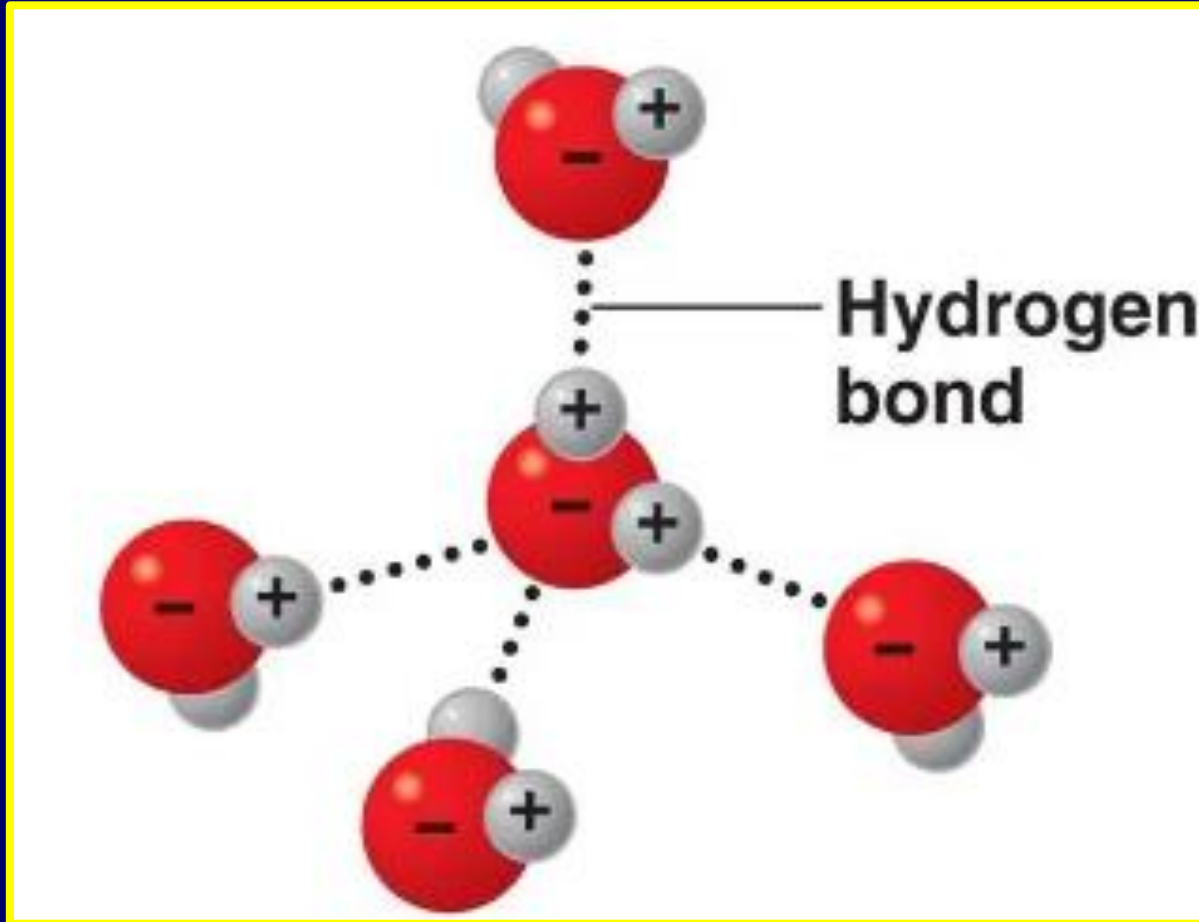


Hydrogen Bonds



Covalent Bonds

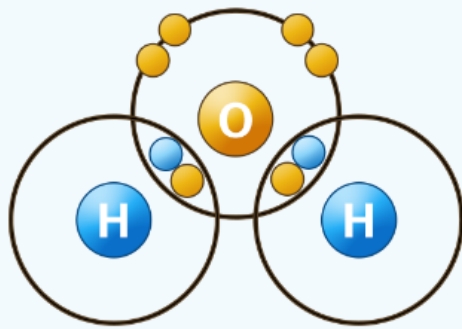
When non-metals join by sharing valence electrons they form covalent bonds.



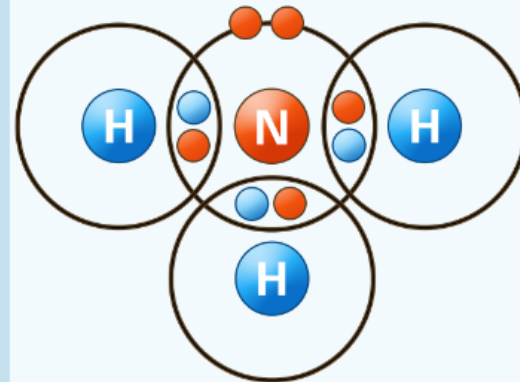
Covalent Bonds

When atoms share valence electrons, those electrons will orbit around each of the atom's nuclei, so each atom can meet the octet rule.

Examples of Covalent Bond



Water (H₂O)



Ammonia (NH₃)

Equal Sharing

When the atoms in a covalent molecule are the same or of similar size, the valence electrons are shared equally.

Nonpolar covalent bonding

Hydrogen
(H_2 or $H-H$)

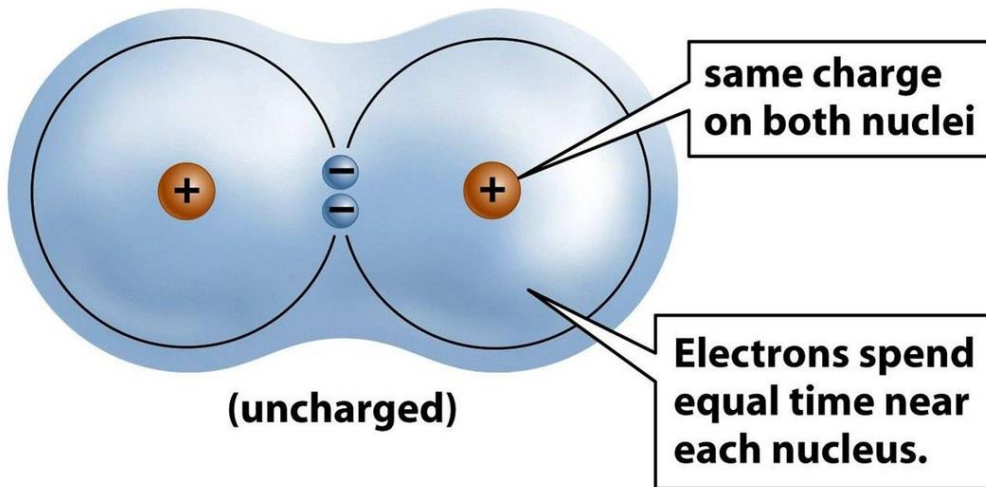
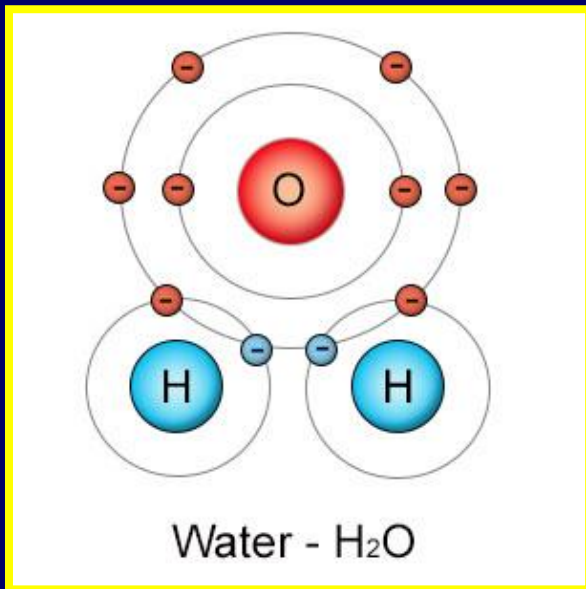


Figure 2-6a Biology: Life on Earth, 8/e
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These molecules are said to be nonpolar.

Unequal Sharing

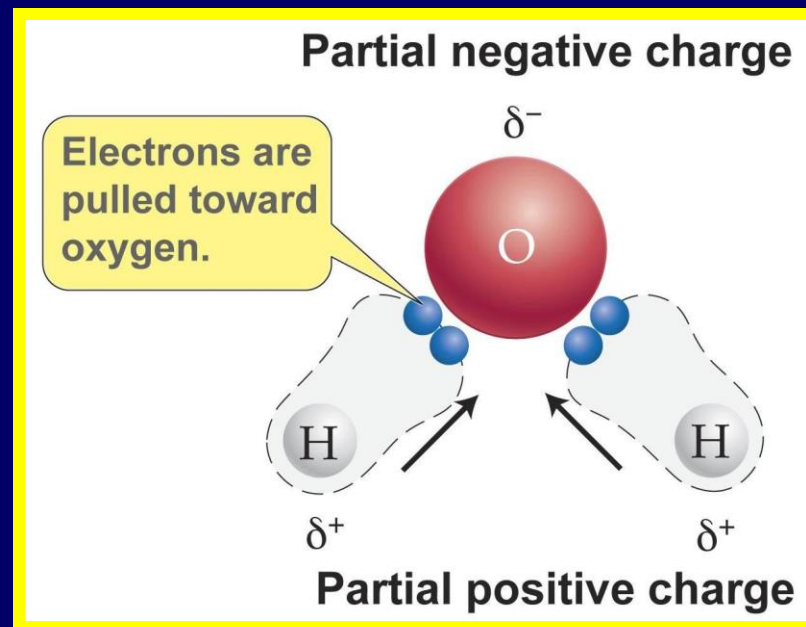
When one of the atoms in a covalent molecule is larger than the other(s), the electrons feel more attraction to the larger atom and spend more time around the larger atom.



This results in an unequal sharing of the electrons.

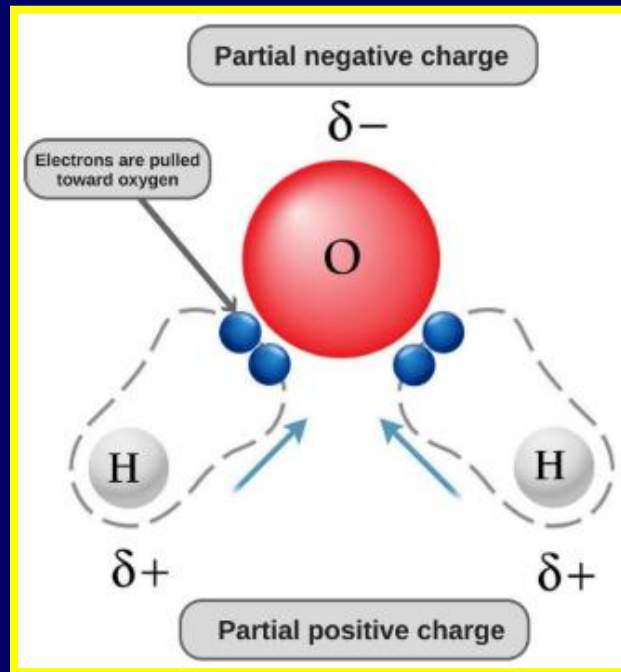
Opposite Charges

The large atom, which the electrons tend to be around, develops a partial negative charge, while the smaller atom develops a partial positive charge.



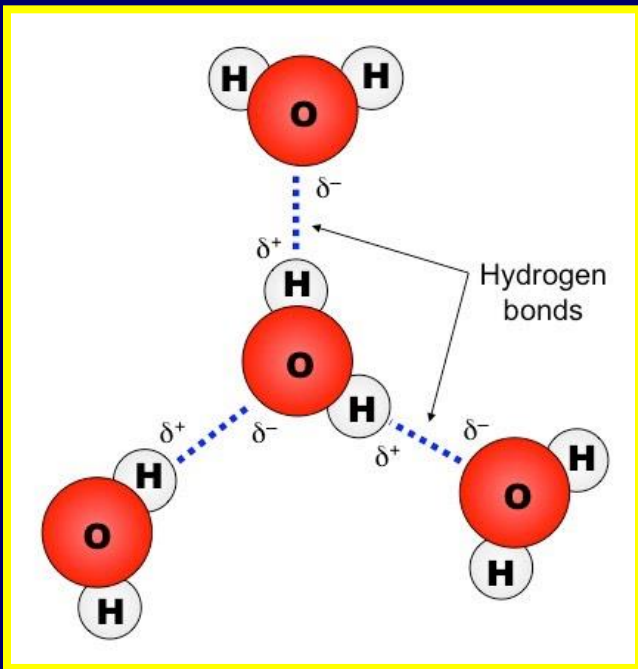
Polar Molecules

Polar molecules have oppositely charged ends, just like the two poles of a magnet.



Hydrogen Bonds

When a polar molecule includes a hydrogen atom, the molecule will form a weak hydrogen bond with an oxygen or nitrogen atom on another polar molecule.



Hydrogen bonds are always formed between two different molecules.

Water

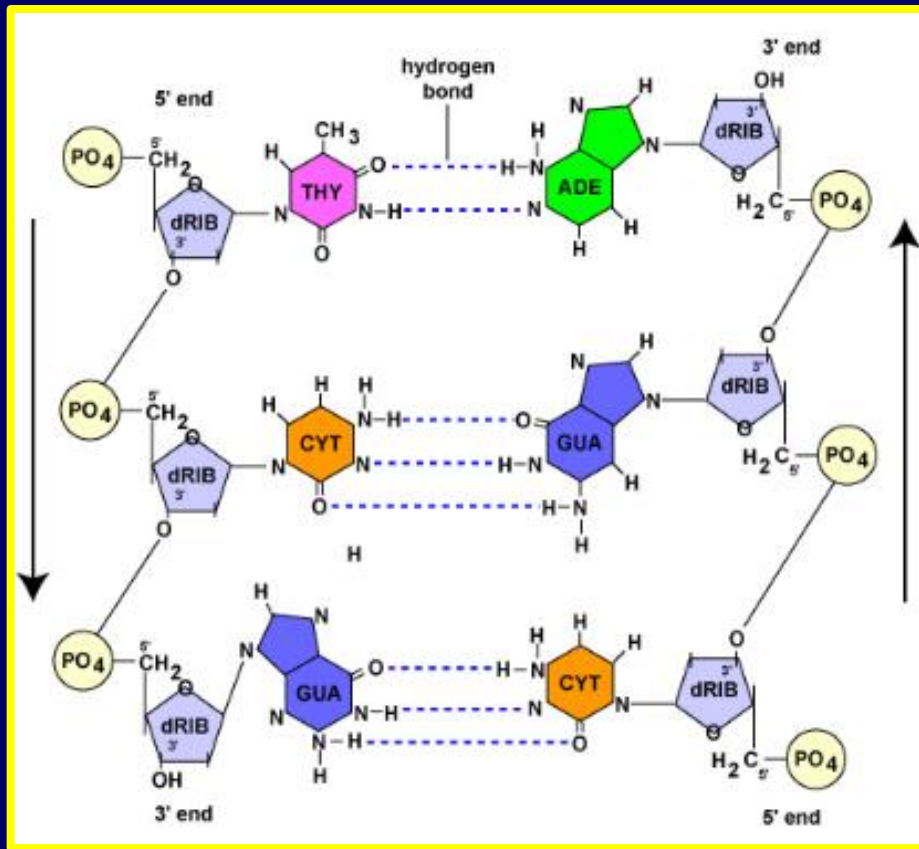
Water is the most common substance formed through hydrogen bonds which give water most of its properties.



- Cohesion
- Adhesion
- Capillary Action
- Surface Tension
- High Specific Heat

DNA

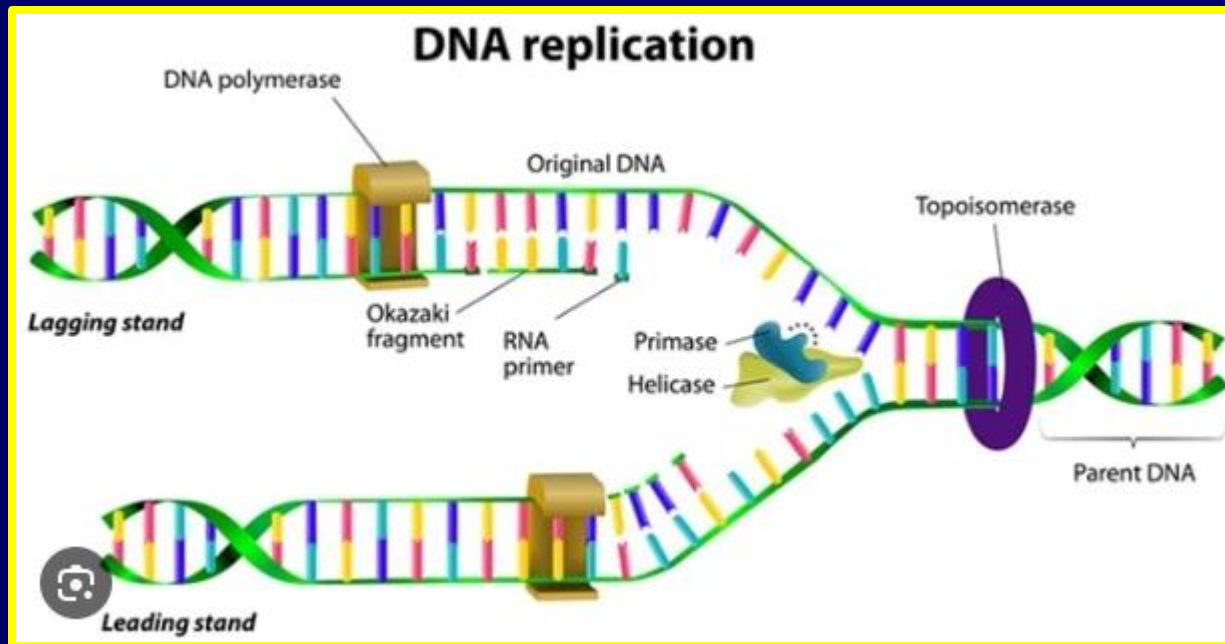
Another common substance that relies upon weak hydrogen bonds is DNA.



Weak hydrogen bonds, between the nitrogen bases, hold the two strands of DNA together.

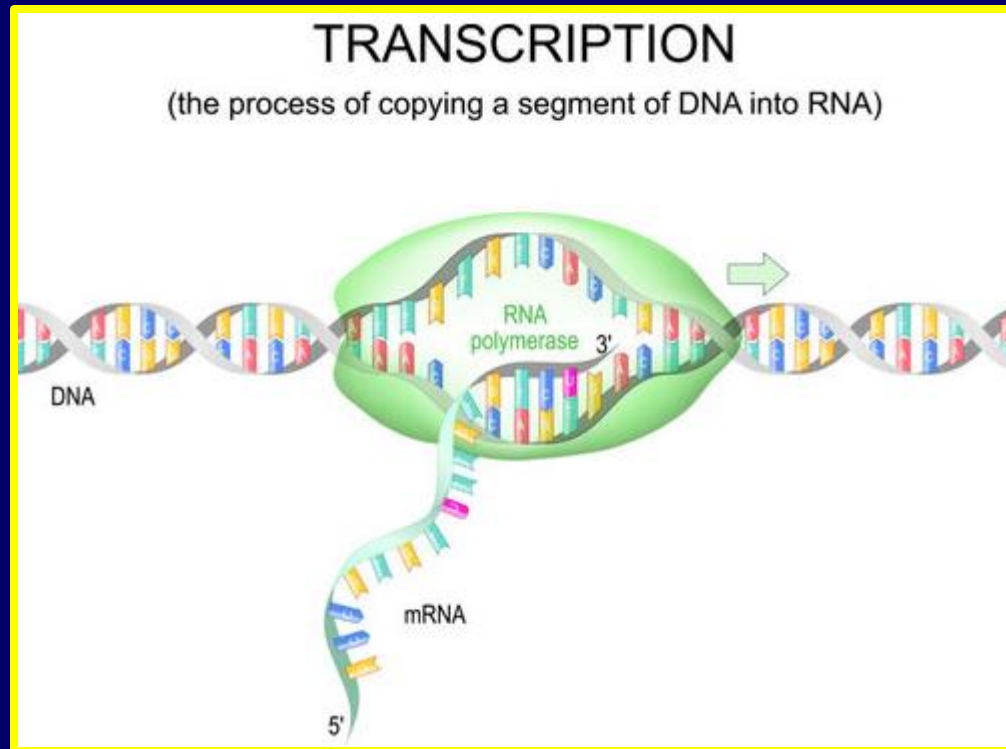
Weak Hydrogen Bonds

When the DNA double helix needs to be opened, so the DNA code can be replicated, the weak hydrogen bonds break and reform easily.



Weak Hydrogen Bonds

The same thing occurs when the DNA double helix needs to be opened so a gene can be transcribed.



The End

