STRONG & WEAK ACIDS/BASES

Strength of an acid or a base

– determined by % ionization
– is NOT determined by the concentration

Strong Acid

– 100 % ionization in water solution
– there won't be any undissociated acids left
– completely dissociated
– the reaction only goes one way
– single arrow (goes to completion)

$HCl_{(g)} + H_2O_{(l)} \rightarrow H_3O^+_{(aq)} + Cl^-_{(aq)}$

What is the concentration of HCl and H_3O^+ in 1.0M HCl?

[HCl] = 0.0M
$[H_3O^+]$ = 1.0M

Weak Acid

- less than 100% ionization
- there will be undissociated acids in the solution
- most of the molecules don't ionize
- reverse reactions do occur
- double arrow

$HF_{(g)} + H_2O_{(l)} \leftrightarrows H_3O^+_{(aq)} + F^-_{(aq)}$

$[H_3O^+]$ is only a small fraction of [HF]

Strong Base

- ionizes (dissociates) 100% in solution
- OH^-, O^{2-}, NH_2^-
- any substance which dissociates completely to produce OH^-, O^{2-}, or NH_2^- is a Strong Base
- Alkali metal hydroxides
- Alkaline earth hydroxides (even though $Sr(OH)_2$ is the only one called "soluble" on the Solubility Table.)

Weak Bases

- Found above OH- on right side of the acid table

concentration vs. strength
How would you describe 1.0M HCl?

This is a strong, and diluted acid.

How would you describe 17.4M HF?

This is a concentrated, and weak acid.

Weak & Strong
→ refers to % ionization
Concentrated & Diluted
→ refers to the moles of acid dissolved per liter.

Levelling effect for ACIDS

What is $[H_3O^+]$ in 1.0M H_3O^+? _____
What is $[H_3O^+]$ in 1.0M HNO_3? _____
What is $[H_3O^+]$ in 1.0M HCl? _____

Although $HClO_4$ is above HCl on the chart, it is no more acidic than HCl in a water solution.

H_3O^+ is the STRONGEST ACID that can exist in aqueous solution because all strong acids will dissociate to from H_3O^+.

HW
Read p112-114 and 121 -125
p125 #21-27