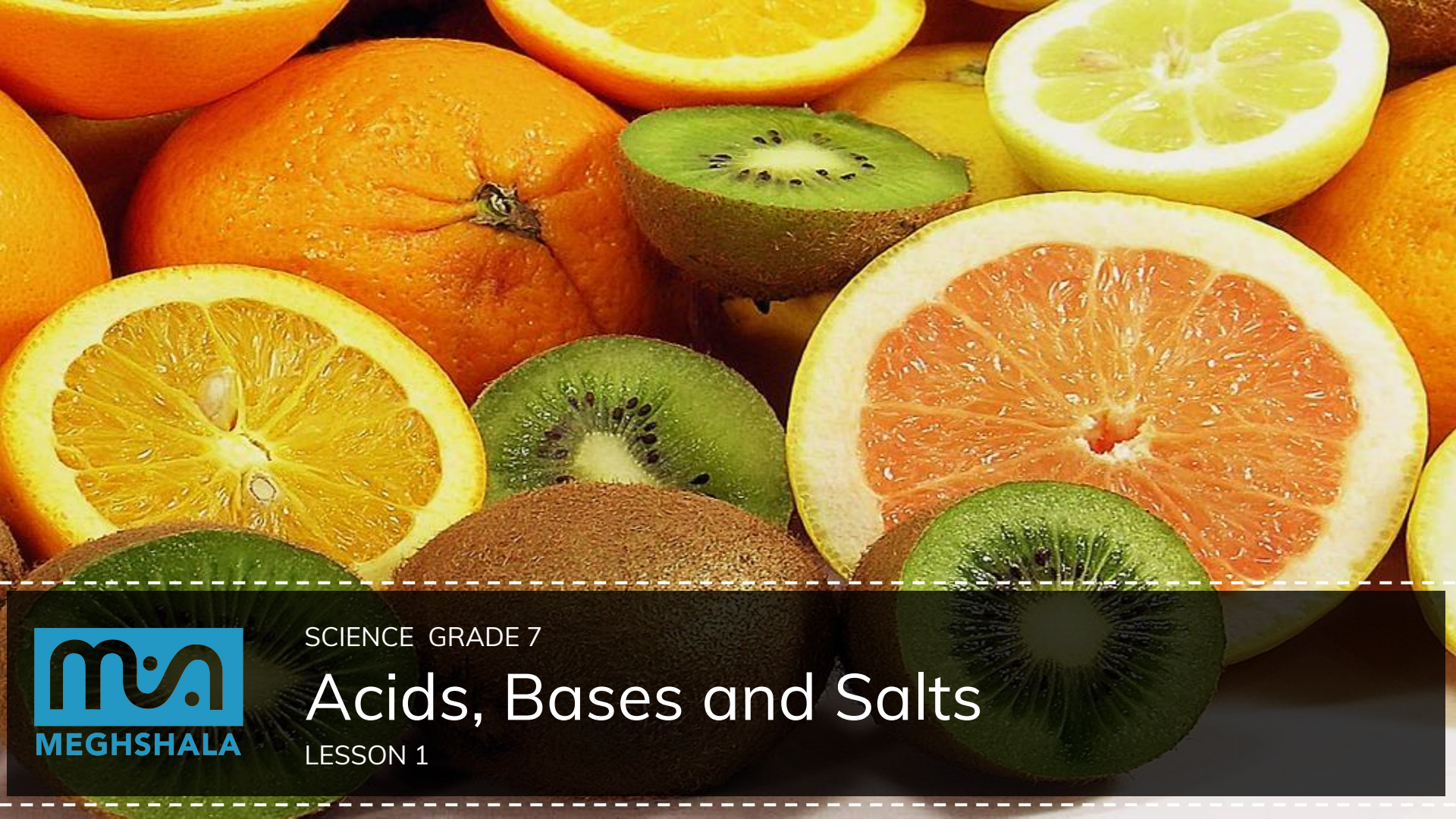


MEGHSHALA

SCIENCE GRADE 7

Acids, Bases and Salts

LESSON 1

UNIT OVERVIEW

Lesson 1: Introduction to acids and bases

Lesson 2: Indicators. Properties of acids and bases

Lesson 3: Neutralization and salts

Lesson 4: Applications of neutralization

LESSON OVERVIEW

What

Students will learn what acids and bases are using food as examples.

They will be introduced to indicators.

Why

Students will understand that commonly used things contain acids and bases.

Some of these acids and bases are food and some are chemicals that are harmful, hence inedible.

How

Students will learn about acids and bases through:

1) an activity: tasting sour and bitter food.
2) association of these tastes to acids and bases.
3) discussion on examples of acids and bases of everyday life.

Time Distribution



Food-tasting activity	10 mins
List sour foods - acids	06 mins
Common acids and uses	06 mins
List bitter food - bases	04 mins
Common bases and uses	08 mins
Indicators - introduction	04 mins
Summary	02 mins

Activity: Tasting Different Foods

What

Students will taste the following things:
tomato, tamarind, amla, lemon, baking powder and table salt.

Why

Through this activity they will understand that different foods have different tastes.

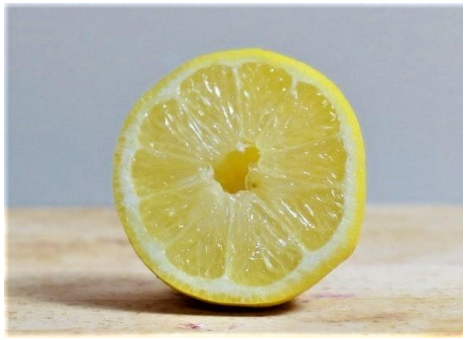
They will understand that sour -tasting foods have acids in them and bitter foods have bases.

How

1. Bring the following foods: amla, lemon, tomato, table salt and baking powder.
2. Divide the class into 6 different groups.
3. Each group will be given one item to taste.
4. After they taste, they will discuss how the food tasted.

Alternatively, you can discuss the tastes of the items displayed on the slides.

Sour, bitter or salty?

		
Lemon	**Baking Powder**	**Tamarind**

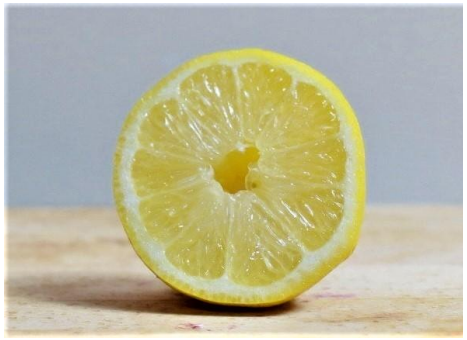
Think: How do these foods taste?

Sour, bitter or salty?

		
Common Salt	**Amla**	**Tomatoes**

Think: How do these foods taste?

Sour, bitter or salty?

		
Lemon	Baking Powder	Tamarind
Sour	Bitter	Sour

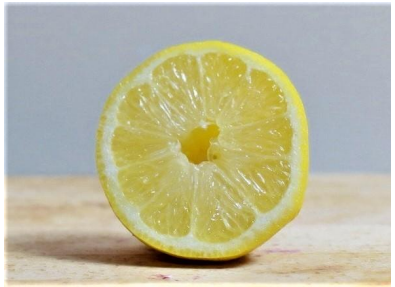
Think: How do these foods taste?

Sour, bitter or salty?

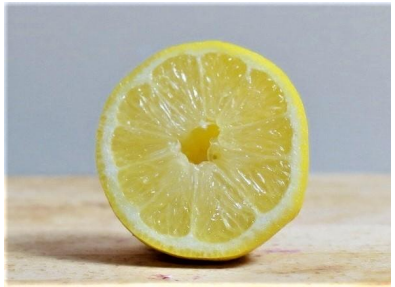
		
Common Salt	Amla	Tomatoes
Salty	Sour	Sour

Think: How do these foods taste?

Why do these foods taste sour?

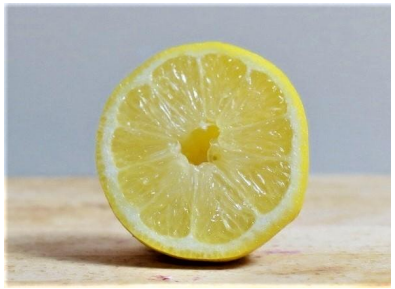
			
Lemon	Tamarind	Amla	Tomato

Answer

			
Lemon	**Tamarind**	**Amla**	**Tomato**

- Sour tasting foods have chemicals called **acids** in them.
- Things that have acids in them are called **acidic** substances.

Different acidic foods contain different kinds of acids.

			
Lemon	Tamarind	Amla	Tomato
Citric acid	Tartaric acid	Ascorbic acid	Citric acid

Think

Can you think of more acidic foods?

Hint: Sour foods are acidic.

Let us also find out which acids are present

in these foods!



Answer

		
Curd	Orange	Grapes
Lactic acid	Citric acid	Tartaric acid Malic acid

More Acidic Foods

		
Soda	Vinegar (Pickles)	Raw mango
Carbonic acid	Acetic acid	Citric acid Malic acid

Notes

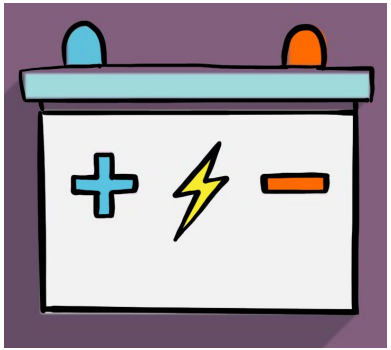
- Students must be warned not to taste chemicals at all.
- Only food can be tasted.
- The previous activity involved food items. The following slides will introduce them to chemicals that are not food and most of these chemicals are harmful or toxic. For example, curd, oranges, grapes, soda etc. are edible and not harmful. But boric acid, hydrochloric acid and sulphuric acid can burn the skin if touched.
- They must be told that acids and bases can burn the skin. They must not smell, touch or eat these chemicals.

Did You Know?

There are some useful acids that we should not taste or touch.



Useful Acids

		
Boric acid	**Hydrochloric acid**	**Sulphuric acid**
It is used as a pesticide to kill insects.	It is present in our stomachs, and helps in digesting food and killing bacteria.	It is present in car batteries. It is also called battery acid.

Why should we not touch acids?

- Most acids are not edible.
- They are **harmful** chemicals.
- Touching harmful acids can **burn** the skin.



Teacher's Notes

The students will learn that hydrochloric acid is present in the stomach to help us digest our food.
They may be curious about how the stomach produces the acid.
The answer is that cells inside the stomach secrete hydrochloric acid.
They may also wonder why presence of hydrochloric acid in the stomach does not harm the stomach.

Explain to students that the cells in the stomach secrete hydrochloric acid and that even though this acid burns off the layer of cells, a new layer is formed each day in the stomach. In this way the stomach is protected from the acid.

Think

We know that hydrochloric acid is:

a) Present in the stomach to help digest food

b) It is harmful to touch or taste, because it can burn the skin.



How is the stomach protected from the harmful effect of hydrochloric acid?

Answer

The innermost layer in the stomach produces hydrochloric acid. These cells get burnt off by hydrochloric acid.

To protect itself, the stomach produces a new layer of cells every day!



Bases

Recall: what tasted bitter?



Baking soda or baking powder is bitter.

The chemical name for baking soda is sodium hydrogen carbonate.

Why is baking soda bitter?

Baking soda tastes bitter because it contains a **base.**

Substances that taste bitter and are said to be **basic** in nature.



Have you touched baking powder?

Try this:

Make a paste of baking powder and water.



How does the paste feel when you touch it?

Bases are Soapy



Did you find the paste to be slippery between your fingers?

This is because bases are soapy when you touch them.

Things that contain bases are ‘**soapy**’ to touch.

Common Bases

		
Soap	Washing Powder	Slaked Lime

Common Bases

		
Detergent	Bleach	Glass cleaner

Answer: All of these bases are used for cleaning.





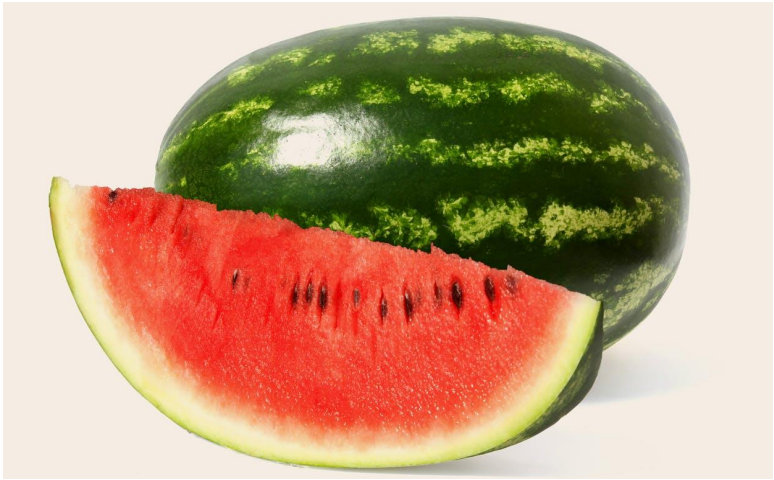




Chemical Names of Bases

Substance	Base
Soap	Sodium hydroxide or magnesium hydroxide
Glass cleaner	Ammonium hydroxide
Milk of magnesia	Magnesium hydroxide
Slaked lime	Calcium hydroxide
Baking powder	Sodium hydrogen carbonate
Washing powder	Sodium carbonate

Did You Know?

	
Even though watermelon does not taste acidic, it is slightly **acidic** in nature.	Spinach does not taste sour but it is **acidic** in nature.

Quiz

Acidic or Basic?

	
Apple is _____.	Lime is _____.

Answers

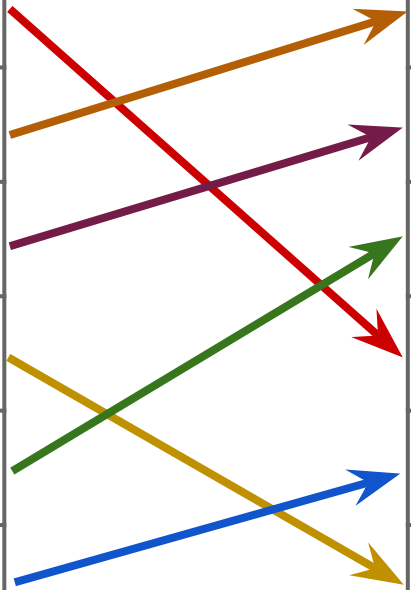
	
Apple is acidic.	Lime is acidic.

Match the Following

Object	Name of acid or base
Orange	Malic acid
Raw Mango	Tartaric acid
Tamarind	Lactic acid
Baking Soda	Citric acid
Curd	Carbonic acid
Soda	Sodium hydrogen carbonate

Answers

Object	Name of acid or base
Orange	Malic acid
Raw Mango	Tartaric acid
Tamarind	Lactic acid
Baking Soda	Citric acid
Curd	Carbonic acid
Soda	Sodium hydrogen carbonate



Think

Is water acidic or basic?

Hint: How does water taste? Does it taste bitter, sour or salty? Does water have any taste at all?



Water



Answer:

Water is neither acidic or basic. It doesn’t have taste.

It is **neutral**.

Indicators

Think

How do you know if a substance has an acid or a base without tasting or touching?



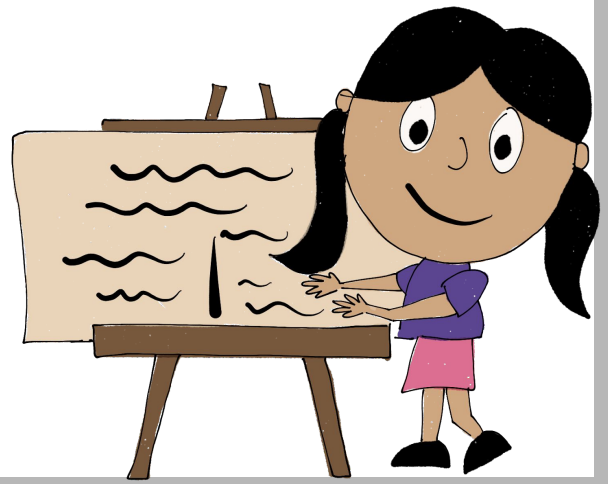
Answer

When a substance is not food or when we do not know what it is made of, we use a special substance called **indicator.**



Indicators

Indicators change colour when we add them to a base or an acid. This **colour change** tells us if the substance is an acid or a base. We will learn more about indicators in the next lesson.



Summary

- Acids taste sour.
- Bases taste bitter and are soapy.
- Some acids and bases can be harmful. They should not be touched or tasted.
- Indicators are used to find out if a chemical is an acid or a base.

