

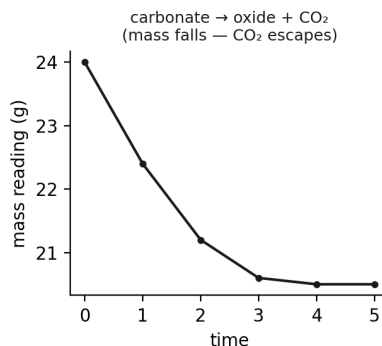
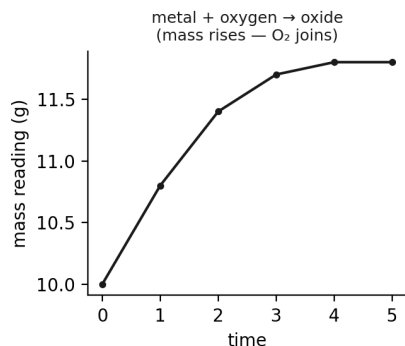
Exercise walk-through

3.4

Concentrations of solutions (4.3.4)

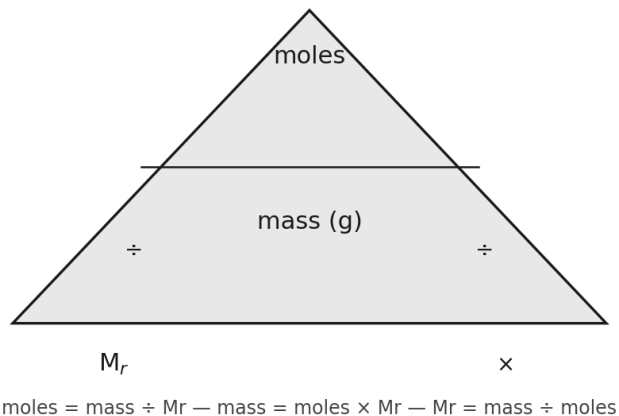
AQA · GCSE · Chemistry

Conservation of mass and Mr



- Conservation of mass and equations.
- Mass of products equals mass of reactants.
- Mr sums the atomic masses; percentage by mass follows.
- Gases explain any apparent mass change.

The mole



- Moles and reacting masses.
- One mole in grams = M_r ;
Avogadro constant 6.02×10^{23} .
- moles = mass divided by M_r .
- Ratio chain — mass to moles,
ratio, moles to mass.

Exercises 2.1·2.3

2.1 How many moles are in 500 cm^3 of 0.200 mol/dm^3 solution? [2]

2.2 Convert 0.005 mol in 25.0 cm^3 into a concentration. [2]

2.3 In $\text{H}_2\text{SO}_4 + 2\text{ NaOH}$, one mole of acid neutralises how many moles of alkali? [1]

3 Exam-style questions

Exercises 2.1·2.3

2.1 How many moles are in 500 cm^3 of 0.200 mol/dm^3 solution? [2]

2.1 $0.500 \text{ dm}^3 \times 0.200 = 0.100 \text{ mol}$.

2.2 Convert 0.005 mol in 25.0 cm^3 into a concentration. [2]

2.2 $0.005 \div 0.0250 \text{ dm}^3 = 0.200 \text{ mol/dm}^3$.

2.3 In $\text{H}_2\text{SO}_4 + 2 \text{NaOH}$, one mole of acid neutralises how many moles of alkali? [1]

3 Exam-style questions

2.3 Two.

Exercises 3.1·3.3

3.1 (*HT*) 23.50 cm^3 of 0.100 mol/dm^3 barium hydroxide neutralises 25.00 cm^3 of hy-

3.2 (*HT*) A student makes 250 cm^3 of sodium carbonate solution containing 13.25 g of

3.3 (*HT*) The mean titre should ignore anomalous trials. The trials read 21.10 , 21.20 , 21.15 and 24.60 cm^3 . Give the mean titre, and the moles of 0.100 mol/dm^3 acid it represents.

[4]

Exercises 3.1·3.3

3.1 (*HT*) 23.50 cm³ of 0.100 mol/dm³ barium hydroxide neutralises 25.00 cm³ of hy-

3.1 Moles Ba(OH)₂ = $0.100 \times 0.02350 = 2.35 \times 10^{-3}$; ratio 1 : 2, so moles HCl = 4.70×10^{-3} ; volume acid = 0.02500 dm³; C = $4.70 \times 10^{-3} \div 0.02500 = 0.188$ mol/dm³.

3.2 (*HT*) A student makes 250 cm³ of sodium carbonate solution containing 13.25 g of

3.2 Moles = $13.25 \div 106 = 0.125$; volume = 0.250 dm³; C = $0.125 \div 0.250 = 0.500$ mol/dm³.

3.3 (*HT*) The mean titre should ignore anomalous trials. The trials read 21.10, 21.20, 21.15 and 24.60 cm³. Give the mean titre, and the moles of 0.100 mol/dm³ acid it represents. [4]

3.3 Discard 24.60; mean = $(21.10 + 21.15 + 21.20) \div 3 = 21.15$ cm³; = 0.02115 dm³; moles = $0.100 \times 0.02115 = 2.115 \times 10^{-3} \approx 2.12 \times 10^{-3}$ mol.