

Combined Science - Chemistry - Key Stage 4

Atomic Structure & the Periodic Table

Comparing the reactivities of group 1 and 7

Dr Patel



Periodic Table of Elements

Key:

relative atomic mass →

Name →

Atomic symbol

Atomic (proton number)

1 H hydrogen 1																	4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[97] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[267] Rf rutherfordium 104	[270] Db dubnium 105	[269] Sg seaborgium 106	[270] Bh bohrium 107	[270] Hs hassium 108	[278] Mt meitnerium 109	[281] Ds darmstadtium 110	[281] Rg roentgenium 87	[285] Cn copernicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[293] Ts tennessine 117	[294] Og oganesson 118



Independent task

A student has written the following answer to **describe and explain** the reactivity of group 1 metals. However, they've made lots of mistakes. Can you correct them?

'As you go down group 1, reactivity decreases because it gets harder to gain an electron to the outer shell.

This is because as you go down group 1, the outer shell gets closer to the positive nucleus, meaning that there is a weaker force of attraction between the nucleus and the positive electrons on the inner shell.

There is also less electron shielding as you go down group 1, because there are more inner shell electrons, which repel the outer shell electron.

All of these reasons mean that as you go down group 1 the outer shell electron is harder to loose'



Independent task

A student has written the following answer to **describe and explain** the reactivity of group 7 elements. However, they've made lots of mistakes. Can you correct them?

'As you go down group 7, reactivity increases because it gets harder to lose an electron from the outer shell.

This is because as you go down group 7, the outer shell gets closer to the positive nucleus, meaning that there is a stronger force of attraction between the nucleus and the positive electrons on the inner shell.

There is also less electron shielding as you go down group 1, because there are less inner shell electrons, to repel any incoming electrons to the outta shell.

All of these reasons mean that as you go down group 1, it is harder to lose an electron from the outer shell.



Reactivity increases

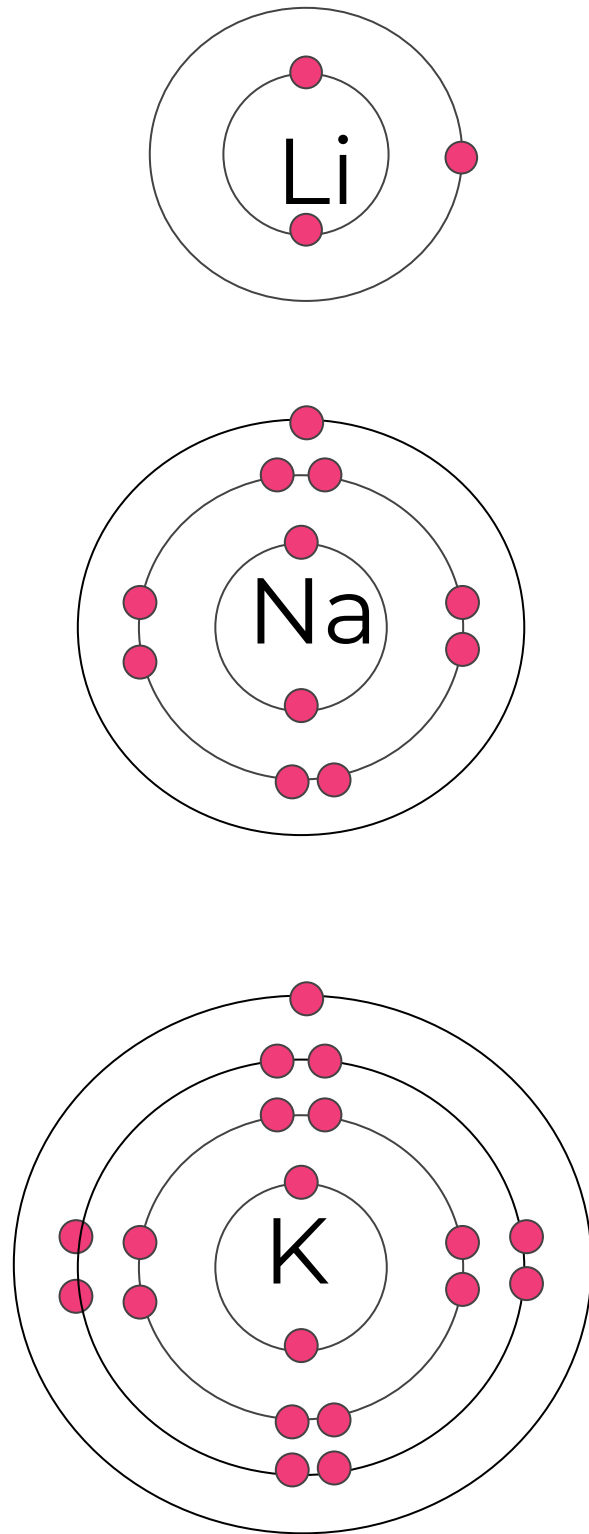


Image source Dr Patel

Group 1 only	Both	Group 7 only

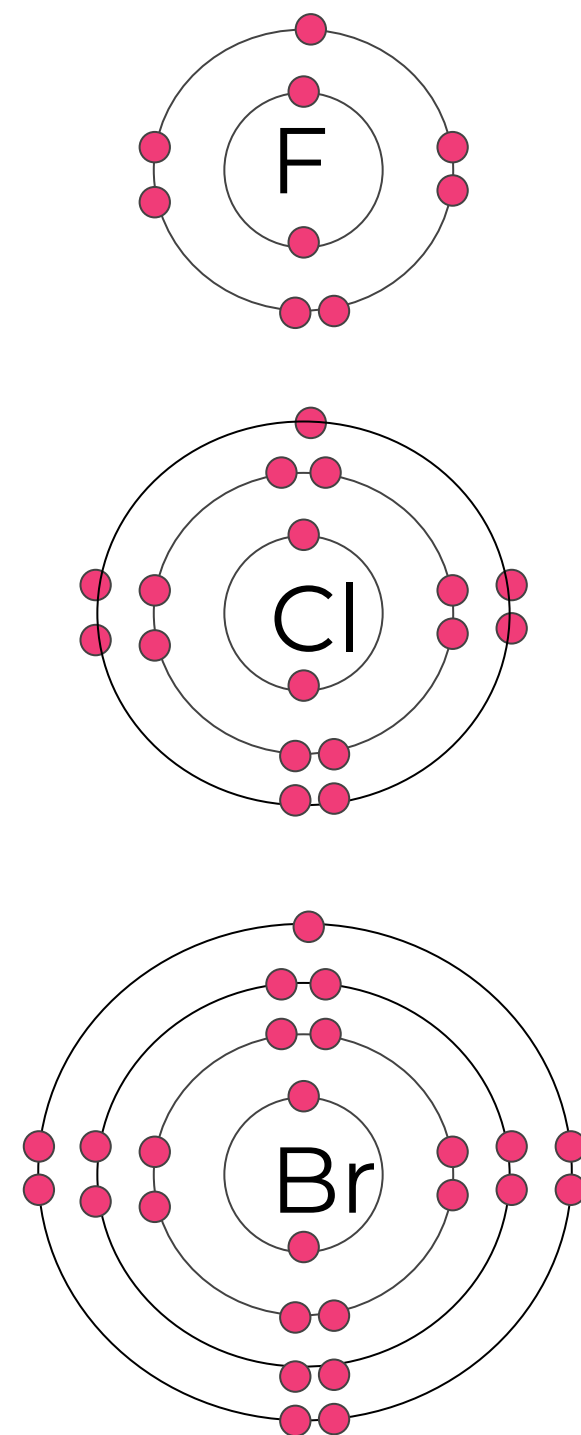


Image source Dr Patel

Reactivity decreases



Independent practice

Explain why group 1 elements increase in reactivity as you go down the group, but group 7 elements decrease.

