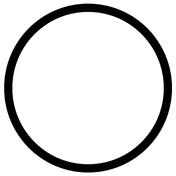
Highlight in Notes

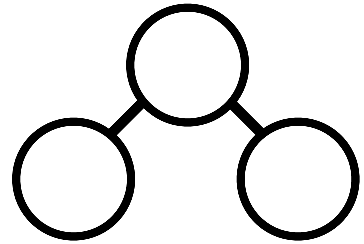
- Molar mass
- Atom, molecule, ion, formula unit, mole
- Mole conversions
- Percent composition
- Empirical formula
- Molecular formula

Atom



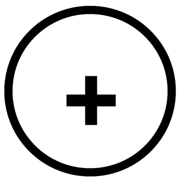
Ex: C

Molecule



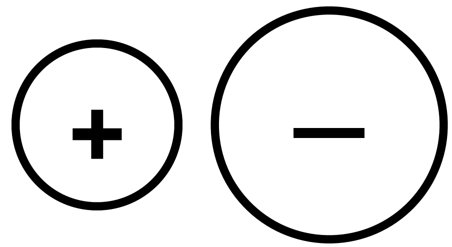
Ex: H_2O

Ion



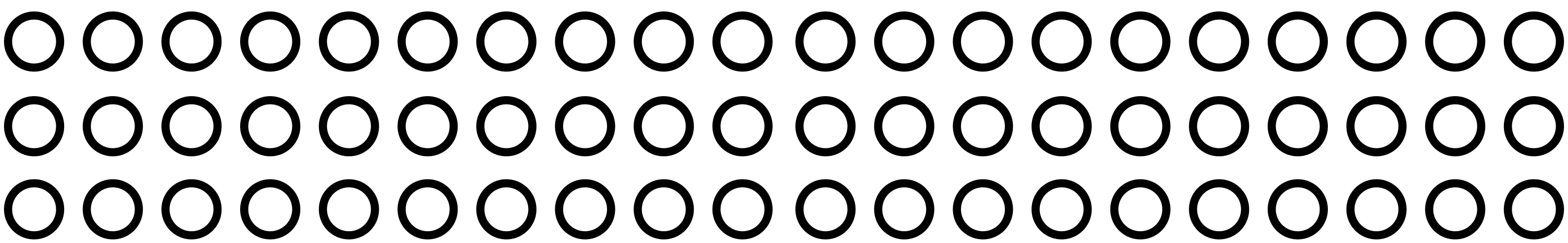
Ex: Na^+

Formula Unit



Ex: NaCl

Mole



Mole Conversions

mass (g) ⟷ **moles (mol)** ⟷ **particles**
(atoms, molecules, F.U.s)

molar mass from periodic table

_____ g = 1 mol

$$\frac{\_\_\_\ \text{g}}{1\ \text{mol}} \quad \text{or} \quad \frac{1\ \text{mol}}{\_\_\_\ \text{g}}$$

Avogadro's number

1 mol = 6.02×10^{23} particles

$$\frac{1\ \text{mol}}{6.02 \times 10^{23}\ \text{particles}} \quad \text{or} \quad \frac{6.02 \times 10^{23}\ \text{particles}}{1\ \text{mol}}$$

Percent Composition (Percentage by Mass)

$$\frac{\text{total mass of one element}}{\text{molar mass of the whole compound}} \times 100\%$$

Empirical Formula

<u>Steps</u>:

1. Convert mass to moles
2. Determine whole-number mole ratio*
   (divide by smallest mole amount)
3. Write empirical formula

*Note: Round mole ratio to nearest whole number if it is within 0.1

If not, multiply by 2/2, 3/3, etc., to obtain a whole number ratio.

Molecular Formula

molecular formula	empirical formula	*n*
C_2H_2	CH	2
C_6H_6	CH	6
H_2O	H_2O	1
$C_6H_{12}O_6$	CH_2O	6

$$\frac{\text{molar mass of molecular formula}}{\text{molar mass of empirical formula}} = n$$

$$n(\text{empirical formula}) = \text{molecular formula}$$