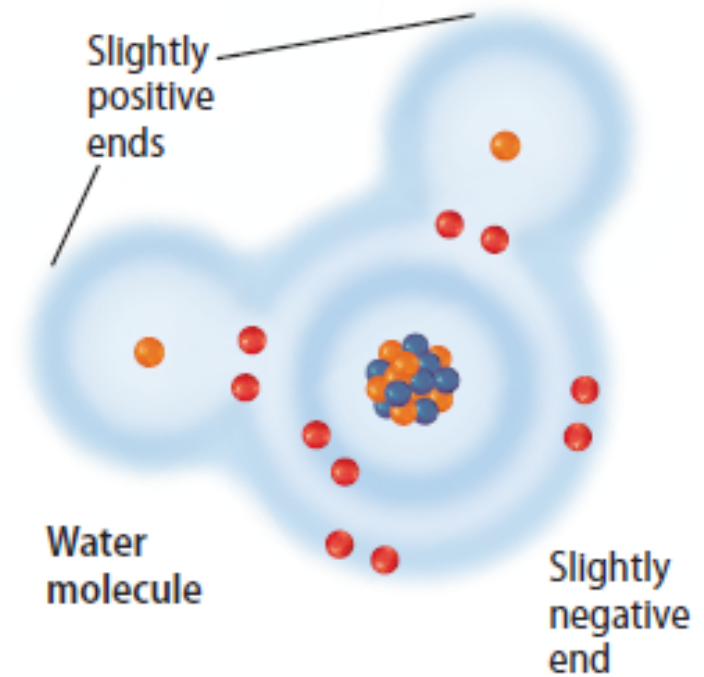


# **6.3 WATER AND SOLUTIONS**

# polar molecules

have an uneven  
distribution of charge

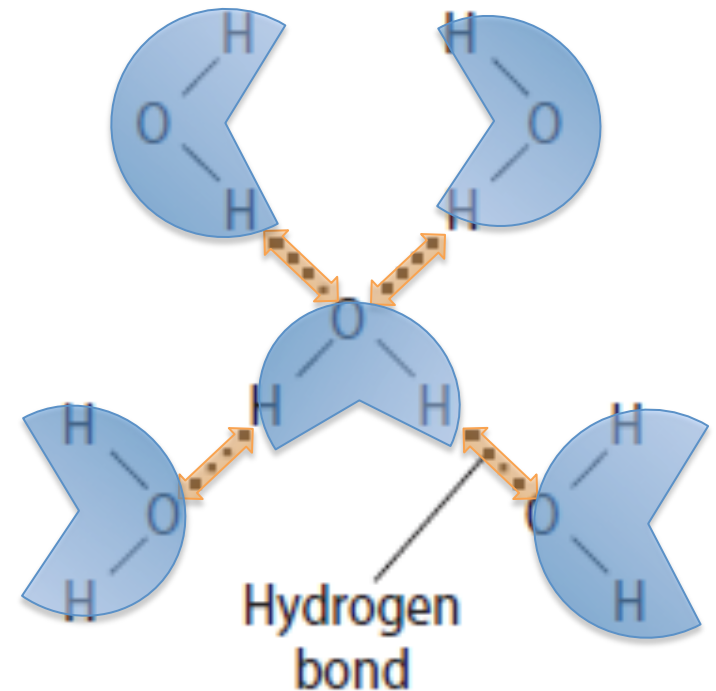
(meaning they have slightly  
positive and slightly negative  
areas)



# hydrogen bond

weak attraction  
between hydrogen  
and: fluorine,  
oxygen, or nitrogen

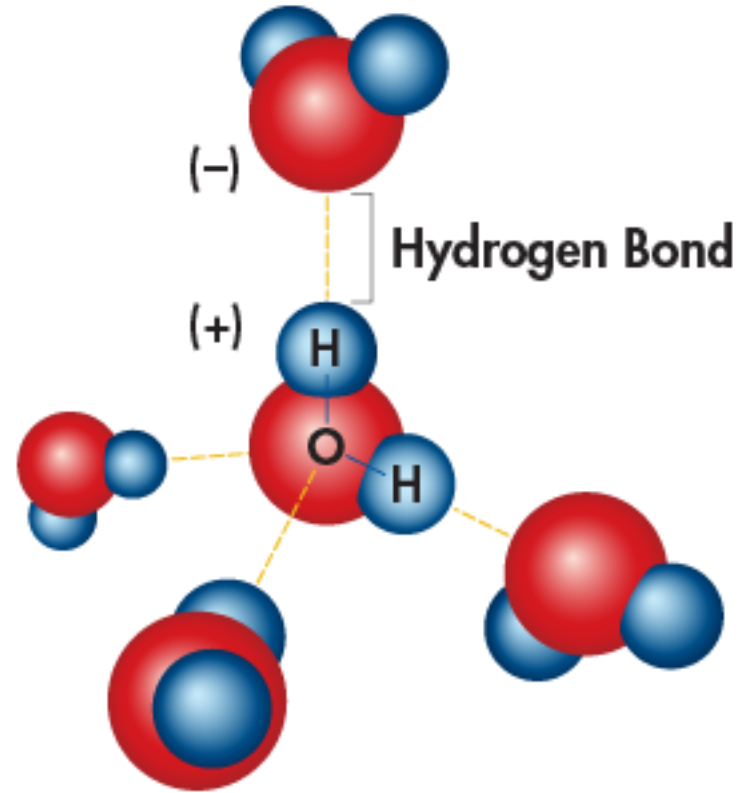
A hydrogen bond is a  
strong type of **van der  
Waals force**.



# Hydrogen Bonding

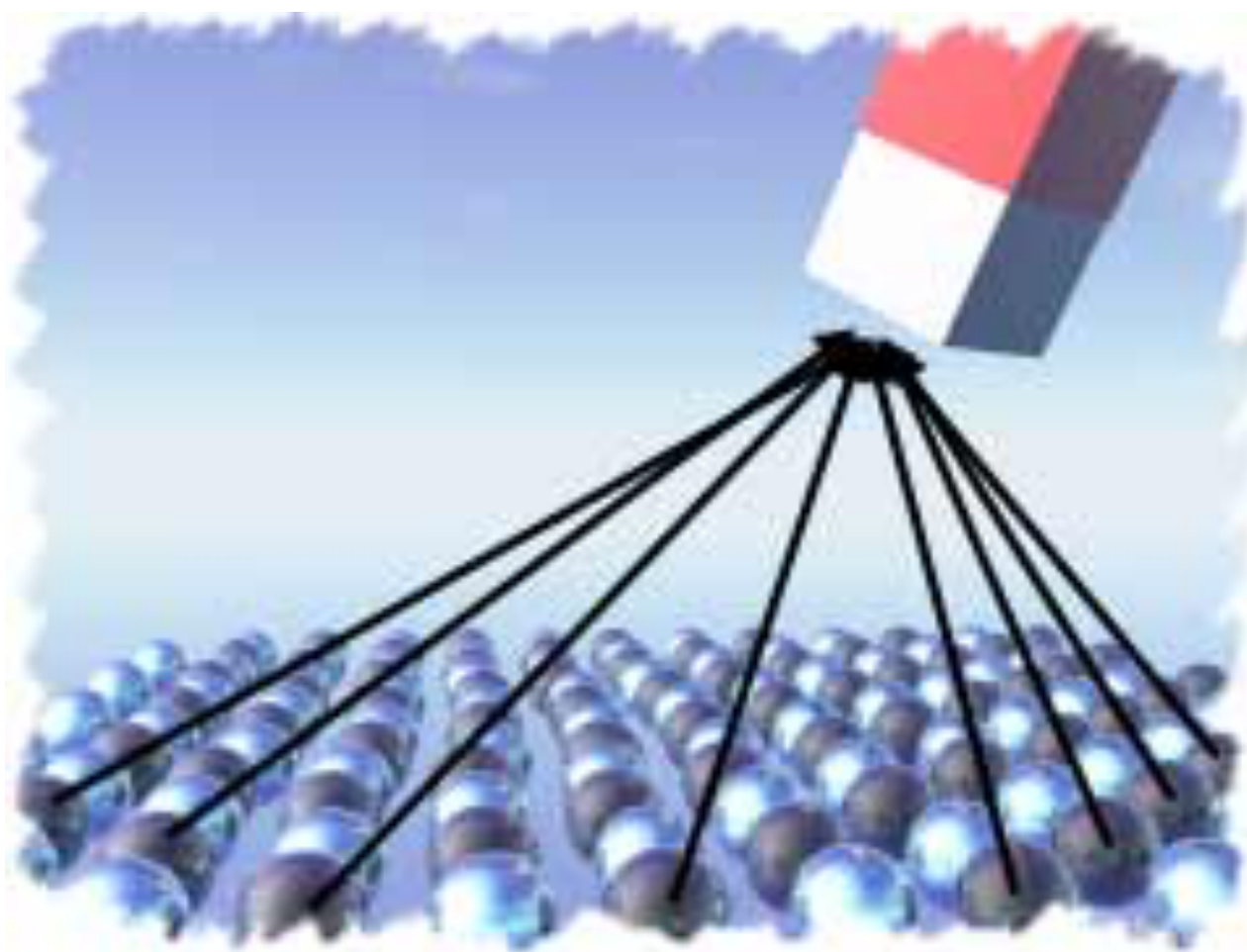
Hydrogen bonds are not as strong as covalent or ionic bonds.

Hydrogen bonds can form in compounds other than  $\text{H}_2\text{O}$ .



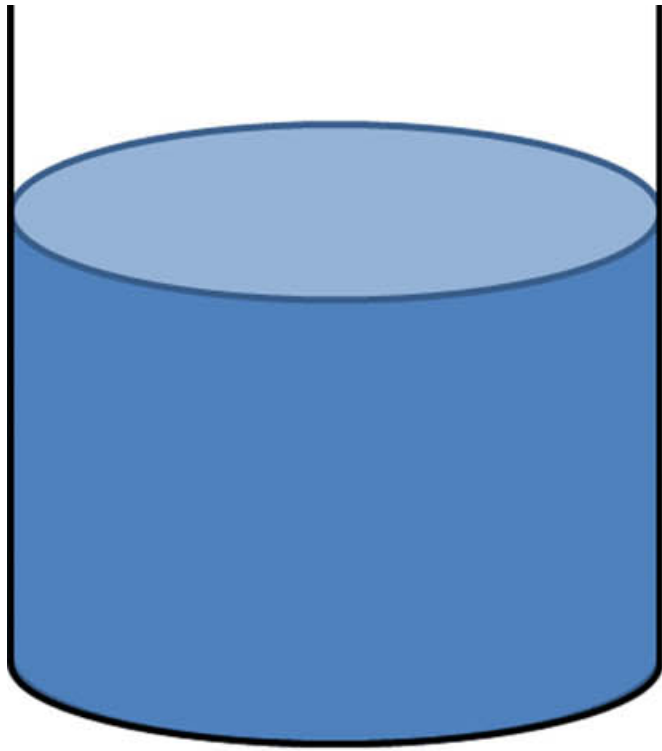
A **mixture** is two or more substances **physically** mixed together but not **chemically** combined

Each substance keeps its characteristics and properties.

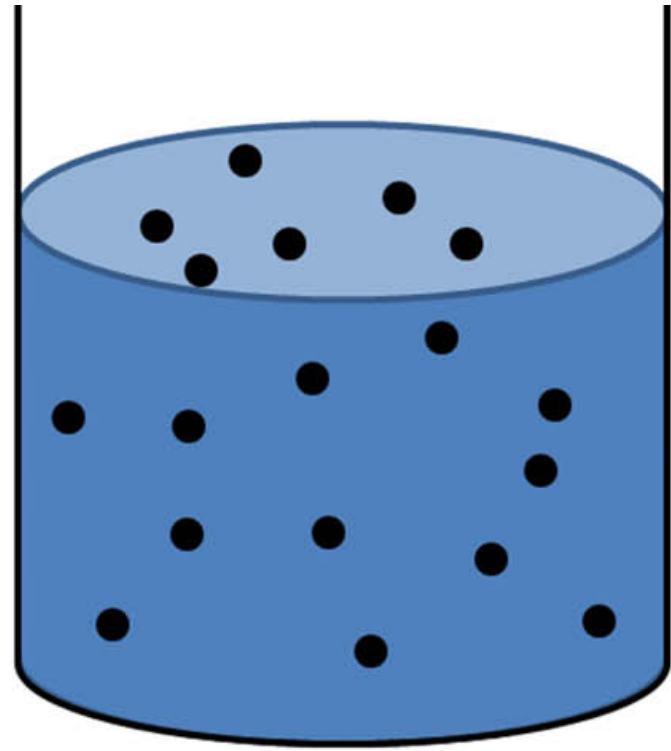


IN A MIXTURE OF SALT AND  
IRON, THE IRON CAN BE  
REMOVED WITH A MAGNET.

# TWO TYPES OF MIXTURES:



**Solution**



**Suspension**

**Suspensions** are  
**heterogeneous** mixtures where  
the particles don't dissolve  
ex: dirty water

A **colloid** is a suspension in which  
the particles do not settle out.



**Solutions** are **homogeneous** mixtures

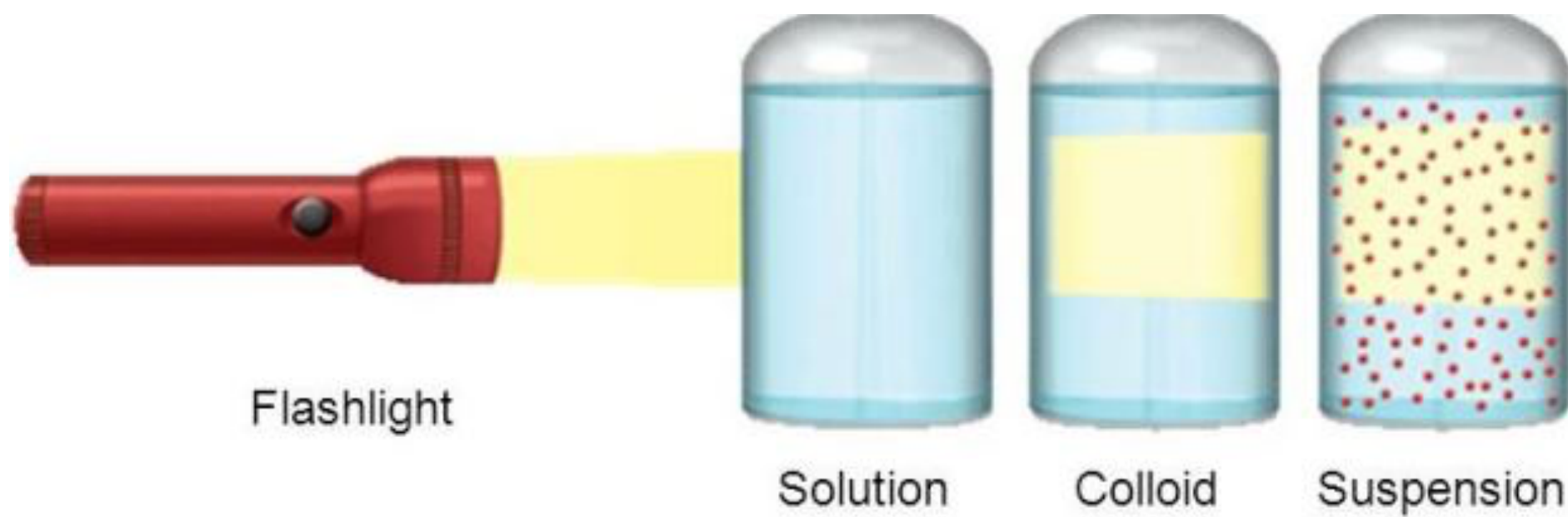
ex: saltwater

two parts of solutions:

**Solute**- the thing being dissolved  
(ex: salt)

**Solvent**- the substance the solute  
dissolves into (ex: water)

Still a mixture: both the salt and the water keep their  
properties. (it still tastes salty right?)



Flashlight

Solution

Colloid

Suspension

# Comparison of Solution and Suspension

## SOLUTION

- Clear
- Homogeneous
- Solute particles do not settle to the bottom
- Solute particles of the solution pass through the filter paper

## SUSPENSION

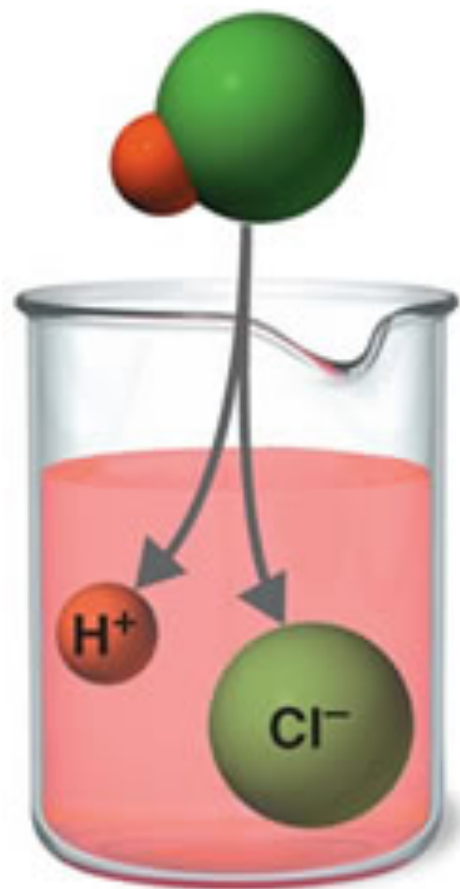
- Cloudy
- Heterogeneous
- Solid particles settle to the bottom when suspension left to stand
- Solute particles of the solution cannot pass through the filter paper and becomes residue on the filter paper

Water is called the “**universal solvent**” because many solutes dissolve in water because of its polarity

**Acids** release  $H^+$  when they are dissolved in water

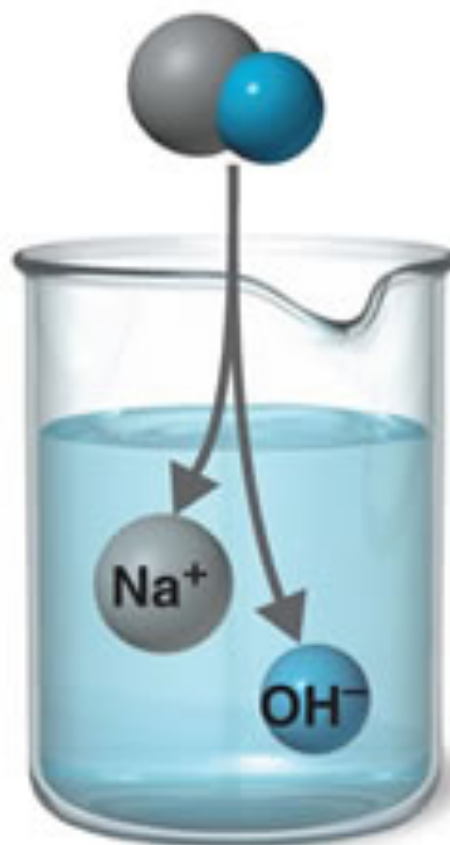
**Bases** release hydroxide ions ( $OH^-$ ) when they are dissolved in water

HCl



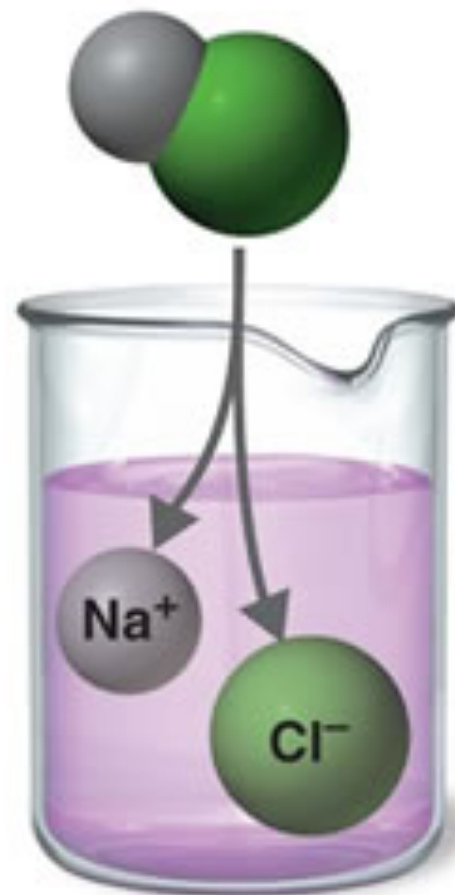
**(a) Acid**

NaOH



**(b) Base**

NaCl



**(c) Salt**

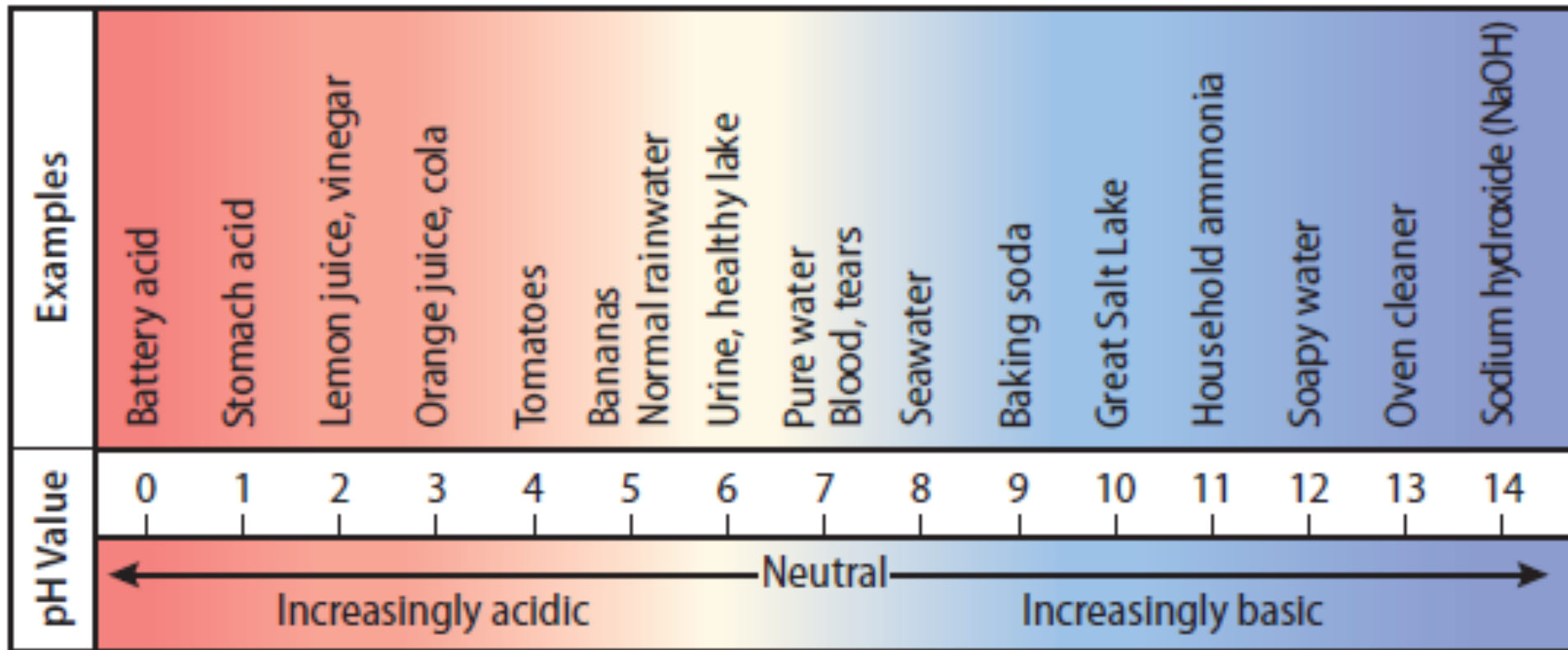
The amount of  $H^+$  or  $OH^-$  determines the strength of an acid or base.

**pH** is the measure of  $H^+$  in a solution

A pH of 7 is “neutral”

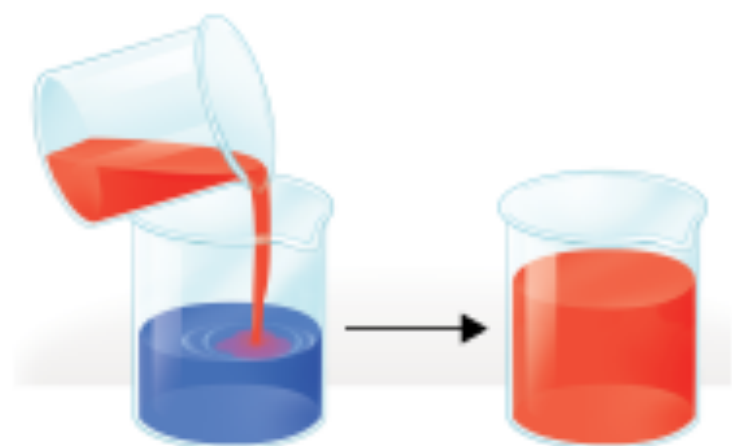
**Acids** have **low** pH values (down to 0)

**Bases** have **high** pH values (up to 14)

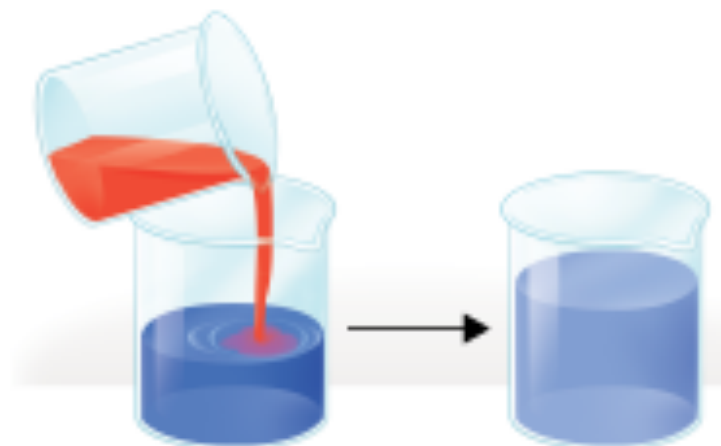




**Buffers** are mixtures that can react with acids or bases to keep the pH from changing.



Unbuffered base + acid = acidic pH



Buffered base + acid = basic pH



