

Grade 9 checklist

7 skills. Tick each one when you can do it. For grade 9 you need the skills for the grades below it too.

Chemistry

- ☐ **Find M_r from mass and moles** $M_r = \text{mass} \div \text{moles}$, then use it to identify a substance or element. (Moles (HT only))
- ☐ **Scale reacting masses in kilograms or tonnes** Mass ratios work in any unit as long as you use the same unit throughout. (Amounts of substances in equations (HT only))
- ☐ **Find a missing mass, then balance** Use conservation of mass to find the unknown mass before converting all masses to moles. (Using moles to balance equations (HT only))
- ☐ **Calculate the mass of excess reactant left** Moles left over = moles at the start – moles that reacted; then convert to a mass. (Limiting reactants (HT only))
- ☐ **Balance ionic equations with different ion charges** Match the electrons lost and gained, e.g. $2\text{Al} + 3\text{Cu}^{2+} \rightarrow 2\text{Al}^{3+} + 3\text{Cu}$. (Oxidation and reduction in terms of electrons (HT only))
- ☐ **Separate strength from concentration in unfamiliar data** For example, explain why a concentrated weak acid can have a lower pH than a very dilute strong acid. (Strong and weak acids (HT only))
- ☐ **Calculate an unknown bond energy** Put the known values into overall energy change = bonds broken – bonds made and rearrange to find the missing bond energy. (The energy change of reactions (HT only))

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