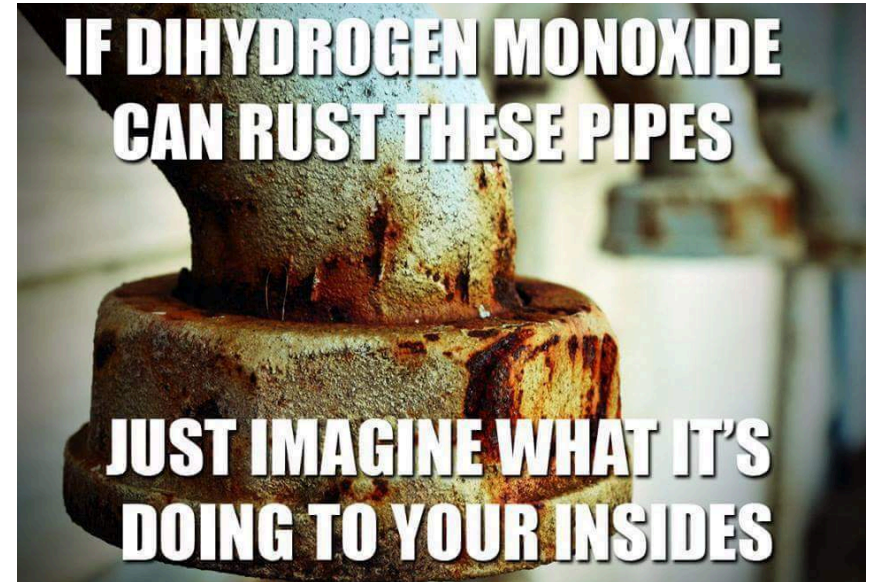


Monday September 26th

Quiz 2.3 on Wednesday!
Last day to retake is Wed Oct 19!

Starter:

From our water lab last week,
list and describe (or draw) two
of the properties of water you observed.



2.3: Properties of Water

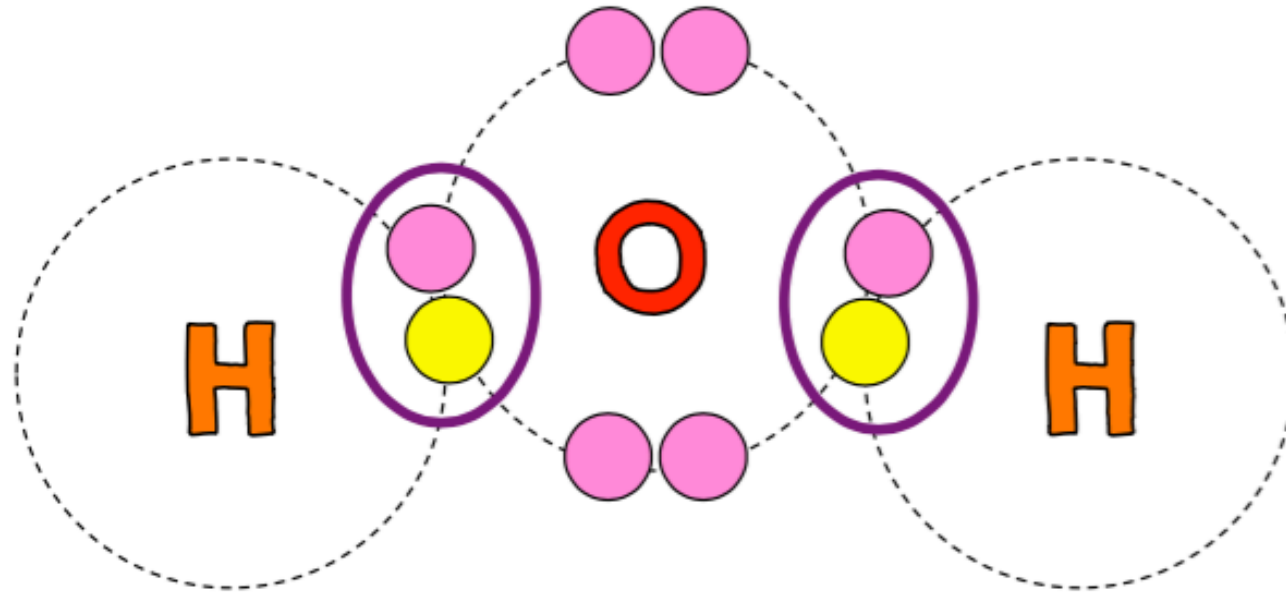
Today's Objective:

I can describe the structure of water and how it leads to water's polarity

I can explain how the properties of water contribute to the functions of life

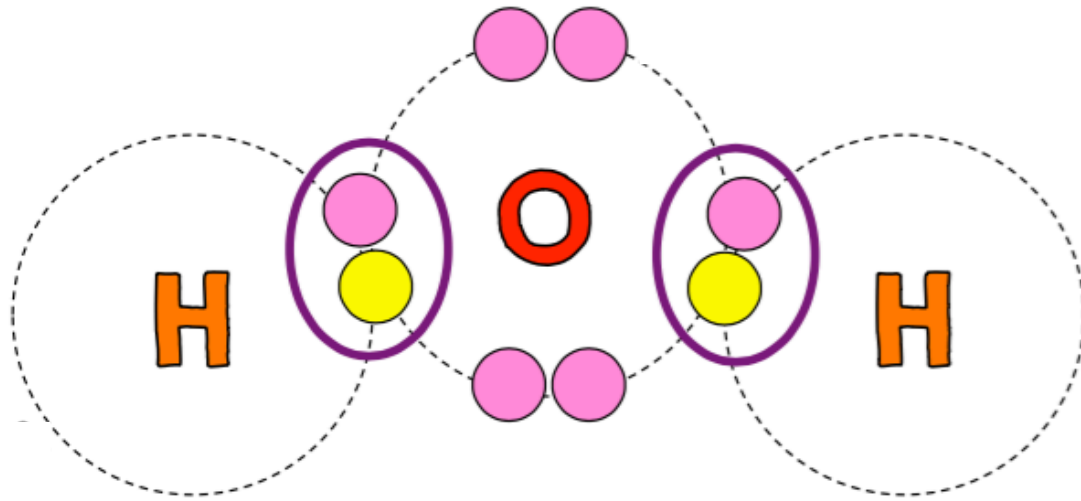
Properties of Water

Chemical Structure of Water

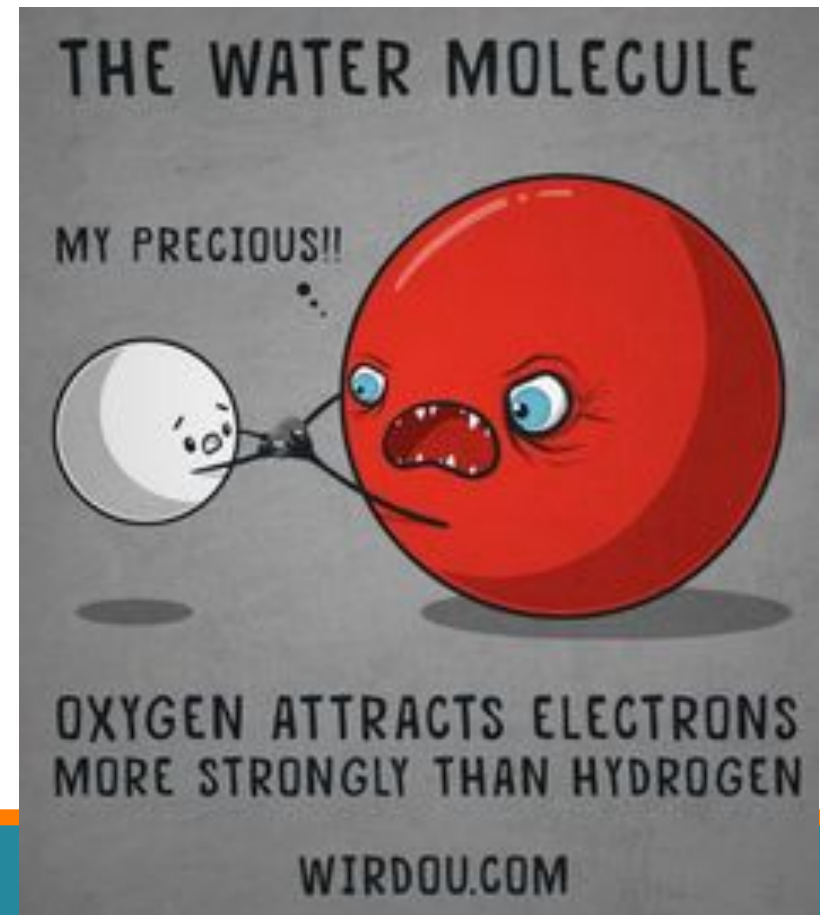


Properties of Water

Chemical Structure of Water



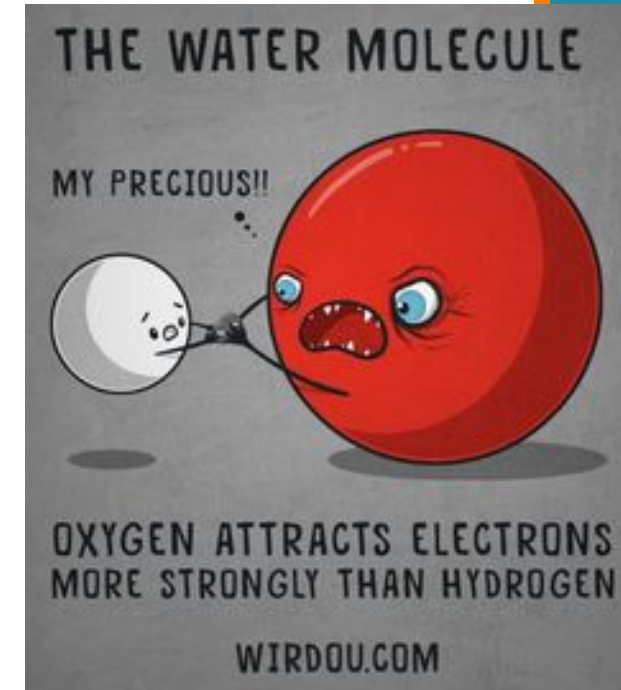
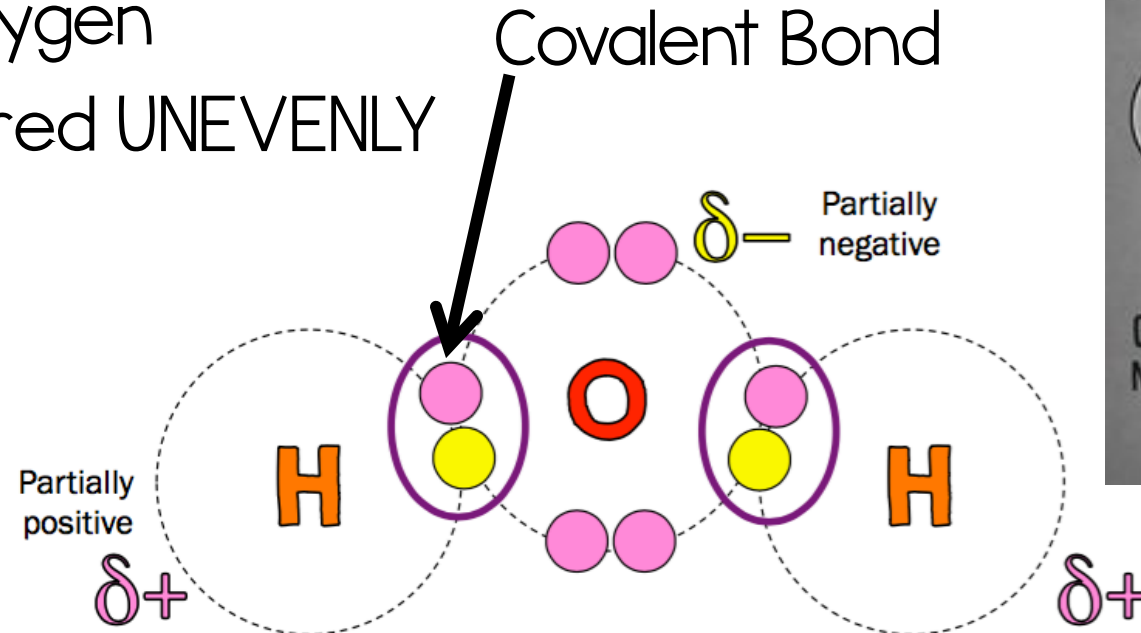
© Stephanie Elkowitz



Properties of Water

Chemical Structure of Water

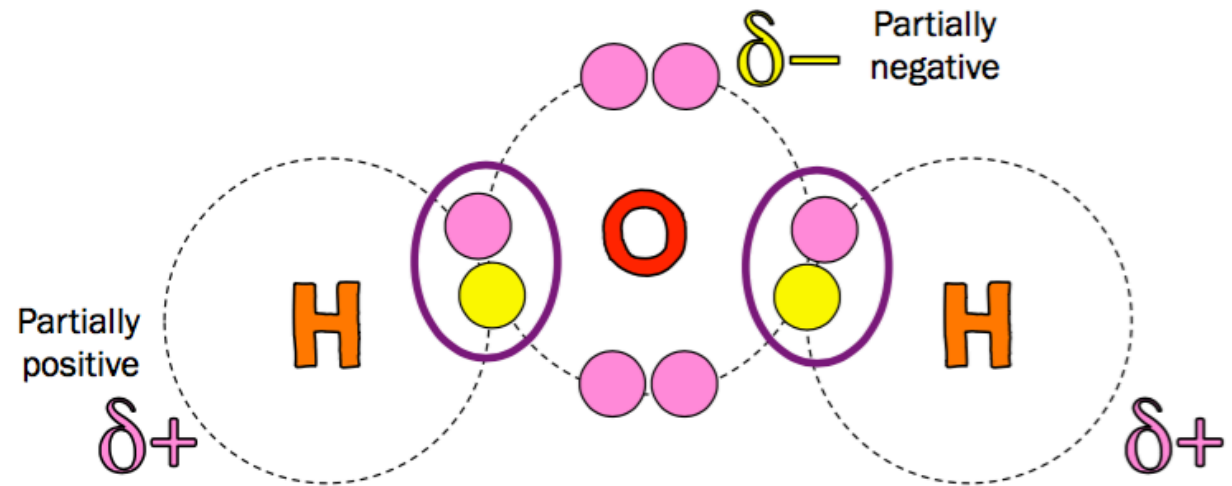
- 2 hydrogens COVALENTLY bonded to 1 oxygen
- Electrons are shared UNEVENLY



Properties of Water

Water is POLAR/Water has POLARITY

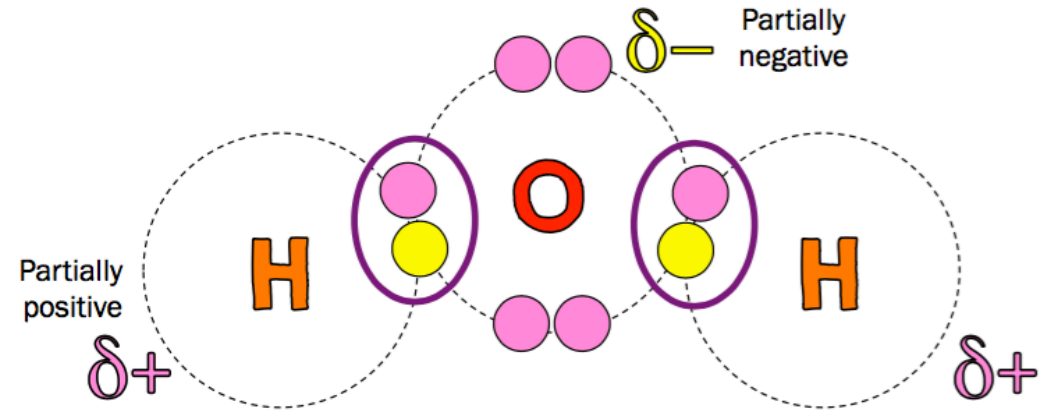
- Uneven sharing creates charges
- Partial negative around oxygen
- Partial positive around hydrogens



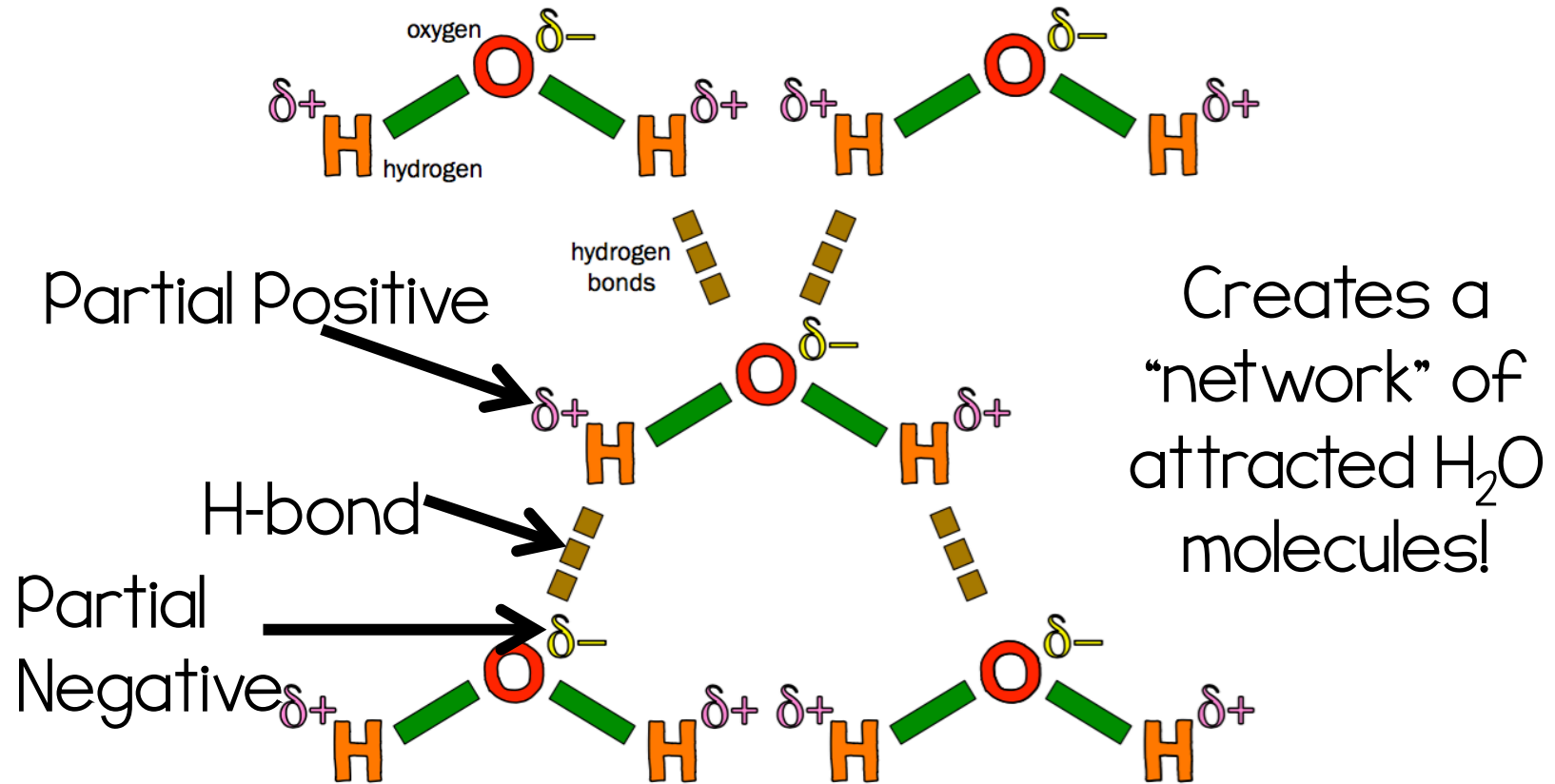
Properties of Water

Water is POLAR/has POLARITY

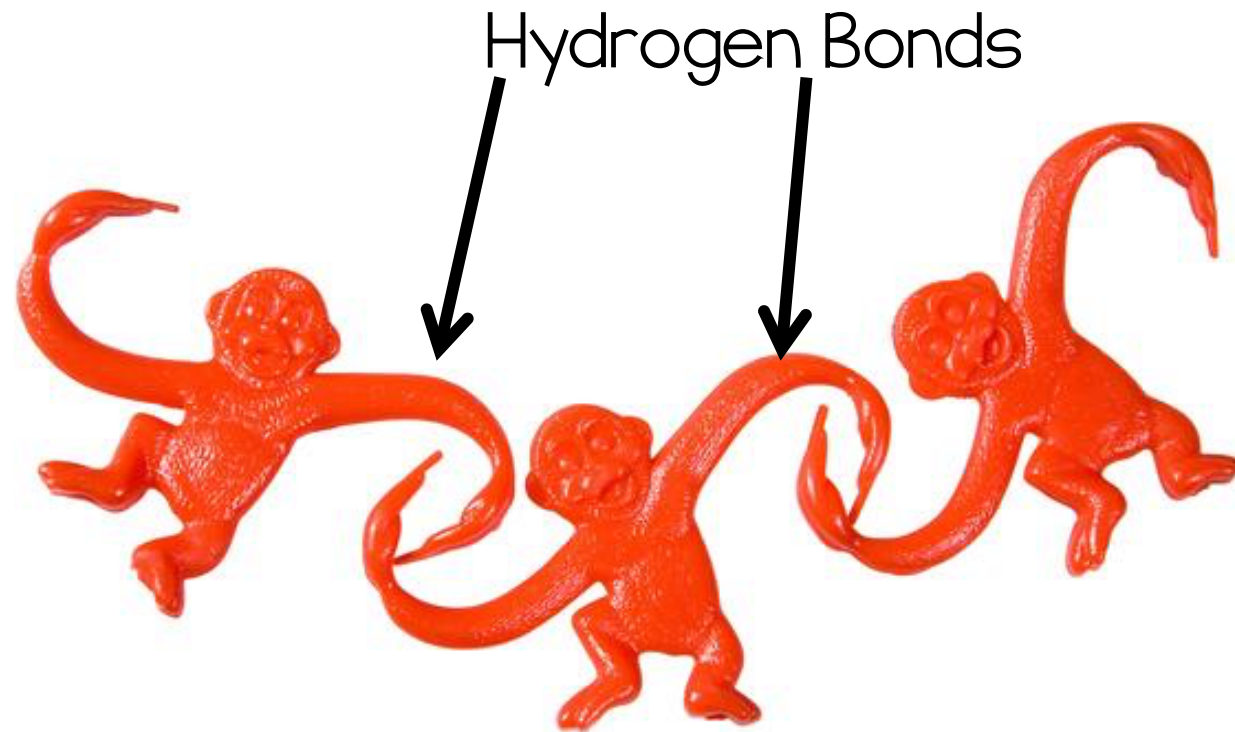
- Hydrogen Bonding of Water
 - Partial charges create attractions btwn water molecules
 - Attractions = hydrogen bonding



Properties of Water



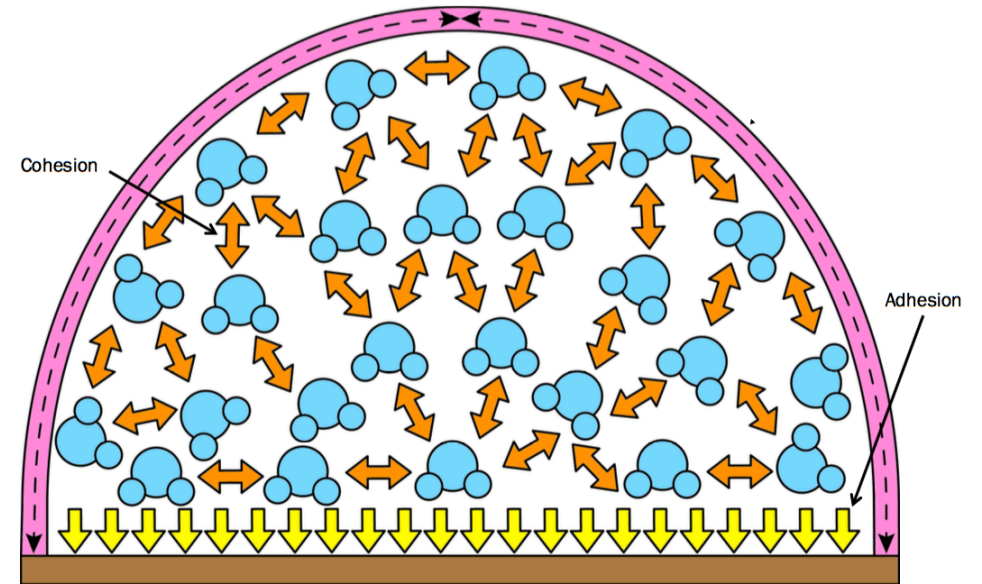
Properties of Water



Properties of Water

Properties Due to Water's Polarity

- Cohesion
 - Due to H-bonds, water “sticks” to itself
 - Molecules are attracted to each other



Properties of Water

Properties Due to Water's Polarity

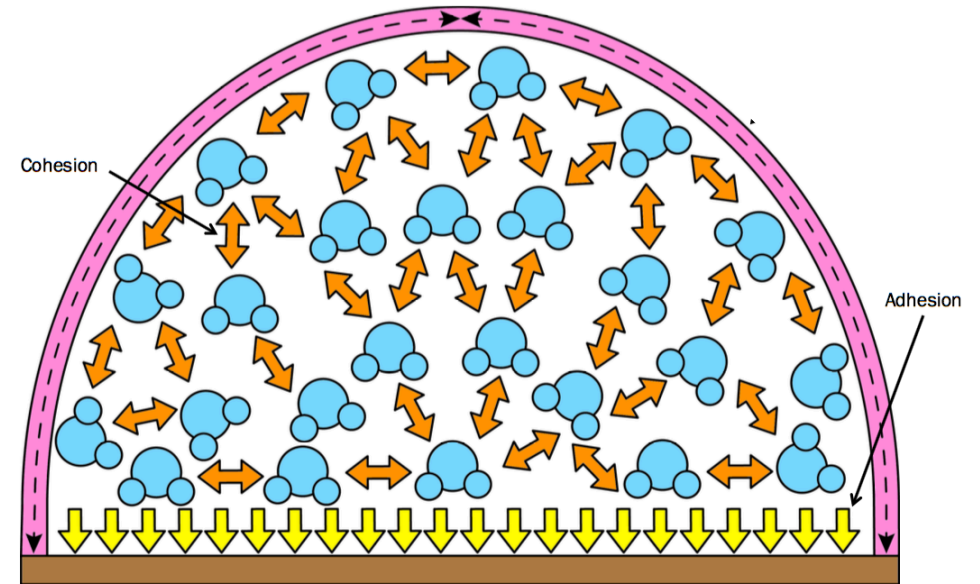
Cohesion



Properties of Water

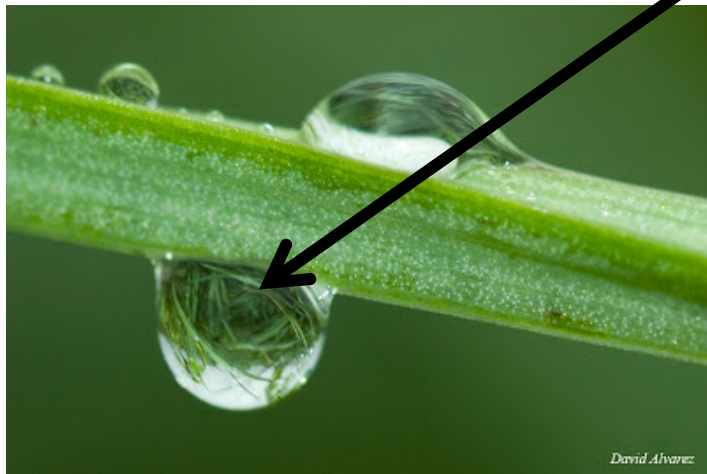
Properties Due to Water's Polarity

- Adhesion
 - Due to H-bonds, water “sticks” to other substances
 - Molecules are attracted to other charged substances



Properties of Water

Properties Due to Water's Polarity



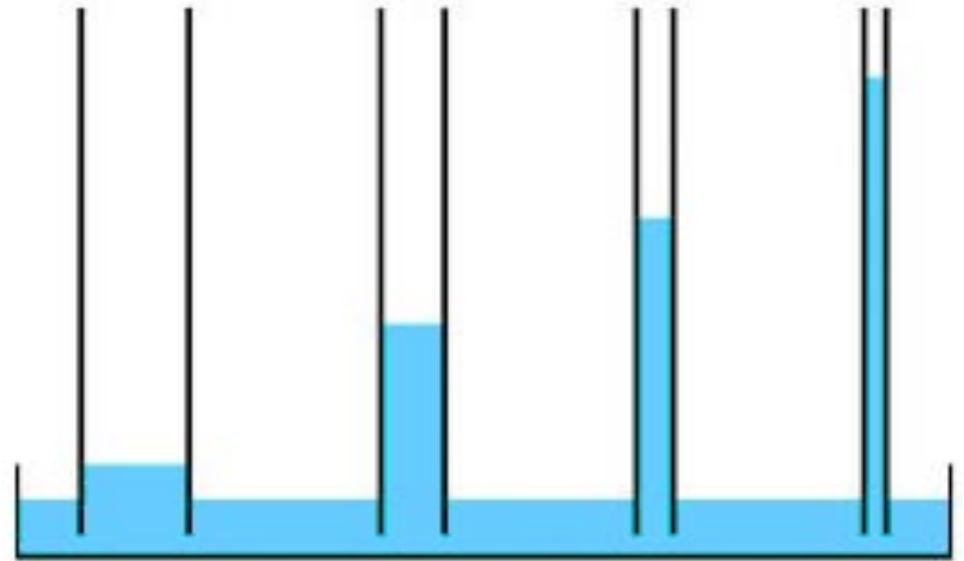
Adhesion



Properties of Water

Properties Due to Water's Polarity

- Capillary Action
 - Due to adhesion & cohesion...
water flows up (climbs) narrow spaces against gravity!
 - Water “pulls” itself upward with hydrogen bonds



Properties of Water

Properties Due to Water's Polarity

- Capillary Action
 - *Important property for movement of materials in plants!*



Properties of Water

Properties Due to Water's Polarity

- Heat Capacity
 - Due to cohesion, water has a HIGH HEAT CAPACITY
 - Water holds on to heat longer than other substances
(Water takes a long time to heat up & a long time to cool down!)

Chemistry of Water

Properties Due to Water's Polarity

- Heat Capacity
 - Important to regulate temperatures in some ecosystems!
 - Important to keep interior temps in cells the same!



Properties of Water

Heat Capacity

SUBSTANCE	SPECIFIC HEAT CAPACITY [J/(G° C)]
H ₂ O(l)	4.18
H ₂ O(s)	2.03
C(s)	0.71
Fe(s)	0.45
Cr(s)	0.488
Al(s)	0.89

Properties of Water

Other Properties:

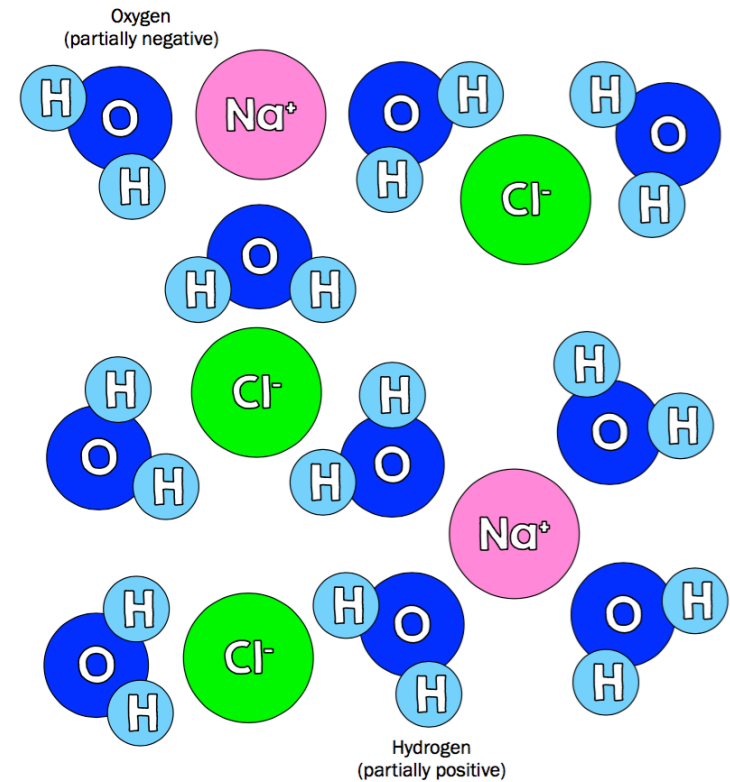
- Universal Solvent
 - Solution
 - A mixture of two or more substances
 - Solvent
 - Substance that dissolves another (i.e. water)
 - Solute
 - Substances that is dissolved (i.e. salt)



Properties of Water

Other Properties:

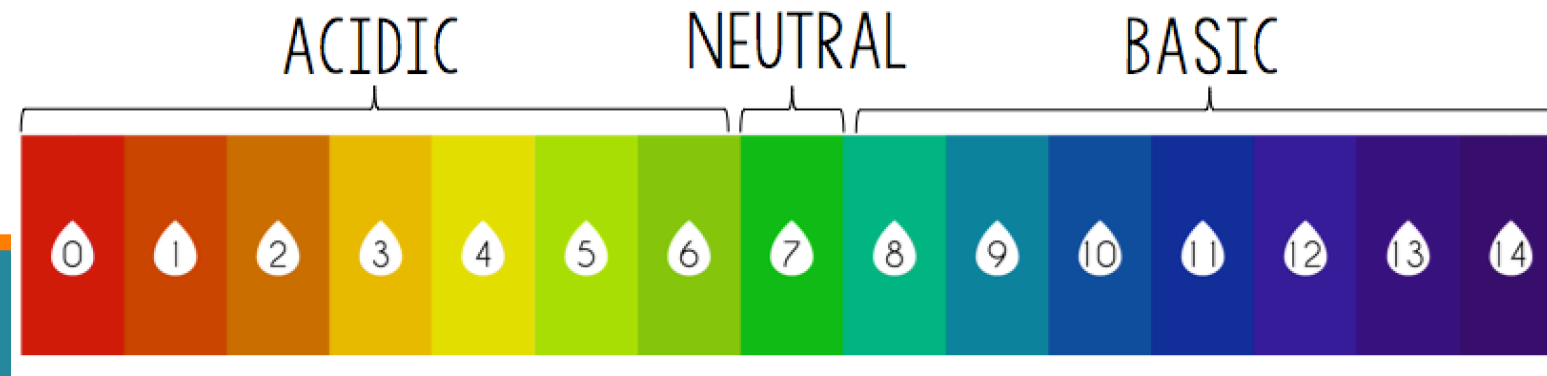
- Universal Solvency of Water
 - Dissolves almost everything!
 - Dissolves more substances than any other liquid!
 - Important in the body:
 - Dissolve wastes = urine
 - Dissolve nutrients & transport = blood



Properties of Water

Other Properties:

- Water Has a Neutral pH
 - pH scale shows how acidic or how basic a substance is
 - 0 - 6.9 = acidic (lower the # = more acidic)
 - 7.1 - 14 = basic (higher the # = more basic)
 - Pure water = 7 or neutral



Thursday October 1st

Please pick up a clicker, you have 3 minutes to answer starter and review!

Starter:

- In your properties of water lab, you observed that isopropyl alcohol evaporates faster than water.
- Given this observation, what inferences can you make about the differences between water and isopropyl molecules?
- (Note: evaporation is just adding heat energy to a substance from the ambient air until the molecules become a gas.)