AS ACADEMIC STUDIO

FREE STUDY GUIDE

General Chemistry 1

Study guide: what to know, the equations to memorize, and the mistakes to avoid

Topic checklist

Check off each topic when you can do a problem on it without your notes.

- [ ] Significant figures, units and dimensional analysis
- [ ] Atoms, isotopes, the mole and molar mass
- [ ] Naming compounds and writing formulas
- [ ] Balancing equations
- [ ] Stoichiometry: limiting reagent, theoretical and percent yield
- [ ] Solutions: molarity, dilution and titration
- [ ] Reaction types: precipitation (net ionic), acid–base and redox
- [ ] Gases: ideal gas law, partial pressures, kinetic molecular theory
- [ ] Thermochemistry: q = mcΔT, calorimetry, Hess's law, ΔH°f
- [ ] Light, quantum numbers and electron configurations
- [ ] Periodic trends: radius, ionization energy, electronegativity
- [ ] Lewis structures, resonance and formal charge
- [ ] VSEPR shapes, polarity and hybridization
- [ ] Intermolecular forces and boiling points

Equations to memorize

Equation	What it's for
$n = m / M$	grams ↔ moles
$M = mol / L$	molarity
$M_1V_1 = M_2V_2$	dilution (and 1:1 titrations only)
% yield = actual / theoretical × 100	percent yield
$PV = nRT$, $R = 0.08206$ L·atm/(mol·K)	ideal gas law (T in kelvin)
$P_{total} = P_1 + P_2 + \ldots$	Dalton's law of partial pressures

$q = mc\Delta T$	heat and calorimetry
$\Delta H° = \Sigma\Delta H°f(\text{products}) - \Sigma\Delta H°f(\text{reactants})$	enthalpy from formation values
$c = \lambda\nu$ and $E = h\nu$	light: wavelength, frequency, energy
Formal charge = valence e^- − dots − lines	choosing the best Lewis structure

The 5 most common mistakes

- **Comparing grams instead of moles** to find the limiting reagent. Always convert to moles and use the coefficients.
- **Using °C in the gas law.** Add 273.15 every time.
- **Using $M_1V_1 = M_2V_2$ for a titration that isn't 1:1** (like H_2SO_4 with NaOH).
- **Removing 3d electrons before 4s** when writing cation configurations. 4s comes out first.
- **Calling a molecule polar just because its bonds are polar.** Check the shape: BF_3 and CO_2 cancel out.

How to practice

Work through the free **General Chemistry 1 Practice Exam** one problem per day, or take it all at once under a 2-hour timer. Check every answer with the answer key and add each miss to your mistake log (see the How to Study Chemistry & Biology guide).

Want help with this? AS Academic Studio offers affordable one-on-one chemistry tutoring online, with flexible pricing for anyone who needs it. Book a free 15-minute intro call at asacademicstudio.com.