Chemistry

Acids & Bases

Why are these Hydrangea's different colors if they are all the same type of flower?

ACIDS & Bases

- ↑ [H+]
- Increase in Hydrogen Ions = decrease in pH
- pH less than 7 is ACIDIC

- Bases = Increase in pH
- Decrease in Hydrogen Ions
- pH greater than 7 in BASIC

pH Scale – potential Hydrogen ions

Concentration of Hydrogen Ions	pH	Examples
1/10,000,000	14	Liquid drain cleaner, Caustic soda
1/1,000,000	13	Bleach, Oven cleaner
1/100,000	12	Soapy water
1/10,000	11	Ammonia (11.9)
1/1,000	10	Milk of magnesium
1/100	9	Toothpaste
1/10	8	Baking soda, Sea water
0	7	"Pure" water
10	6	Milk
100	5	Acid rain, Black coffee
1,000	4	Tomato juice
10,000	3	Grapefruit & Orange juice
100,000	2	Lemon juice, Vinegar
1,000,000	1	Sulfuric acid
10,000,000	0	Battery acid

How do Buffers resist a change in pH?

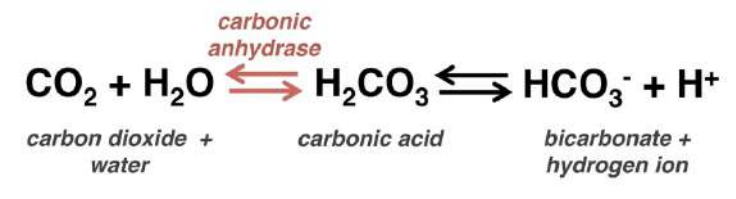
- The Buffer contains a weak acid and a strong base or a strong acid and a weak base.
- Buffers resist a change in pH when limited amounts of acid or bases are added.
- There are enough Hydrogen or hydroxide ions to add to an acid or a base, but not to change it significantly.

Blood – Real world reason for a buffer

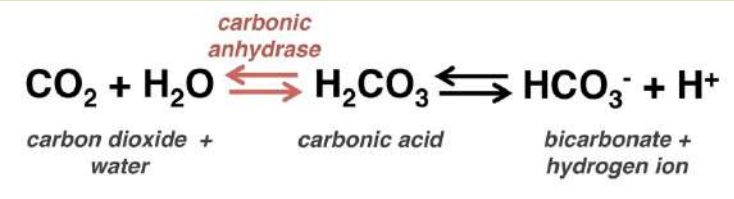
- Our Blood has to be maintained around 7.4.
  - If our blood gets out of range then Proteins (enzymes) lose their ability to function.
- It will not fluxuate below 7.1 or above 7.7.
- If the blood drops to 7.1 then acidosis occurs
  - Due to overexerted cramps in leg
  - Lactic acid in the muscle tissue
- If the blood raises to 7.7 then alkadosis

Body helps maintain 7.4 blood pH in 3 ways.

1. Excess acids or bases will be excreted in the urine.
2. Carbonic Anhydrase (enzyme) releases 600,000 molecules of CO_2 per minute.
3. The body contains buffering systems



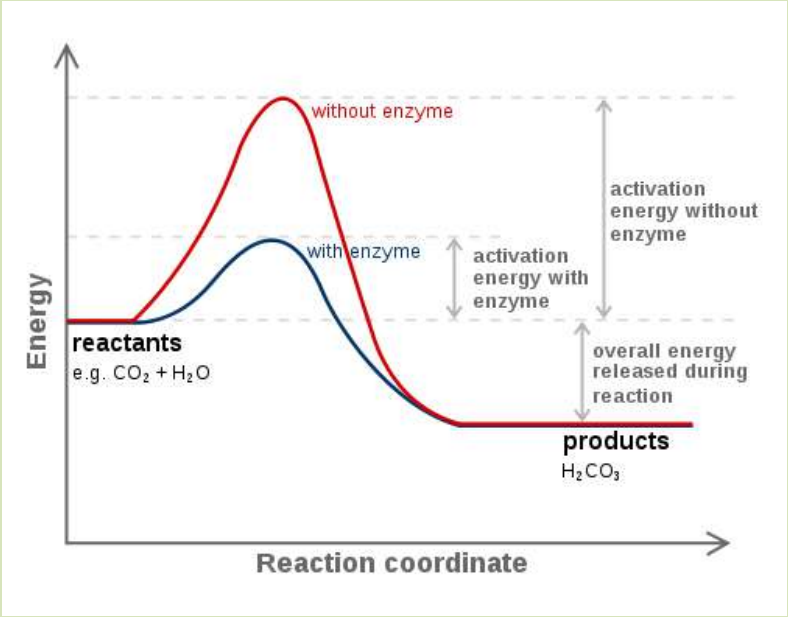
Blood must maintain an Acid – Base balance



Acids and bases are deposited into the bloodstream from normal everyday chemicals from metabolic reactions.

During this metabolic rate:

- H_2CO_3/ HCO_3- equilibrium will shift
- Lungs will alter the rate [CO_2] from the body
- Kidneys can alter the rate and removal of HCO_3-



Stomach

- Stomach acid must be maintained around 1.6 – 1.8 pH
- Antiacids treat indigestion and heartburn
  - Bases that neutralize digestive acids

Activity

- Vinegar + Baking Soda
- 25 ml + 1 gram = ?
- Learn about Conservation of Mass

Activity – Measuring the pH of various substances

- Without smelling any of the liquids, measure the pH
- Write the Letter of the substance on your paper in the first Column
- In the second column, write the pH of that substance.
- Identify where it is an Acid or a Base in the third Column.

Substance	pH	Acid or Base
A		
B		
C		
D		
E		

Adult Ed Project Chemistry Research Batteries .5 credits

- What is a battery?
- What types of Batteries are there, name and discuss 3.
- What chemicals do batteries store, name and discuss 3.
- How do batteries work, explain in detail, using diagrams if need be.
- This assignment should be about 2 – 3 pages in length.

Works cited

- Chemistry in the Community, p. 370 - 380
- Chemistry Matter & Change, p. 622