The Periodic Table

AQA 8462 · Edexcel 1CH0 · OCR J248 / J258

GCSE2MED

1 Elements, compounds & mixtures

Chunk 1

Type	What it is
Element	one type of atom
Compound	elements chemically combined, fixed ratio
Mixture	not combined; physical separation

Filtration · crystallisation · distillation · chromatography

2 Group & period

Chunk 2

Ordered by increasing atomic number

- **Group** = column = **outer electrons**
- **Period** = row = **occupied shells**
- Same group → **similar reactions**

Cl: group 7, period 3 → **2,8,7**

3 Metals & non-metals

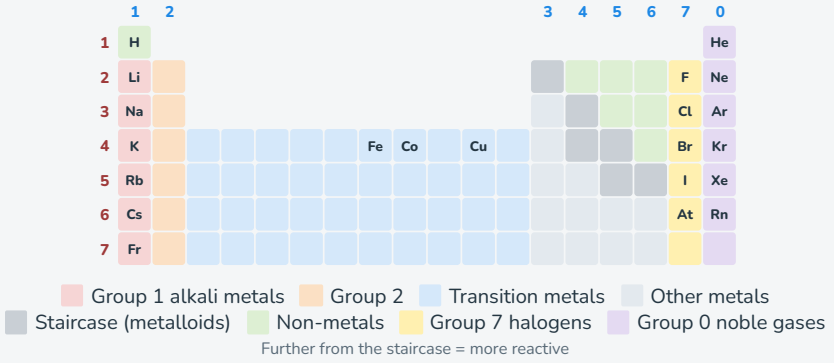
Chunk 4

	Metals	Non-metals
Look · conduct	shiny · well	dull · poorly
Solid · m.p.	malleable · high	brittle · lower

Metals lose electrons → positive ions. **Non-metals gain or share** → negative ions / covalent. Both reach a full outer shell.

4 Where things sit

Chunks 2 & 4



Further from the staircase = more reactive

5 How the table developed

Chunk 3

READ LEFT → RIGHT: oldest to newest

1 Early tables — ordered by atomic weight only; some elements in the wrong place

2 Newlands 1864 — every 8th element similar (octaves); no gaps, forced elements to fit

3 Mendeleev 1869 — left **gaps**, swapped a few elements, **predicted** properties (later confirmed)

4 Modern table — ordered by **atomic number** — explains the swaps

Isotopes explain why weight order sometimes failed (e.g. iodine and tellurium) — Edexcel links this to isotope abundance.

6 Group 1: alkali metals

Chunk 5

1 outer electron · soft, low density · stored under oil

Reacts with	Makes
Water	hydroxide + H_2 $2Na + 2H_2O \rightarrow 2NaOH + H_2$
Oxygen	oxide $4Li + O_2 \rightarrow 2Li_2O$
Chlorine	chloride $2Na + Cl_2 \rightarrow 2NaCl$

Li, Na, K, Rb, Cs, Fr — reactivity ↑

Down the group the outer electron is **further** and **more shielded** → lost more easily.

7 Group 7: halogens

Chunk 6

7 outer electrons · diatomic (Cl_2, Br_2, I_2) · gain 1 e^- → 1− ions, or share

HCl, HBr, HI: gases → **acidic** solutions

Displacement: more reactive displaces less reactive

chlorine + potassium bromide → potassium chloride + bromine

F, Cl, Br, I, At — reactivity ↑ · m.p. / b.p. ↑

Down the group the outer shell is further and more shielded → electron gained **less** easily.

Why m.p. / b.p. rises: bigger molecules → **stronger forces between molecules** → more energy to overcome.

8 Group 0: noble gases

Chunk 6

Colourless, **monatomic** gases

Full outer shell → stable → **unreactive** (inert)

Why b.p. rises: bigger atoms → **stronger forces between atoms** → more energy to overcome.

Uses: argon in bulbs and welding (stops reactions) · helium in balloons (low density, won't burn)

He, Ne, Ar, Kr, Xe, Rn — b.p. ↑

9 Transition metals vs group 1

Chunk 7 · Chemistry only

	Hardness	Density	Melting pt	Reactivity	Ions	Compounds
Transition	hard, strong	dense	high (not Hg)	much less reactive	different charges (Fe^{2+}, Fe^{3+})	often coloured
Group 1	soft	low	low	very reactive	only 1+	white

Cu(II) compounds blue · iron(III) oxide red-brown (rust) · cobalt chloride blue → pink with water · iron catalyst in Haber process