CHEMISTRY DAILY PLAN

Class: **Date:**

Subject: ***Acids*** **Time:**

Compounds can be classified into four groups.

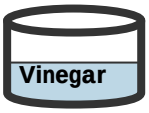
1. Acids 2. Bases 3. Salts 4. Oxides

ACIDS

Some of the compounds that we use in daily life are acids. Although these compounds are irritant and have sour taste, they exist in many foods and drinks.

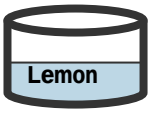
For example,

Acetic Acid



Carbonic Acid

Citric Acid



However, some acids are harmful for human health and it is dangerous to take these acids into organism. For example nitric acid, sulfuric acid, hydrogen cyanide and many others are harmful for human body and never try to taste any of these chemicals.

Definition

A compound that produces H^+ ion in an aqueous solution is called an acid. Ionization equations of some acids in water are as follow;

$HCl \Rightarrow H^+_{(aq)} + Cl^-_{(aq)}$ $\quad$ $H_2SO_4 \Rightarrow 2H^+_{(aq)} + SO_4^-{}_{(aq)}$

$HNO_3 \Rightarrow H^+_{(aq)} + NO_{3\,(aq)}$ $\quad$ $HCN \Rightarrow H^+_{(aq)} + CN^-_{(aq)}$

H^+ ions of acidic solutions are not alone, they combine with H_2O molecules. These ions can be shown as H^+ ions or as H_3O^+ ions which is called hydronium ions.

The equations given above also can be written as;

$HCl + H_2O \Rightarrow H_3O^+_{(aq)} + Cl^-_{(aq)}$ $\quad$ $H_2SO_4 + H_2O \Rightarrow 2H_3O^+_{(aq)} + SO_4^-{}_{(aq)}$

$HNO_3 + H_2O \Rightarrow H_3O^+_{(aq)} + NO_{3\,(aq)}$ $\quad$ $HCN + H_2O \Rightarrow H_3O^+_{(aq)} + CN^-_{(aq)}$

Every substance that contains hydrogen does not show acidic property. For example, although they contain hydrogen, (CH_4) methane, ethyl alcohol (C_2H_5OH), glucose ($C_6H_{12}O_6$), (NH_3) ammonia are not acid.

Naming Acids

Formula	Name
HCl	Hydrochloric acid
HF	Hydrofluoric acid
HI	Hydroiodic acid
H_2S	Hydrosulfuric acid
HBO_3	Boric acid.
H_2SO_4	Sulfuric acid
HNO_3	Nitric acid

Formula	Name
H_2SO_3	Sulfurous acid
HNO_2	Nitrous acid
HClO	Hypochlorous acid
$HClO_3$	Chloric acid
$HClO_2$	Chlorous acid
$HClO_4$	Perchloric acid

Properties of Acids

1. Acids have a sour taste. Think of the taste of vinegar, (a 5% solution of acetic acid), the taste of lemon juice (a mixture of citric acid),
2. Acids turn the color of blue litmus (a dye material) to red. Remember that the color of a glass of tea gets pale when some lemon juice is added to water.
3. Acid solutions conduct electricity.
4. Acids react with most of the metals, and produce H_2 gas.

   $Na_{(s)} + 2HNO_{3\ (aq)} \Rightarrow NaNO_{3\ (aq)} + H_{2\ (g)}$

   $Zn_{(s)} + 2HCl_{(aq)} \Rightarrow ZnCl_{(aq)} + H_{2(g)}$

   $2Al_{(s)} + 3H_2SO_{4(aq)} \Rightarrow Al_2(SO_4)_{3\ (aq)} + H_{2\ (g)}$
5. Acids react with bases to produce salt and water. The reaction between an acid and a base is called "neutralization reaction"

   $HCl_{\ (aq)} + NaOH_{\ (aq)} \Rightarrow NaCl_{\ (aq)} + H_2O_{(l)}$

   $H_2SO_{4\ (aq)} + Ba(OH)_{2\ (aq)} \Rightarrow BaSO_{4\ (s)} + 2H_2O_{\ (l)}$

   $H_3PO_{4\ (aq)} + Al(OH)_{3\ (aq)} \Rightarrow Al_2(SO_4)_{3\ (s)} + 3H_2O_{\ (l)}$

Strength of Acids

The rate of dissociation of an acid is related to the strength of that acid. The strong acids dissociate completely, but weak acids partially. The strong acid solutions conduct electricity better than the weak acid solutions. HI, $HClO_4$, HNO_3, HCl, H_2SO_4 are examples of strong acids and HF, HCN, CH_3COOH are examples of weak acids.