

3.1 - The Periodic Table

3.1.1 - Describe the arrangement of elements in the periodic table in order of increasing atomic number

Elements in the periodic table are arranged in order of **increasing atomic number (Z)**. There is a division between metals and non-metals. Metals are on the left and non-metals are on the right. Metals tend to have a smaller number of electrons in their outer shell

The long metal periods are divided into the **transition metals**, **lanthanides** and **actinides**

Hydrogen is difficult to place, however it is placed in group 1 because it displays some of the same characteristics as these elements, although it is a non-metal

Helium is still a noble gas because its outer shell is filled by 2 electrons

1	2											3	4	5	6	7	0
1 H 1.01																	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 36.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc 98.91	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.90	54 Xe 131.30
55 Cs 132.91	56 Ba 137.34	57† La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.21	76 Os 190.21	77 Ir 192.22	78 Pt 195.09	79 Au 196.97	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.98	84 Po (210)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89‡ Ac (227)															
			†	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm 146.92	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.92	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
			‡	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (254)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)



3.1.2 - Distinguish between the terms group and period

Group - A vertical column of elements.

These have been classified in a number of ways - IB numbers them 1 to 7, with the noble gases being group 0. Some groups have names, such as Alkali metals (group 1) and Halogens (groups 7). Groups 3 to 6 have both metal and non-metal elements. The metalloids (B, Si, Ge, As, Sb, Te and Po) have characteristics of both metals and non-metals.

Period - A horizontal row of elements

These are numbered 1 to 7. The number matches the number of its outer shell electrons. Elements of the same period have the same number of occupied electron shells

1		2												3		4		5		6		7		0											
1 H 1.01				<div>Atomic number</div> <div>Element</div> <div>Atomic mass</div>																				2 He 4.00											
3 Li 6.94		4 Be 9.01												5 B 10.81		6 C 12.01		7 N 14.01		8 O 16.00		9 F 19.00		10 Ne 20.18											
11 Na 22.99		12 Mg 24.31												13 Al 26.98		14 Si 28.09		15 P 30.97		16 S 32.06		17 Cl 35.45		18 Ar 39.95											
19 K 39.10		20 Ca 40.08		21 Sc 44.96		22 Ti 47.90		23 V 50.94		24 Cr 52.00		25 Mn 54.94		26 Fe 55.85		27 Co 58.93		28 Ni 58.71		29 Cu 63.55		30 Zn 65.37		31 Ga 69.72		32 Ge 72.59		33 As 74.92		34 Se 78.96		35 Br 79.90		36 Kr 83.80	
37 Rb 85.47		38 Sr 87.62		39 Y 88.91		40 Zr 91.22		41 Nb 92.91		42 Mo 95.94		43 Tc 98.91		44 Ru 101.07		45 Rh 102.91		46 Pd 106.42		47 Ag 107.87		48 Cd 112.40		49 In 114.82		50 Sn 118.69		51 Sb 121.75		52 Te 127.60		53 I 126.90		54 Xe 131.30	
55 Cs 132.91		56 Ba 137.34		57-71 La 138.91		72 Hf 178.49		73 Ta 180.95		74 W 183.85		75 Re 186.21		76 Os 190.21		77 Ir 192.22		78 Pt 195.09		79 Au 196.97		80 Hg 200.59		81 Tl 204.37		82 Pb 207.19		83 Bi 208.98		84 Po (210)		85 At (210)		86 Rn (222)	
87 Fr (223)		88 Ra (226)		89-103 Ac (227)																															

e.g. Sulfur is in group 6 and period 3

Its electron arrangement is 2.8.6 (6 outer electrons, 3 shells)

1 st Shell	2 nd Shell	3 rd Shell	4 th Shell
2	8	8	2

** The fourth shell can hold more electrons, but at SL, you will only use up to two

3.1.4 - Apply the relationship between the number of electrons in the highest occupied energy level for an element and its position in the periodic table

Group Number

- The same as the number of electrons in the outer shell
- Group 1 = 1 outer shell electron

Period Number

- The same as the number of shells in the atom
- All except the outer shell will be full

