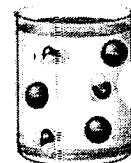


I ACIDS AND BASES:A. What is an acid?

1. An acid is any compound that increases the number of hydronium ions when dissolved in water.
2. Hydronium ions form when a hydrogen ion ( $\text{H}^+$ ) separates from the acid & bonds <sup>with</sup>  $\text{H}_2\text{O}$  to form  $\text{H}_3\text{O}^+$  (hydronium ion)

B. Properties of acids:

1. They have a Sour taste.
 

Example: citric acid found in fruits like lemons, limes.
2. They react with some metals to produce hydrogen gas.
3. They are corrosive, they destroy body tissue.
 

(they remove water from skin)
4. Acid solutions can conduct electricity.
5. Most acids are also poisonous.
6. They make indicators change color.
  - a) Bromthymol blue turns yellow in the presence of an acid.
  - b) Blue litmus paper turns red.

C. Uses of acids:

$\text{H}_2\text{SO}_4$  1. Industries use sulfuric acid to make many products:

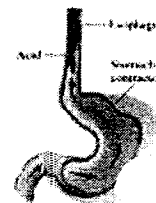
paper, paint, detergents

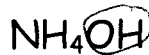
$\text{HNO}_3$  2. Nitric acid is used to make fertilizers.

$\text{HCl}$  3. Hydrochloric acid extracts metals from their ores.

4. Hydrochloric acid is also found in your stomach.

5. Vitamin C is Ascorbic acid, found in orange juice.



D. What is a base?

1. A base is any compound that increases the number of hydroxide ions,  $(\text{OH}^-)$ , when dissolved in water.

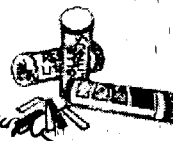
E. Properties of bases:

1. Bases have a bitter taste.
2. Bases have a slippery feel. (dissolves fats in your skin)
3. Solutions of bases conduct electricity due to the hydroxide ions.
4. Bases make indicators change color.

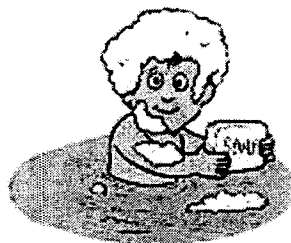
a) Bromthymol blue turns dark blue in the presence of a base.

b) Red litmus paper turns blue.

c) PHTH (clear liquid) turns pink/lavender/purple.

F. Uses of bases:

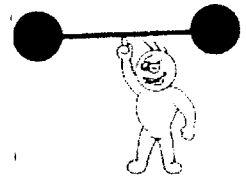
1. Sodium hydroxide is used to make SOAP and paper.
2. Calcium hydroxide is used to make cement.
3. Ammonia ( $\text{NH}_4\text{OH}$ ) is in many cleaners.
4. Magnesium hydroxide ( $\text{Mg}(\text{OH})_2$ ) is in antacid.
5. Lye ( $\text{NaOH}$ ) dissolves grease and is used in Drano.



II SOLUTIONS OF ACIDS AND BASES:

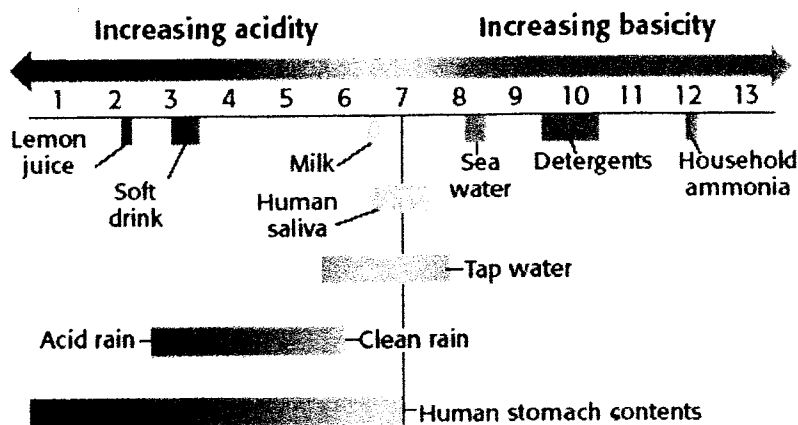
A. Strengths of Acids and Bases:

- The STRENGTH of an acid or a base depends on the # of molecules that break apart when dissolve in water.
- STRONG acid or base: if ALL the molecules of the acid or base break apart.
- WEAK acid or base: if only a few molecules of the acid or base break apart.



B. pH Scale:

- pH is a measure of the hydronium ion concentration in the solution.
- pH scale goes from 0 to 14.
- 0-6 = ACIDIC    7 = neutral    8-14 = basic
- pH paper can tell how strong or weak a solution is.



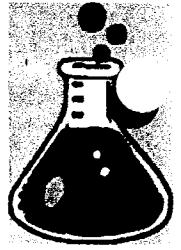
- Living things depend on a steady pH in their environment.
- Many organisms in lakes need a neutral pH.
- Most rain is 5.5 - 6. Acid rain is usually 4 - 4.5

Librari video → 8 min. Acid rain in Adirondacks

as low as 3!

C. Neutralization Reaction:

pH + H



1. A reaction between an ACID and a BASE.
2. The acid and base NEUTRALISE each other.
3. The  $H^+$  from the acid and the  $OH^-$  from the base react to form water.
4. The other IONS from the acid and base combine chemically to form a SALT.

5. Salt: an IONIC compound formed from the positive ion of the acid and the negative ion from the base. A compound of a metal and a nonmetal.

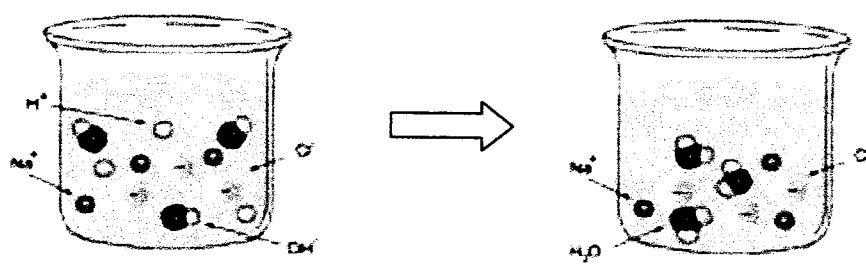
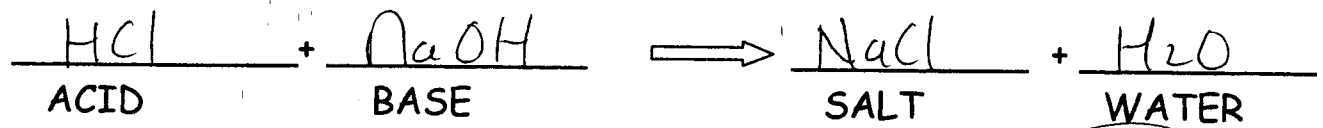
6. Examples of salts: NaCl ZnCl<sub>2</sub> LiCl

7. Uses of salts:

- a) NaCl - to make foods tasty
- b) NaNO<sub>3</sub> - to preserve food
- c) MgCl<sub>2</sub> - to help de ice roads



7. Example of neutralization reaction:



pH + H  
purple in a base

demonstrate  
indicator  
should have  
been in  
notes

8. Importance of neutralization reactions:

- a) to counteract acid spills
- b) upset stomach