BASIC CHEMISTRY, SOLUTIONS, OSMOSIS

BASIC CHEMISTRYof SOLUTIONS

SOLUTION ARE MIXTURES

Solutions can be:

Liquid/liquid: alcohol in water

Gas/gas- oxygen in air

Gas/liquid- oxygen in blood

Solid/liquid- sand in water

-Salt in water

Gas /solid: pumice

Solutions are made to a certain concentration

- Concentration = $\frac{\text{solute (grams)}}{\text{solvent(ml)}}$

Concentration units= percent or molar

Ex. 2% NaCl= 2 grams NaCl in 100 ml of water

Well mixed= homogeneous solution

(same concentration on top of mixture as bottom)

- Taste same saltiness throughout

Dilutions and Concentrations

- Making various concentration from a “stock” solution

DISSOLVING IS A PHYSICAL CHANGE

- WATER IS THE UNIVERSAL SOLVENT
  SOME CHEMICALS DISSOLVE IN WATER
  SOME CHEMICALS DO NOT DISSOLVE

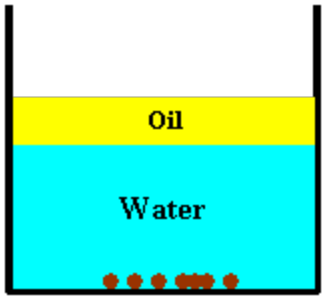
THIS DEPENDS ON THE “POLARITY”

- POLAR CHEMICALS DISSOLVE POLAR CHEMICALS
  EX.SODIUM CHLORIDE IN WATER
  “LIKE DISSOLVES LIKE”

CHEMICALS THAT DISSOLVE IN WATER ARE CALLED “HYDROPHYLIC” (water loving)

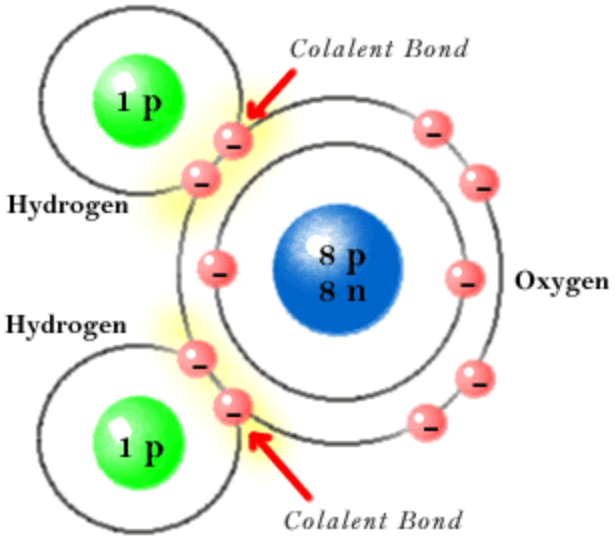
NOT ALL CHEMICALS DISSOLVE IN WATER

- SOME CHEMICAL DO NOT DISSOLVE IN WATER SINCE THEY ARE NON-POLAR (HYDROPHOBIC)
- Ex. Oil and water don't mix

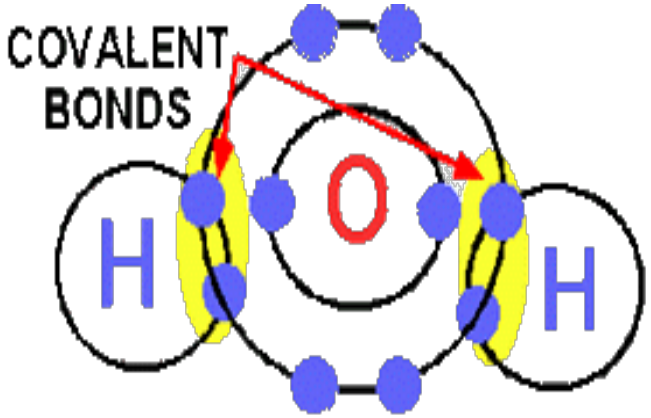


BUT "NON-POLAR DISSOLVES NON-POLAR- (like dissolves like)"

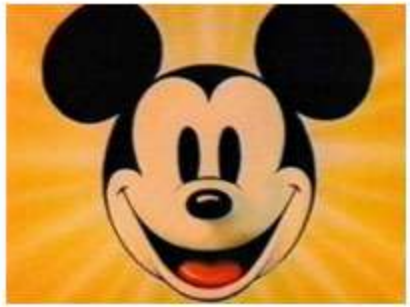
Ex. Oil paints and linseed oil

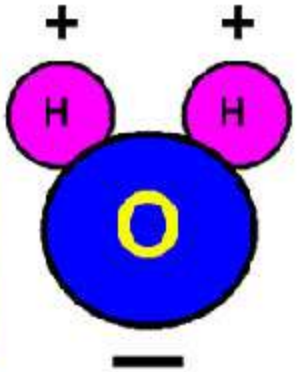


Bohr Model of H_2O

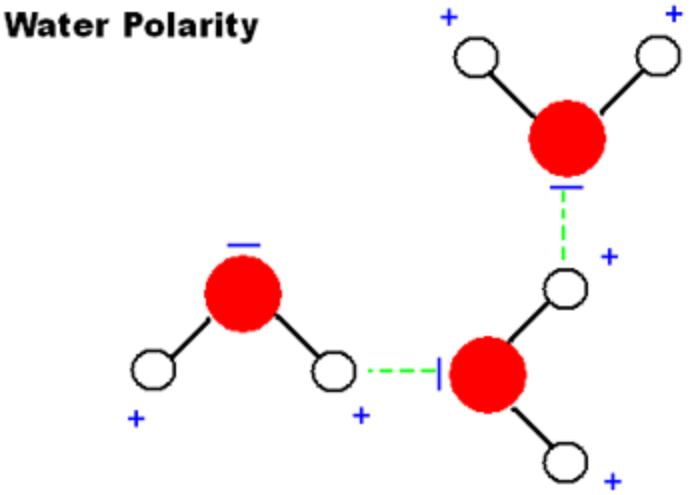


WATER MOLECULE





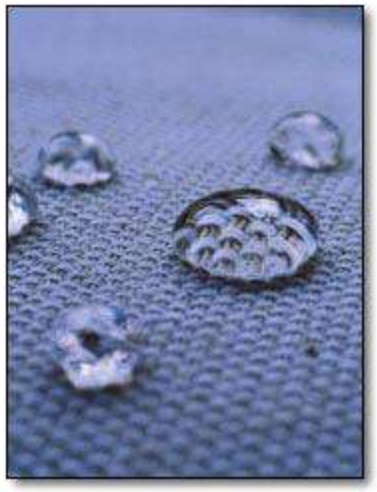
Hydrogen Bonds make water cohesive “sticky”



HYDROGEN BONDING ANIMATION
http://w3.dwm.ks.edu.tw/bio/activelearner/02/ch2c4.html

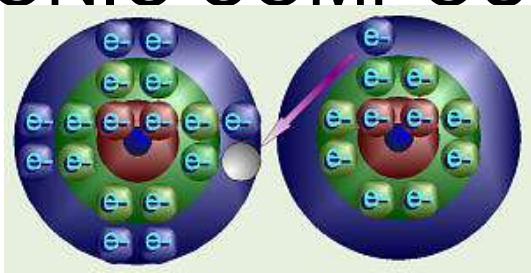
Water and hydrogen bonding
http://programs.northlandcollege.edu/biology/Biology1111/animations/hydrogenbonds.html

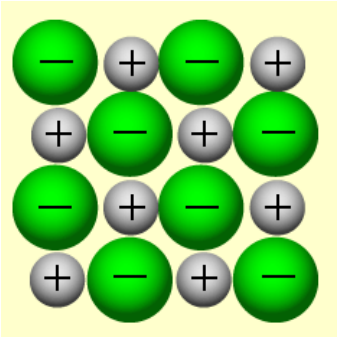
Surface Tension is due to these cohesive forces



SOME IONIC COMPOUNDS DISSOLVE WELL IN WATER

- Ionic Compounds have Polar Ionic Bonds:
- TABLE SALT OR SODIUM CHLORIDE IS AN IONIC COMPOUND





Animation of the formation of sodium chloride ionic compound

http://w3.dwm.ks.edu.tw/bio/activelearner/02/ch2c3.html

Salt dissolving in water is a physical change

- Sodium chloride dissolves in water because both are polar compounds
- Salt dissolving in water animations
- http://programs.northlandcollege.edu/biology/Biology1111/animations/dissolve.html
- http://www.mhhe.com/physsci/chemistry/essentialchemistry/flash/molvie1.swf

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Osmosis Animation

- http://www.stolaf.edu/people/giannini/flashanimat/transport/osmosis.swf
- http://zoology.okstate.edu/zoo_lrc/biol1114/tutorials/Flash/Osmosis_Animation.htm

- What direction did the water move?
- Toward the salty side or not salty side?

View different concentrations on the movement of water in and out of a cell

- http://www.zerobio.com/flashmx/transport.swf
- http://physioweb.med.uvm.edu/bodyfluids/osmosis.htm
- What happens to a Red Blood cell as it is dropped into a solution of water?
- http://www.usd.edu/%7Ebgoodman/Osmos.htm

Hyper/Hypo/Isotonic solutions

- http://www.biologycorner.com/bio1/diffusion.html#

How would you describe a hypertonic solution?

Hypotonic solution?

Isotonic Solution?

Interactive-

http://www.zerobio.com/flashmx/tonicity.swf

http://www.zerobio.com/flashmx/thirst.swf

http://www2.nl.edu/jste/osmosis.htm#Osmosis

- What if the concentration inside cells is naturally about 1% NaCl, then what concentrations of NaCl would be
- Hypertonic?
- Hypotonic?
- Isotonic?

Hyper/Hypo/Isotonic solutions

- http://www.biologycorner.com/bio1/diffusion.html#

How would you describe a hypertonic solution?

Hypotonic solution?

Isotonic Solution?

If a dormant seed needs water to rehydrate which type if solution would work best?

Closure word list

- Covalent bond
- Ionic bond
- Polar
- Non-polar
- Hydrogen bonding
- Dissolving
- Solute/solvent/solution
- Homogeneous/heterogenous
- Osmosis
- Tonicity-hyper/hypo/iso tonic
- plasmolysis/lysis

Acidosis Alkalosis Sites

- http://inst.sfcc.edu/~dsimon/chem/AK6.HTM

Condition	Possible causes
respiratory acidosis	apnea or impaired lung capacity, with a build-up of CO_2 in the lungs
metabolic acidosis	ingestion of acid, production of ketoacids in uncontrolled diabete (These all result in *build-up* of H^+ from sources other than excess CO_2.)

Condition	Possible causes
respiratory alkalosis	hyperventilation, with a net loss of CO_2 from the blood.
metabolic alkalosis	ingestion of alkali, prolonged vomiting (loss of HCl), or extreme kidney retention of bicarbonate. (The common thread is *loss* of depletion of CO_2.)