STUDY FORMULA BOOKLET

OxfordAQA International GCSE Chemistry 9202 periodic table and equations

The 9202 insert prints only the periodic table. Every calculation formula is yours to recall, so learn the moles, concentration, 24 dm3 gas volume, rate, Rf and energy relationships.

IN THE BOOKLET printed in the official booklet LEARN IT not printed: students must recall it

Based on the official **The Periodic Table of Elements, Insert for International GCSE Chemistry (9202) and Combined Science (9204) papers v1, Oxford International AQA Examinations**, with what to learn and exam tips added by CuratedPrep.

What the insert prints

The 9202 insert prints only the periodic table below and one note: the relative atomic masses of Cu (63.5) and Cl (35.5) are not rounded to whole numbers. It prints no formulas and no constants, so every relationship after the table is yours to recall.

The periodic table of elements

Groups are shown as 1 to 7 and 0, as printed. The lanthanides (atomic numbers 58 to 71) and the actinides (90 to 103) have been omitted, as on the printed table. Relative atomic masses for Cu and Cl have not been rounded to the nearest whole number. Square brackets are kept as printed. La and Ac sit in group 3 with an asterisk, as printed.

Z Sym name A_r — atomic number · symbol · name · relative atomic mass

1	2											3	4	5	6	7	0
1 H hydrogen 1																	2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 63.5	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium [97]	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57 La lanthanum 139	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium [209]	85 At astatine [210]	86 Rn radon [222]
87 Fr francium [223]	88 Ra radium [226]	89 Ac actinium [227]	104 Rf rutherfordium [267]	105 Db dubnium [270]	106 Sg seaborgium [269]	107 Bh bohrium [270]	108 Hs hassium [270]	109 Mt meitnerium [278]	110 Ds darmstadtium [281]	111 Rg roentgenium [281]	112 Cn copernicium [285]	113 Nh nihonium [286]	114 Fl flerovium [289]	115 Mc moscovium [289]	116 Lv livermorium [293]	117 Ts tennessine [293]	118 Og oganesson [294]

Atoms and relative masses

Neutrons in an atom

Protons equal the atomic number; electrons equal protons in a neutral atom.

$$\text{neutrons} = \text{mass number} - \text{atomic number}$$

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Relative formula mass

Add the relative atomic masses of every atom in the formula, using the masses printed in the table.

$$M_r = \sum A_r$$

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Percentage by mass of an element

Atoms is the number of atoms of that element in the formula.

$$\%\ \text{of element} = \frac{\text{atoms of element} \times A_r}{M_r} \times 100$$

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Empirical formula

Divide each mass (or percentage) by its Ar, then divide all by the smallest answer to get the simplest whole number ratio.

$$\text{mole ratio} = \frac{\text{mass or \%}}{A_r}$$

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Molecular formula

Multiply every number in the empirical formula by n.

$$n = \frac{M_r \text{ of molecule}}{M_r \text{ of empirical formula}}$$

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Moles and masses

Moles from mass

n in mol, m in g, Mr relative formula mass (g per mol). One mole is the relative formula mass in grams.

$$n = \frac{m}{M_r}$$

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Mass from moles

Rearranged form. Use the balanced symbol equation to scale moles between reactants and products.

$$m = n \times M_r$$

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Number of particles

One mole contains 6.02 × 10^{23} atoms or molecules (Avogadro's constant).

$$\text{particles} = n \times 6.02 \times 10^{23}$$

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Solutions and gases

Concentration in mol/dm3

c in mol/dm^3, n in mol, V volume of solution in dm^3. Divide cm^3 by 1000 to get dm^3.

$$c = \frac{n}{V}$$

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Concentration in g/dm3

m mass of solute in g, V in dm^3. The specification asks for titration calculations in both mol/dm^3 and g/dm^3.

$$\text{concentration } (\text{g/dm}^3) = \frac{m}{V}$$

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Converting concentration units

Multiply by Mr to go from mol/dm^3 to g/dm^3, divide to go back.

$$\text{g/dm}^3 = \text{mol/dm}^3 \times M_r$$

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Moles from concentration and volume

Rearranged form used in titrations: find moles of the solution you know, then use the equation ratio.

$$n = c \times V$$

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Volume of gas at room temperature and pressure

The specification assumes 24 dm^3 per mole at room temperature and pressure. Use n = V / 24 to go the other way.

$$V = n \times 24 \text{ dm}^3$$

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Rates, chromatography and energy

Rate of reaction (reactant used)

Amount may be a mass, a volume of gas or moles. Units such as g/s, cm^3/s or mol/s.

$$\text{rate} = \frac{\text{amount of reactant used}}{\text{time}}$$

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Rate of reaction (product formed)

Read the rate at a point from the gradient of an amount against time graph.

$$\text{rate} = \frac{\text{amount of product formed}}{\text{time}}$$

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Rf value

Both distances measured from the start line. No unit; always less than 1. Used to identify components of a mixture.

$$R_f = \frac{\text{distance moved by the substance}}{\text{distance moved by the solvent}}$$

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Energy from a fuel or solution

Q energy in J, m mass of water or solution in g, c specific heat capacity in J/g °C, ΔT temperature change in °C.

$$Q = mc\Delta T$$

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Energy change per mole

Energy released or taken in per mole. Convert J to kJ by dividing by 1000. Energy may also be given per gram.

$$\Delta H = \frac{Q}{n}$$

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Energy change from bond energies

Bond energies are supplied. A negative answer means exothermic; a positive answer means endothermic.

$$\text{energy change} = \sum(\text{bonds broken}) - \sum(\text{bonds formed})$$

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General formulae

Alkanes

Saturated hydrocarbons with single carbon-carbon bonds only.

$$\mathrm{C}_n\mathrm{H}_{2n+2}$$

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Alkenes

Unsaturated hydrocarbons with a carbon-carbon double bond.

$$\mathrm{C}_n\mathrm{H}_{2n}$$

LEARN IT

Learn these: not in the booklet

Sub-atomic particles

Proton: relative charge +1, relative mass 1. Neutron: charge 0, mass 1. Electron: charge -1, mass very small. Isotopes are atoms of the same element with different numbers of neutrons.

Relative atomic mass

Ar compares the mass of an atom with carbon-12 and is an average for the isotopes of the element. You are not expected to calculate it from isotope abundances.

Moles from mass

$$n = \frac{m}{M_r}$$

The most used relationship in 9202 calculations.

Concentration

$$c = \frac{n}{V}$$

V in dm3. Divide cm3 by 1000.

Gas volume at room temperature and pressure

$$V = n \times 24\ \mathrm{dm}^3$$

24 dm3 per mole is not printed on the insert.

Avogadro's constant

$$6.02 \times 10^{23}\ \mathrm{mol}^{-1}$$

Particles in one mole. The insert does not print it; the specification states it.

Why yield is below the calculated amount

The reaction may be reversible and not go to completion, product may be lost when separated, or reactants may react in other ways.

Using the booklet in the exam

- Use the relative atomic masses printed in the table exactly: most are whole numbers, but Cu is 63.5 and Cl is 35.5.
- Write the formula, convert units (cm3 to dm3, kJ to J) and then substitute, so every step can earn a mark.
- For a titration, find the moles of the solution you know, then use the balanced equation ratio to get the moles of the other.
- Gas volume at room temperature and pressure is moles times 24 dm3. Give the unit dm3.
- Elements in square brackets, such as [97] for technetium, have no stable isotope: use the number as printed in any calculation.

Based on: OxfordAQA International GCSE Chemistry 9202, Periodic table insert for 9202 and 9204 papers, v1; OxfordAQA International GCSE Chemistry 9202 specification, Version 5.3. Statistical tables are calculated by CuratedPrep to the same layout. Updated 31 October 2026. Always practise with the version of the official booklet your exam uses. More free sheets and topic worksheets at curatedprep.com.