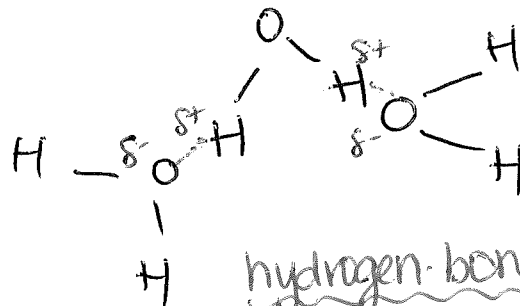
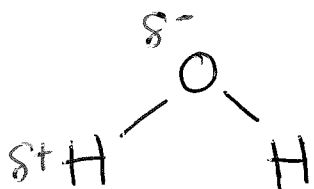


Section 2.3 - Chemistry of Water p29-30

* water is a polar molecule

* water is hydrogen-bonded to one another



unequal sharing of electrons

e⁻s spend more time @ Oxygen

∴ O is slightly more negative

δ⁻ = partial negative charge

and

H is slightly more positive

δ⁺ = partial positive charge

= POLAR molecule

These 2 qualities are responsible for the properties of water and the reason why life is possible!

Properties of water

① high heat capacity

- it takes a lot of energy to change the temperature of water

why? b/c H-bonds can absorb extra heat

imp? only small changes means organisms can

maintain their internal temp more easily (big changes = hard to deal with \Rightarrow death?)

② high heat of vaporization

- lots of energy needs to be added for water to boil
why? b/c H-bonds need to be broken first

imp? cooling mechanism in hot climates

\rightarrow sweat/water hitting hot animal will be vaporized by excess body heat

① \approx ②

why ocean's temp. doesn't change much.

allows it to absorb extra heat in summer

\rightarrow release extra heat in winter

= why Vancouver has milder weather than Winnipeg?

③ is a solvent

- dissolves lots of substances

why? b/c partial \oplus & \ominus charges attract oppositely charged ions

imp? allows for important reactions to occur

inside/outside organisms.

take apart compounds \approx create new ones.

* hydrophilic = water loving; attracted to water, polar ex. NaCl.

* hydrophobic = water hating; will avoid water, non-polar ex. lipids

④ cohesive \approx adhesive

cohesion = stick to one another

b/c H-bonds

adhesion = stick to a polar surface

b/c polar molecule

imp? water = transport molecule \rightarrow *nutrients \downarrow wastes around/out of organism

= lubricant in joints \rightarrow *humans via blood \rightarrow plants

⑤ high surface tension

why? b/c H-bonds keep water molecules connected @ surface (cohesion)

imp? allows water striders to live/travel on surface of water

⑥ frozen water = less dense than liquid water

- usually molecules become closer together = more dense

why? b/c it's a 'bent' molecule, when they get closer together, there are spaces b/w them \therefore lighter/less dense.

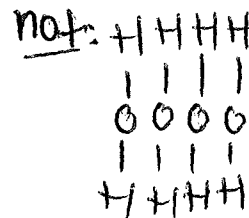
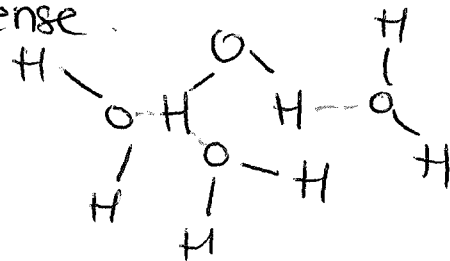
imp? ice floats @ surface

so life can exist in water

\rightarrow doesn't freeze bottom up

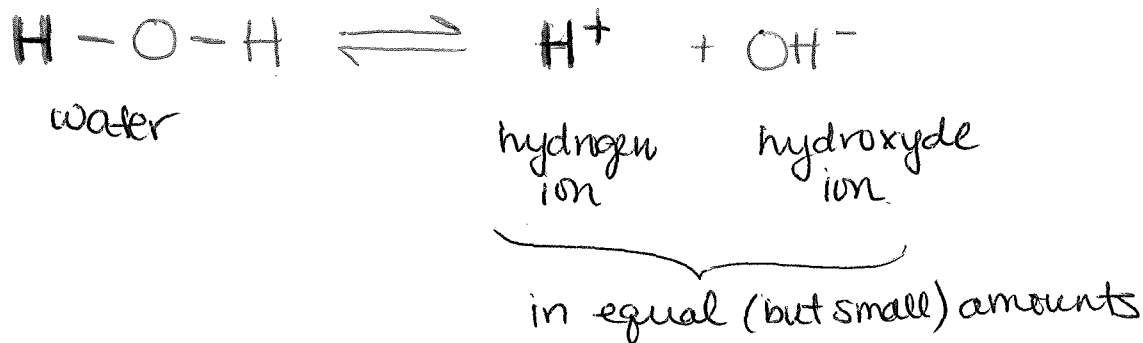
\rightarrow insulates during winter so water below doesn't cool

too much, protects aquatic organisms



Section 2.3 - Acids & Bases p30-32

when water ionizes:



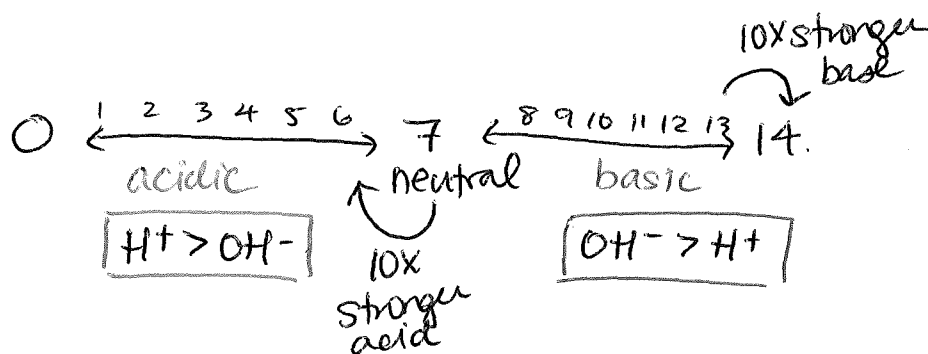
Acidic Solutions

- High H^+ concentrations
- substances that release H^+ in water $\therefore [\text{H}^+] > [\text{OH}^-]$
 - ex. $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$
when it dissociates in water, almost completely, lots of H^+
 \therefore strong acid.

Basic Solutions

- Low H^+ concentrations
- substances that \rightarrow take up H^+
OR
 \rightarrow release OH^- $\therefore [\text{OH}^-] > [\text{H}^+]$
 - ex. $\text{NaOH} \rightarrow \text{Na}^+ + \text{OH}^-$
dissociates almost completely in water \therefore lots of OH^-
 \therefore strong base

pH scale



Buffers and pH

Buffer = substance that maintains pH in a certain range

imp? prevent protein denaturation → cell death

prevent * acidosis (pH 7) of blood } life threatening
* alkalosis (pH 7.8) of blood }

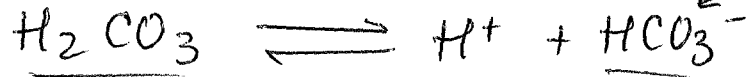
how? take up extra H^+ or OH^-

if it's becoming too acidic

if it's becoming too basic

ex. H_2CO_3 - carbonic acid. Buffer!
(weak acid)

in your blood stream you have carbonic acid & bicarbonate ions.

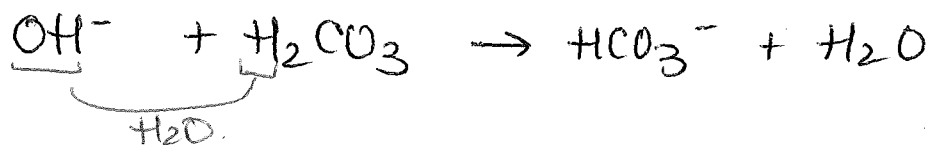


* if levels of H^+ get too high in blood, then the extra H^+ will combine with some bicarbonate ions



now there's less H^+ in the blood, so it becomes less acidic

* if levels of OH^- become too high, then the extra OH^- will combine with carbonic acid.



now there's less OH^- so blood becomes less basic.