The most stable arrangement of atoms in a covalent bond exists at some optimal distance between nuclei. At this point, the net attraction is greater than the net repulsion.

**Molecular Compounds**
- the chemical formula of a molecular compound.
- shows how many atoms of each element a molecule contains.
- A molecular formula shows the actual number of atoms, while a formula unit (for ionic compounds) shows the lowest whole-number ratio of ions.

**Single Covalent Bonds**
- When only one pair of electrons is shared, such as in a hydrogen molecule, it is a single covalent bond.

- Sigma bonds occur when the pair of shared electrons is in an area centered between the two atoms.

**Multiple Covalent Compounds**
- Sharing multiple pairs of electrons forms multiple covalent bonds
  - **Double Bonds**
    - form when two pairs of electrons are shared between two atoms
  - **Triple Bonds**
    - form when three pairs of electrons are shared between two atoms

**The Pi Bonds**
- form when parallel orbitals overlap and share electrons.
- The shared electron pair of a pi bond occupies the space above and below the line that represents where the atoms are joined together.

**The Strength of Covalent Bonds**
- The strength depends on the distance between the two nuclei, or bond length.
- As length increases, strength decreases.
- The amount of energy required to break a bond is called the bond dissociation energy.
- The shorter the bond length, the greater the energy required to break.

**Naming Binary Molecular Compounds**
1. The first element is always named first using the entire element name.
2. The second element is named using its root and adding the suffix –ide.
3. Prefixes are used to indicate the number of atoms of each element that are present in the compound.

**Exceptions:**
- The first element in the compound name never uses the mono--prefix
- If using a prefix results in two consecutive vowels, one of the vowels is usually dropped to avoid an awkward pronunciation

**Naming Acids**
1. The first word has the prefix hydro- followed by the root of the element plus the suffix –ic.
2. The second word is always acid (hydrochloric acid is HCl in water).

**Oxyacid**
- an acid that contains both a hydrogen atom and an oxyanion

**Naming Oxyacids**
- Identify the oxyanion present.
- The first word is the root of the oxyanion + the prefix per- or hypo- if it is part of the name + the suffix –ic if the anion ends in -ate or -ous if the oxyanion ends in -ite