

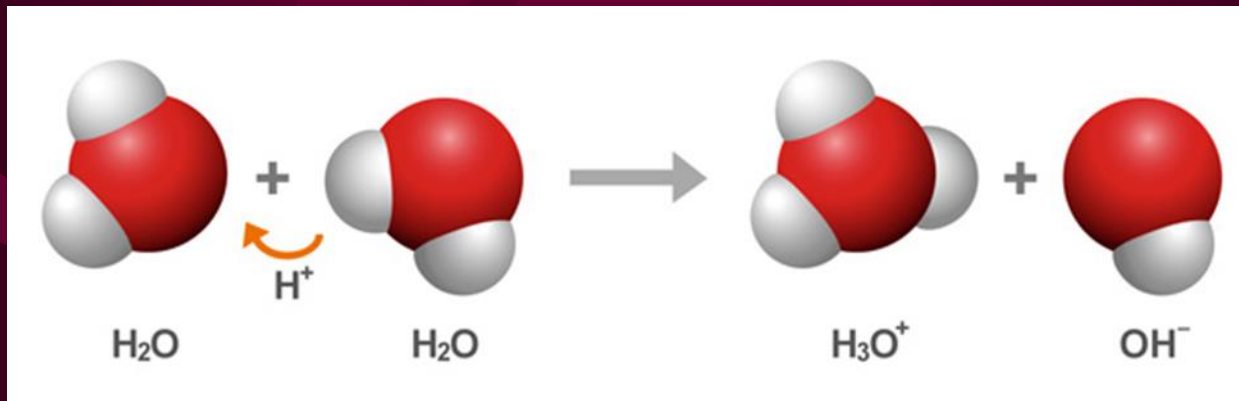
Acids, Bases, & Salts



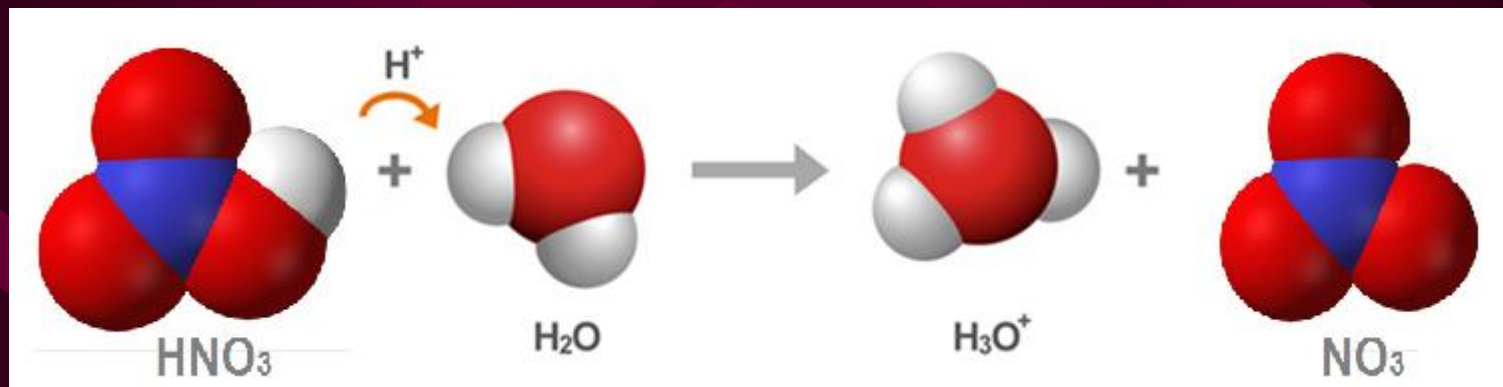
What makes an acid or a base?

Sometimes molecules break down in water, and release either an H^+ (hydrogen) ion or an OH^- (hydroxide) ion. When a hydrogen ion is released, the solution becomes acidic. When a hydroxide ion is released, the solution becomes basic.

Example: vinegar (CH_3COOH) molecules placed in water will split into CH_3COO^- and H^+ . That hydrogen ion is the reason it is an acid.



Acids Generate Ions



Acids and Bases in Solution

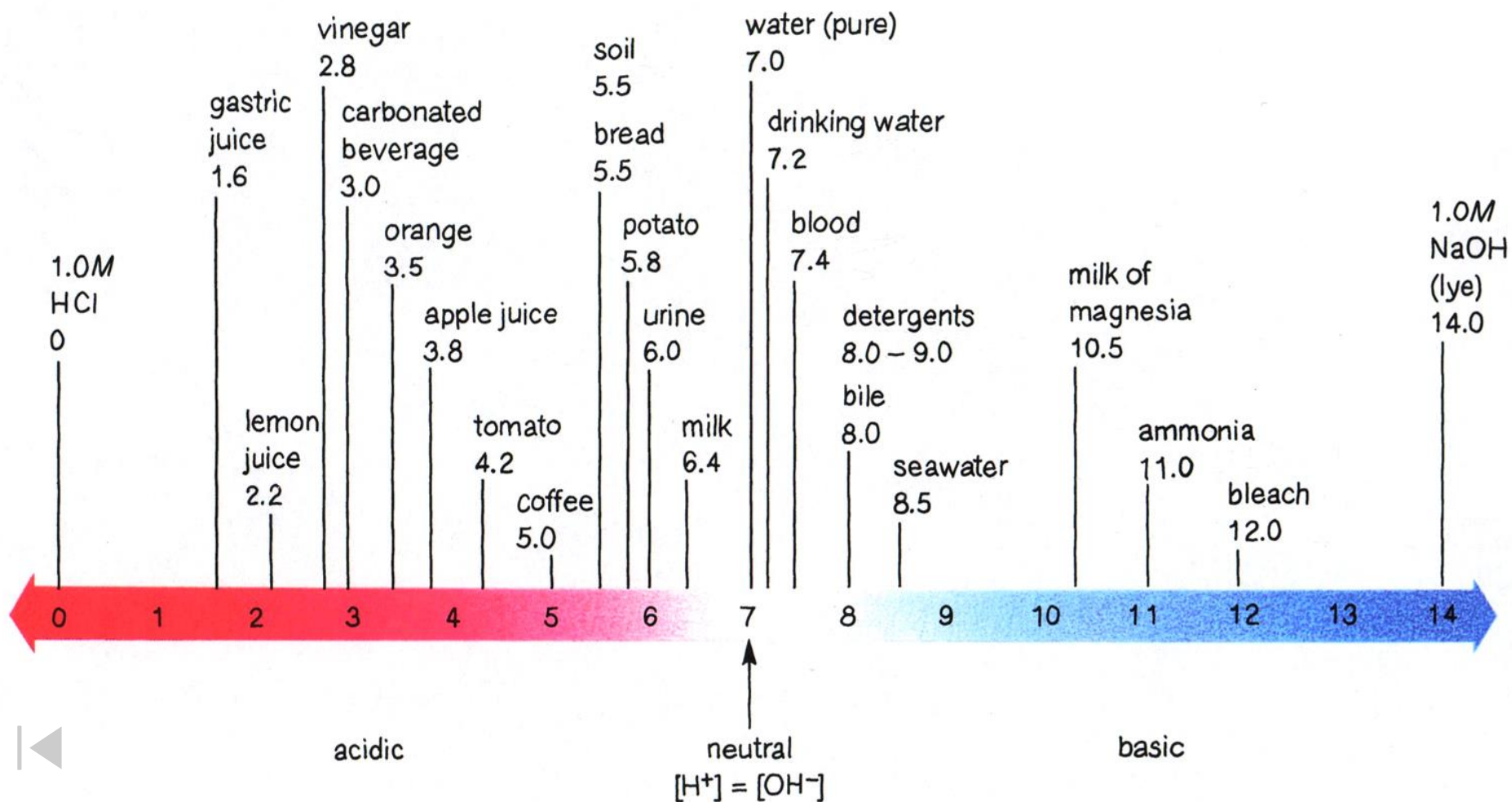
- $\text{HCl} + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ + \text{Cl}^-$
- $\text{NaOH in water} \rightarrow \text{Na}^+ + \text{OH}^-$
- $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{HOH}$
- $\text{NH}_3 + \text{H}_2\text{O} \rightarrow \text{NH}_4^+ + \text{OH}^-$

pH

Scientists use something called the **pH** scale to measure how acidic or basic a liquid is. pH measures concentrations of hydrogen ions (H^+) and hydroxide ions (OH^-) on a scale from 0 to 14.

Distilled water is 7 (right in the middle). Acids are found between 0 and 7. Bases are from 7 to 14.

pH of Common Substances



Properties of Acids

- pH less than 7
- Tastes sour
- Neutralizes bases
- Forms H^+ ions in solution
- Corrosive-reacts with most metals to form hydrogen gas
- Good conductors of electricity

Properties of Bases

- pH greater than 7
- Taste bitter
- Neutralizes acids
- Usually forms OH^- ions in solution
- Dissolves fats and oils (corrosive)
- Feels slippery

Common Acids

- HCl - hydrochloric- stomach acid
- H_2SO_4 - sulfuric acid - car batteries
- HNO_3 – nitric acid - explosives
- $\text{HC}_2\text{H}_3\text{O}_2$ - acetic acid - vinegar
- H_2CO_3 -carbonic acid – sodas
- H_3PO_4 - phosphoric acid –artificial flavorings





Common Bases

- NaOH - sodium hydroxide (LYE) soaps, drain cleaner
- $\text{Mg}(\text{OH})_2$ - magnesium hydroxide-antacids
- $\text{Al}(\text{OH})_3$ -aluminum hydroxide-antacids, deodorants
- NH_4OH -ammonium hydroxide- “ammonia”



What is a SALT?

- A salt is a neutral substance produced from the reaction of an acid and a base.
- Composed of the negative ion of an acid and the positive ion of a base.
- One of the products of a Neutralization Reaction
- Examples: KCl , MgSO_4 , Na_3PO_4



Neutralization Reaction

- A neutralization reaction is the reaction of an acid with a base to produce salt and water.
- Example

