

# Acids and Bases

PS 3.6

# Acid !

- Definition: A chemical that releases hydrogen ions ( $H^+$ ) in a solution.
- When dissolved in water,  $H^+$  ions interact with water molecules and form the hydronium ion ( $H_3O^+$ ).

# Identifying Acids

- Hydrogen (H) will be the first element in the formula.
  - HCl Hydrochloric acid (stomach acid)
  - H<sub>2</sub>SO<sub>4</sub> Sulfuric Acid (common industrial acid)
- Exception: H<sub>2</sub>O

# Acid Properties

1. Conduct electricity
2. Taste sour
3. Turn blue litmus paper red
4.  $\text{pH} < 7$
5. React w/ metals such as zinc and magnesium.
6. Reacts with bases to produce water and salt.

# Bases!

- Definition: A chemical that releases hydroxide ions ( $\text{OH}^-$ ) in a solution.

# Identifying bases

- Formula will end in hydroxide  $\text{-OH}$ .
  - $\text{NaOH}$  sodium hydroxide ( drain cleaner)
  - $\text{Ca(OH)}_2$  Calcium Hydroxide (fertilizer)

# Base Properties

1. Conduct electricity
2. Taste bitter
3. Turn red litmus paper blue
4.  $\text{pH} > 7$
5. Feel slippery
6. React with acids to produce water and salt.

# Neutralization

- A chemical reaction in which  
acid + base  $\rightarrow$  salt + water
- $\text{HCl (aq)} + \text{NaHCO}_3 \text{ (s)} \rightarrow \text{NaCl (aq)} + \text{CO}_2 \text{ (g)} + \text{H}_2\text{O (l)}$   
acid + base  $\rightarrow$  salt + water

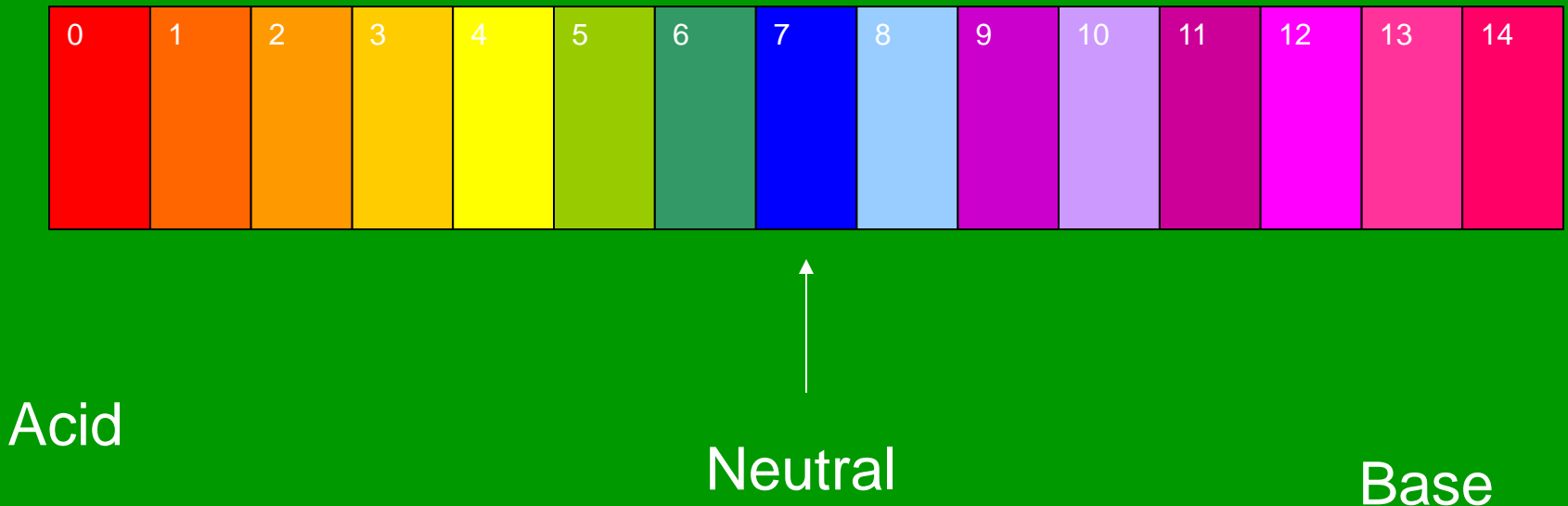


# Salt

- Definition: compound formed when the negative ions formed from an acid combine with the positive ions formed from a base.
- $2\text{HCl (aq)} + \text{Ca(OH)}_2 \text{ (aq)} \rightarrow \text{CaCl}_2 \text{ (aq)} + 2\text{H}_2\text{O (l)}$   
acid + base salt + water

# pH scale

- A way to measure the concentration of hydrogen ions in solution. It measures how acidic or how basic a solution is.



# Indicators

1. pH paper
2. litmus paper
3. pH meters
4. Phenolphthalein
5. Cabbage Juice

# Strength of acids

- Strong acid: acid that ionizes almost completely in a solution.
- Examples:  $\text{HCl}$ ,  $\text{HNO}_3$ ,  $\text{H}_2\text{SO}_4$
- Weak acid: acid that only partly ionizes in solution
- Example: acetic acid, carbonic acid

# Strength of Bases

- Strong base: dissociates completely in solution. Ex: NaOH
- Weak base: one that does not ionize completely. Ex: NH<sub>3</sub>

