Chemistry Unit 6a

Chemical Formulas and Naming Compounds

Chemical Formulas

- Tells the ratio number of atoms of each element in a compound.
- Molecular or Covalent bonding
  - Formulas represent the number of atoms of each element in a single molecule.
- Ionic bonding
  - Formulas represent the ratio of positive and negative ions in one compound.

Ionic Bond

- The ionic bond binds opposite charged ions together.

Ionic Bonds

- Metals
  - Lose valence electrons
  - Ions are positively charged
  - cations
- Nonmetals
  - Gain electrons
  - Ions are negatively charged
  - anions

Writing Ionic Formulas

- Write the symbol for the atoms
  - Cation/metal is written first
  - Anion/nonmetal is written second
- Determine the charge on each ion
- Select a factor that will make the positive ions charge equal to the negative ion's charge.
- Ex. Sodium chloride

Criss-Cross Method

- Write symbol of cation followed by symbol of anion along with their oxidation numbers.
- Use the oxidation number of the charge of each ion as the subscript for the other ion.
- If a subscript is 1 omit it.
- If the subscripts are the same, reduce them.
- Subscripts must be simplified in an ionic formula

Naming Ionic Compounds

- Consist of only two elements.
- Name the positive cation
- Name the negative anion, changing the ending to –ide.
- When metals that can form more than one type of ion are in a compound use a roman numeral in parentheses after the name of the metal to show the charge.

Examples

- $NaCl$
- MgO
- Cu_2S
- $SnCl_4$

Ternary Ionic Compounds

- Made up of 3 elements
- Name the cation then name the polyatomic ion without changing the ending.
- Na_2SO_4
- $FeCrO_4$

Molecular or Covalent Compounds

- Formulas represent the number of atoms of each element in a single molecule.
- YOU CANNOT REDUCE THE NUMBER OF ATOMS.

Prefix System of nomenclature

Prefix	Number		Prefix	number
Mono	1		Hexa	6
Di	2		Hepta	7
Tri	3		Octa	8
Tetra	4		Nona	9
Penta	5		Deca	10

Examples

- Dinitrogen monoxide-_____
- Tetraphosphorus decoxide-_____
- Carbon dioxide-_____
- Carbon monoxide-_____

Organic compounds

- Organic compounds are any covalently bonded compound containing carbon, with the exception of carbon monoxide, carbon dioxide and sodium carbonate.
- Hydrocarbons are composed of only C and H and are very stable due to intermolecular bonds.
  - Saturated compounds(alkanes) contain only single bonds
  - Unsaturated compounds contain double bonds(alkenes) or triple bonds(alkynes)

Organic Nomenclature

Prefix	Number of Carbon		Prefix	Number of Carbon
Methyl	1		Hexa	6
Ethyl	2		Hepta	7
Propyl	3		Octa	8
Butyl	4		Nona	9
Penta	5		Deca	10

- Alkane= C_nH_{2n+2}
- Alkenes= C_nH_{2n}
- Propane=
- Nonane=
- Butene=

Naming Molecular Compounds

- The elements are named in order they appear in the molecule.
- Prefixes are used to denote the number of atoms of each element. An exception is that the first element named is given a prefix only if there are more than one atom of that element in the compound.

Naming Molecular compounds cont.

- The “o” or “a” at the end of a prefix is dropped when the word following the prefix begins with a vowel.
- The second element’s ending is changed to –ide.
- ICl_3

Naming Hydrocarbons

- Alkane: C_nH_{2n+2}
- Alkene: C_nH_{2n}

- C_4H_{10}
- C_2H_4

Bellringer

- Naming Dice Lab
- Please come in and write the essential question in the blanks provided on your lab sheet.
- EQ: How do we write ionic formulas and how do we name ionic compounds?