

### Chemistry of water

- H<sub>2</sub>O molecules form hydrogen bonds with each other. The +Hydrogen is attracted to the -Oxygen which creates a "Sticky Molecule".

### Hydrogen Bonds Result in...

- good solvent
- cohesion & adhesion
- lower density as a solid
- high specific heat
- high vaporization rate

### High Heat Vaporization

\* It takes a long time for water to become vapor

### High Specific Heat

H<sub>2</sub>O resists heat changes in temperature

- High specific heat
- Must add lots of heat to increase temperature
- Likewise must lose lots of heat to cool

H<sub>2</sub>O moderates earths temperature

### Water Dissociation (pH)

Water "Disassociates" meaning that...

- +H = -O means water is neutral
- +H > -O means water is acidic
- +H < -O means water is basic

### Lower Density as a solid #1

Most substances become denser when solid BUT NOT WATER!

- Ice floats; Hydrogen bonds create a lattice like structure in ice and becomes less dense than liquid water

- The lattice frame puts space between molecules

### Lower Density #2 Why is this important?

- \* Oceans and lakes don't freeze solid
- Surface ice insulates water below
- This allows life to survive the winter
- \* If ice sank the lakes would freeze, fish would die in the winter and only the top layer of water would thaw.

### Buffers in pH

Buffers: Something that keeps the pH the same or resists change

- \* pH effects shape and function of enzyme molecules
- \* pH can be stabilized with buffers. Ex: a reservoir of +H can donate more +H or absorb +H

### pH Scale

- \* Measures the concentration of +H ions
- \* Measures acidic or basic (0-14)
- \* Each pH unit = ten-fold change in H<sup>+</sup> ions  
ex: Moving from pH 1 (10<sup>-1</sup>) to pH 2 (10<sup>-2</sup>) = ten fewer +H ions

### Cohesion and Adhesion #1

Cohesion and adhesion are what get water up a 300ft tree (and water potential and osmosis but that is in another chapter).  
Cohesion gets the water to stay together.  
Adhesion gets the waters to stick to the glucose and "climb".

### Cohesion & Adhesion #2

Cohesion; sticking together and to itself

- caused by the polar molecules

- causes surface tension

Adhesion; sticking to something else

- attraction of water between other molecules

- Capillary Action; water "climbs" up a cotton paper towel

- water likes/ climbs glucose and glass

### Good Solvent #1

- polarity makes H<sub>2</sub>O a good solvent
- Polar H<sub>2</sub>O molecules surround + and - ions along with polar molecules (ex: carbohydrates & protiens)

### Good Solvent #2

What dissolves in water?	What doesn't dissolve in water?
* Hydrophilic or "water loving" substances	* Hydrophobic or "water fearing" substances
*They are attracted to water and are often polar	*They are not attracted to water and are often non polar



By STEMhighschool

[cheatography.com/stemhighschool/](http://cheatography.com/stemhighschool/)

Published 1st April, 2020.

Last updated 1st April, 2020.

Page 1 of 1.

Sponsored by **CrosswordCheats.com**

Learn to solve cryptic crosswords!

<http://crosswordcheats.com>