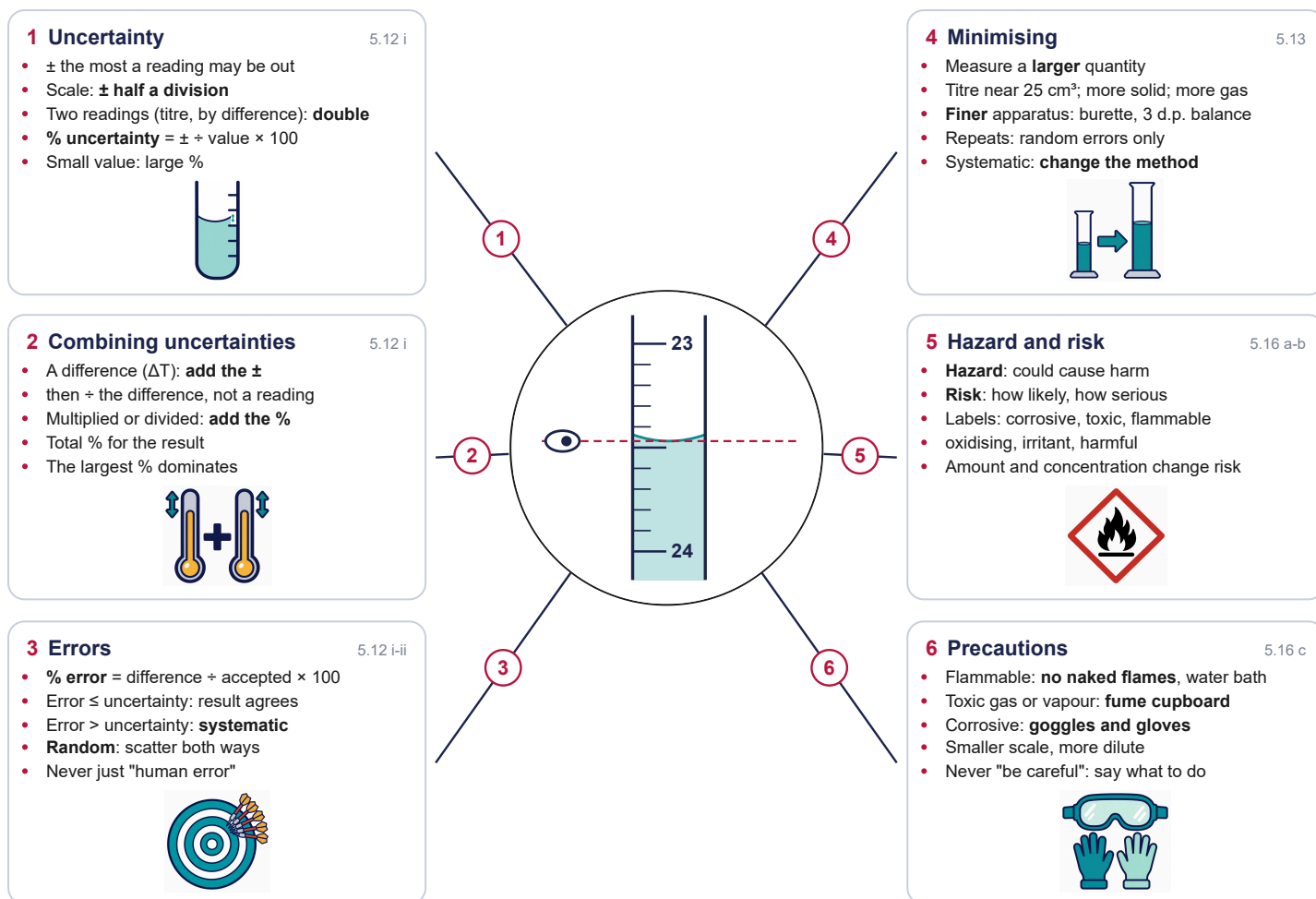


Uncertainty and Practical Safety Map

Edexcel A Level Chemistry · Topic 5 Formulae, Equations and Amounts of Substance · Uncertainty and Practical Safety



Common measurements typical school apparatus; use the value the question or the manufacturer gives

Measurement	Per reading	As used	Example
Burette titre	$\pm 0.05 \text{ cm}^3$	$\pm 0.10 \text{ cm}^3$ (two)	20.00 cm ³ : 0.50 %
Mass by difference (2 d.p.)	$\pm 0.005 \text{ g}$	$\pm 0.01 \text{ g}$ (two)	2.00 g: 0.50 %
Mass by difference (3 d.p.)	$\pm 0.0005 \text{ g}$	$\pm 0.001 \text{ g}$ (two)	0.500 g: 0.20 %
Temperature change (1 °C scale)	$\pm 0.5 \text{ °C}$	$\pm 1.0 \text{ °C}$ (two)	ΔT 8.0 °C: 13 %
Gas syringe	$\pm 0.5 \text{ cm}^3$	$\pm 0.5 \text{ cm}^3$ (one)	50 cm ³ : 1.0 %
Combined result	—	add the %	0.50 + 0.50 + 1.0 = 2.0 %

Worked examples

Error or uncertainty?

- Found 23.1, accepted 24.0
- % error 3.8 %; uncertainty 1.2 %
- **systematic error**

Make it smaller

- Titre 10.20 cm³: 0.98 %
- halve the burette concentration
- **20.40 cm³: 0.49 %**

Hazard to precaution

- Ethanol: highly flammable
- warm it in a water bath
- **no naked flames**

Every core practical is evaluated this way: uncertainty, error and a risk assessment.

