Unit 3

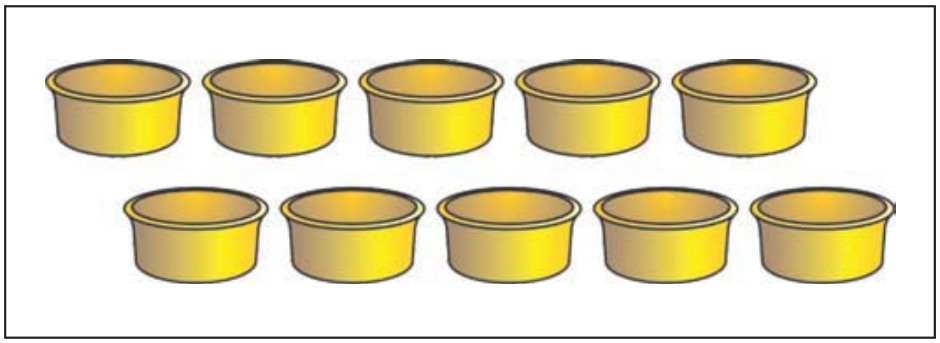
# Acid, Base and Salt

You have collected some objects either from the kitchen of your house or from somewhere else. Whichever object, from the objects you have brought falls in the following list, then make the sign against it :

| | | | | | |
|---|---|---|---|---|---|
| Lemon | ☐ | Butter-milk | ☐ | Washing soda | ☐ |
| Sugar | ☐ | Tomatoes | ☐ | Curd | ☐ |
| Lime | ☐ | Soap | ☐ | Tamarind | ☐ |
| Edible soda | ☐ | Salt | ☐ | Citrate | ☐ |

If you have any object other than the above mentioned objects, then make note of it.

**What is required ?** Objects you have collected, small bowls, red and blue litmus papers.



**What to do ?**

- ☞ Write down the names of the objects you have collected on each of the small bowl.
- ☞ Now extract juice from the objects like lemons and tomatoes and pour it in the corresponding bowl.
- ☞ Now dissolve in water the objects like tamarind, salt, edible soda, washing soda, soap, citrate (citric acid) and sugar and fill them in the corresponding bowls.
- ☞ Fill in the objects like curd or butter-milk in the original state in the corresponding bowls.

☞ Now dip a blue litmus paper in any one bowl.

☞ Observe whether there is any change in the colour of the litmus paper.

☞ Now dip a piece of red litmus paper in the same solution.

☞ Is there any change in the colour of the litmus paper ? Observe it.

- Whatever you observed, write it down in the following table.
- In the similar way test every solution.

| No. | Name of the object | What is the effect on the colour of the blue litmus paper | What is the effect on the colour of the red litmus paper |
|---|---|---|---|
| 1 | Lemon juice | | |
| 2 | Tomato juice | | |
| 3 | Salt solution | | |
| 4 | Sugar dissolved solution | | |
| 5 | Tamarind water | | |
| 6 | Lime water | | |
| 7 | Butter-milk | | |
| 8 | Solution of washing soda | | |
| 9 | Solution of citrate (citric acid) | | |
| 10 | Soap-water solution | | |
| 11 | Distilled water | | |

List of the substances which are acid : **Some substances change the colour of blue litmus paper into red. Such substances are called acid.**

Will you be able to tell which of the substances in your list are acid ?

**Properties of acid :**

- It changes the colour of blue litmus paper into red.
- It is sour in taste.

**Uses of acid :**

- It is used in preparation of food.
- It is used to clean tiles.

**Soda-water known as a cold drink, fluid used in filling car batteries and human urine all of them possess acidic properties.**

**Some substances change red litmus paper into blue. Such substances are called base.**

Will you be able to tell which of the substances in your list are base ?

- **List of the substances which are base :**

**Properties of base :**

- It turns red litmus paper into blue.
- It is bitter in taste.
- It is adhesive (feel slippery).

**Uses of base :**

- It is used in the preparation of food.
- It is used for washing clothes.

**Some solutions of substances do not make any effect on either red litmus paper or blue litmus paper such substances are called neutral substances.**

Can you tell which of the substances in your list are neutral substances ?

List of the substances which are neutral towards litmus papers :

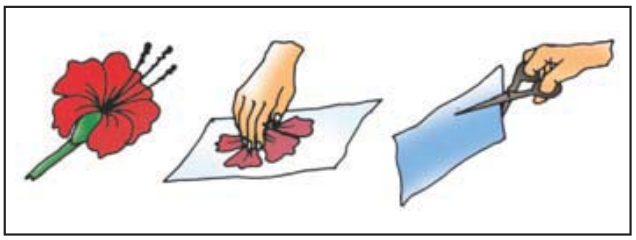
Some of these neutral substances are salts. E.g. Solution of common salt; but solution of sugar is neutral still it is not a salt.

## What if you don't have a litmus paper ?

**What is required ?** Seven-eight hibiscus (jasud) flowers, turmeric, sheet of white paper, a pair of scissors, water and a plate.

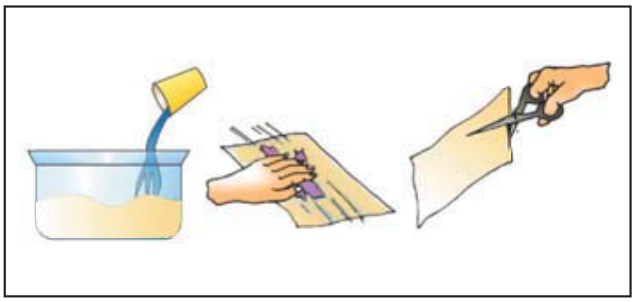
**What to do ?**

☞ **Preparation of hibiscus flower paper :**



- Rub some of the petals of hibiscus flower on a piece of white paper.
- Carry on rubbing the petals on the white paper until the paper turns blue.
- Now cut the white paper into small stripes by a pair of scissors.
- We call these stripes hibiscus paper.

☞ **Preparation of turmeric paper :**



- Take some water in a dish or a small vessel.
- Add some turmeric powder in it and dissolve in it.
- Dip a paper in turmeric solution and remove it after it is thoroughly drenched.
- Keep this white paper in the sun light for some time and let it be dry.
- After the paper is completely dry, take a pair of scissors and cut the white paper into small stripes.
- These stripes are called Turmeric paper.

**Perform an experiment and find out yourself that these hibiscus papers and turmeric papers behave like which of the litmus papers.**

**Take some other flowers like hibiscus flowers and do the same kind of activities.**

**Edible soda and washing soda are salts. But while making their solution in water they give chemical reaction with water and due to this the solution possesses the properties of base.**

## Titration

**What is required ?** Dilute hydrochloric acid HCl, solution of costic soda (NaOH), Phenolphthalein, litmus papers, test-tube, dropper, tongs, stand for test-tubes.

**What to do ?**

- ☞ Take a test-tube.
- ☞ With the help of a dropper put ten to twelve drops of HCl in the test-tube.
- ☞ Test it with litmus papers and make your observation and note it down :

  This solution changes ☐ coloured litmus paper into ☐ coloured litmus paper.

  This solution is **acid** / **base** (cross out the wrong word) :
- ☞ Now add two to three drops of phenolphthalein in the test-tube.
- ☞ Now shake the test-tube well.

☞ Did you find any change in its colour ? [ ]

☞ Now take sodium hydroxide solution in a beaker.

☞ Test the solution by litmus papers and note the observation below :

This solution changes [ ] coloured litmus paper into [ ] coloured litmus paper. This solution is **acid / base** (cross out the wrong word).

☞ With the help of a dropper add a drop of sodium hydroxide in the test-tube.

☞ Now shake the test-tube for some time.

☞ Thus slowly go on adding one by one drop in the test-tube and carry on shaking the test-tube.

☞ When the solution in the test-tube turns slightly pink in colour then stop adding the drops in it.

☞ Now examine this solution by both litmus papers and note down your observations. What did you observe ?

☞ What can be said from this ?

**Due to chemical reaction taking place between proper portions of acid and base, both the substances lose their own properties and make salt and water. This process is called Neutralization.**

**We can describe the experiment we performed as below :**

| Acid | | Base | | Neutral salt | | |
|---|---|---|---|---|---|---|
| HCl | + | NaOH | ⟶ | NaCl | + | $H_2O$ |
| (Hydrochloric acid) | | (Sodium Hydroxide) | | (Salt) (Sodium Chloride) | | (Water) (Hydrogen Oxide) |

**Salts which are used in daily routine :**

| Name of salt | Uses |
|---|---|
| Common salt | It is used in<br>- preparation of food.<br>- preserving dry food for long duration.<br>- preparation of washing soda. |
| Edible soda | It is used in - medicine of acidity<br>- fire extinguishing instruments.<br>- preparation of food. |
| Washing soda | It is used in - to remove dirt<br>- washing clothes and vessels.<br>- changing hard water into soft water. |

**Do you like to learn magic ? Let us do a magic today.**

**What is required ?** Sheet of papers, water, turmeric powder, soap-water, a dish

**What to do ?**

- ☞ Applying soap-water on a sheet of paper and let it to be dry.
- ☞ Now wet both the palms and apply turmeric powder on them.
- ☞ Make impressions of both the palms on a dried sheet of paper and note down your observations.

Discuss the reason for such a happening with your friends.

**Q.1 Classify the following substances given below in acid, base and salt :**

Lemon, butter-milk, washing soda, sugar, tomato, curd, lime, soap, tamarind, edible soda, common salt, citrate (citric acid)

| Acid | Base | Salt |
|---|---|---|
| | | |

**Q.2 Explain the difference between :**

(1) Acid and Base

(2) Acid and Salt

(3) Base and Salt

**Q.3 Answer in brief :**

(1) State the properties of acid and give its three examples.

(2) State the properties of base and give its three examples.

(3) State the properties of salt and give its three examples.

(4) State the uses of acid.

(5) State the uses of base.

(6) State the uses of salt.

(7) Which main salt is in the sea-water ?

**Q.4 Give explanation :**

"All neutral substances are not salt." Explain.