Notes for Chemical Bonding

- **Full Outer Energy Levels**
  - **Hydrogen and helium want 2 valence electrons**
  - **Octet Rule – all other elements want 8 valence electrons**
  - **Atoms can gain, lose, or share electrons to fill outer energy levels**
- **Ionic Bonds**
  - **Metals and Nonmetals**
  - **Ions – atoms with a charge due to loss or gain of electrons**
  - **Metals lose electrons and develop a positive charge (Na^+)**
  - **Nonmetals gain electrons and develop a negative charge (Cl^-)**
  - **Oppositely charged ions attract each other to form ionic bond (NaCl)**
- **Covalent Bonds**
  - **Nonmetals**
  - **Atoms share valence electrons (O_2, N_2, H_2O)**
  - **Organic molecules consist of C, H, N, O, P, and S**

- Unequal sharing of valence electrons – larger atom develops a slightly negative charge and smaller atom develops a slightly positive charge. (Polar)

- Hydrogen Bonds
  - Hydrogen atom from one polar molecule forms weak bond with O, F, or N atom from another polar molecule.
  - H_2O and H_2O
- Metallic Bonds
  - Metals
  - Sea of electrons
  - Electrons are shared by all metal atoms making them shiny, ductile, malleable, and able to easily conduct electricity and heat.