

behave similarly, but an atom with full valence shell (8 electrons or 2 in the first shell), is unreactive.

- We never know the exact location of an electron. The space where an electron is found 90% of the time is an orbital
- Atoms interact so they can try to complete their valence electron shells. They can do this by either sharing or transferring electrons. They are held together by chemical bonds: covalent and ionic bonds
- Covalent → sharing electrons (two hydrogens coming together, completing their valence shells and having two). Two or more covalently bonded atoms makes a molecule. **Single bond** → pair of shared electrons **Double bond** → sharing two pairs of electrons
- A compound is a combination of two or more DIFFERENT elements. A pairing of two of the same atoms is called a pure element
- Electronegativity is the amount an electron is pulling
- Polar and nonpolar covalent bonds***
- Ionic → transfer of electrons to complete the valence shells
- Ion is a charged particle (more protons than electrons due to the transfer) → unbalancing the charges between protons and electrons
 - When it is more positive it is a **cation**
 - When it is more negative it is a **anion**
 - **The attraction of the two transferred electron atoms forms an ionic bond.**
The cation and the anion
- Weak bonds → hydrogen bonds, a hydrogen atom bonded with an electronegative atom nearby
- Vanderwaals interactions → because electrons in atoms are always moving, there are some parts of the atom that may be more negative or more positive at one point. So other oppositely charged atoms will attract to the atoms briefly to form a weak bond. These do not usually last long
- The shape of a molecule is very important to its function (ex: endorphins)
- Reactants, reaction, products
 - Photosynthesis: $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- Reactions can be reversible

8/27/14 → Basic chemistry

Scale of nature:

- Smallest level= atomic level 10^{-8}m
- Larger level= ecosystems 10^6m
- 14 orders of magnitude is the range between these two levels

Approaches to biology

1. Reductionist approach (we are using this approach) → reduce everything to its smallest component parts and learn everything about them to build a big picture of the whole