LO: Students will be able to identify properties of acids and bases.

DOL: Students will correctly analyze acids and bases at least 4/5 times.

Acids: Properties of aqueous solutions of acids

1) sour taste

2) change the color of acid-base indicators

3) some acids produce hydrogen gas when reacting with certain metals

4) acids react with bases forming a salt and water

5) acids are electrolytes

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Acid nomenclature

binary acids contain only two different elements - hydrogen and one of the more electronegative elements

HF	hydrofluoric acid
HCl	hydrochloric acid
HBr	hydrobromic acid
HI	hydriodic acid
H2S	hydrosulfuric acid

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Oxyacids contain hydrogen, oxygen, and a third (usually nonmetal) element. These are known as ternary acid because they contain 3 different elements.

CH_3COOH	acetic acid	acetate ion
H_2CO_3	cabonic acid	carbonate ion
$HClO_3$	chloric acid	chlorate ion
H_2SO_4	sulfuric acid	sulfate ion

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Common Industrial Acids

Sulfuric: most commonly produced industrial chemical in the world. It us used in the petroleum industry as well as in the production of metals, paper, paint, dyes, detergents, and car batteries.

Nitric: has a "suffocating" odor, will stain proteins yellow, used in making explosives as well as rubber, plastics, dyes, and pharmaceuticals.

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Phosphoric: used to make fertilizers and animal feed. Non-toxic and used as a flavoring agent in beverages.

Hydrochloric: stomach acid, used in "pickling" iron and steel (essentially eats away surface impurities). Concentrated HCl is often referred to as muriatic acid and can be found in hardware stores.

Acetic: vinegar contains between 4-8%, used in making plastics, food supplements such as lysine. Also used as a fungicide.

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Bases

- taste bitter
- change the color of acid-base indicator
- dilute solutions feel slippery
- react with acids to produce a salt and water
- are electrolytes

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Arrhenius Acid is a chemical compound that increases the concentration of H^+ ions in an aqueous solution.

Arrhenius Base is a chemical compound that increases the concentration of OH^- ions in an aqueous solution.

A **strong acid** is one that ionizes completely in an aqueous solution - strong electrolytes with a hydrogen make strong acids. **Strong bases** are ones that completely dissociates in water.

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Bronsted-Lowry acid is a molecule or ion that is a proton donor

essentially, a molecule that reacts and gives a H+ to another molecule is a Bronsted-Lowry acid.

$HCl + H_2O \longrightarrow H_3O^+ + Cl^-$

$HCl + NH_3 \longrightarrow NH_4^+ + Cl^-$

Water can also act as a Bronsted-Lowry acid

$H_2O + NH_3 \rightleftharpoons NH_4^+ + OH^-$

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Bronsted-Lowry base is a molecule or ion that is a proton acceptor.

$HCl + NH_3 \longrightarrow NH_4^+ + Cl^-$

The ammonia is the Bronsted-Lowry base because it accepts the proton from the HCl.

In a Bronsted-Lowry acid-base reaction, protons are transferred from one reactant (acid) to another reactant (base).

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Monoprotic acid is one in which each molecule can donate one proton.

Polyprotic acid is one in which each molecule can donate more than one proton.

First stage is a strong acid -

$H_2SO_4 + H_2O \longrightarrow H_3O^+ + HSO_4^-$

Second stage is a weak acid -

$HSO_4^- + H_2O \rightleftharpoons H_3O^+ + SO_4^{2-}$

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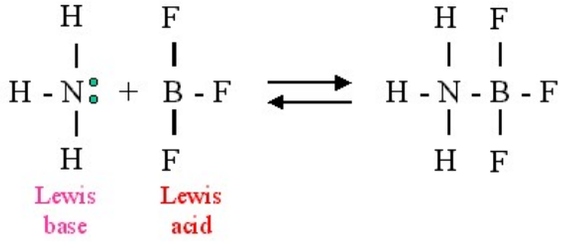
Lewis acid is an atom, ion, or molecule that accepts an electron pair to form a covalent bond.



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