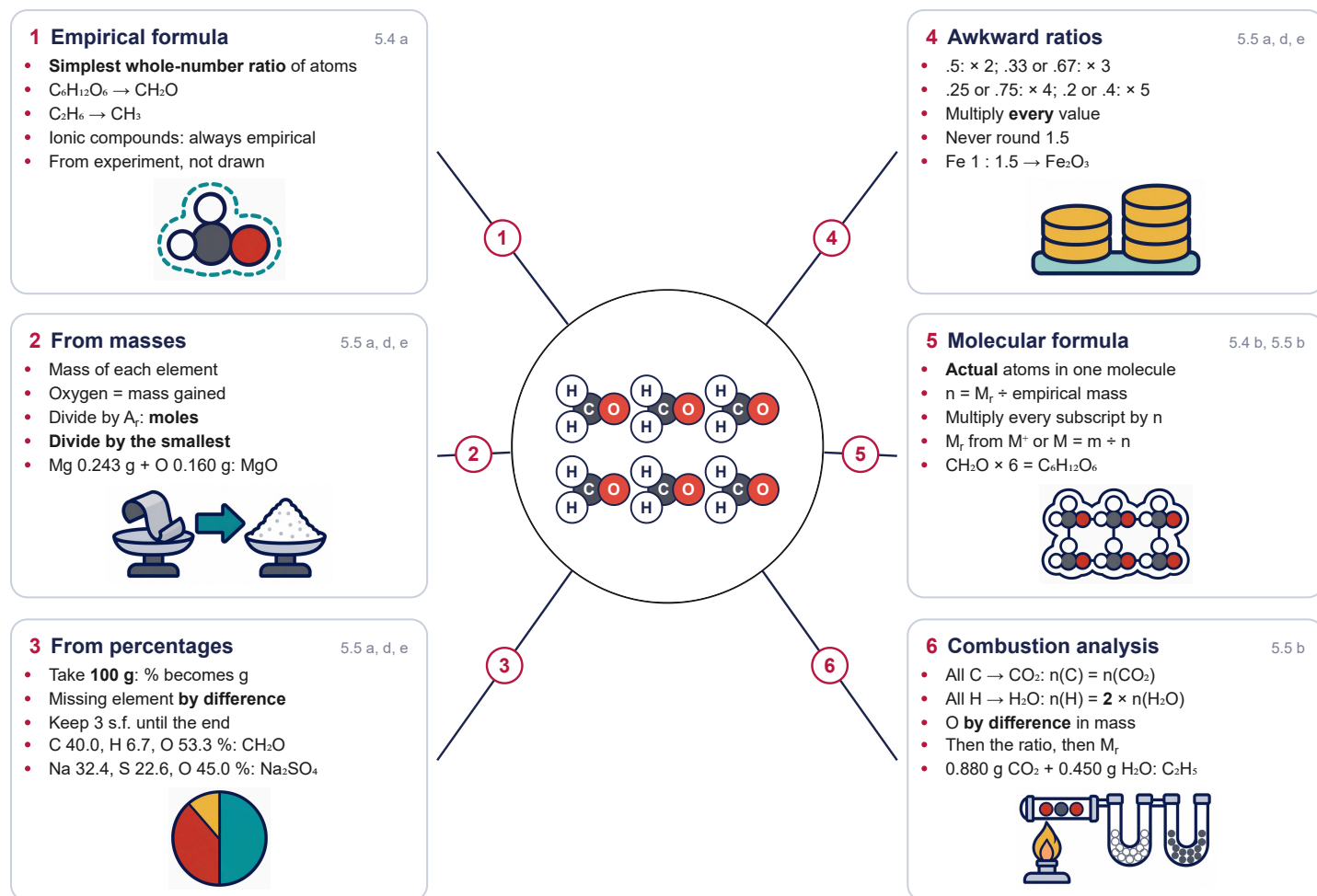


Empirical and Molecular Formulae Map

Edexcel A Level Chemistry · Topic 5 Formulae, Equations and Amounts of Substance · Empirical and Molecular Formulae



From data to molecular formula empirical formula mass $\times n = M_r$; n is always a whole number

Compound	Data	Empirical	M_r	Molecular
glucose	C 40.0 %, H 6.7 %, O 53.3 %	CH_2O	180	$C_6H_{12}O_6$
ethanoic acid	C 40.0 %, H 6.7 %, O 53.3 %	CH_2O	60	$C_2H_4O_2$
butane	0.880 g CO_2 , 0.450 g H_2O	C_2H_5	58	C_4H_{10}
benzene	C 92.3 %, H 7.7 %	CH	78	C_6H_6
cyclopentane	C 85.7 %, H 14.3 %	CH_2	70	C_5H_{10}
ethyl ethanoate	M^+ at m/z 88	C_2H_4O	88	$C_4H_8O_2$

Worked examples

From masses

- 2.80 g Fe, 1.20 g O
- $0.0502 : 0.0750 = 1 : 1.5$
- Fe_2O_3**

By difference

- C 54.5 %, H 9.1 %: O 36.4 %
- $4.54 : 9.1 : 2.28$
- C_2H_4O**

Molecular

- $CH_2Cl = 49.5$
- M^+ at m/z 99: $\times 2$
- $C_2H_4Cl_2$**

M_r values come from mass spectra (Topic 1) and from $pV = nRT$ for gases and volatile liquids (5.5 c).



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