KS3 SCIENCE · CHEMISTRY

The periodic table revision sheet

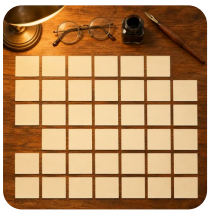
Name _____



1. Metals and non-metals

METALS	NON-METALS
Shiny	Dull
Good conductors of electricity and heat	Poor conductors of electricity and heat
Malleable (can be hammered into shape) and ductile (can be pulled into a wire)	Brittle when solid (they shatter when hit)
Nearly all are solid at room temperature	Many are gases at room temperature

- **Odd ones out:** mercury is a liquid metal. Bromine is a liquid non-metal. Graphite, a form of carbon, is a non-metal that conducts electricity.
- Only a few metals are **magnetic**: iron, nickel and cobalt.
- **Properties decide uses.** Copper conducts electricity well and is ductile, so it is used for wires. Aluminium is malleable, so it can be rolled into foil.



2. Organising the elements

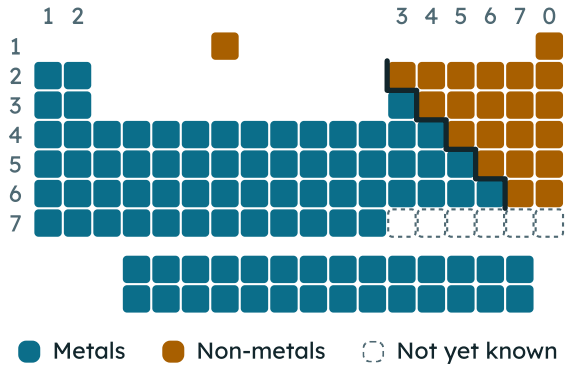
- The **periodic table** lists every element in order. Today it holds 118 elements, in order of atomic number.
- **Mendeleev** published his periodic table in 1869. He put the elements in order of the mass of their atoms, and put elements with similar properties in the same column.
- He **left gaps** for elements that had not been discovered, and predicted their properties. When germanium was found in 1886, it matched his prediction.
- A **group** is a column. The elements in a group have similar properties. A **period** is a row.
- The main groups are numbered 1 to 7 and 0. Some tables number every column from 1 to 18: on those, Group 7 is 17 and Group 0 is 18.

3. Reading the periodic table

	1	2	3	4	5	6	7	0
1				1 H				2 He
2	3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
3	11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
4	19 K	20 Ca						

… and 98 more elements

The first 20 elements. Groups run across the top, periods down the side



The whole table: 118 elements

- Each box shows the element's **symbol** and its **atomic number**. The atomic number counts the elements in order: hydrogen is 1, helium is 2.
- **Metals are on the left and in the middle. Non-metals are on the right.** A zigzag line divides them. About three quarters of the elements are metals.
- Hydrogen is a non-metal. It does not fit neatly into any group, so this table shows it on its own. A few elements beside the zigzag line, such as silicon, have properties of both metals and non-metals.



4. Group 1: the alkali metals

- Lithium, sodium and potassium are **soft, very reactive metals**. They can be cut with a knife and are stored under oil.
- They all react with water to make **hydrogen** gas and a metal hydroxide, which dissolves to make an **alkali**.

sodium + water → sodium hydroxide + hydrogen

METAL	WHAT YOU SEE WHEN IT IS ADDED TO WATER
Lithium	Floats and fizzes steadily
Sodium	Fizzes faster, melts into a ball and skates across the water
Potassium	Reacts faster still and catches fire, with a lilac flame

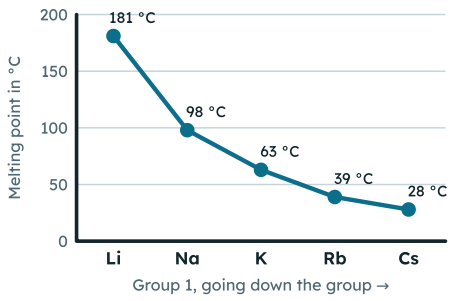
- **Reactivity increases as you go down Group 1.** Rubidium and caesium, lower down, explode in water.



5. Group 7 and Group 0

GROUP 7: THE HALOGENS	GROUP 0: THE NOBLE GASES
Fluorine, chlorine, bromine, iodine	Helium, neon, argon, krypton, xenon
Reactive, coloured, poisonous non-metals	Colourless non-metals that are inert (unreactive)
Going down: two gases, then a liquid (bromine), then a solid (iodine)	All are gases at room temperature
React with metals to make salts: sodium + chlorine → sodium chloride	Their atoms hardly ever join up with other atoms
Get **less** reactive going down the group	Used in balloons (helium), signs (neon) and light bulbs (argon)

6. Predicting from patterns



Melting points fall going down Group 1

- A **trend** is a pattern in a property as you go down a group or across a period.
- To **estimate a missing value**, look at the elements above and below. The missing value usually lies between theirs. Potassium melts at 63 °C and caesium at 28 °C, so rubidium should melt somewhere between: it melts at 39 °C.
- Going down Group 7 and Group 0, the boiling points **rise**.
- **Reactions follow patterns too.** Group 1 gets more reactive going down, so caesium reacts more violently than potassium. Group 7 gets less reactive going down, so astatine should be less reactive than iodine.

Key words

Periodic table: a chart of all the elements, arranged in rows and columns

Group: a column of the periodic table

Period: a row of the periodic table

Atomic number: the number that gives an element its place in the periodic table

Metal: an element that is usually shiny and a good conductor

Non-metal: an element that is usually dull and a poor conductor

Malleable: can be hammered into shape without breaking

Ductile: can be pulled out into a wire

Brittle: shatters when it is hit

Conductor: lets electricity or heat pass through it easily

Physical property: a feature you can observe without changing the substance

Chemical property: how a substance reacts with other substances

Alkali metals: the reactive metals in Group 1

Halogens: the reactive non-metals in Group 7

Noble gases: the unreactive gases in Group 0

Reactive: takes part in chemical reactions easily

Inert: unreactive: it hardly ever takes part in a reaction

Trend: a pattern in a property as you go down a group or across a period

Pictures are illustrations made for this sheet, not real photographs.