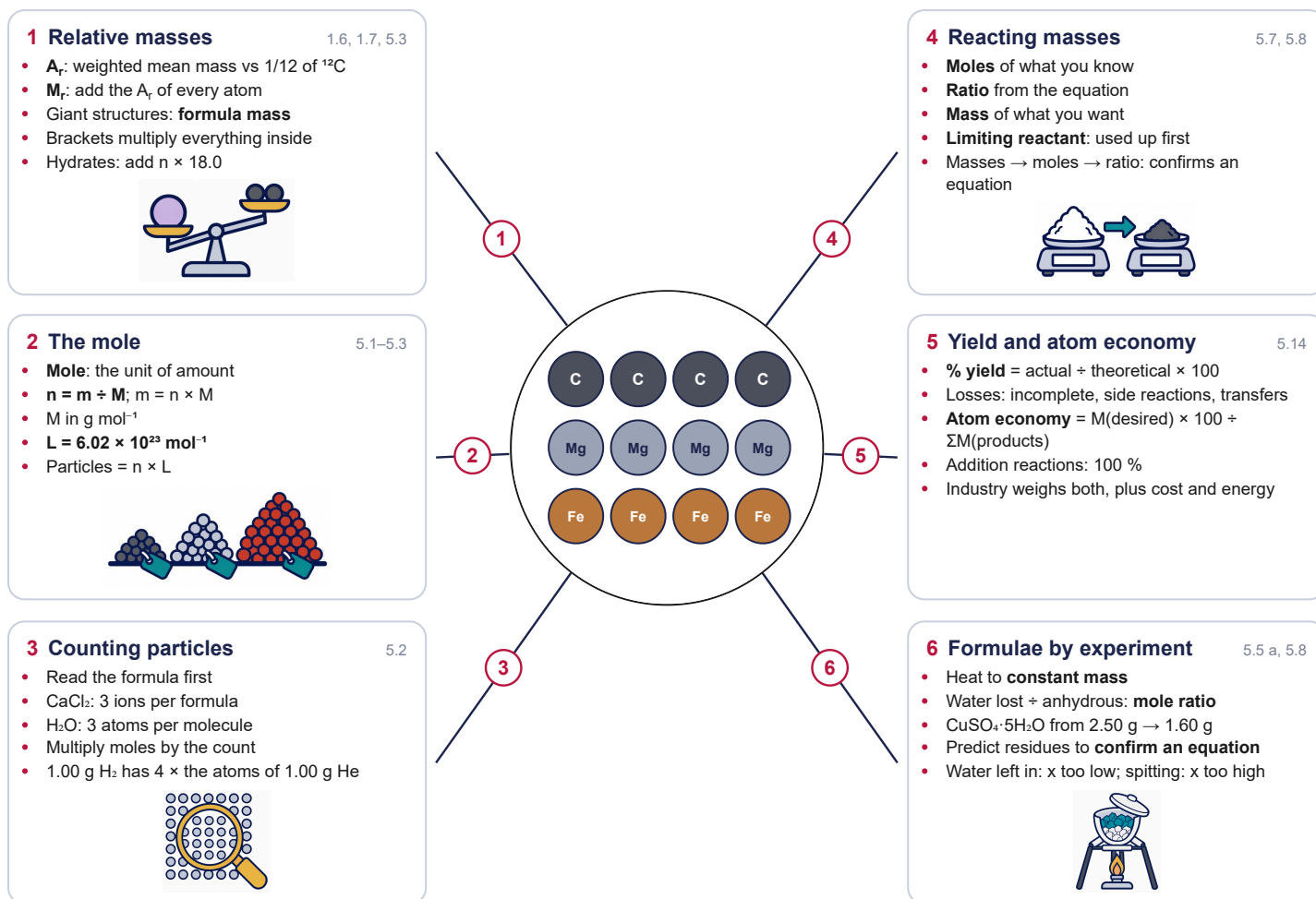


Mole Calculations Map

Edexcel A Level Chemistry · Topic 5 Formulae, Equations and Amounts of Substance · Mole Calculations



The equations of mole calculations n in mol, m in g, M in g mol^{-1} , $L = 6.02 \times 10^{23} \text{ mol}^{-1}$

Quantity	Equation	Worked example
Amount from mass	$n = m \div M$	4.40 g CO_2 : $4.40 \div 44.0 = 0.100 \text{ mol}$
Mass from amount	$m = n \times M$	0.250 mol NaOH: $0.250 \times 40.0 = 10.0 \text{ g}$
Number of particles	$N = n \times L$	0.200 mol H_2O : 1.20×10^{23} molecules
Percentage yield	actual $\div$ theoretical $\times 100$	5.04 g of 5.60 g CaO: 89.9 %
Atom economy	$M(\text{desired}) \times 100 \div \Sigma M(\text{products})$	CaO from CaCO_3 : $56.1 \div 100.1$: 56.0 %
Water of crystallisation	$x = n(\text{H}_2\text{O}) \div n(\text{salt})$	$0.0500 \div 0.0100$: $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Worked examples

Reacting mass

- 25.0 g CaCO_3 : 0.250 mol
- 1 : 1, so 0.250 mol CaO
- 14.0 g CaO**

Limiting reactant

- 0.200 mol Mg, 0.150 mol HCl
- Mg needs 0.400: HCl limits
- 0.0750 mol H_2**

Confirm an equation

- 4.20 g NaHCO_3 leaves 2.65 g
- Na_2CO_3 predicts 2.65 g
- $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$**

Moles link to empirical and molecular formulae and to solutions, gases and titrations, the next two sections of Topic 5.



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