Chapter 3 Mass relationships in chemical reactions
Chemical reactions are rearrangements in bonds
Electrons involved in bonds are those with the least energy
Filled orbitals typically remain undisturbed
The unfilled orbitals attempt to fill by bonding with other atoms
This only involves electrons, the atoms themselves remain the same
We describe reactions using balanced equations
Atoms are integers, need to remain whole

Three components of a chemical equation

1. Reactants on the left, products on the right, arrow left to right

2. The equation must also represent the bonds gained and lost

3. A balanced chemical equation shows that the law of conservation of mass is adhered to

In a balanced chem equation, the numbers and kinds of atoms on both sides of the rxn arrow are identical

2Na(s)+Cl2(g)->2NaCl(s)

1.write unbalanced quation using the correct chem formula for each reactant and product
2. find suitable coefficients the numbers placed before formulas to indicate how many formula units of ech substance are required to balance the equation
3. reduce the coefficients to their smallest whole number values
4. check your answer by making sure that the numbers and kinds of atoms are the same on both sides of the equation

Once we have a balanced equation, we can set up a balanced reaction, not needed, but wasteful, and excess reactants remain as contaminates
If we know balanced equation, we can substitute moles for number of molecules

2 molecules of hydrogen gas react with 1 molecule of oxygen to yield 2 molecules- microscopic
Macroscopic- 2 moles of h gas react with 1 mole of oxygen

Stoichiometry= element measure
Goals

1) Calculate the molecular mass from the formula
2) Interconvert mass and moles
3) Using a balanced equation and given the mass of one reactant, calculate the mass of the second reactant necessary
4) Calculate expected products

Molecular mass = sum of atomic masses of all atoms in a molecule
Formula mass = sum of atomic masses of all atoms in a formula unit of any compound, molecular, or ionic

Grams ofA -> moles ofA-> mles ofB-> grams of B
Molar mass of A mole ratio molar mass of B

Actual yield: the mount actually formed in a reaction
Theoretical yield the amount predicted by calculation
Percent yield=actual yield of product/theoretical yield of productx100%