating agent.

(ii) in the manufacture of fertilizers like ammonium phosphate, calcium ammonium phosphate, calcium super phosphate, etc.

(iii) in the manufacture of celluloid plastic, artificial silk, paints, drugs and detergents.

(iv) in petroleum refining, textile, paper, and leather industries.

(v) in lead storage batteries.

The uses of sulphuric acid are so large and so important that it is known as the king of chemicals (Figure 6.4).

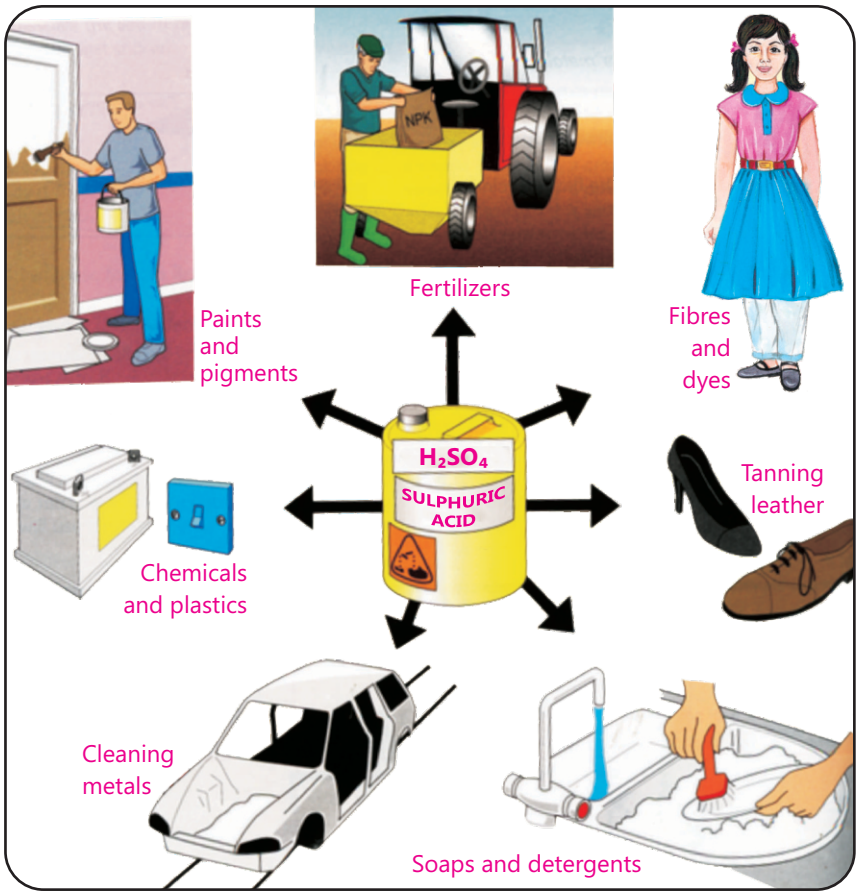


Figure 6.4: Uses of sulphuric acid

Acetic Acid

Acetic acid is used:

(i) in the preparation of pickles. (ii) in the manufacture of synthetic fibre.

6.2 Bases / Alkalis

Many compounds have properties which are contrary to acids. Such compounds are termed as bases. The bases which are soluble in water are called alkalis. The word alkali has been taken form Arabic word "qali" which means "from ashes". Alkalis are obtained from the ashes of plants.

Alkalis/bases are the compounds which produce hydroxide ions (OH^-) in their aqueous solutions. Sodium hydroxide (NaOH), potassium hydroxide (KOH), calcium hydroxide $Ca(OH)_2$, etc., are the examples of bases / alkalis. Some important alkalis and their formulae are given in Table 6.3.

Table 6.3: Some common alkalis and their formulae

Alkali	Formula
Sodium hydroxide	NaOH
Potassium hydroxide	KOH
Calcium hydroxide	$Ca(OH)_2$
Ammonium hydroxide	NH_4OH
Magnesium hydroxide	$Mg(OH)_2$

Commonly used alkalis as laboratory reagents are shown below in reagent bottles (Figure 6.5).

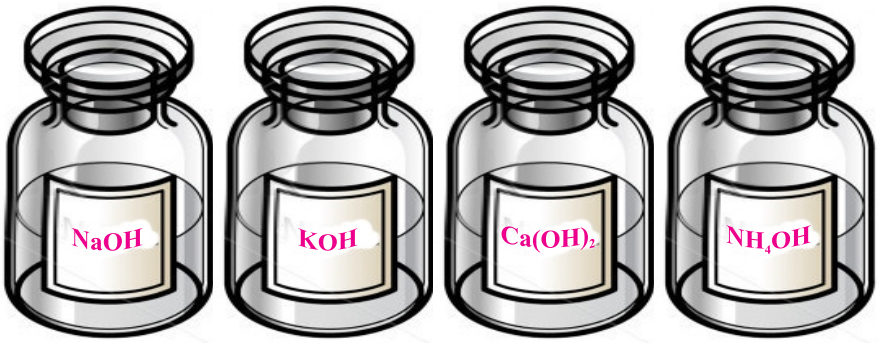


Figure 6.5: Common alkalis used in laboratory

? Do you know?

All alkalis are bases but all bases are not alkalis.

Properties of Bases / Alkalis

(i) Aqueous solution of a base has a soapy touch.

Activity 6.4

Apparatus / Material required:

Test tube, sodium hydroxide, water, etc.

Procedure:

- Take 10 cm^3 of water in a test tube.
- Add a few pellets of sodium hydroxide and shake it.
- Touch the solution with your fingers.

How do you feel?

(ii) Bases turn red litmus blue, colourless phenolphthalein pink and methyl orange yellow. They turn turmeric paper brown.

(iii) Aqueous solution of bases are good conductor of electricity.

(iv) Bases react with acids to form salts and water. The reaction is called neutralization reaction.

$$\underset{\text{Sodium hydroxide}}{NaOH\,(aq)} + \underset{\text{Hydrochloric acid}}{HCl\,(aq)} \longrightarrow \underset{\text{Sodium chloride}}{NaCl\,(aq)} + \underset{\text{Water}}{H_2O\,(\ell)}$$

Activity 6.5

Apparatus / Material required:

Test tube, sodium hydroxide solution, dilute hydrochloric acid, phenolphthalein, etc.

Procedure:

- Take 3 cm^3 of sodium hydroxide solution in a test tube.
- Add a drop of phenolphthalein solution to it. It turns pink.
- To this, add dilute hydrochloric acid slowly until the colour is discharged. Transfer the solution to a china dish and evaporate it to dryness.

What do you observe?

v. Alkalis when heated with ammonium salts produce ammonia gas (Figure 6.6). We can identify ammonia gas by its pungent smell. Ammonia also turns moist red litmus paper blue.

$$Ca(OH)_{2\,(aq)} + 2NH_4Cl_{\,(aq)} \xrightarrow{\text{heat}} CaCl_{2\,(aq)} + 2H_2O_{\,(\ell)} + 2NH_{3\,(g)}$$

Calcium hydroxide | Ammonium chloride | Calcium chloride | Water | Ammonia

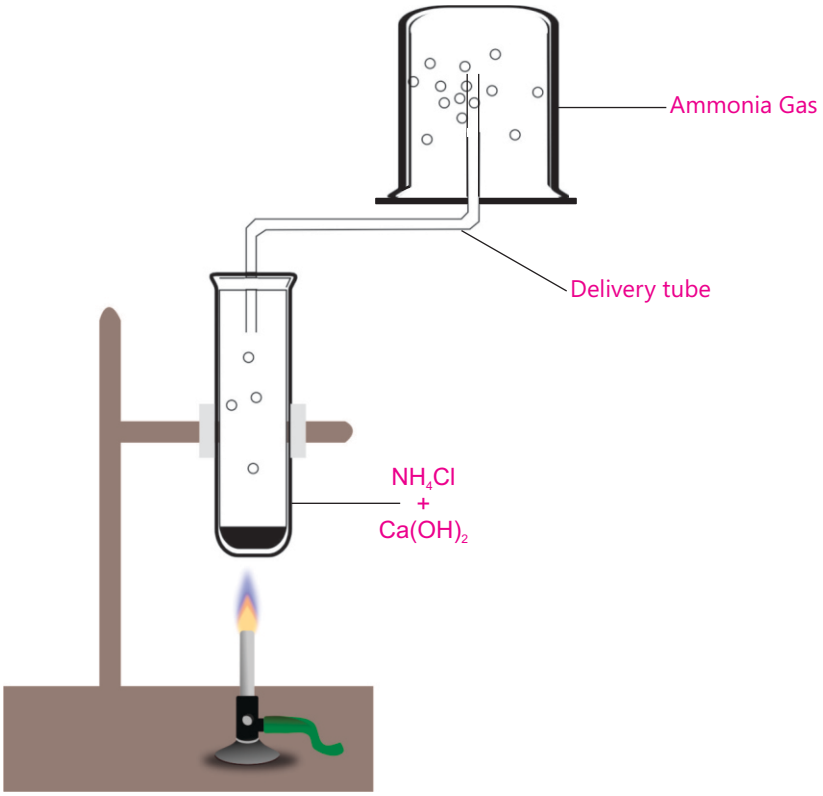


Figure 6.6: Reaction of calcium hydroxide with ammonium chloride

(vi) Alkalis react with fats to form soap.

Uses of Bases / Alkalis

Some common uses of bases are:

Sodium hydroxide (NaOH)

Sodium hydroxide is largely used in:

(i) soap, textile and plastic industries.
(ii) petroleum refining.
(iii) making rayon.
(iv) the manufacture of paper pulp and medicines.

Calcium hydroxide

Calcium hydroxide is called slaked lime. It is used:

(i) in the manufacture of bleaching powder.
(ii) as a dressing material for acid burns.
(iii) in making lime sulphur sprays to be used as fungicide.
(iv) as a water softener.
(v) for neutralizing acidity present in soil.

Ammonium hydroxide

Ammonium hydroxide is used:

(i) to remove grease from window panes.
(ii) to remove ink spots from clothes.
(iii) as a reagent in laboratory.
(iv) for the treatment of bees' stings.

6.3 Salts

A salt is a compound formed by the neutralization of an acid with a base.

A large variety of compounds exists as salts. Sodium chloride is a common salt which we use in our food.

Some common salts and their formulae are given in Table 6.4 and shown in figure 6.7.

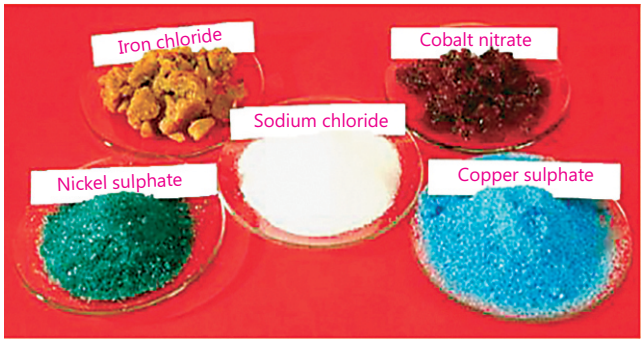


Figure 6.7: Some common salts

Table 6.4: Some common salts and their formulae

Salt	Formula	Salt	Formula
Sodium chloride	NaCl	Sodium nitrate	$NaNO_3$
Potassium chloride	KCl	Potassium nitrate	KNO_3
Ammonium chloride	NH_4Cl	Ammonium nitrate	NH_4NO_3
Calcium chloride	$CaCl_2$	Calcium sulphate	$CaSO_4$
Sodium carbonate	Na_2CO_3	Calcium carbonate	$CaCO_3$
Sodium hydrogen carbonate	$NaHCO_3$	Copper sulphate	$CuSO_4$

Properties of Salts

(i) Salts exist in solid states. They are found in crystalline or in powder forms. They have high melting and boiling points.

(ii) Generally, salts are soluble in water. However, the salts like calcium carbonate, lead chloride and cadmium sulphate, etc., are insoluble in water.

(iii) Aqueous solutions of metal salts or their molten forms conduct electricity.

(iv) Many of the salts contain water molecules in their crystals which are responsible for the shape of the crystals.

(v) Carbonates and bicarbonates react with acids to liberate carbon dioxide gas.

$$\underset{\text{Sodium carbonate}}{Na_2CO_3\,(s)} + \underset{\text{Hydrochloric acid}}{2HCl\,(aq)} \longrightarrow \underset{\text{Sodium chloride}}{2NaCl\,(aq)} + \underset{\text{Water}}{H_2O\,(\ell)} + \underset{\text{Carbon dioxide}}{CO_2\,(g)}$$

(vi) When salts of heavy metals react with alkalis, precipitates of heavy metal hydroxides are formed in the reaction mixture. Precipitates are the substances which appear as solid insoluble product in the liquid reaction mixture.

$$\underset{\text{Ferric chloride}}{FeCl_3\,(aq)} + \underset{\text{Sodium hydroxide}}{3NaOH\,(aq)} \longrightarrow \underset{\text{Ferric hydroxide}}{Fe(OH)_3\,(ppt)} + \underset{\text{Sodium chloride}}{3NaCl\,(aq)}$$

(vii) The chemical reaction of water with a salt produces an acid and a base and the reaction is called hydrolysis.

$$\underset{\text{Sodium carbonate}}{Na_2CO_3\,(s)} + \underset{\text{Water}}{2H_2O\,(\ell)} \longrightarrow \underset{\text{Sodium hydroxide}}{2NaOH\,(aq)} + \underset{\text{Carbonic acid}}{H_2CO_3\,(aq)}$$

Uses of Salts

(i) Role of salts in human body

Salts of sodium, potassium, calcium, magnesium and iron are needed for the normal working of our body (Figure 6.8). They perform the following functions:

(a) Sodium and potassium salts are needed for the proper functioning of muscles and the nervous system.

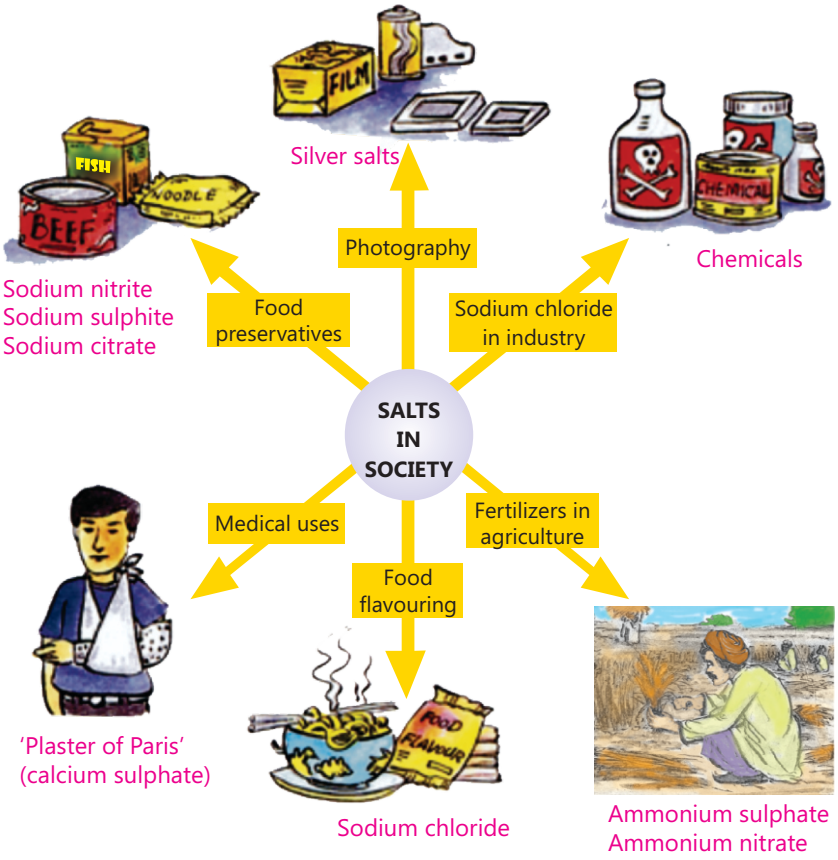


Figure 6.8: Uses of salts

(b) Salts of calcium are present in bones. They are responsible for the strength of bones. These salts are responsible for preventing heart attacks. Plaster of Paris ($CaSO_4 \cdot \frac{1}{2} H_2O$) is used for broken limbs.

(c) Potash alum is used to coagulate the blood coming out of a wound. It is also used for the purification of water.

(d) Salts of iodine are needed for the proper functioning of thyroid glands. They are also used for the treatment of goiter.

(ii) Uses of salts in our daily life

(a) In our daily life, we use common salt for seasoning food. It is also used as a

preservative for fish and pickles (Figure 6.8).

(b) Baking soda is used for giving softness to bread and cake.

(c) Washing soda is used for washing clothes.

(d) Sodium potassium tartrate is used as a laxative.

(iii) Uses of salts in industries

(a) Sodium chloride is used for the manufacture of chlorine, hydrogen chloride, caustic soda, washing soda and sodium hydrogen carbonate.

(b) Sodium carbonate is used for softening hard water and for the manufacture of glass and soap.

(c) Potassium nitrate is used for the preparation of gun powder and fireworks. It is also used as a fertilizer.

(d) Potash alum is used for purification of water, in dyeing cloth and for tanning hides.

(e) Copper sulphate is used as a fungicide, in calico printing and in electroplating.

6.4 pH scale

The scale which is used to measure the strength of acidic or alkaline solution is known as pH scale. The pH of a solution can be found with the help of universal indicator or pH paper. A universal indicator paper has a mixture of several dyes coated on it. It shows different colours for different pH values of the solutions. In an acidic solution, colour changes from yellow to orange and then red as the pH decreases. The colour changes from indigo to violet when pH changes from 7 to 14.

Activity 6.6

Apparatus / Material required:

pH paper, sodium hydroxide, ammonium hydroxide, vinegar solution, dilute hydrochloric acid

Procedure:

- Add separate strips of pH paper in different solutions.
- Observe the change in colour of the strips and record your observations.

You will observe that different shades of colour appear on each strip of pH paper. By

comparing the colours with the chart provided with the pH paper you can find the pH of different solutions. Strong acids have pH value 0 to 2. pH of weak acids is in between 3 and 6. pH of strong alkalis is 12 to 14.

Activity 6.7

Material required: Universal indicator paper, dilute NaOH, dilute NH_4OH, dilute HCl, dilute H_2SO_4, vinegar, distilled water

Procedure:

- Take 1cm^3 of dilute HCl, dilute H_2SO_4, dilute CH_3COOH (vinegar), dilute NaOH distilled water in different test tubes.
- Add 1.5 cm^3 of distilled water.
- Dip separate universal indicator papers in each tube and match the colour with colour given on the strip.
- Note the observations.

Sample	Colour of univeral indicator paper	pH of the solution
Dilute HCl		
Dilute H_2SO_4		
Dilute CH_3COOH		
Dilute NaOH		
DiluteNH_4OH		
Distilled H_2O		

6.4.1 pH and its Range (0 –14) in Aqueous Medium

Pure water ionizes very slightly into hydrogen (H^+) and hydroxide (OH^-) ions. However, the concentrations of hydrogen ions (H^+) and hydroxide ions (OH^-) in pure water are equal. Hydrogen ion concentration increases, when acids are dissolved in water. Alkalis on dissolving in water decrease the concentration of hydrogen ions in water as compared to hydroxide ion. The greater the concentration of hydrogen ions (H^+) in a solution, the stronger the acid it is. The lesser the concentration of hydrogen ions as compared to hydroxide ions in a solution, the stronger the alkali it is.

Hence, the scale which is used to measure the strength of an acid or alkali in an aqueous solution is based on the concentration of hydrogen ions (H^+) which is termed as pH.

pH values range from 0 – 14 (Figure 6.9). The solutions having equal concentrations of hydrogen ions (H^+) and hydroxide ions (OH^-) are neutral solutions. They have pH = 7. pH = 7 is the midpoint of the pH scale.

The solutions with higher concentration of hydrogen ions will have lower than 7 value of pH. The solutions with lower concentration of hydrogen ions than that of hydroxide ions will have greater than 7 value of pH. Solution with lower pH values are stronger acids. The solutions with higher pH values are stronger alkalis. The higher the pH value of the solutions, the stronger the alkalis they are.

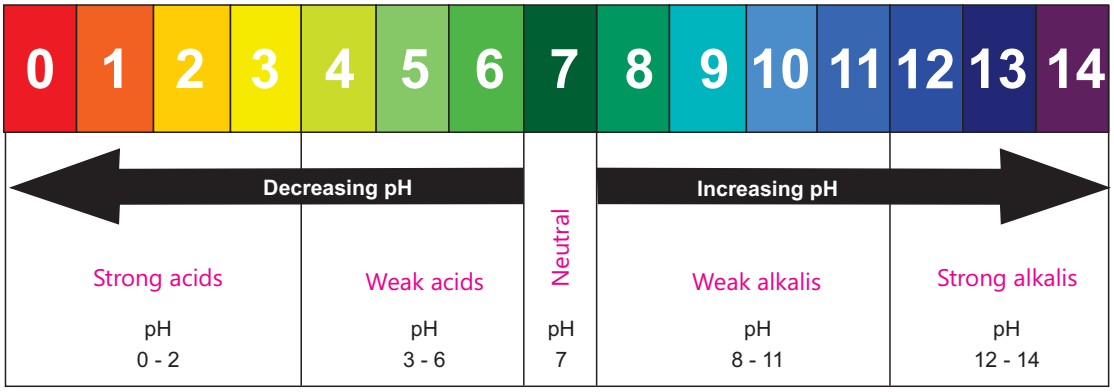


Figure 6.9: pH Scale

pH values of some common substances are given in Table 6.5.

Table 6.5: pH values of some common substances

Substance	pH	Substance	pH
Pure sulphuric acid	0	Pure water	7
Gastric juice in the stomach	1	Cleaning fluid	9
Lemon juice	2	Baking powder	10
Vinegar	3	Milk of magnesia	11
Tomato juice	4	Household ammonia	12
Acid rain	5	Strongest alkalis such as potassium hydroxide	14

pH Meter

The instrument which is used to measure the exact pH of the solutions is called pH meter (Figure 6.10). When the electrode of pH meter is dipped in the solution, the reading of its pH appears on the digital display of pH meter.

Figure 6.10: pH meter

6.5 Indicators

Majority of acids and bases are colourless. It is not possible to identify them by their appearance. In order to identify whether a substance is an acid or alkali indicators are used.

An indicator is a substance that shows different colours in acidic and basic solutions (Table 6.6). Some examples of indicators are phenolphthalein, methyl orange, litmus, turmeric, china rose and red cabbage.

Table 6.6: Indicators and their colours in acidic and basic solutions

Indicator	Original colour	Colour in acid	Colour in base
Litmus	Violet	Red	Blue
Phenolphthalein	Colourless	Colourless	Pink
Methyl orange	Orange	Red	Yellow

Activity 6.8

Apparatus / Material required:

Dilute HCl, soap solution, lemon juice, tap water, sodium hydroxide, ammonia solution and household bleach.

Procedure:

- Put these samples in clean test tubes.
- Add a few drops of red and blue litmus solution in each tube.
- Record your observations in the following table.

Sample	Colour change		Nature of solution
	Red litmus	Blue litmus	
Dil HCl	Remains red	Turns red	Acidic
Soap solution			
Tap water			
Sodium hydroxide	Turns blue	Remains blue	Basic
Household bleach			
Ammonia solution			

Test the above samples with methyl orange and phenolphthalein and record the observation.

Natural indicators

Red cabbage, turmeric, china rose and litmus.

Activity 6.9

Apparatus / Material required:

Turmeric powder, water, filter paper, different solutions

Procedure:

- Make a paste of turmeric powder with water.
- Apply the paste on the filter paper and allow it to dry.
- Remove the dry powder from the filter paper.
- Cut the filter paper into small strips.
- Pour different solutions separately on the strips and note the colour changes.
- Record the observations in tabular form as in activity 6.8.

Turmeric (Haldi Powder)

You will observe that:

Turmeric paper remains yellow in acidic and neutral solutions but turns brown in alkaline solution.

Red Cabbage

Activity 6.10

Material required:

Red cabbage, water, filter paper, different solutions

Procedure:

- Put some chopped red cabbage in hot water for sometime.
- Filter the coloured solution.
- Purple coloured cabbage indicator is ready for use.
- Test the sample of activity 6.9 with this indicator and record the results.

You will observe that:

The purple colour of cabbage indicator turns red in acidic solutions and green in basic solutions.

Neutral solutions do not change the colour of red cabbage indicator.

KEY POINTS

- Acids are substances which have sour taste. They change blue litmus red. They also react with active metals producing salts and hydrogen gas.
- Acids act on metal carbonates and hydrogen carbonates liberating carbon dioxide.
- Acids neutralize bases to form salts and water.
- Acids have many uses in laboratories and industries.
- Hydroxides like NaOH, KOH, $Ca(OH)_2$, NH_4OH are examples of bases.
- Bases have bitter taste and turn red litmus blue, colourless phenolphthalein to pink.
- Bases neutralize acids to form salts and water.
- Bases have many uses in laboratories in homes and in industries.
- Many salts are commonly used in our daily life.

QUESTIONS

6.1 Fill in the blanks.

(i) Acids react with bases to form water and _____.

(ii) Vinegar contains _____ acid.

(iii) Tartaric acid is present in _____.

(iv) Bases have _____ taste.

(v) All alkalis are bases but all bases are not _____.

(vi) Bases have _____ touch.

(vii) Sodium hydroxide is also called _____.

6.2 Put (✓) for correct and (×) for incorrect statement.

(i) Acetic acid is found in grapes.

(ii) All carbonates react with mineral acids liberating CO_2 gas.

(iii) Acids turn red litmus blue.

(iv) All bases do not dissolve in water.

(v) Solution of a base has a soapy touch.

6.3 Encircle the correct option.

(i) The king of chemicals is

a. KOH b. Hcl

c. H_2SO_4 d. NaCl

(ii) Sodium hydroxide solution in water will:

a. turn blue litmus red

b. give pink colour with phenolphthalein

c. give red colour with methyl orange

d. not affect the phenolphthalein indicator

(iii) When carbon dioxide is passed through lime water, the milkiness is due to the compound:

a. $Ca(HCO_3)_2$ b. $CaCO_3$

c. H_2CO_3 d. CaO

(iv) Lactic acid is found in:

a. grapes b. tomatoes

c. ant's string d. yoghurt

(v) Which is not the salt of phosphoric acid?

a. Na_3PO_4 a. NaH_2PO_4

c. Na_2HPO_3 d. Na_2HPO_4

(vi) Sodium carbonate is an important salt used for many purposes in industries. Sodium hydroxide is made to react with which acid to get it?

a. oxalic acid b. citric acid

c. carbonic acid d. acetic acid

6.4 Give short answers.

(i) Define an acid.

(ii) Name three mineral acids.

(iii) State three properties of acids.

(iv) Mention the uses of two salts in industries.

(v) Name a salt which can reduce the acidity in our stomach.

(vi) What happens when a salt like copper sulphate reacts with water?

(vii) Is soda water acidic or basic?

(viii) Which alkali is commonly used to open a drain?

(ix) Write down the chemical equation showing the reaction of ammonia and water.

(x) How is litmus solution prepared?

6.5 What is the effect of dilute HCl on the colours of the following?

(i) Methyl orange (ii) Phenolphthalein (iii) Blue litmus

6.6 What is a base? Write down the names and formulae of four bases.

6.7 Mention the sources of the following.

(i) Citric acid (ii) Tartaric acid (iii) Acetic acid

6.8 What is the action of caustic soda on the colour of the following.

(i) Red litmus (ii) Phenolphthalein (iii) Methyl orange

6.9 Describe how are salts useful for the human body.

6.10 What happens when:

(i) magnesium reacts with dilute Hcl?

(ii) sodium hydrogen carbonate reacts with dilute H_2SO_4?

(iii) copper oxide reacts with dilute sulphuric acid?

(iv) sodium reacts with chlorine?

6.11 Why are the aqueous solutions of $NaHCO_3$ and Na_2CO_3 basic in nature?

6.12 How does the soil become acidic?

6.13 Sulphuric acid (H_2SO_4) molecule can give two protons in water whereas hydrochloric acid molecule can give only one proton. Does that mean sulphuric acid is twice as strong an acid as hydrochloric acid?

6.14 Indicate in front of each salt the acid and the base which have been used to produce them.

Calcium acetate, potassium hydrogen sulphate, magnesium nitrate, ammonium oxalate, sodium potassium tartarate, ferric chloride

Name of salt	Acid	Base
Calcium acetate		
Potassium hydrogen sulphate		
Magnesium nitrate		
Ammonium oxalate		
Sodium potassium tartarate		
Ferric chloride		

Online Learning

www.krysstal.com/acidbase.html
www.science.uwaterloo.ca/~cchieh/cact/c123/salts.html
www.bbc.co.uk
cbse.myindialist.com
www.e-education.psu.edu
www.visualphotos.com