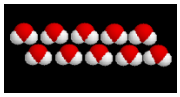
THE EXTRAORDINARY PROPERTIES OF WATER

A water molecule (H_2O), is made up of _____ atoms --- one _____ and two _____.



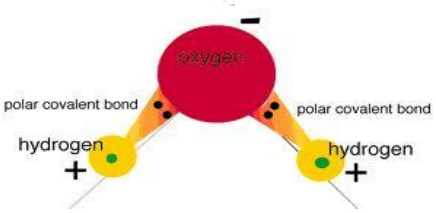
Water is Polar: In each water molecule, _____ more than its "fair share" of _____

The _____ end "acts" _____

The _____ end "acts" _____

Causes the water to be_____

However, Water is neutral (equal number of e- and p+) --- Zero Net Charge



Hydrogen Bonds Exist Between Water Molecules:

Formed between a highly _____ _____ in one water molecule and one of the partially _____ _____ of another water molecule

_____ hydrogen bond is _____, but _____ hydrogen bonds are _____.

In other words… the _____ _____ *end of one water molecule is attracted to the* _____ _____ *end of another water molecule to form a* _____ *bond*

Properties of Water: At sea level, pure water boils at _____ and freezes at _____.

The boiling temperature of water _____ at higher _____ (lower atmospheric pressure).

For this reason, an egg will take longer _____ at higher altitudes

Cohesion **Adhesion** **High Specific Heat** **High Heat of Vaporization** **Less Dense as a Solid**

Cohesion

Attraction between particles of the _____ (why water is attracted to itself)

Results in _____ _____ (a measure of the strength of water's surface)

Produces a _____ _____ on water that allows insects to walk on the surface of water

---

Adhesion

Attraction between two _____ substances.

Water will make _____ bonds with other surfaces such as glass, soil, plant tissues, and cotton.

Capillary action- water molecules will "tow" each other along when in a thin glass tube.

Example: transpiration process which _____ remove water from the soil, and paper towels soak up water.

Which gives water the ability to _____ structures

High Specific Heat

Amount of heat needed to raise or lower 1g of a substance 1° C.

Water _____temperature change, both for heating and cooling.

Water can _____ or _____ large amounts of heat energy with little change in actual temperature.

High Heat of Vaporization

Amount of _____ to convert _____ of a substance from a _____ to a _____

In order for water to _____, hydrogen bonds must be _____. (this takes a lot of energy!!!!)

As water evaporates, it removes a lot of _____ with it. (think sweat)

Water's heat of vaporization is _____

In order for water to evaporate, each gram must _____ calories (temperature doesn't change --- 100oC).

As water evaporates, it removes a lot of _____ with it (cooling effect).

Water vapor forms a kind of global '_____which helps to keep the Earth warm.

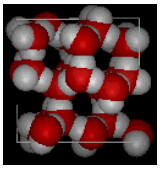
Heat radiated from the sun warms the _____ of the earth and is absorbed and held by the _____ vapor.

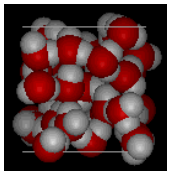
Water is less dense than a solid

Ice is less dense as a _____ than as a _____ (ice floats)

Liquid water has hydrogen bonds that are constantly being _____ and reformed. (this gives water its "flexibility")

Frozen water forms a crystal-like lattice whereby molecules are set at_____ distances.





Homestasis

Ability to maintain a _____state despite _____ conditions

Water is important to this process because:

a. Makes a good _____

b. _____ temperature change

c. Universal _____

d. Coolant

e. Ice protects against temperature _____ (insulates frozen lakes)