Chemistry 20

Unit B: Gases and the gas laws

Investigations of gas behaviour

A falling gauge and a capped syringe

- People connected with the land, including Indigenous communities and agricultural workers, have read plant and animal responses as signs of changing atmospheric pressure.
- A capped syringe on the same bench asks a different question: which quantities you will hold still while you change one other.

Safety first, then a fair table

- Read the WHMIS label and the safety data sheet before a gas cylinder is opened or a reaction that makes a gas is started.
- The investigation names controlled variables, graphs the data, identifies a gas or finds R, and keeps every trial.

Key terms

controlled variable

A quantity kept unchanged so the test shows the effect of the one quantity that is deliberately varied.

molar mass

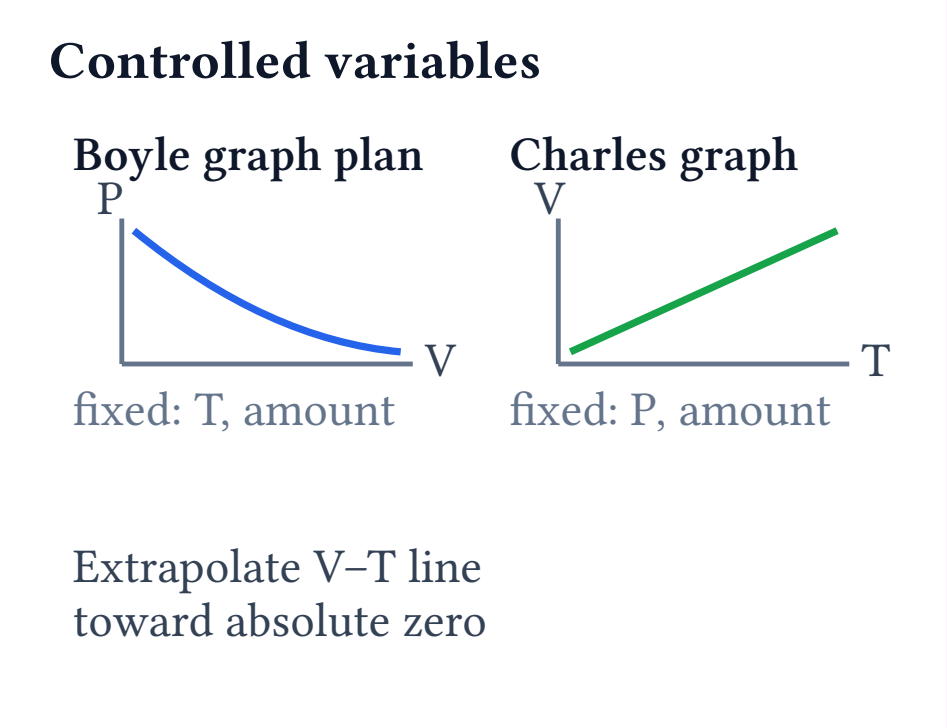
The mass of one mole of a substance. For an unknown gas it is calculated from $M = mRT/PV$. ($g \cdot mol^{-1}$)

WHMIS

The Workplace Hazardous Materials Information System of labels and safety data sheets used before hazardous products are handled.

Controlled variables and graphs

- A Boyle plan keeps temperature and amount fixed while pressure and volume change.
- A Charles plan, or an absolute-zero graph, keeps pressure and amount fixed while volume and temperature change.



Gas identity from M = mRT/PV

- A 2.200 g sample occupies 1.120 L at 101.325 kPa and 273.15 K.
- The molar mass is compared with carbon dioxide, 44.01 g·mol⁻¹.

A constant product and a temperature window

- Three Boyle pairs can be tested by multiplying pressure by volume.
- The thermometer limit belongs in the same report as the graph.

R from the whole table

- A group presentation shows how pressure, volume, temperature, and amount determine R.
- Every trial remains in the shared table while groups compare values.