MEGHSHALA

SCIENCE GRADE 7

Acids, Bases and Salts

LESSON 3

UNIT OVERVIEW

Lesson 1: Introduction to acids and bases

Lesson 2: Indicators. Properties of acids and bases

Lesson 3: Neutralisation and salts

Lesson 4: Applications of neutralisation

LESSON OVERVIEW

What

Students will learn that when acids and bases mix, salt and water is formed.

They will understand the term ‘neutralisation’.

Why

Neutralisation is the basis of important chemical reactions which the students will learn about in higher classes.

Neutralisation has various applications in life.

How

Students will learn neutralisation by:

- discussing the concepts involved in the story introduced in the previous lesson.
- observing a demonstrated neutralisation experiment and video.

Time Distribution

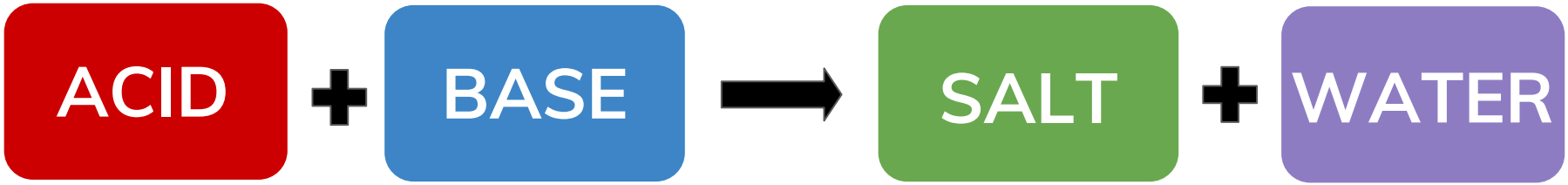
Recap of Subbu's story	03 mins
Neutralisation	05 mins
Experiment demo./ video	05 mins
Quiz	05 mins
Observe and Understand	10 mins
Did you know	02 mins
What happens when...	10 mins

Think

What happens when you mix an acid and a base?

Answer:

When an acid mixes with a base, a new substance called a **salt** is formed along with **water**.



A salt is neither acidic nor basic. It is **neutral**.

Think: Is this salt the same as the salt we eat?

Answer

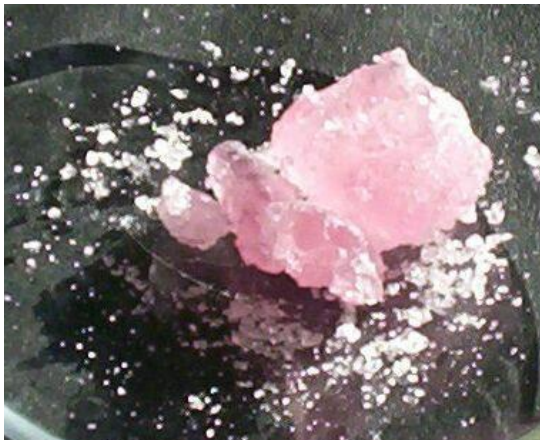
Yes. The salt that we eat is commonly known as table salt or **common salt**. Its chemical name is **sodium chloride**.

Teacher's Notes

In case students are curious, these are the names of the salts in the next slide:

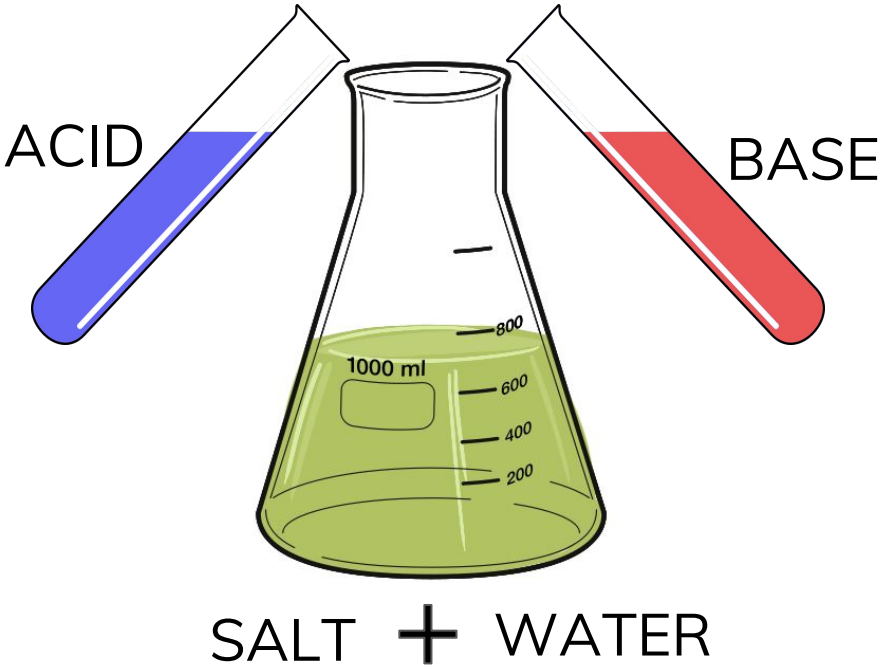
		
Chalcanthite	Manganese chloride	Potassium dichromate

There are many different kinds of salts found around us. The nature of a salt depends on the acid and the base that mix to form the salt.



Neutralisation

The process by which acids and bases react to form a salt and water is known as **neutralisation**.



Teacher's Notes

Students will learn neutralisation by observing a demonstration of a simple experiment.

Materials required: A clean transparent glass/ plastic bottle, a medium sized balloon, vinegar, baking soda.

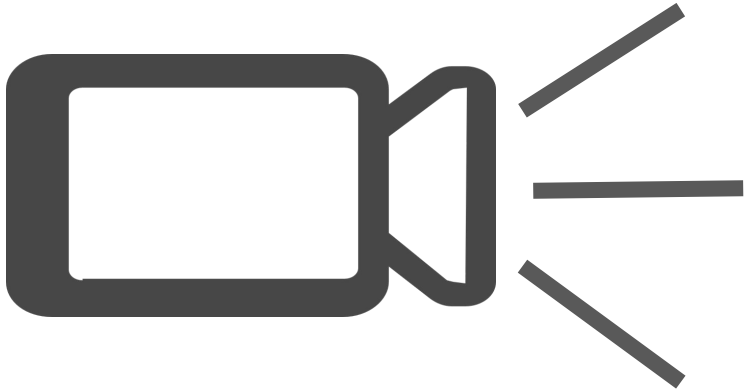
1. Fill 1/4th of the bottle with vinegar.
2. Put 2-3 tablespoons of baking powder into the balloon.
3. Cover the mouth of the bottle with the balloon containing baking powder.
4. Ensure that the mouth of the bottle is sealed tightly by the balloon.
5. Slowly lift the balloon head such that baking powder falls into vinegar.

Teacher's Notes

Observation and interpretations:

Carbon dioxide gas released from the reaction will fill up the balloon when the acid and base react. The gas that is formed, is lighter than the salt, which is why the gas rises up and fills the balloon.

Students can be allowed to touch the bottle and notice that it is warm.



Neutralisation


funke
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Timing - 55 seconds

Link-

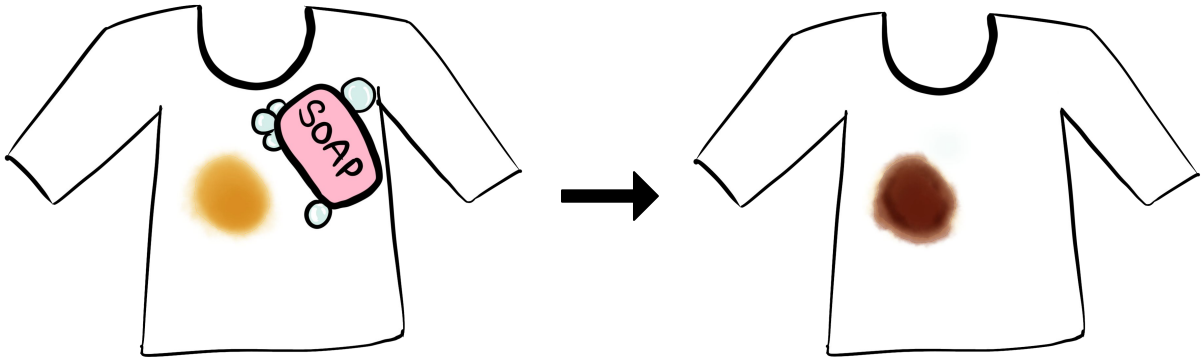
https://drive.google.com/open?id=0Bwuqk-WHiLp_N2lSQUI2RUpMSloyLU9lYjlwSmtCaXoxaEpJ

Script: We are going to learn about neutralisation reactions using simple things. We will need a balloon, a spoon, a glass, a transparent bottle, baking powder, vinegar and a sheet of paper. We need to put baking powder into the balloon using this sheet of paper. Roll the sheet of paper into a funnel and hold the end of the funnel at the mouth of the balloon. Put about two spoons of baking powder into the funnel and ensure that the baking powder gets into the balloon. Take some vinegar into the glass and pour it into the empty bottle. Now take the bottle and cover the mouth of the bottle with the balloon. When you're ready, lift the balloon so that the baking powder falls into the vinegar in the bottle. Notice the balloon being inflated. This is a reaction between the acid (vinegar) and a base (baking powder) which form salt, water and a gas called carbon dioxide. This gas inflates the balloon.

Quiz

What happened to Subbu’s shirt?

From the previous lesson, recall what happened to Subbu’s shirt.



Do you know why the stain disappeared when his mother applied lemon juice to it?

Hint

We know that

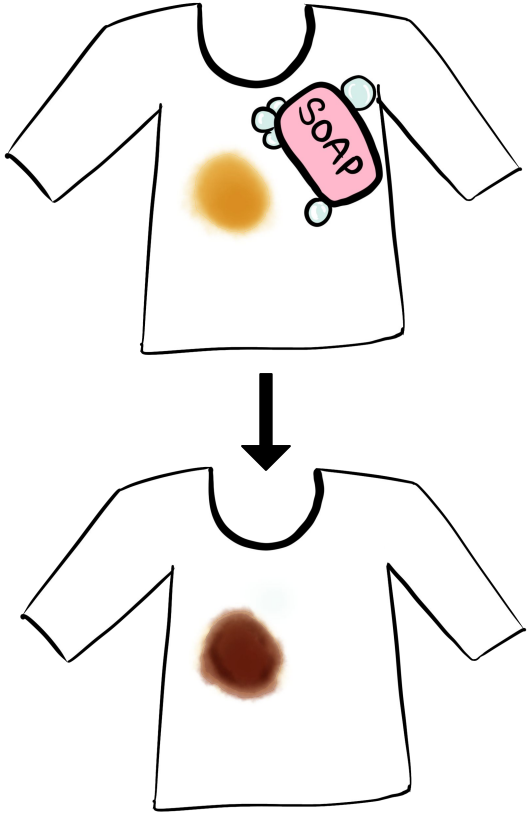
1. Lemon juice has an acid called citric acid.
2. Soap is a base.
3. Turmeric is an indicator.

Do you know why the stain disappeared when his mother applied lemon juice to it?

Subbu’s mystery solved!

Step 1:

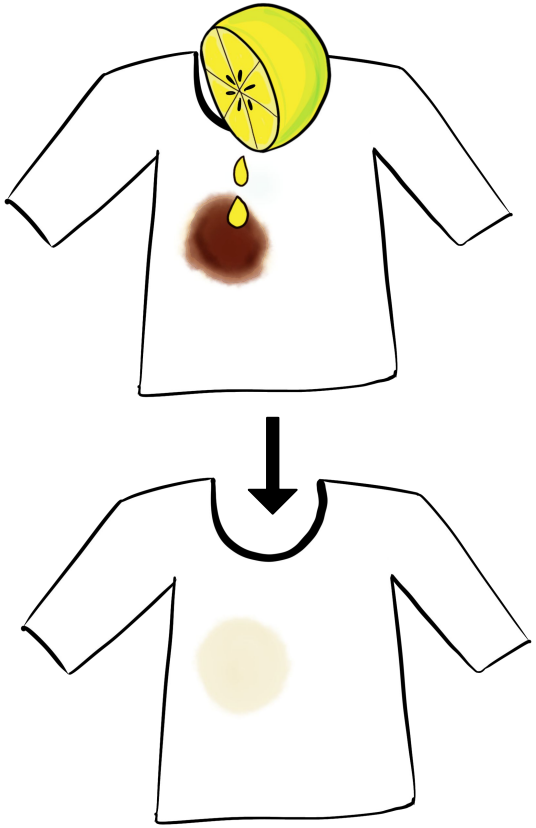
When soap (base) was used to wash the turmeric stain, it turned from yellow to brown.



Subbu’s mystery solved!

Step 2:

When Subbu’s mother applied lemon juice to the stain, **the soap was neutralised by citric acid in the lemon juice** and the brown stain turned yellow. On washing, the stain disappeared.



Activity: Observe and Understand

What

Students will be shown pictures of neutralisation experiment in a laboratory setting.

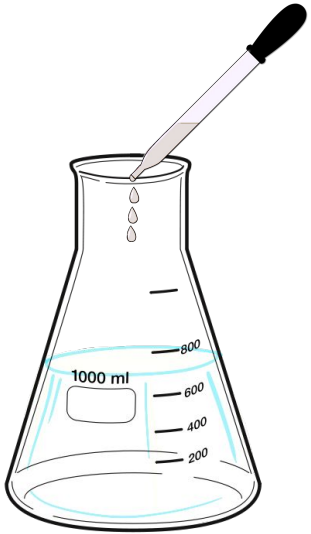
They will understand the use of phenolphthalein in neutralisation.

How

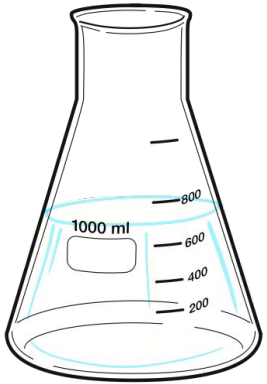
By looking at the pictures of the experiment, students will visualize the reaction step-by-step and understand the process of neutralisation systematically.

They will discuss why colour change occurs due to the reaction.

Phenolphthalein is a synthetic indicator. It is colourless in acidic solutions and turns pink in basic solutions. Observe the following experiment and write down what you understand.

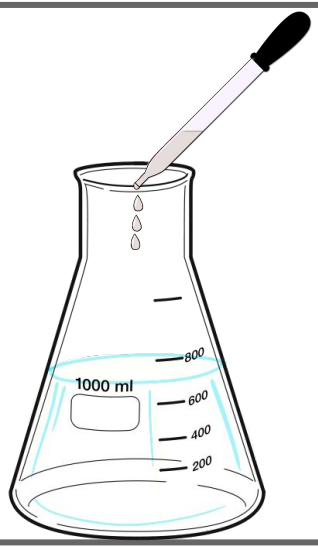


Vinegar + phenolphthalein

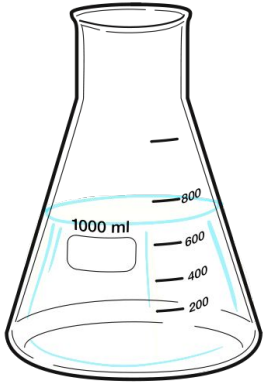


No change in colour

Observe the following experiment and write down what you understand.

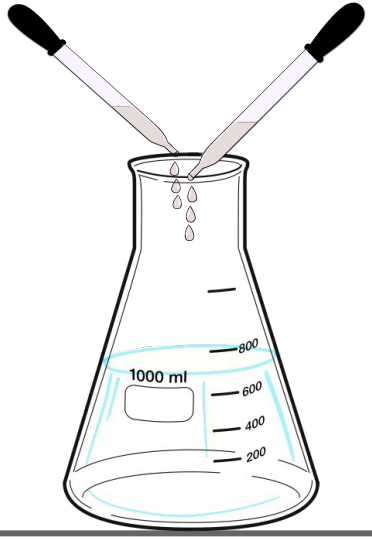


Vinegar + phenolphthalein + soap water

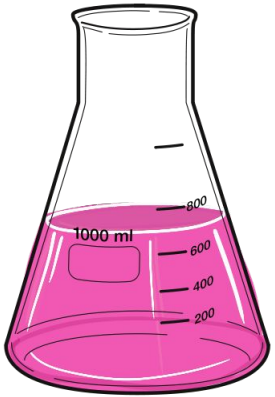


No change in colour

Observe the following experiment and write down what you understand.



Vinegar + phenolphthalein + more soap water



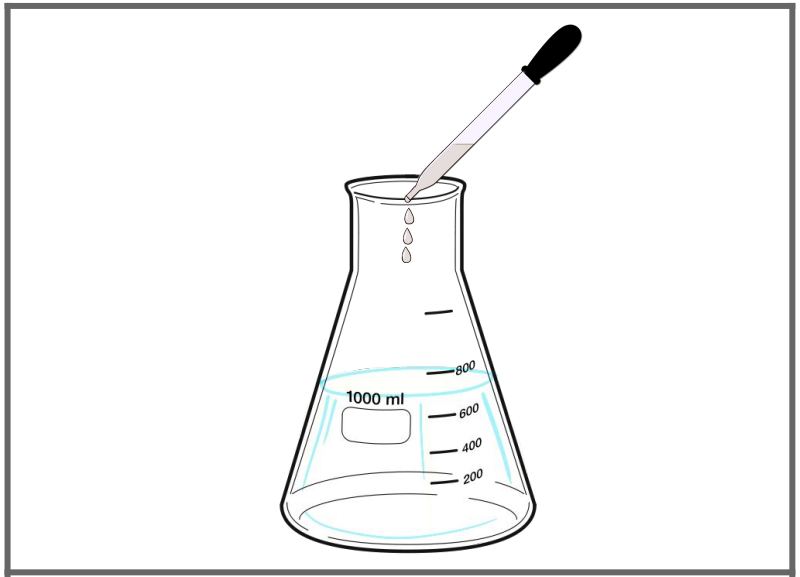
Colour turns pink

Teacher's Notes

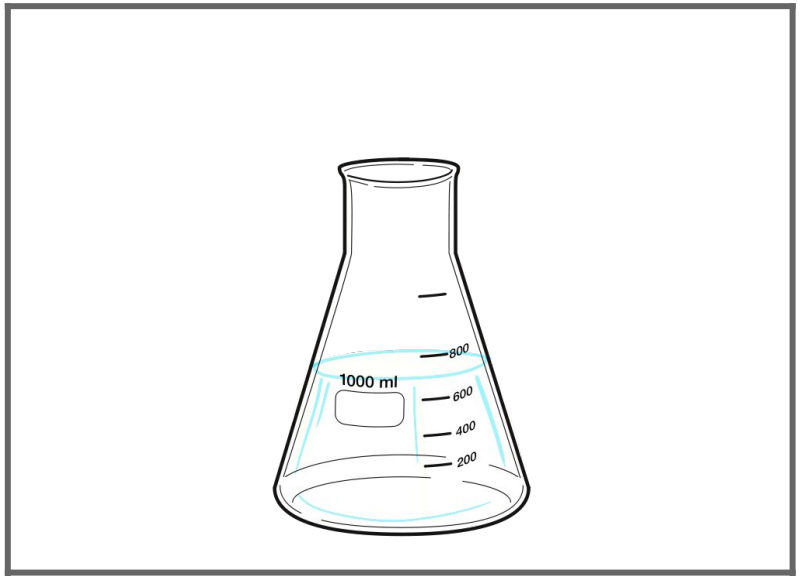
In this exercise, students will observe that,

1. Phenolphthalein is an indicator. When it is added to an acid (vinegar), there is **no colour change.**
2. When a base (soap water) is added slowly, the colour still does not change because the **acid present in the solution gets neutralised by the soap** being added.
3. After all the acid present in the flask is neutralised by base, adding more and more amounts of base **(soap water) makes the solution basic**. This is indicated by the change in colour of the solution to **pink**. This is because of the phenolphthalein present in the flask.

In the presence of vinegar (acid), phenolphthalein remains colourless.

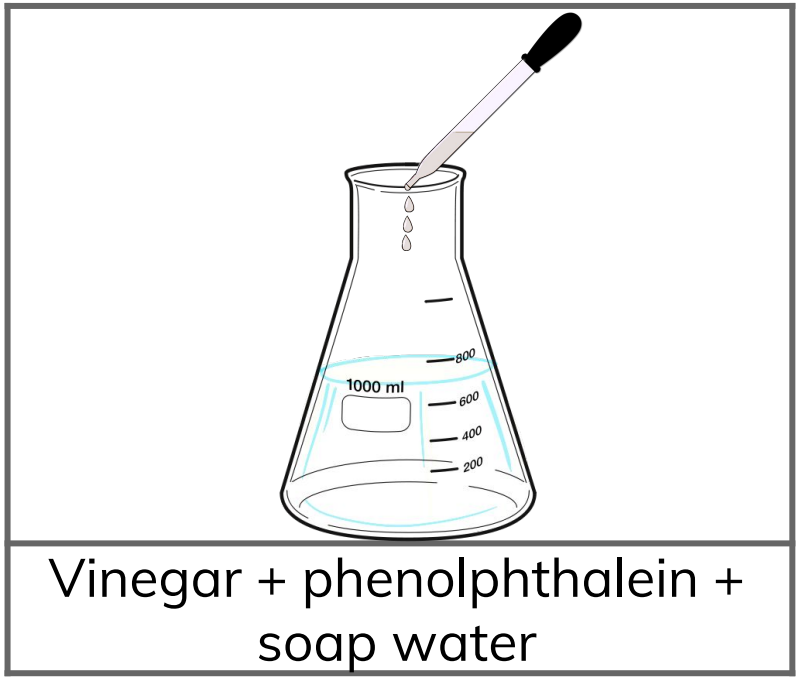


Vinegar + phenolphthalein



No change in colour

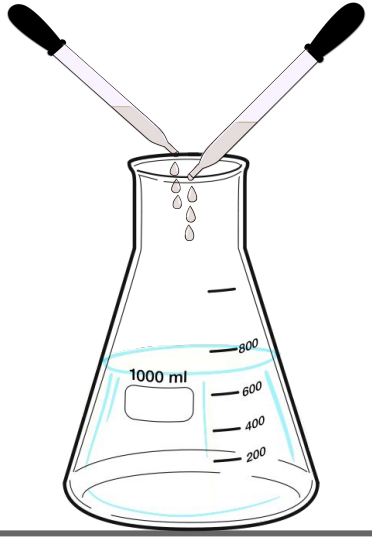
When a soap (base) is added drop by drop, the acid and base neutralize each other. Hence there is still no colour change.



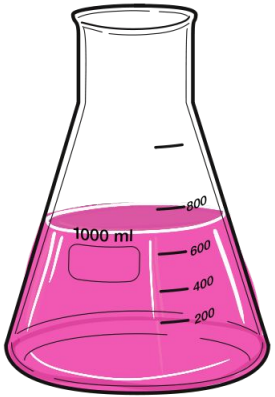
Vinegar + phenolphthalein + soap water

No change in colour

On adding more soap water, the solution turns pink in colour, because all the acid is neutralised by the base. Adding excess of base made the solution basic. Hence the solution turns pink.



Vinegar + phenolphthalein + more soap water

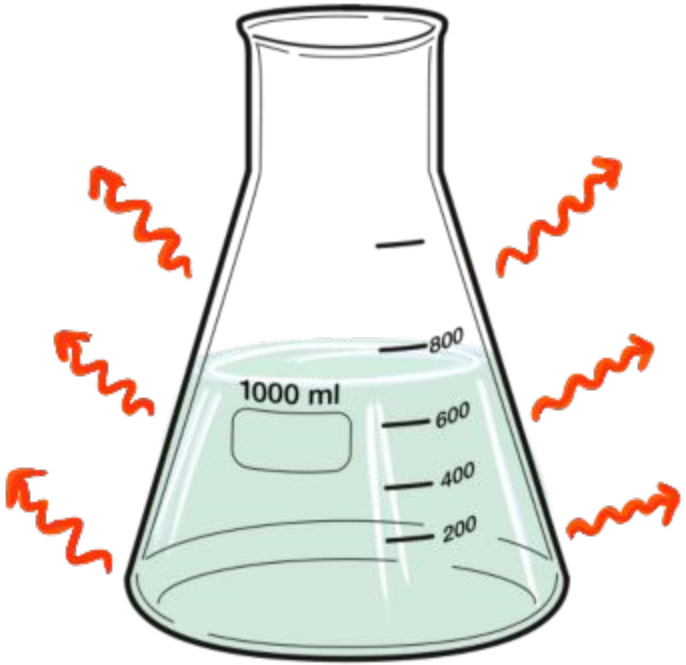


Colour turns pink

Did You Know?

When neutralisation takes place, energy is released from the reaction in the form of **heat**.

This is why when we touch the container in which a neutralisation reaction has occurred, we will find it is warm.



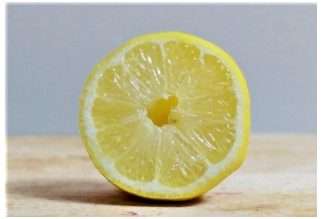
Quiz

What happens in these cases:

1) Tamarind juice mixes with soap

2) Washing powder mixes with grape juice

3) Lemon juice mixes with orange juice



What happens in these cases:

1) Tamarind juice mixes with soap

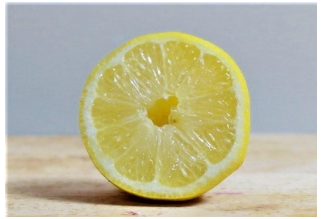
   Salt is formed.

2) Washing powder mixes with grape juice

   Salt is formed.

3) Lemon juice mixes with orange juice

   The solution remains acidic.



What happens in these cases:

4) Lemon juice mixes with black tea?

5) Turmeric mixes with liquid detergent?

6) Red litmus paper is dipped in soap water?

What happens in these cases:

4) Lemon juice mixes with black tea?

Black tea turns orange/ brown.

5) Turmeric mixes with liquid detergent?

Liquid detergent turns dark brown.

6) Red litmus paper is dipped in soap water?

Red litmus turns to blue.

Summary

- Acids and bases react to form salt and water.
- This reaction is called neutralisation.
- Heat is released during neutralisation.

In the next lesson, we will learn how we use neutralisation in our daily lives.