

Water Properties

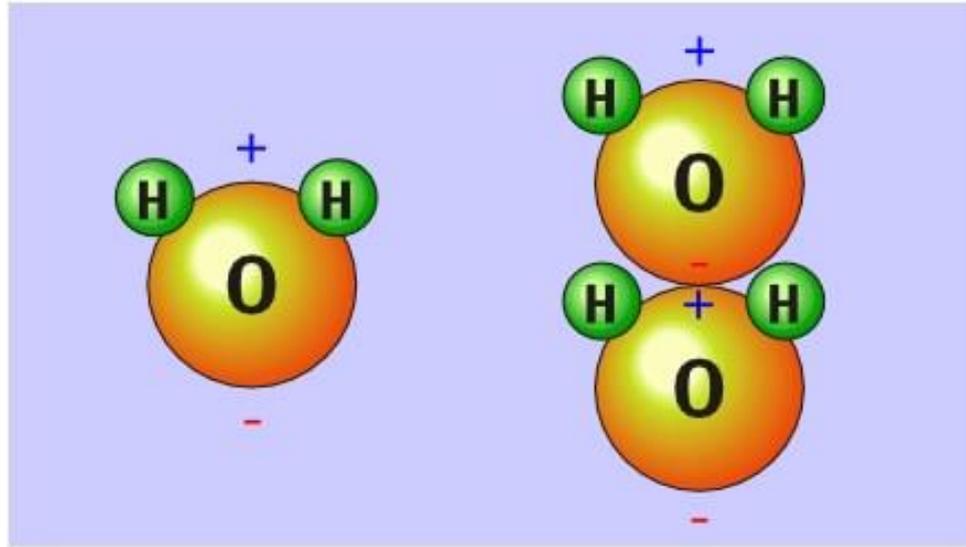


By the end of the day:

I will be able to explain how the properties of water contribute to maintenance of cells in living organisms.

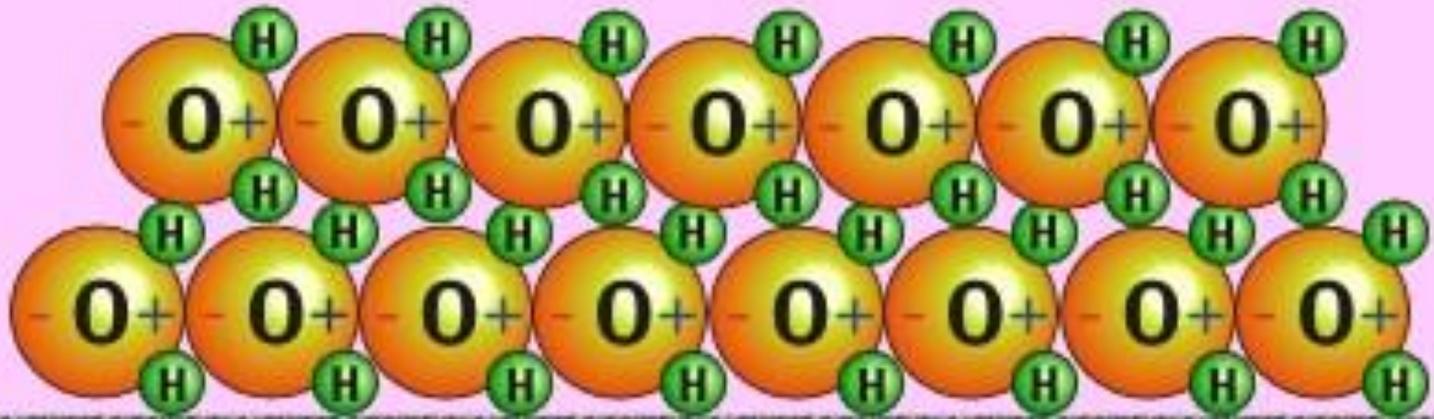
- I will demonstrate the properties of water which include: cohesion, adhesion, heat capacity and solvent properties.
- I will recognize the importance of homeostasis in living systems.
- Use terms “solvent” and “solute” to describe solutions

Water is polar! What?



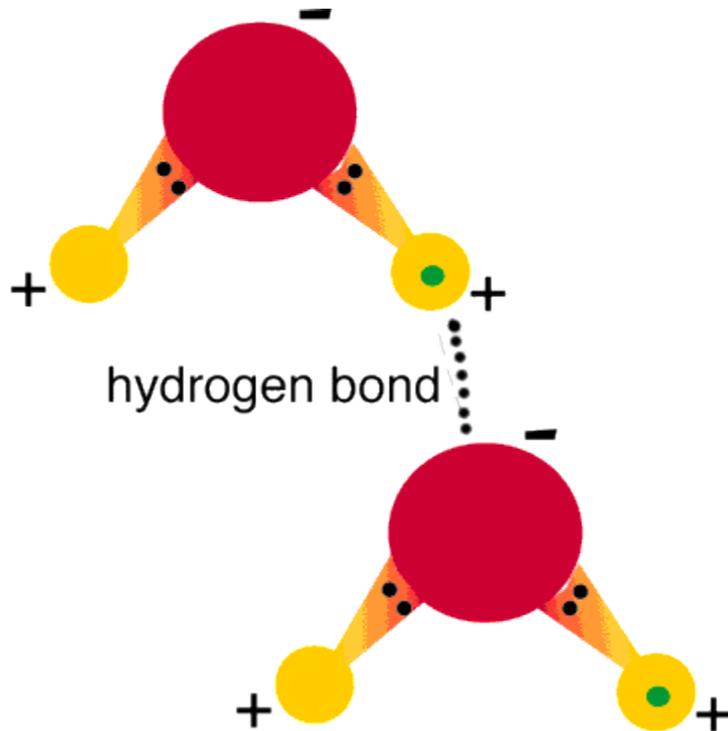
Being POLAR or having POLARITY means that the molecule has a positive end (Hydrogen), and a negative end (Oxygen)

Polarity causes water to stick together because opposites (positive and negative) are attracted to each other.



Cohesion & Hydrogen Bonds

- Cohesion: The attraction between LIKE-molecules... Water is attracted to itself.
- The bonds between water molecules are called HYDROGEN BONDS.

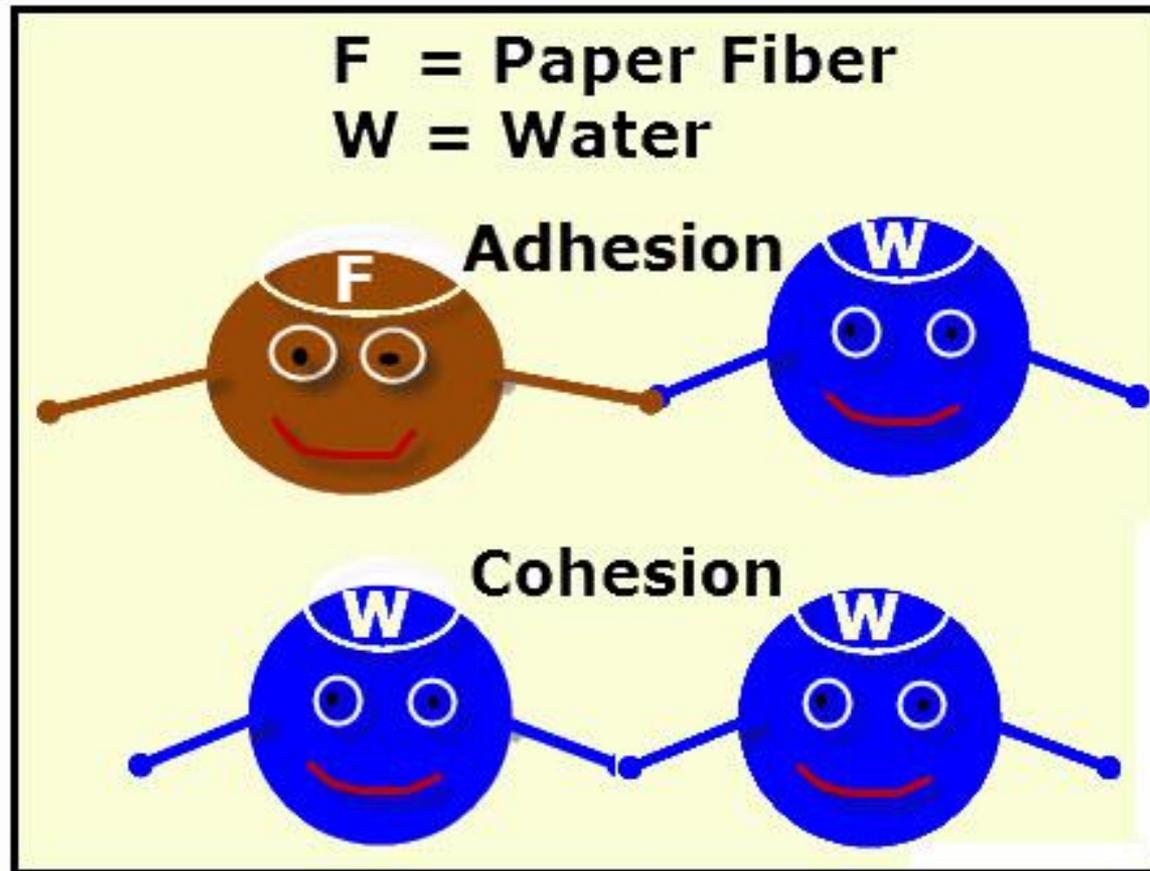


Hydrogen Bonds are important because:

- 1) Their presence explain most the unique properties of water.
- 2) They are weak... so they break easily & recombine easily

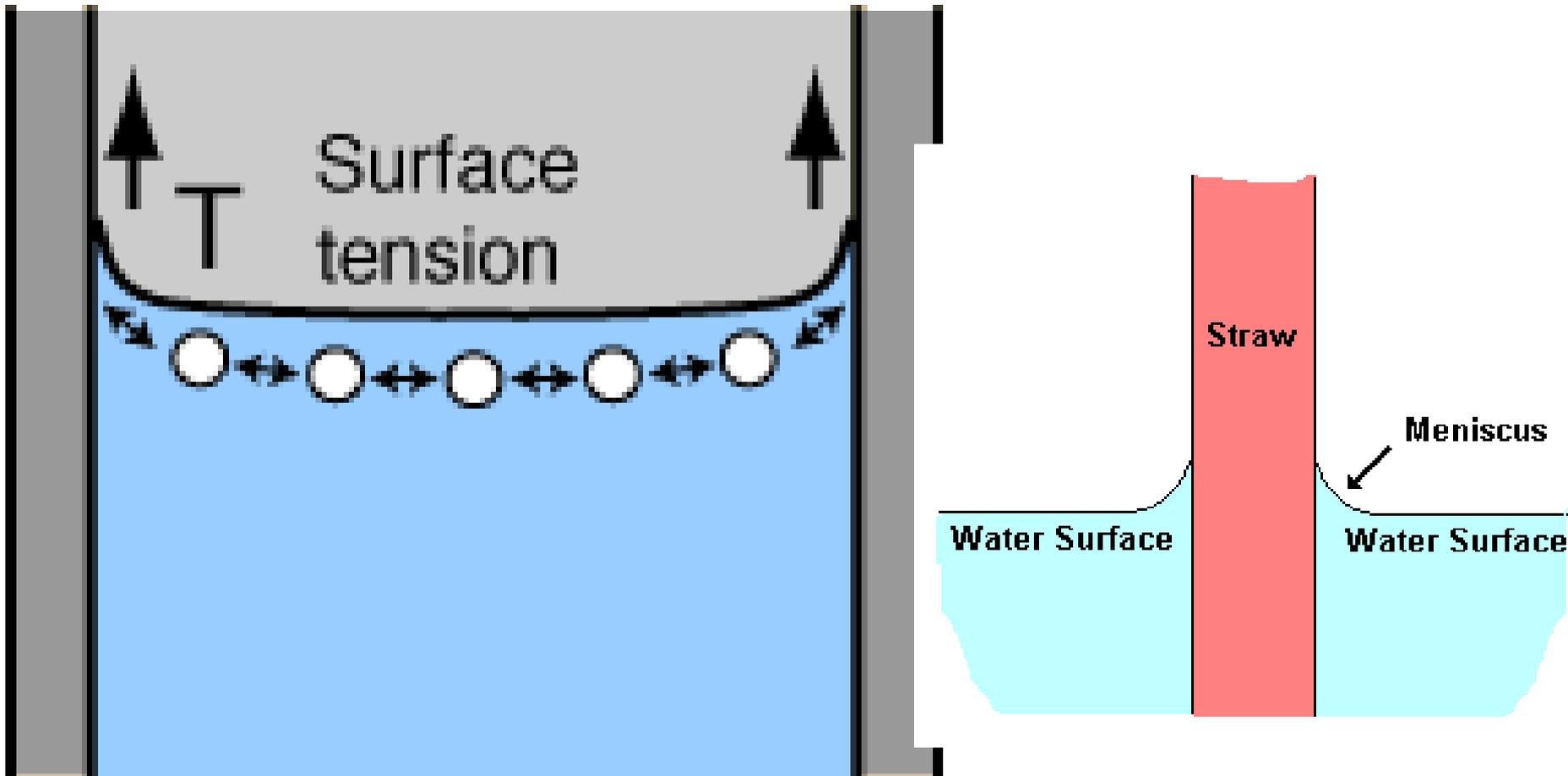
Adhesion

- Water attracted to other materials.



Surface Tension

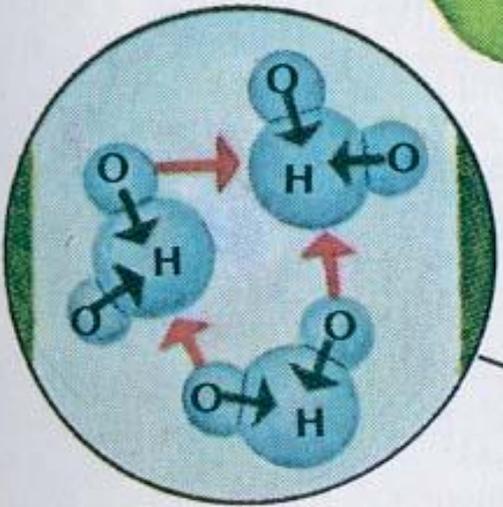
Water has a high surface tension because of Hydrogen Bonds. That means it is hard to break through the surface. Adhesion and Surface Tension cause water to stick to the sides of cups, straws, or test tubes.



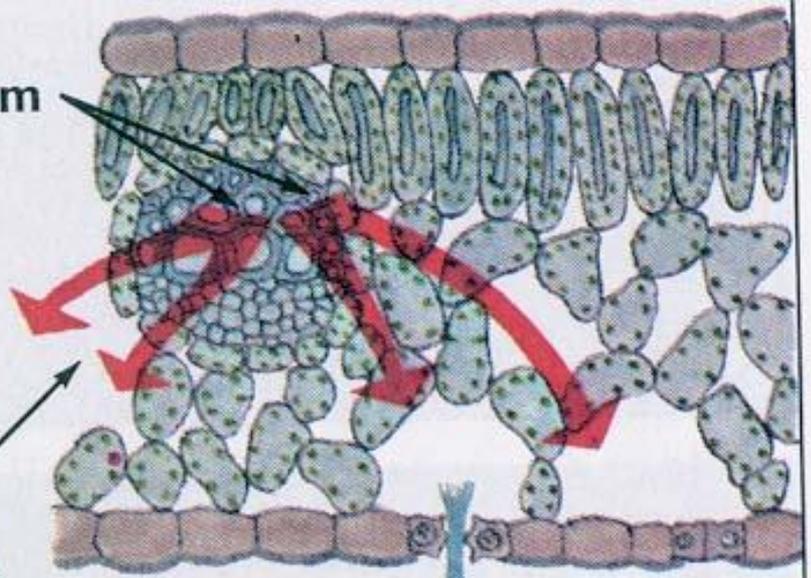
Capillary Action

- Capillary action is when water climbs up small tubes. This is caused by adhesion and cohesion.
- It is **EXTREMELY IMPORTANT** for the survival of plants because they use capillary action to get water to all parts of the plant.

Xylem tube

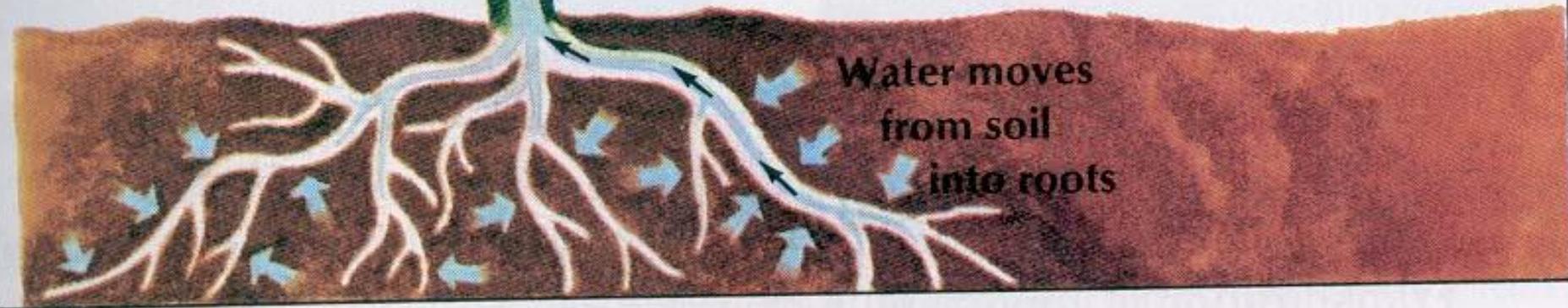


Water from xylem



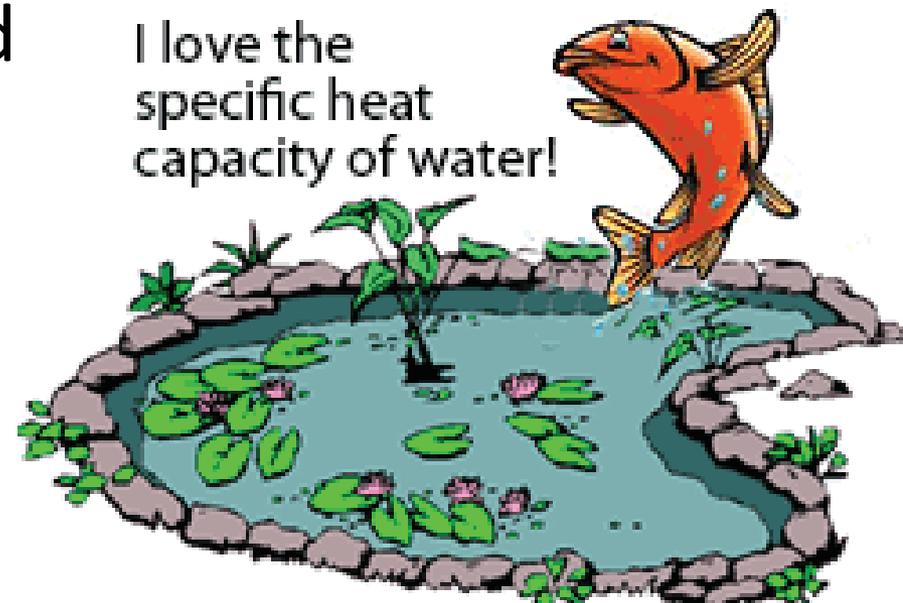
Water leaving through stomata

Water moves from soil into roots



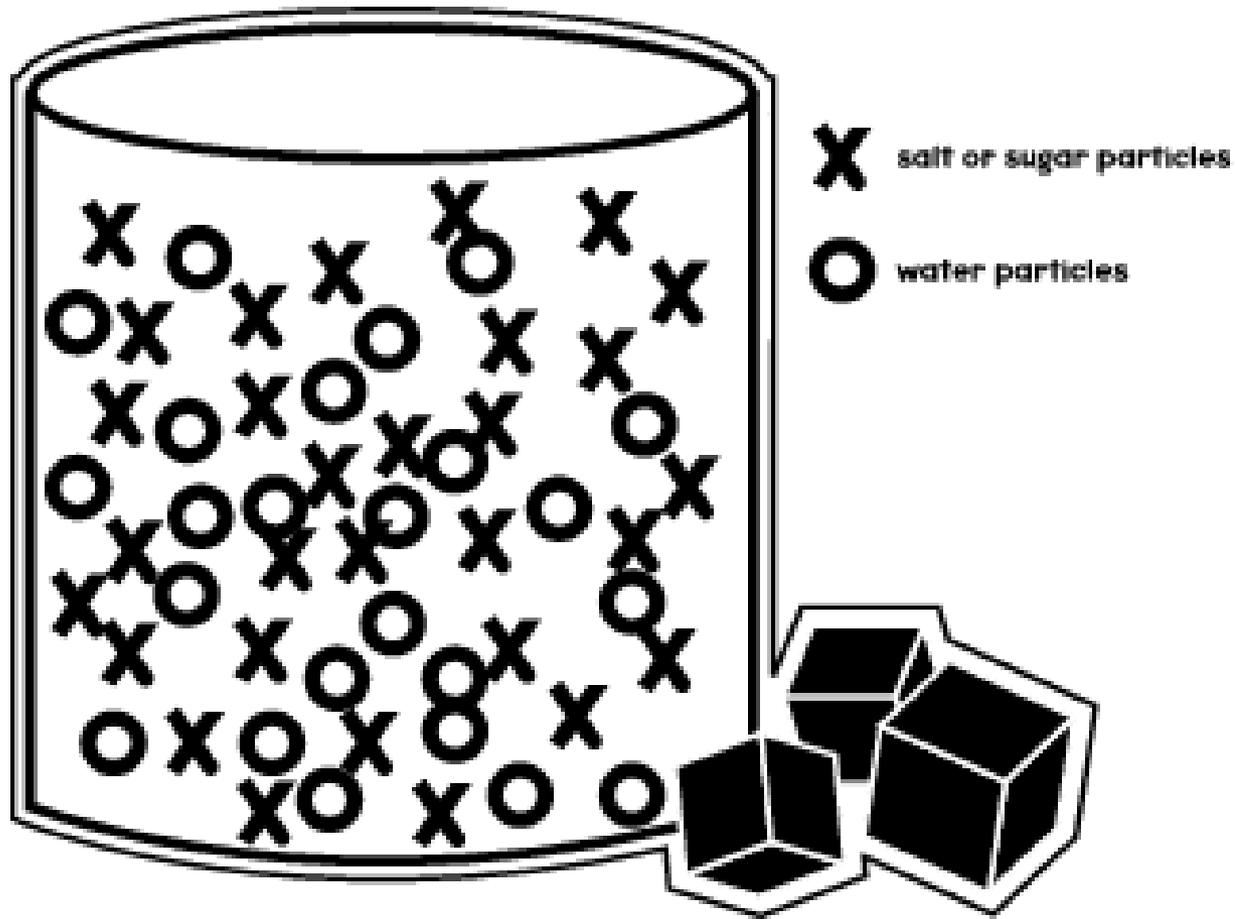
Heat Capacity!

- Water has a high specific heat – that means it takes a lot of energy to change its temperature.
- This contributes to maintaining the cooler temperature of the world



Solvent

- The power to dissolve other substances.
- Water dissolves a lot of substances so our bodies can use them.



- Solvent: the substance that's doing the dissolving
- Solute: The substance that is being dissolved
- Solution: The substance and the Solute after the dissolving has happened.

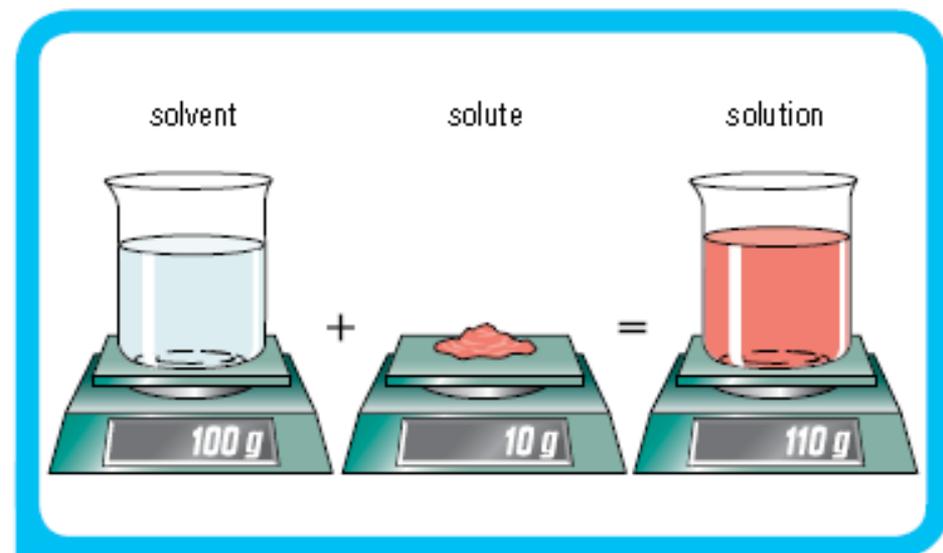
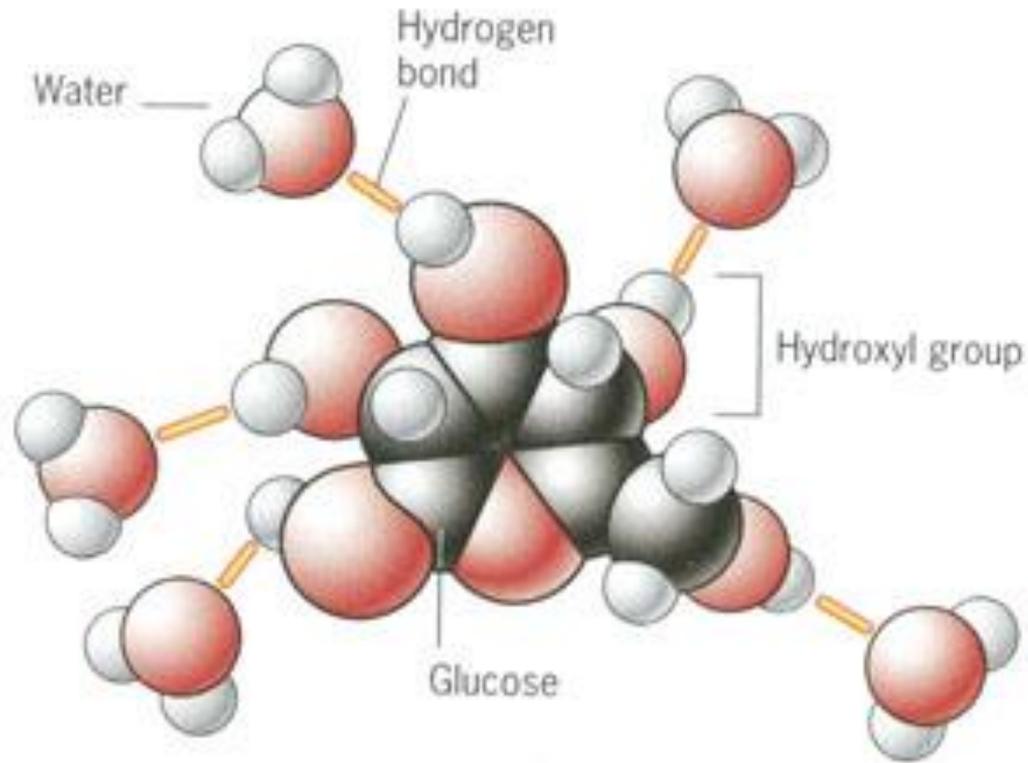


Fig 3.1.1

When you dissolve a solid it might look like it disappears, but mass tells you it's still there.

Water molecules in the blood dissolve sugar molecules and delivers them to the cells



It surrounds the glucose molecule, so it is shielded from other glucose molecules, so the crystal does not reform.

Water helps us maintain HOMEOSTASIS

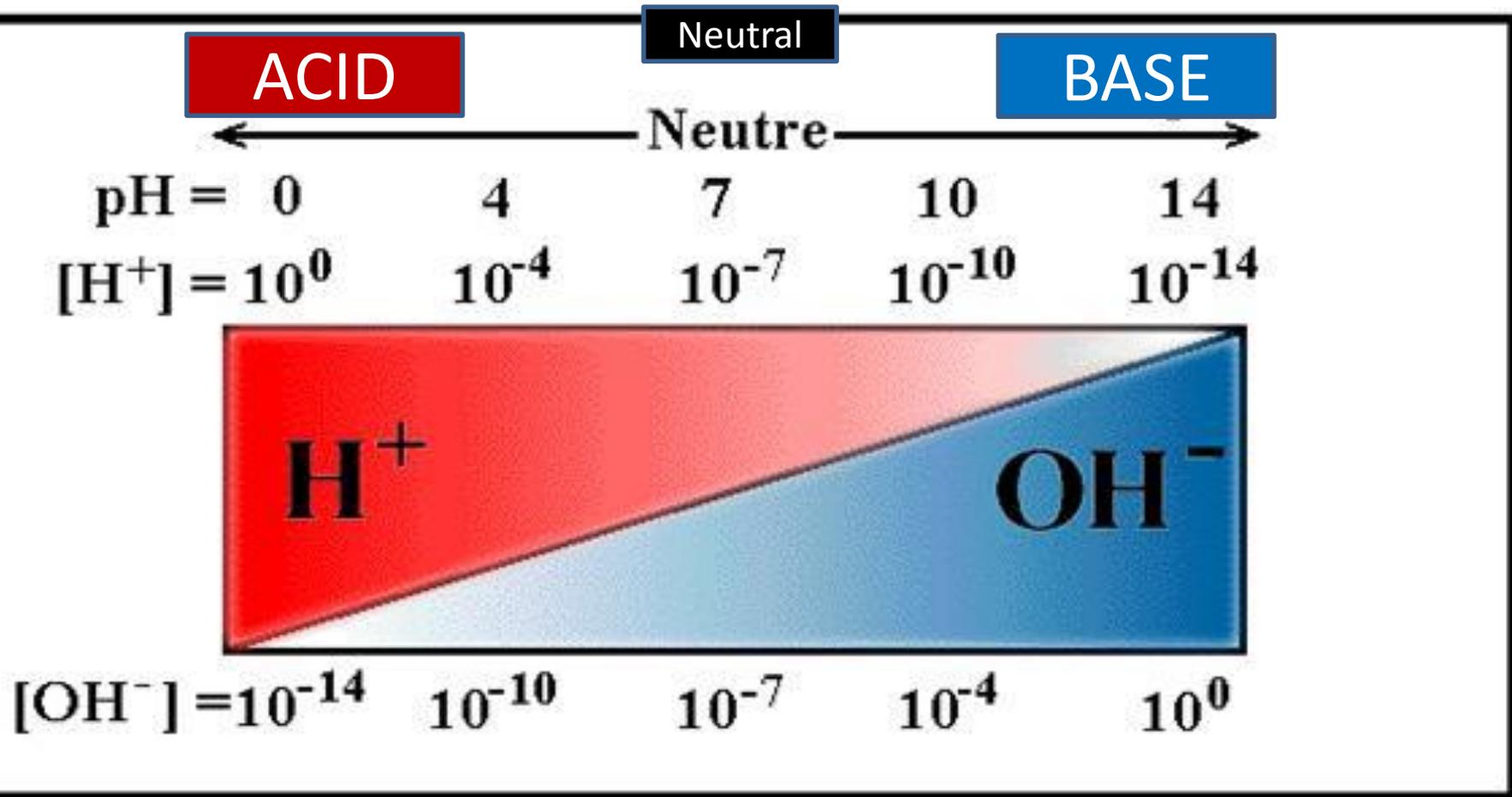
- HOMEOSTASIS: Maintaining balance.
- For example: Water cools our body and helps us keep a balanced temperature by allowing us to sweat. It also works as a solvent, dissolving materials we need for our cells.

Water has a Neutral pH

- pH is a measure of acidity (acid) and alkalinity (base) in substances.
- The more H^+ ions (charged molecules) a substance has, the more acidic it is.
- If a substance has more OH^- ions (charged molecules)
- Pure water has a equal number of H^+ and OH^- ions.

Water can be split in two parts!

(Notice there are 2 H's and 1 O)



Hydroxide ion

So Water has a pH of 7 and soda has a pH of 3.5
 Does soda have more H⁺ ions or less H⁺ ions than water?

