4.3 the Mole and Molar Mass

Definitions:

- Avogadro's constant
- Mole
- Molar mass
- Diatomic

Basics

- Need a manageable amount of a compound to work with. (About a tablespoon of carbon.)
- When I want to know the average mass of a penny. I would not weigh a single penny. I would weigh out 100 pennies and divide by 100 to get the average mass of a penny.

Avogadro's Constant and the Mole

- 6.02×10^{23} particles/mole
- 6.02×10^{23} particles/mole = Avogadro's constant = N_A

Molar Mass

- Molar mass = M = g/mol
- 1 atom of carbon-12 = 12u
- 6.02×10^{23} atoms of carbon-12 = 12g
- Molar mass is related to the atomic mass. For one mole the value of the atomic mass is the same value for the molar mass.
- E.g. 1 mole of carbon = 12g
  1 mole of oxygen = 16 g
- This also works with molecules
- E.g. 1 molecule of water = 18u
  1 mole of water = 18g
- Watch out for molecular formula
- E.g. 1 atom of oxygen = 16u
  Oxygen exists as O_2 = 32u
  Therefore 1 mole of O_2 = 32g

Homework

- Practice Questions: 1,2,3,4,5,67,8,9,10,11,12,13
- Section Questions: 1,2,3,4,5