2026 VCE Chemistry Data Book

Original worked revision examples with notes on units and assumptions.

Use the board PDF below for the official sheet. Coverage of examples varies by subject.

Official reference material

Official VCAA 2026 Chemistry Data Book, version 2

What to work out beyond the sheet

A data-book relationship gives the number of moles of electrons. The balanced half-equation gives the amount of product formed from those electrons.

Formulas and worked examples

Amount · four routes to moles

Formula or reference: n = m/M = cV = N/NA = V/Vm, using the form appropriate to the data.

Units and conditions: Use matching mass units, c in mol/L and solution volume in L, or matching gas volume and molar-volume units.

Worked example: 40.0 mL of 0.250 mol/L solution contains 0.0100 mol. The same amount corresponds to about 6.02×10^{21} entities.

Solutions · concentration in ppm by mass

Formula or reference: c(ppm) = solute mass in mg ÷ solution mass in kg.

Units and conditions: ppm by mass is numerically mg/kg.

Worked example: A 0.50 kg solution containing 4.0 mg of solute has a concentration of 8.0 ppm by mass.

Properties · density

Formula or reference: ρ = m/V

Units and conditions: Use consistent units, such as g/mL or kg/m^3.

Worked example: A 24.0 g liquid sample occupying 30.0 mL has density 0.800 g/mL.

Gases · ideal gas law

Formula or reference: pV = nRT

Units and conditions: Use K and consistent pressure and volume units for the selected value of R.

Worked example: At 300 K and 100 kPa, 0.50 mol of ideal gas occupies about 12.5 L.

Thermochemistry · enthalpy difference

Formula or reference: $\Delta H = H_{products} - H_{reactants}$

Units and conditions: Use the same units and basis for both values.

Worked example: If products are at 180 kJ and reactants at 220 kJ for the stated reaction, ΔH = −40 kJ.

Calorimetry · heat transferred

Formula or reference: $q = mc\Delta T$

Units and conditions: With m in g and c in J/(g °C), q is in joules.

Worked example: Heating 100 g of water by 3.0 °C at c = 4.18 J/(g °C) transfers about 1.25 kJ to the water.

Calorimetry · molar enthalpy

Formula or reference: $\Delta H = q/n$

Units and conditions: Use q for the signed heat of the reaction and n for the amount on the specified reaction basis.

Worked example: If 0.10 mol releases 3.0 kJ, ΔH is −30 kJ/mol.

Electrolysis · amount of electrons

Formula or reference: $Q = It$ and $n(e^-) = Q/F$.

Units and conditions: I in A, t in seconds, Q in coulombs and F in C/mol.

Worked example: A current of 0.50 A for 193 s transfers 96.5 C, or about 0.00100 mol of electrons when F = 96,500 C/mol.

Electricity · energy supplied

Formula or reference: $E = VIt$

Units and conditions: Use V, A and s to obtain J.

Worked example: A 6 V supply delivering 2 A for 10 s supplies 120 J.

Calorimetry · calibration factors

Formula or reference: Electrical: $CF = E/\Delta T$. Reaction: $CF = n\Delta H/\Delta T$ with the corresponding sign convention.

Units and conditions: Use the same energy unit in both forms. A physical calibration factor is positive.

Worked example: A 120 J input that increases temperature by 0.40 °C gives 300 J/°C. A reaction delivering 150 J to the calorimeter and raising it by 0.50 °C gives the same value.

Electrochemistry · standard cell potential

Formula or reference: E°cell = E°(reduction half-cell) − E°(oxidation half-cell), using tabulated reduction potentials.

Units and conditions: Both values in volts.

Worked example: A +0.34 V cathode and −0.76 V anode, read as reduction potentials, give E°cell = +1.10 V.

Green chemistry · atom economy

Formula or reference: Atom economy = (mass of desired product from the balanced equation ÷ mass of all reactants on the same basis) × 100%.

Units and conditions: Apply stoichiometric coefficients to the molar masses before taking the ratio.

Worked example: If the balanced reaction gives 60 g of desired product for 100 g of reactants on the same basis, atom economy is 60%.

Synthesis · percentage yield

Formula or reference: Yield = (actual yield ÷ theoretical yield) × 100%.

Units and conditions: Both quantities must be for the same product and in matching units.

Worked example: An actual mass of 7.5 g against a theoretical 10.0 g is a 75% yield.

Equilibrium · concentration expression

Formula or reference: For $aA + bB \rightleftharpoons cC + dD$, $K_c = [C]^c[D]^d/([A]^a[B]^b)$, omitting pure solids and liquids.

Units and conditions: Use equilibrium concentrations. The concentration-form units depend on the powers in the expression.

Worked example: For $A \rightleftharpoons 2B$, [A] = 0.50 mol/L and [B] = 0.20 mol/L give $K_c = 0.20^2/0.50 = 0.080$ mol/L.