



Elements arranged in order of atomic number

Elements with similar properties are in columns called groups

Elements in the same group have the same number of outer shell electrons and elements in the same period (row) have the same number of electron shells.

The Periodic table

Alkali metals	<i>Soft and easily cut</i>	Low melting and boiling points.
	<i>Very reactive with oxygen, water and chlorine</i>	Only have one electron in their outer shell. Form +1 ions.
	<i>Reactivity increases down the group</i>	Negative outer electron is further away from the positive nucleus so is more easily lost.

EDEXCEL TOPIC 6: Groups in the periodic table

Metal	Reaction with water	Word equation
Lithium	Fizzing	Lithium + water → lithium hydroxide + hydrogen
Sodium	Fizzing more vigorously than lithium	Sodium + water → sodium hydroxide + hydrogen
Potassium	Fizzes and burns with a lilac flame	Potassium + water → potassium hydroxide + hydrogen

Halogens	<i>Consist of molecules made of a pair of atoms</i>	Have seven electrons in their outer shell. Form -1 ions.
	<i>Melting and boiling points increase down the group (gas → liquid → solid)</i>	Increasing atomic mass number.
	<i>Reactivity decreases down the group</i>	Increasing proton number means an electron is less easily gained as outer shell is further away from nucleus, therefore the attraction force is weaker.

Halogen	Colour at room temperature	State at room temperature
Chlorine	Yellow-green	Gas
Bromine	Red-brown	Liquid
Iodine	Dark purple	Solid

With metals	Forms a metal halide	Metal + halogen → metal halide e.g. Sodium + chlorine → sodium chloride	e.g. NaCl metal atom loses outer shell electrons and halogen gains an outer shell electron
With hydrogen	Forms a hydrogen halide	Hydrogen + halogen → hydrogen halide e.g. Hydrogen + bromine → hydrogen bromide	Dissolve in water to form acidic solutions.
With aqueous solution of a halide salt	A more reactive halogen will displace the less reactive halogen from the salt	Chlorine + potassium bromide → potassium chloride + bromine	(HT) These are redox reactions. The halogen gains electrons and the halide ion from the compound loses electrons.

Noble gases	<i>Unreactive, do not form molecules</i>	This is due to having full outer shells of electrons.
	<i>Boiling points increase down the group</i>	Increasing atomic number.

Helium	<i>Used in balloons</i>	Due to being less dense than air, which means balloons will float.
Neon	<i>Used in signs</i>	Glows when electricity flows through it.
Argon	<i>Used in filament light bulbs</i>	Stops the heated filament reacting with oxygen. Bulbs filled with unreactive argon instead.