

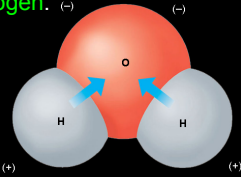
Chapter 2: Chemistry of Life

Cornell Notes 2.2 Properties of Water

Why is water polar?

Where does water's polarity come from?

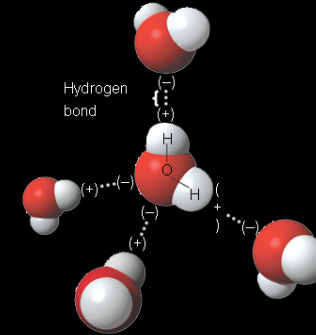
- I. Life depends on hydrogen bonds in water
 - A. Polarity is the attraction of electrons
 1. The oxygen in water has a much stronger polarity than the hydrogens, thus the electrons spend more time around the oxygen
 2. **A water molecule is polar because there is an uneven pull on the electrons between oxygen and hydrogen.** (-) (+)



Cornell Notes

What is a hydrogen bond?

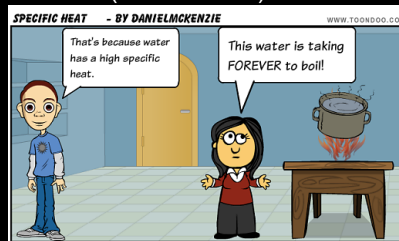
- B. **Hydrogen bonds** are the attraction between the slightly positive hydrogen of one water molecule and the slightly negative oxygen of another water molecule.



Cornell Notes

What leads to most of water's special properties?

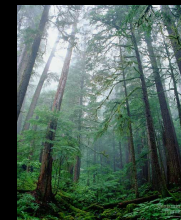
- C. Properties Related to Hydrogen Bonds (Water's Special Properties):
 1. High specific heat means water is able to resist change in temperature.
 - a. Living things are better able to maintain a stable temperature (homeostasis).



Cornell Notes

What is the difference between cohesion and adhesion?

2. **Cohesion** is water's ability to attract itself.
 - a. Cohesion leads to water's high surface tension.
3. **Adhesion** is water's ability to attract another substance.
 - a. Adhesion allows water to rise in narrow tubes called capillary action.



Cornell Notes

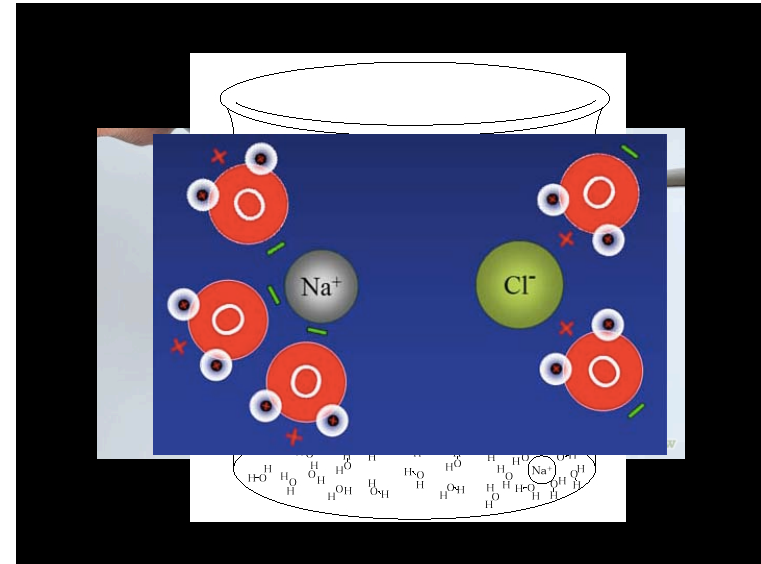
What is a mixture?

What makes up a solution?

What is water able to dissolve?

II. Many compounds dissolve in water

- A. Water is usually found as a **mixture**, a substance composed of two or more elements or compounds.
- B. **Solution** is a mixture of substances that is the same throughout.
 1. solute – the substance that is dissolved
 2. solvent – the substance in which the solute dissolves
- C. Water can dissolve many ionic and polar substances because of its polar nature.
- D. Water will rarely dissolve in nonpolar substances.



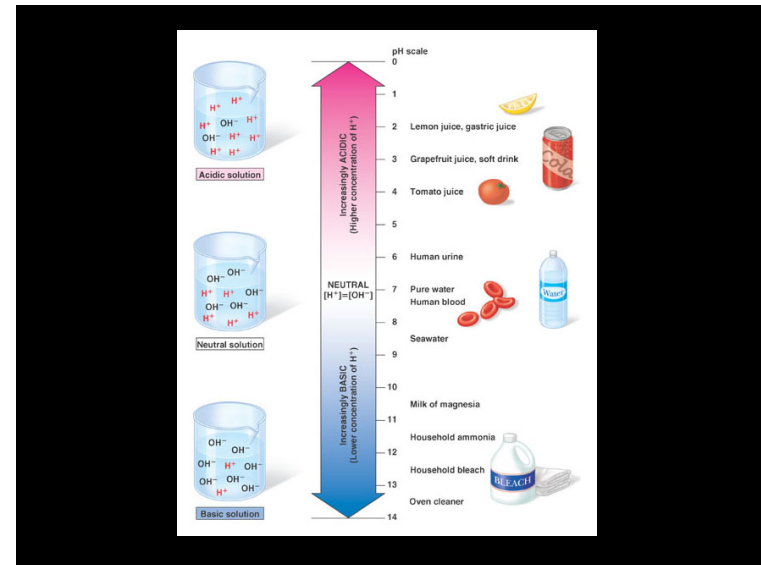
Cornell Notes

What types of ions can water form?

What is pH scale?

III. Some compounds form acids and bases

- A. Some compounds break down into ions in water:
 1. An **acid** releases a proton or hydrogen ions (H^+) from solution
 2. A **base** removes a proton from solution
- B. The **pH scale** is used to indicate the concentration of H^+ and how acidic or basic a solution is.



Cornell Notes

What pH
represents an
acid? A base?

What is a
buffer?

- C. Each change in pH represents a ten-fold change in H^+ concentration.
1. Acid pH 0 to <7 – has a high concentration of H^+ in solution
 2. Base pH >7 to 14 – has a low concentration of in H^+ solution
- D. Buffers can react with acids/bases to prevent changes in pH.