Chapter 18: Elements and Their Properties Section 1: Stability in Bonding

Elements: substance that contains only one kind of atom

Compounds: substance in which the atoms of two or more elements combine in a fixed proportion

Chemical formula: shows what elements a compound contains and the exact number of the atoms of each element in a unit of that compound

- Review counting atoms:
 - Subscript tells the quantity
 - o No number means #1
 - Parathesis mean to multiply the quantity inside times the number outside
 - o Examples:
 - H₂O
 - NaCl
 - CaCO₃
 - NH₄OH
 - Ca₃(PO4)₂

Chemical bond formation

- Atoms in group 18 are chemically stable. Why?
 - Its outer energy electrons are full with 8 valence electrons
 - Chemically stable = outer energy level is complete
 - o Ne, Ar, Kr, Xe, and Rn all have 8 valence electrons

- Helium has 2 valence electrons and it is stable because that is the max electrons energy level 1 can hold
- o Draw the dot notations here

- How do other elements get to 8 ve? Remember 8 ve (or 2 ve) will be chemically stable.
 - Atoms can lose, gain, or share electrons to obtain a stable outer energy level.
 - Combine with other atoms that also have partially compete outer energy levels to reach stability.
 - o Losing and gaining electrons
 - Typically, between a metal and nonmetal
 - The smaller numbered valence electron atom will give up its electron to the larger numbered valence electron atom
 - Metals = smaller #s = tend to lose electrons
 - Nonmetals = larger #s = tend to gain electrons
 - Draw Sodium and Chlorine here

Sharing electrons

- Typically, between 2 nonmetals
- Here atoms share its valence electrons with the other atom to achieve the magic number 8 (or 2 for smaller atoms)
- Draw Water

Chemical bond: the force that holds atoms together in a compound

• When atoms gain, lose, or share electrons, an attraction forms between the atoms, pulling each atom together to form a compound