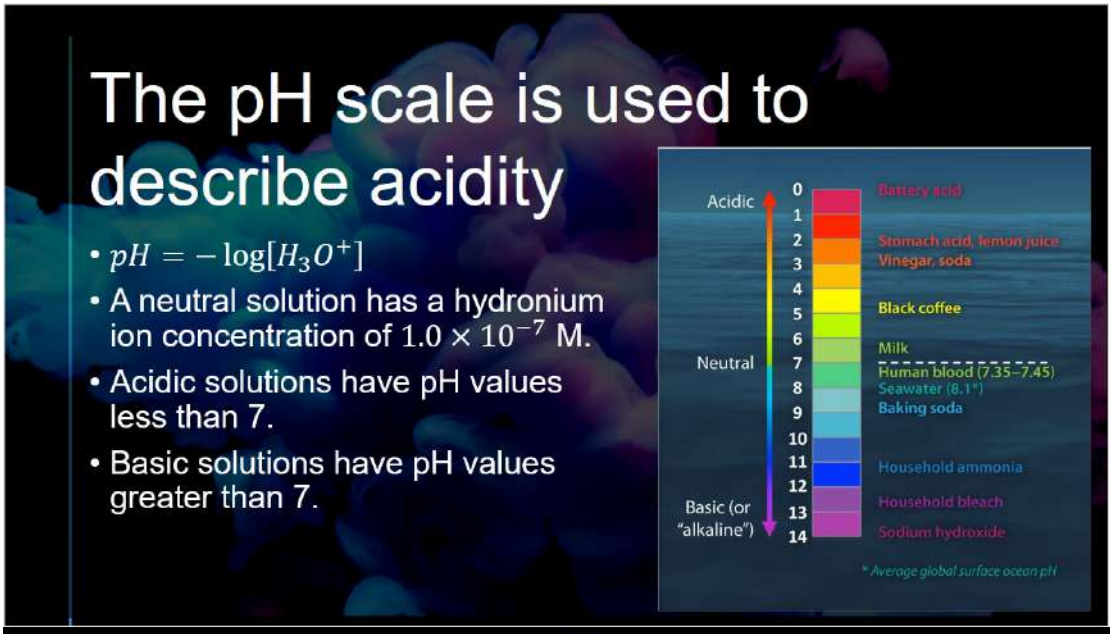
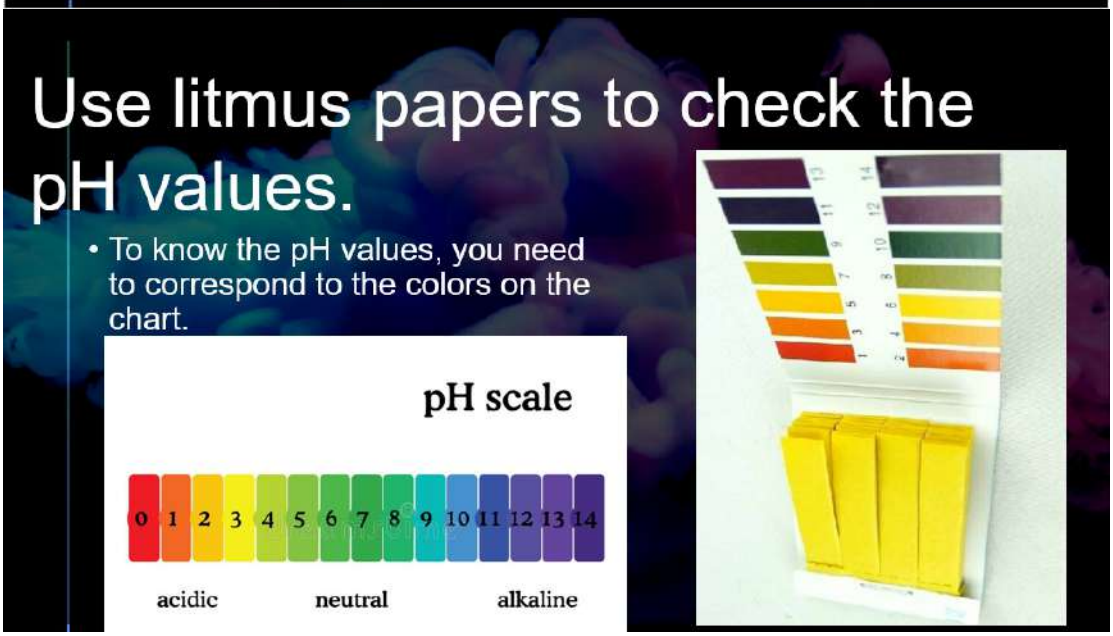
109 學年度上學期學習歷程 化學

題目：觀念化學報告
關鍵字：Conceptual Chemistry、pH 值、石蕊試紙

在本報告中，我整理了提及 pH 值和其應用的兩小節，並且整理成兩頁報告，和我的組員一起上台講解。

以下兩張圖片即我製作的簡報。





內容大意是 pH 值的定義以及計算和石蕊試紙的用法。

我學到了團隊合作的重要性，以及原文書其實沒有那麼可怕，只要肯仔細閱讀，搞不好上面寫的內容比課本還簡單！

完整的簡報附在後面，以便查閱。

Conceptual Chemistry conjugation acid and base

150907,150918,150921

Solutions

- Acid
- Base
- Neutral

pH scale

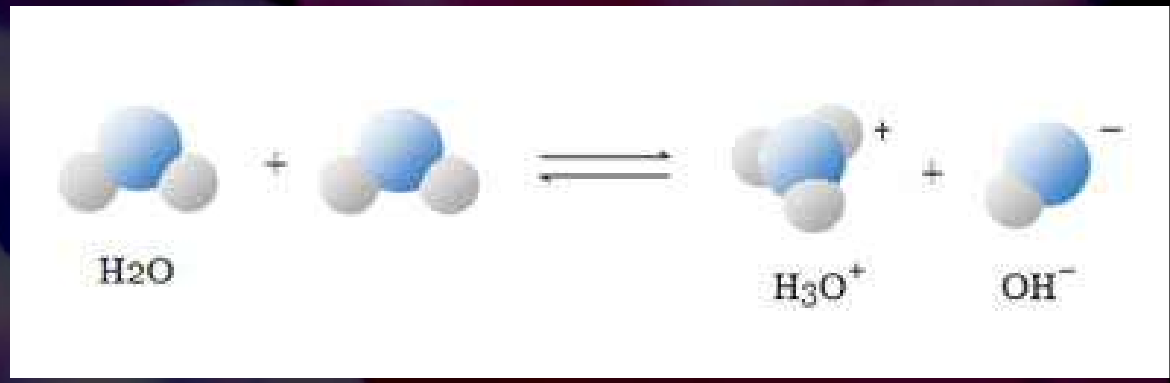
- Definition
- Application

Example in Nature

- Rainwater
- Ocean Water

Solutions Can Be Acidic, Basic or Neutral

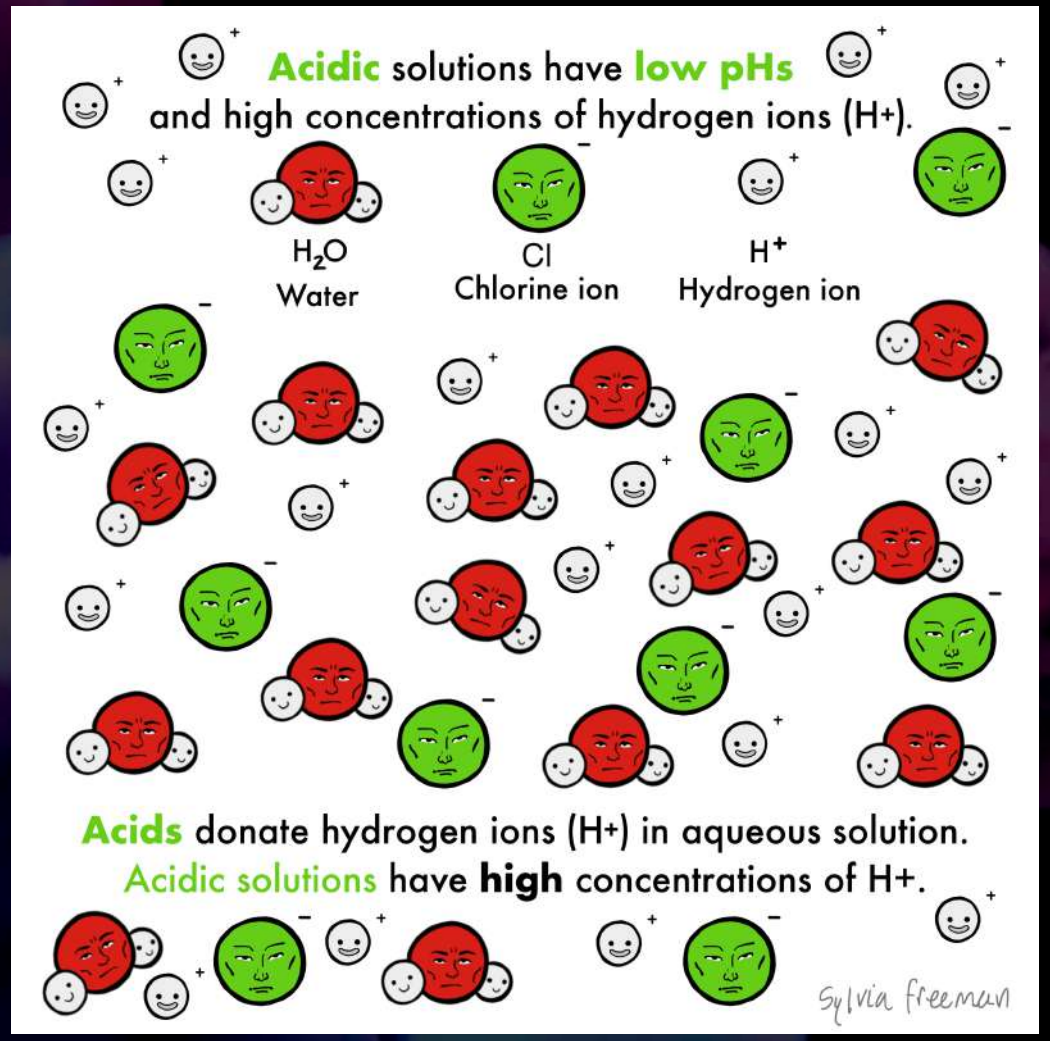
- Water is a very weak acid as well as a very weak base.
- From this reaction we can see that in order for a water molecule to gain a hydrogen ion, a second water molecule must lose a hydrogen ion.



(H^+ and H_3O^+ are different representations of the same ion.)

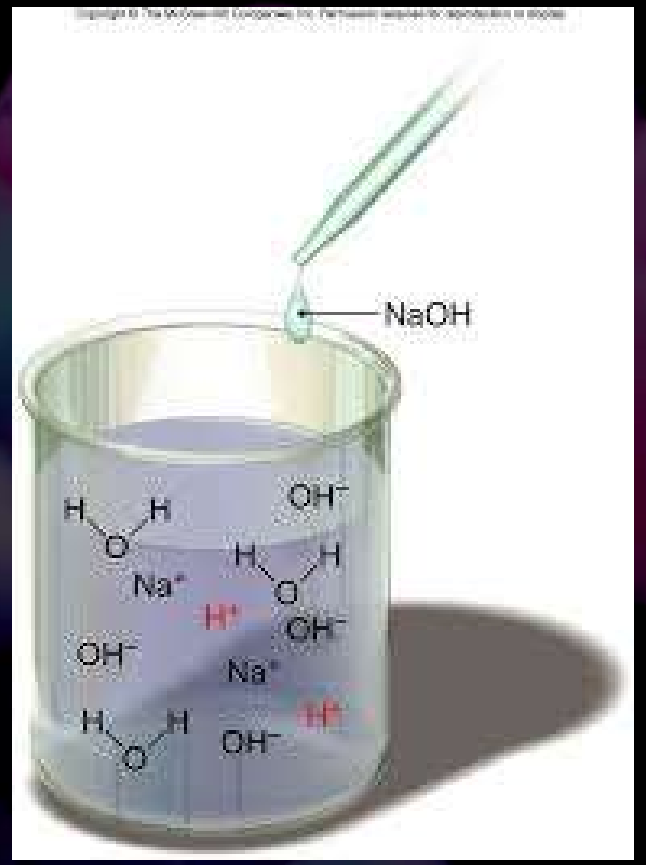
Acidic solution

- An acidic solution is one in which the hydronium ion concentration is higher than the hydroxide ion concentration.
- The acidic solution is made by adding an acid to water.
- The effect of this addition is to increase the concentration of hydronium ions, which necessarily decreases the concentration of hydroxide.



Basic solution

- A basic solution is one in which the hydroxide ion concentration is higher than the hydronium ion concentration.
- The basic solution is made by adding a base to water.
- This addition increases the concentration of hydroxide ions, which necessarily decreases the concentration of hydronium.

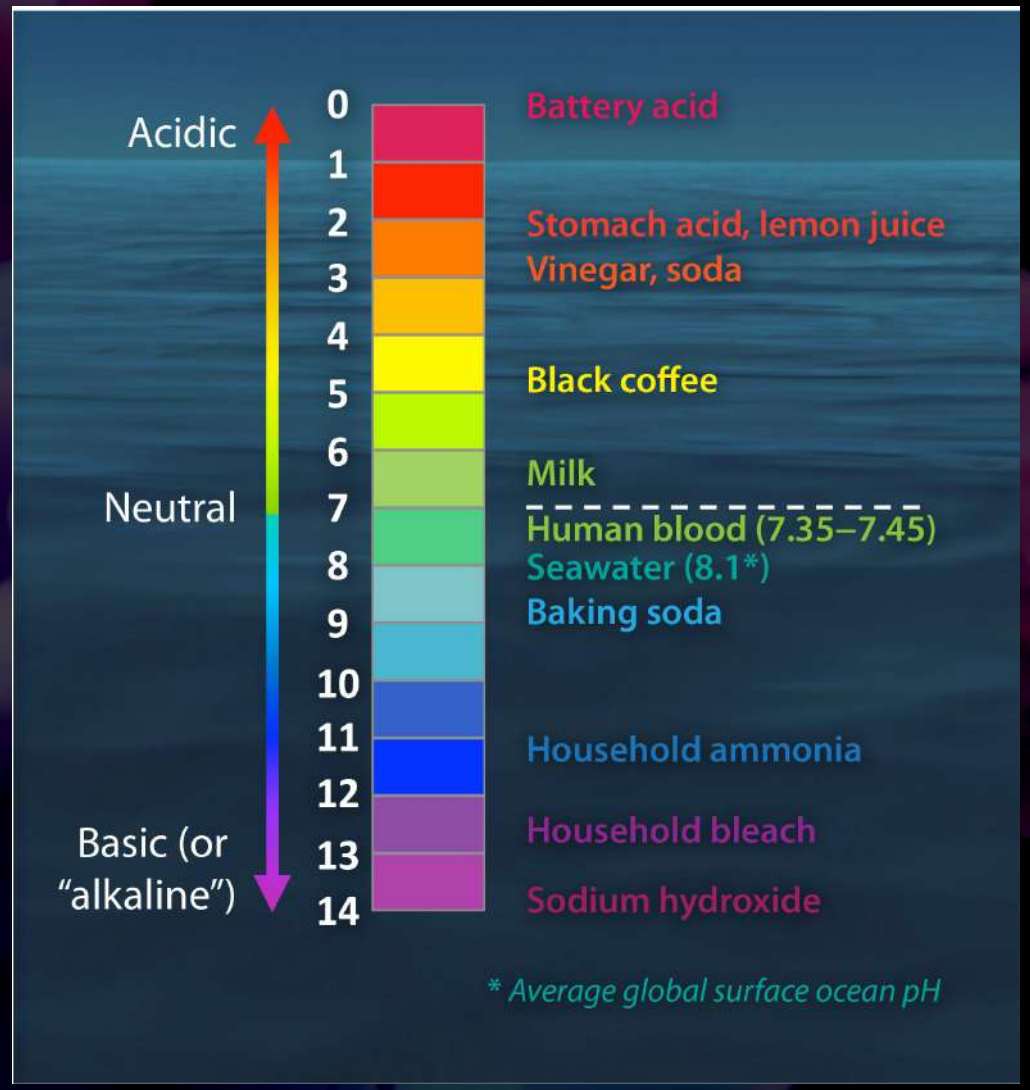


Neutral solution

- A neutral solution is one in which the hydronium ion concentration equals the hydroxide ion concentration.

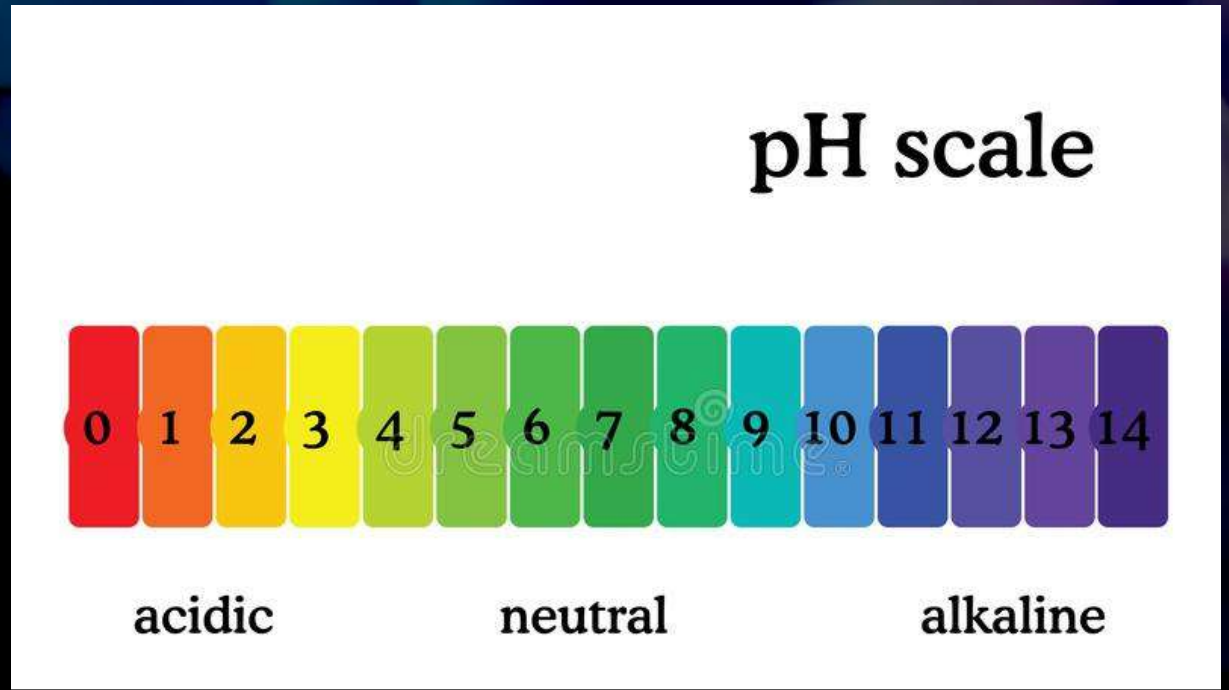
The pH scale is used to describe acidity

- $pH = -\log[H_3O^+]$
- A neutral solution has a hydronium ion concentration of 1.0×10^{-7} M.
- Acidic solutions have pH values less than 7.
- Basic solutions have pH values greater than 7.



Use litmus papers to check the pH values.

- To know the pH values, you need to correspond to the colors on the chart.



The phenomenon in nature

Rain Water Is Acid

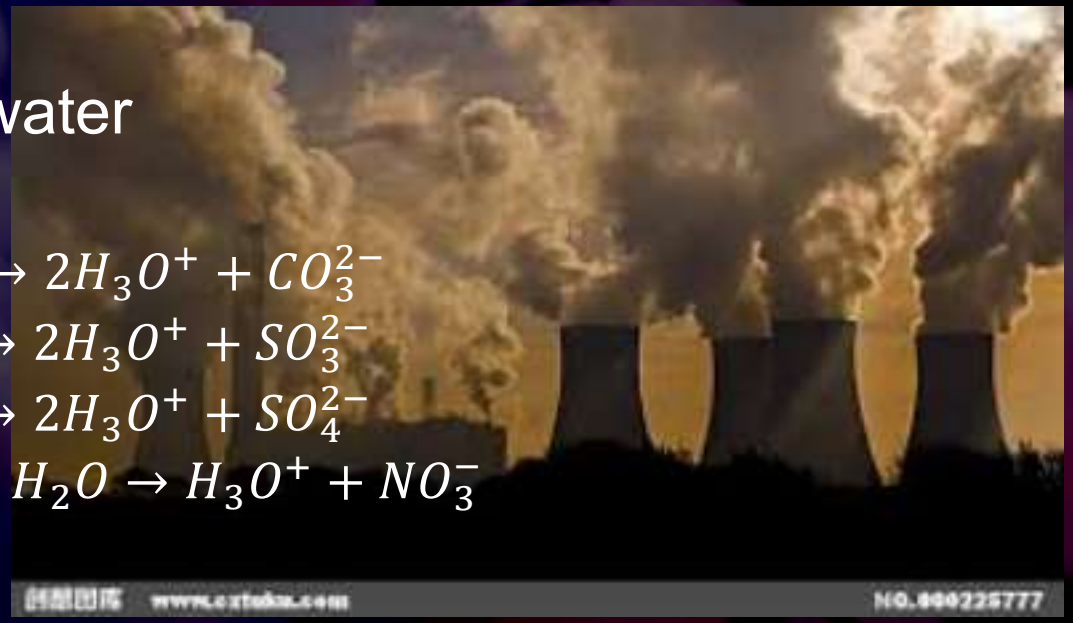
- Reason?

Ocean Water is Base

- Reason?

Why Rain Water Is Acid?

- Industry?
  - The exhaust emission dissolve in water
  - For instance:
    - $CO_2 + H_2O \rightarrow H_2CO_3, H_2CO_3 + 2H_2O \rightarrow 2H_3O^+ + CO_3^{2-}$
    - $SO_2 + H_2O \rightarrow H_2SO_3, H_2SO_3 + 2H_2O \rightarrow 2H_3O^+ + SO_3^{2-}$
    - $SO_3 + H_2O \rightarrow H_2SO_4, H_2SO_4 + 2H_2O \rightarrow 2H_3O^+ + SO_4^{2-}$
    - $3NO_2 + H_2O \rightarrow NO + 2HNO_3, HNO_3 + H_2O \rightarrow H_3O^+ + NO_3^-$



Why Rain Water Is Acid?

- The creature?
  - Respiration
  - $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

Are there any impact or not?

- When the rain water is too acidic, then the problem below may happen.
- The building made from marble would be corrosion
  - The equation below
  - $CaCO_3 + H^+ \rightarrow Ca^{2+} + H_2O + CO_2$

Why ocean water is base?

- Natural Alkaline
  - Such as calcium carbonate($CaCO_3$)
- Who supply natural alkaline?


Thank for your listening