The Periodic Table Trends

All physical and chemical behavior of the elements is based ultimately on the electron configurations of their atoms.

A **vertical row** is called a group or a column.

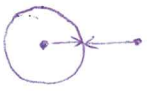
Each group is numbered (starting on the left; Group I) and some have "family names" (e.g. Group 1 are the Alkali Metals, Group 2 are the Alkaline Earths; Group 17 are the Halogens).

A **horizontal row** is called a period or a row.

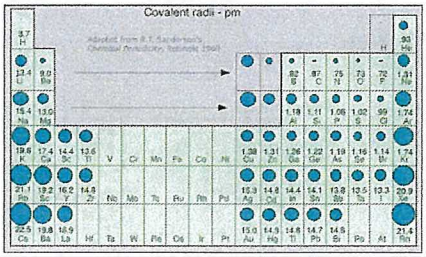
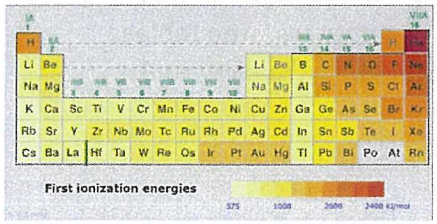
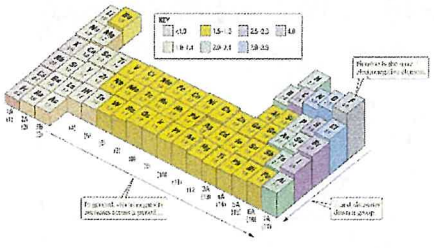
The first row consists of hydrogen and helium; the second row starts with lithium and ends at neon. There are seven rows in the modern form of the Periodic Table.

The elements are arranged in the Periodic Table in order of **increasing atomic number**, and with few exceptions, this also means in order of **increasing relative atomic mass**. The table is called "periodic" because chemical and physical properties repeat periodically, leading to the vertical "family" groupings.

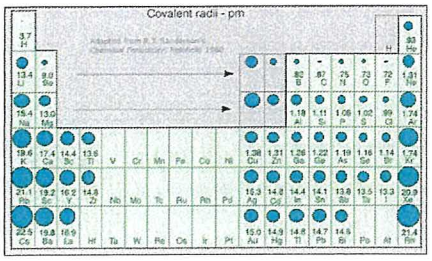
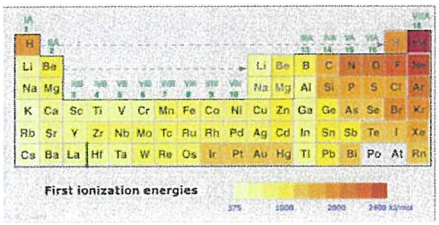
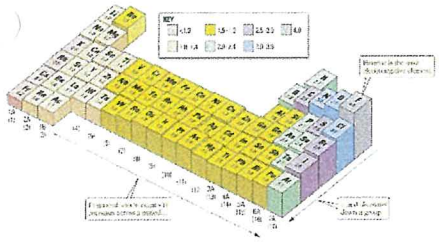
Key terms:

Atomic radius	 ½ Distance of two adjacent bonded nuclei
Nuclear charge	Determined by the number of protons (positive charge).
Ionisation energy	**First:** The energy required to removed one mole of electrons from one mole of atoms. **Successive:** The energy required to remove the next electrons (successively).
Electronegativity	The ability of an atom to attract electrons within a ~~covalent~~ chemical bond.
Electron affinity	The energy released when one mole of atoms gains one mole of electrons.

PERIODIC TABLE TRENDS ACROSS PERIODS:

TREND	TRENDS AND EXPLANATIONS
ATOMIC RADIUS 	Trend: Left to right ATOMIC RADIUS ↓
	Explanation: ↑ in no. of protons (ENC) electro nuclear charge ↑ in attraction to the electron ∴ pulled inwards.
IONISATION ENERGY 	Trend: ↑ across a period.
	Explanation: • Due to decreased atomic radius + ↑ ENC electrons are more attracted to the nucleus. • Takes more energy to remove.
ELECTRONEGATIVITY 	Trend: Left to right Electronegativity ↑
	Explanation: ↑ in ENC (Shielding) ↑ in protons. (Same no. of electron shells).

PERIODIC TABLE TRENDS **DOWN GROUPS**:

TREND	TRENDS AND EXPLANATIONS
ATOMIC RADIUS 	Trend: GOING DOWN A GROUP ATOMIC RADIUS ↑
	Explanation: ↑ no. of protons ↑ no. of electrons ↑ no. of shells.
IONISATION ENERGY 	Trend: ↓ going down groups.
	Explanation: ↑ no. of electrons ↑ no. of shells. ∴ ↑ distance + ↑ electron sheilding electrons are easier to remove.
ELECTRONEGATIVITY 	Trend: Going down a group, Electronegativity decreases
	Explanation: Even though there is an increased nuclear charge, the period number indicates the number of electron shells. More electron shells means more sheilding.