

SAI International School
Lesson Notes
Subject - Chemistry
Ch-Acids, Bases & Salts
Topic- pH in Every Day Life

Module -12

Dt_ /04/2020

Suggested Videos-

1. <https://youtu.be/x-nl3Ws7nxQ>
pH in every day life
2. <https://youtu.be/0HuVMmN5LFk>
Importance of pH in Everyday Life

To be done in CW Copy-

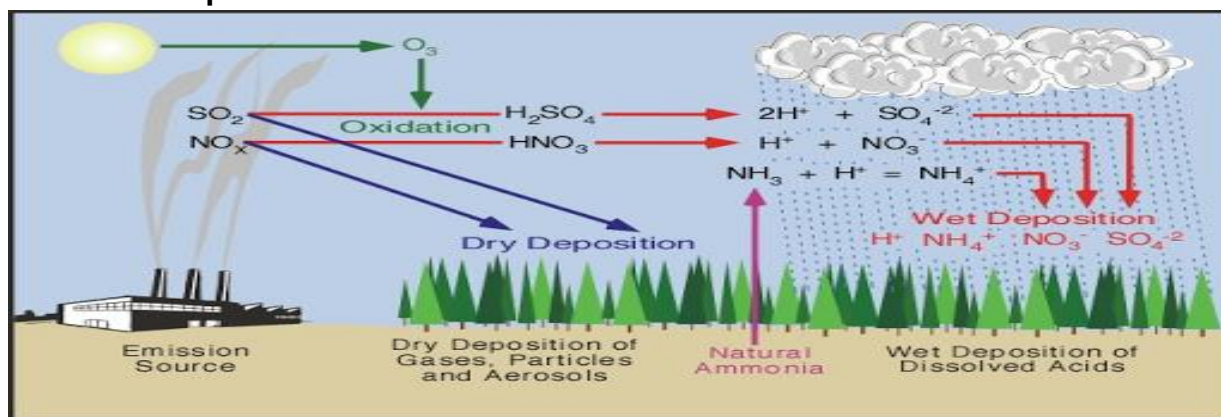
➤ **pH plays a very important role in our everyday life.**

- 1- Plants and animals are **pH sensitive**.
- 2- **pH of the soil** should be equal to **7 [neutral]** for healthy growth of plants.
- 3- **Acid in our stomach** has **low pH** and **antacids** are **alkaline** and have **high pH** that neutralizes the acid.
- 4- **pH of milk changes** when it becomes **curd** in which, amount of **lactic acid** is more so **curd** is more **acidic**.
- 5- **Toothpaste is alkaline** and has **high pH**. So they **neutralize** the **excess acid** in the **mouth** produced by bacteria.

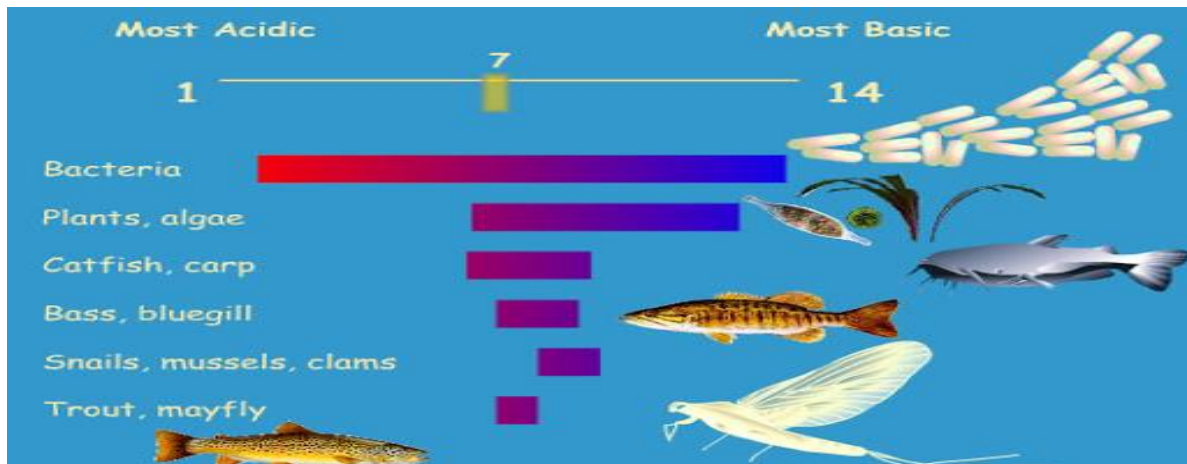
1- **Plants and animals are pH sensitive.**

- **Living organism** works within a **narrow range of pH of 7.0 to 7.8** only. If this **pH range increases or decreases**, living organism find it **difficult to survive**.

- When **pH of rain water is less than 5.6**, it is called **acid rain**. When **acid rain** flows into the rivers, it **lowers the pH of the river water**. The **survival of aquatic life** in such rivers **becomes difficult**.



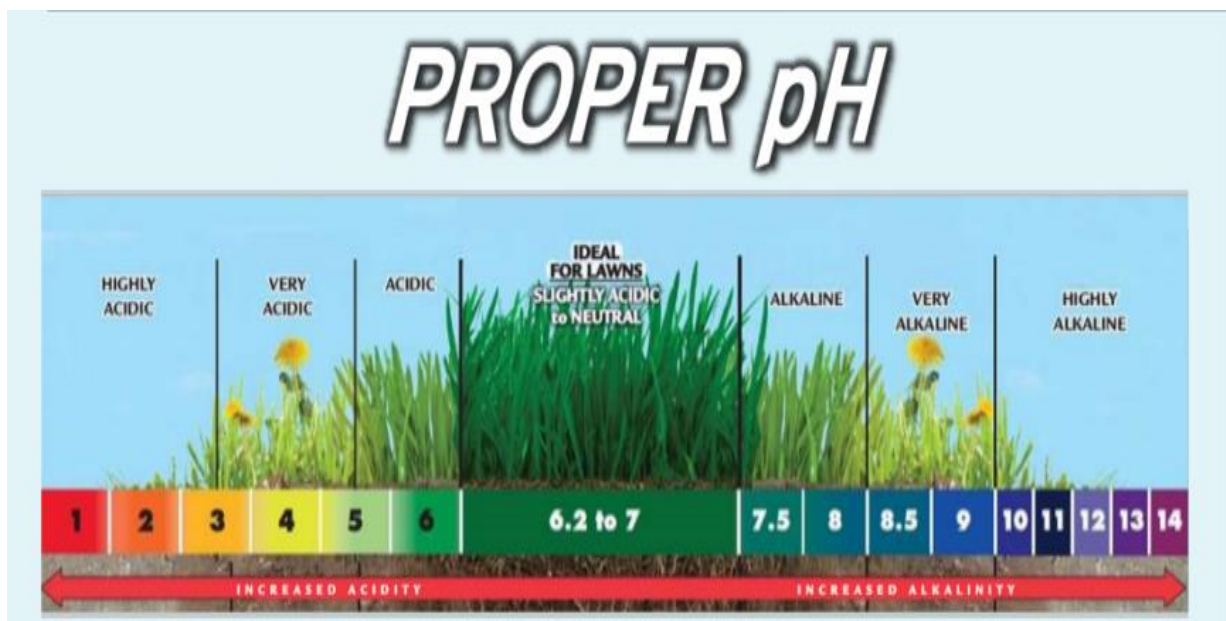
Formation of Acid Rain in Atmosphere



2- pH of the soil should be equal to 7 [neutral] for healthy growth of plants.

- If pH value of soil is found lower than 7, i.e. soil becomes acidic. It is treated with calcium oxide, calcium hydroxide or chalk (Basic in nature). After treatment excess acid present in soil neutralizes and soil becomes fertile again.

- Similarly, often pH value of soil becomes greater than 7, i.e. becomes basic. In such condition also soil is treated with neutral manure or compost or pyrite or gypsum which neutralizes the basic nature of soil.



3- Acid in our stomach has low pH and antacids are alkaline and have high pH that neutralizes the acid.

- Walls of our stomach produce hydrochloric acid which kills germs

present in food if any. This **hydrochloric acid** also helps in the digestion of food we eat.

Digestion takes place in our stomach in acidic medium.

The pH value of our stomach is near 1.2.

But in the case of overeating the receptors of walls of stomach get wrong message and start producing more acid.

This decreases the pH value of our stomach, resulting in the condition of hyperacidity.

This creates problems and we feel burning sensation and uneasiness, and sometimes vomiting tendency also.

- To neutralize excess acid produced by stomach, an antacid (a medicine) is taken orally.

This neutralizes the extra acid produced by our stomach and we feel comfortable. Milk of magnesia is taken as medicine which is a mild base.



4- pH changes as the cause of tooth decay.

- The normal pH range for saliva is 6.2 to 7.6.

- Food and drink reduce the pH level of saliva.

For example, **bacteria** in your mouth breaks down the **carbohydrates** you consume, releasing **various acids**.

- **Tooth's enamel** is made up of **calcium phosphate**.

This is **insoluble in water** and is the **hardest substance** found in **human body**. But it starts **corroding** because of acid (pH of mouth goes below 5.5).

Sometimes food particles get trapped between teeth gap.

After some time bacteria present in mouth starts acting upon sugar, present in food items and produces acid.

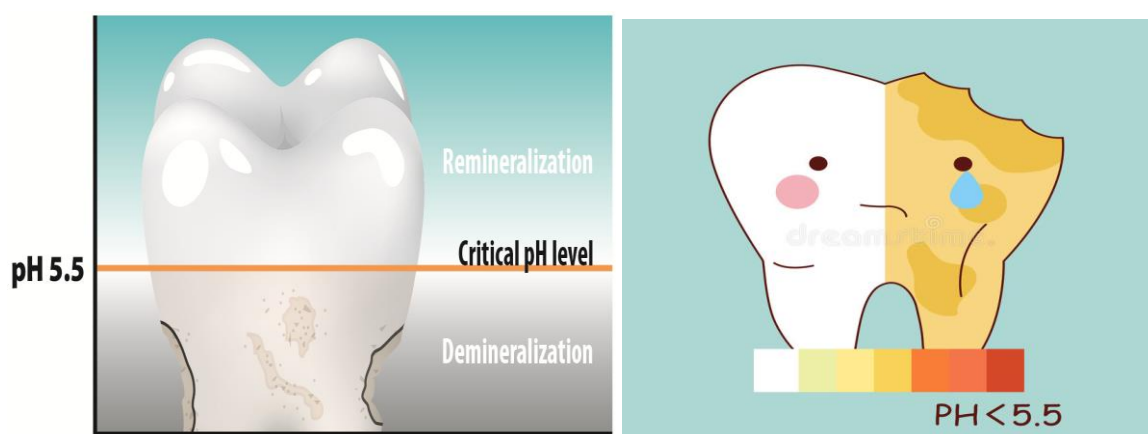
This acid decreases the pH value of mouth from 6.

This acid starts decaying the enamel of tooth.

After degradation of enamel teeth becomes sensitive and bad breadth starts coming out of the mouth.

If decaying of tooth is not stopped timely, it is resulting in tooth loss.

- The action of **bacteria** can be prevented by **brushing of teeth** using **toothpaste** as it is **basic** in nature and **neutralizes the excess acid** produced in the mouth because of bacteria.



5- Self defense by animal and plants through chemical warfare:

- All living organism got self defence tools as a gift from nature. For example deer, buffalo, cows, etc. has long and sharp horn, lizard can change its colour, bee has sting, etc.

- Defense weapon of bee:

Honey bees are armed with **chemical sting** as defense tool. Honey bee contains **acid** in their sting. When a person is **stung by honey bee**, it **injects acid** and pushes and leaves its sting in skin. Because of **acid present in sting**, victim feels **pain near the stung area**. Area of stung get swollen after some time.

Honey bee sting contains methonic acid, so rubbing of baking soda, toothpaste or other mild base at the stung area neutralizes the effect of acid and gives relief to the victim from pain.



A Bee stinging



Bee sting left behind after stinging

- **Defense weapon of ant:**

Ant has bite as their **defense tool**. **Ant bite** also contains **methanoic acid** similar to **honey bee**. Thus, by **rubbing of mild base** near the ant bite gives **relief** to the victim.

- **Plants with defense weapon:**

Some **plants** are armed with **sting** as **defense tool**, such as **nettle plants**. A person who touches the **nettle leaves gets stung** similar to **honey bee**. **Nettle leaves** also contain **methanoic acid**, which results in **pain and irritation** near the **stung area**. In such case also **rubbing of mild base**, such as **slaked lime**, **baking powder**, etc. gives relief to the victim from pain.

A **traditional remedy** is **rubbing the area** with the **leaf of the dock plant**, which is **basic in nature** and often grows beside the nettle plants in the wild.



Stings in Nettle Leaf



Dock Plant

Name of acid	Found in
Acetic acid	Vinegar
Formic acid	Ant's sting
Citric acid	Citrus fruits such as oranges, lemons, etc.
Lactic acid	Curd
Oxalic acid	Spinach
Ascorbic acid (Vitamin C)	Amla, Citrus fruits
Tartaric acid	Tamarind, grapes, unripe mangoes, etc.
All the acids mentioned above occur in nature	
Name of base	Found in
Calcium hydroxide	Lime water
Ammonium hydroxide	Window cleaner
Sodium hydroxide / Potassium hydroxide	Soap
Magnesium hydroxide	Milk of magnesia

Assessment

MCQs

Q.1	Antacids contain- (a) weak base (b) weak acid (c) strong base (d) strong acid
Q.2	Calcium phosphate is present in tooth enamel. Its nature is (a) basic (b) acidic (c) neutral (d) amphoteric
Q.3	To protect tooth decay we are advised to brush our teeth regularly. The nature of the tooth paste commonly used is (a) acidic (b) neutral (c) basic (d) corrosive
<p>➤ For Assertion & Reason question follow the following directions.</p> <p>DIRECTION: Each of these questions contains an Assertion followed by Reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements.</p> <p>(a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.</p> <p>(b) If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.</p> <p>(c) If Assertion is correct but Reason is incorrect.</p> <p>(d) If Assertion is incorrect but Reason is correct.</p> <p>(e) If Assertion & Reason both are incorrect.</p>	
Q.4	Assertion: Baking soda creates acidity in the stomach. Reason: Baking soda is alkaline.
Q.5	Assertion: If the pH inside the mouth decreases below 5.5, the decay of tooth enamel begins.

	Reason: The bacteria present in mouth degrades the sugar and left over food particles and produce acids that remains in the mouth after eating.
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Home assignment

S.L No.	Questions	Mark	Skill
Q.1	At what pH in the mouth is tooth decay faster and why? [CBSE 2008]	1	R
Q.2	What measures you will take when a person gets bitten by honeybee.	1	u
Q.3	The pH of the mouth of a person is lower than 5.5. What changes will occur in his mouth? How these changes can be controlled? Write any two measures. [CBSE 2012, 2011, 2010]	3	R+A
Q.4	pH has a great importance in our daily life. Explain by giving three examples. [CBSE Sample Paper 2018]	3	U+A
Q.5	(a) Mention the Ph range within which our body works. Explain how antacids give relief from acidity. Write the name of one such antacid. (b) Fresh milk has a Ph of 6. How does the Ph will change as it turns to curd ? Explain your answer. (c) A milkman add a very small amount of baking soda to fresh milk. Why does this milk take a longer time to set as curd ? (d) Mention the nature of tooth pastes. How do they prevent tooth decay ?	5	HOT