Grade 11

SCIENCE

Self-Study Pack- Acid, Base and Salts

Subject : Science
Grade : 11
Term : 2st Term
Unit : Acid, Base and Salts

Learning out comes:

- List out the characteristics of acid base and salts.
- Mention the difference in between strong acids and weak acids.
- Mention the difference in between weak acids and weak bases.
- State salts are produce when acids and bases are reacted.
- Discuss the applications of neutralization process in daily life.
- Study and note down the applications of acids, bases and salts in everyday life.

Activity: -

11.7.1 Lets identify the reaction of an acid at home.

Materials Needed: -

- Lime juice
- Baking soda (sodium bicarbonate)
- Soap water
- Glass (Transparent, somewhat heighten)

Method: -

- Squeeze out juice of a lime fruit.
- Add one tea spoon of baking power to the glass.
- Mix little volume of soap water/diluted shampoo sample in baking powder.
- Shake well, the mixture when lime juice is added to the sample you prepared in the above step.

Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College

Answer the following questions by the observations you gained through the activity and the knowledge you gain in the classroom

1 What are the observations of the activity@
2 Is lime an acid or a base
3 What will be the gas evolved @
4 Baking soda is sodium bicarbonate writ in the symbolic form.
5 Writ 2 substances that you can find at home which has the characteristic features of time juice.

For your knowledge

1) Acids are two fold as strong and weak acids.
2) When HT ions are completely ionized in an aqueous medium can be named as strong acids.
3) Acids which release HT ions in aqueous medium by incomplete or partial ionization are called weak acids
4) Lime juice, vinegar, tamarind juice , billing juice are few weak acids found at home.
5) When an acid reacts with a carbonate to give off CO_2 gas.
6) When a metal reacts with an acid, it give off H_2 gas (Metal should Lie above H in the reactivity series)

11.7.2 Test indicators to differentiate acids and bases at home.

Materials needed: -

- Little sample of lime juice or vinegar
- Soap water
- Turmeric solutions (Chop a piece of turmeric and make the solution)
- Used two caps of yoghurt

Method: -

- Pour Little amount of soap water and vinegar in to two caps of yoghurt
- Add two drop of turmeric solution in to two solutions above, by a dropper
- Observe, mixing the solutions slowly

Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College

Answer the following questions by the observations you made and the knowledge you gain in the class room.

1 What are the observations when turmeric is added to the,
- Vinegar solution
- Soap solution

2 Name two other indicators that can be used at home except turmeric.

3 Name the types of indicators that we can use to identify the acids and bases at the laboratory.

For your knowledge

1 Chemical substances which change the colour in acids and bases are indicators.

2 There are two types of indicators as artificial and natural indicators.

3 Turmeric solution, shoe flower boiled water, Blue citronella boiled water can be used as natural indicators at home.

4 Litmus, phenolphthalein, methyl orange are the indicators we use at the laboratory.

5 Indicators give different colours in acids and bases.

Indicators	Audis colour	Basic color
Litmus	Red	Blue
Phenophalene	Colourless	Pink
Methyl Orange	Red	Yellow

Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College

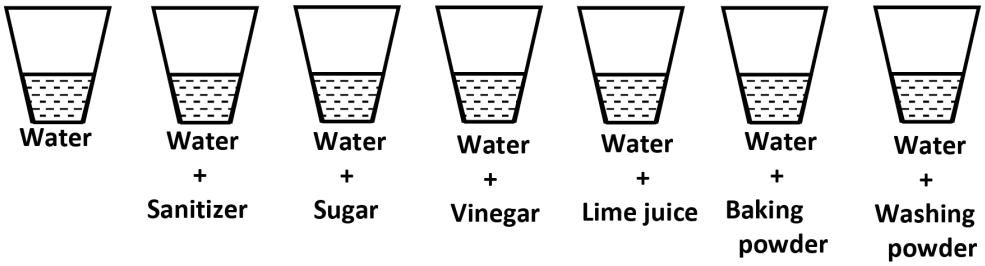
11.7.3 Find the strength of acids and bases by sing indicators

Material needed:

* Transparent yoghurt cups/ plastic cups (08).
* Red cabbage.
* Sugar, Vinegar, Lime juice, water, baking powder, washing powder (small amount).

Method: -

- Take red cabbage, chop it well and mix with water. Filter the solution by a piece of clothes (blender can be used to prepare the solution)
- Add half volume of water to each cups.
- Add one teaspoon of each solution prepared, to each of the following cups.
- Indicate the solutions in a piece of paper and paste on each cup.



- Add one drop of cabbage into each cup. Use a dropper to add the sample of red cabbage solution.
- Test and observe the colours of each vessel.
- Examine the colours.

Answer the following questions by using the observation and knowledge you gained.

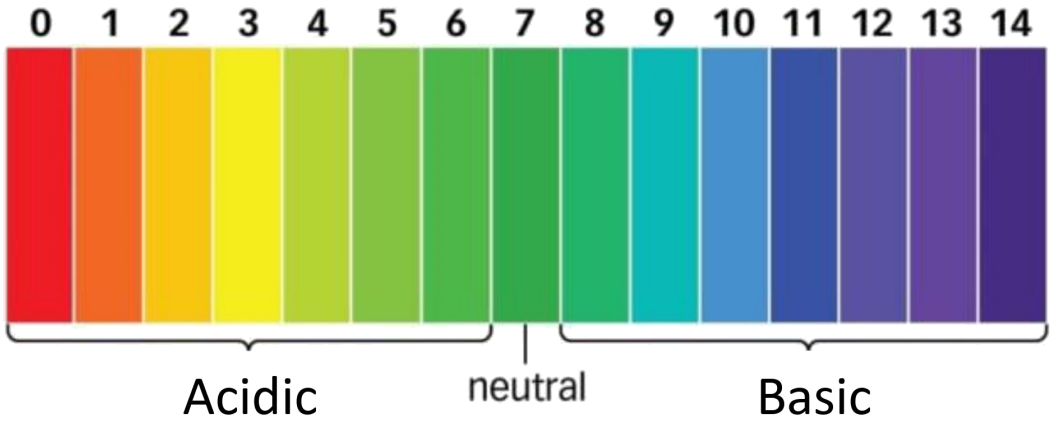
1) Tabulate the colours of each solution after adding cabbage solution to each cup.
2) Arrange the yoghurt cups adding to a pattern of colors.
3) Repeat the practical by using blue citronella flowers and record the colours.
4) Which indicator can be used to find the strength of acids and bases in the laboratory?

Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College

For your knowledge

* Most indicators can be used to differenciate acids and bases but not the strength of acids and bases.
* But shoe flower boiled solution and blue citronella boiled solution can be used to examine the strength of acids and base fir some extent.
* PH papers can be used to find the strength of acids and bases in the laboratory.
* According to the PH scale PH 7 is neutral, PH 8-14 is basic and PH 0-6 is acidic.



Self-Evaluation

➢ Answer the following questions in 2016, 2017, 2018, 2019 and 2020 GCE O/L paper.

year	MCQ	Paper I Part A	Paper II Part B
2016	5, 6, 7	-	-
2017	6	-	9 (A) i)
2018	18, 20	-	-
2019	21	6	-
2020	-	-	-

Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College

Summary

Acids

H^+ donates in an aqueous solution

$HCl_{(aq)} \longrightarrow H^+_{(aq)} + Cl^-_{(aq)}$

Bases

OH^- donates in an aqueous solution

$NaOH_{(aq)} \longrightarrow Na^+_{(aq)} + OH^-_{(aq)}$

Salts

Acid base reactions give salts.

This is neutralization

$HCl_{(aq)} + NaOH_{(aq)} \longrightarrow NaCl_{(aq)} + H_2O_{(aq)}$

Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

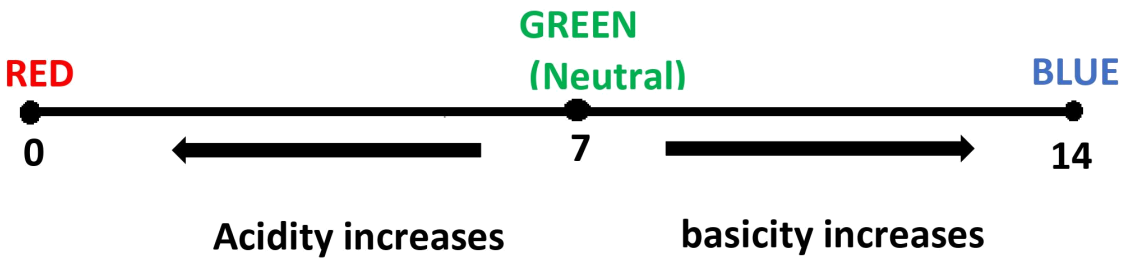
Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College

STRONG ACIDS	STRONG BASES
Acids that release H^+ by complete ionization in an aqueous medium.	Bases that completely ionization in aqueous solutions.
WEAK ACIDS	**WEAK BASES**
Acids which release H^+ by complete ionization in an aqueous medium.	Bases which partially ionize in aqueous solutions.

Indicators

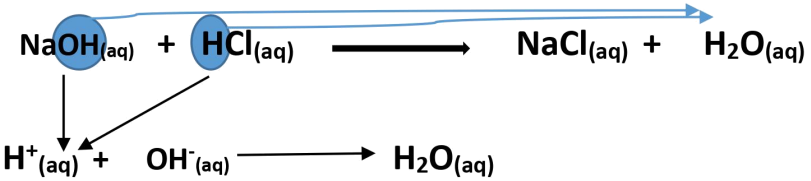
- Chemical which change the colour in acids and bases.

	Acids	Bases
Litmus	Red	Blue
Phenophalene	White	Pink
Methyl Orange	Red	Yellow



Salt and neutralization

Acids and bases react to form salts. H^+ from acids and OH^- from bases combine together to form H_2O.



Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College

Properties of salts

- Crystalline
- Dissolve in water
- Neutral

Uses of salt

- Food taste
- Preservation
- Fungicides
- Electroplating of metal

Content: Mr. Mahinda Premarathne, Mrs. Gothamala S. Palpolage

Created by: G.K.S.D Jayarathne, H/ Weeraketiya Rajapaksa Central College