

History

Early periodic tables arranged in order of **atomic weight**

⊗ Some elements were in the wrong groups so didn't follow the pattern



Mendeleev **left gaps** for undiscovered elements.

☺ The elements were discovered that filled the gaps and proved him right.

☺ **Isotopes were discovered** which explained why order based on weight didn't work.



Modern periodic table – order of **atomic (proton) number**.

Elements with similar properties in columns (**groups**).

Elements in same group have the same number of electrons in their outer shell and so have similar chemical properties.

I GROUP/FAMILY (vertical column) have similar chemical properties

II PERIODS/SERIES (horizontal row) - has same core elements and number of main energy levels

Metals vs Non-metals

Non-metals: Many electrons in outer shell so form **negative ions**. Low melting and boiling points.

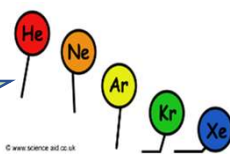
Metal										Metalloid		Nonmetal											
H																	He						
Li	Be																	B	C	N	O	F	Ne
Na	Mg																	Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr						
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe						
Cs	Ba	La-Lu	Hf	Ta	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn							
Fr	Ra	Ac-Lu																					

Metals: Few electrons in outer shell so form **positive ions**. Hard, high melting and boiling points.

Group 0

Noble gases. Unreactive (due to full outer shell)

Increasing atomic mass



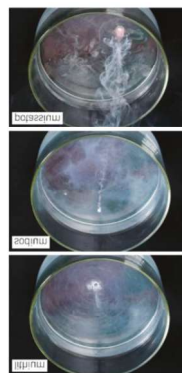
Increasing boiling point

L4 – 10 Periodic Table

Group 1

Alkali Metals

Very reactive (due to single electron in outer shell)



- Metals
- React with oxygen to form **oxides**
- React with water to form the **hydroxide and hydrogen**
- React with chlorine to form **chlorides**

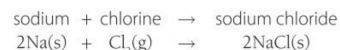
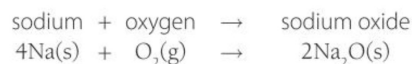


Diagram showing the electron shells for lithium (2,1), sodium (2,8,1), and potassium (2,8,8,1).

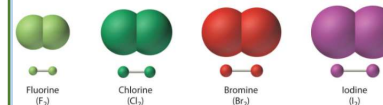
Alkali metals get **MORE reactive**

Group 7

Halogens

Very reactive (due to having 7 electrons in outer shell)

- Non-metals
- Exist in pairs as molecules (diatomic molecules)



- React with metals to form white solid crystals
- React with non-metals to form small molecules

Halogens get **MORE reactive**

