Combined Science - Chemistry - Key Stage 4

Atomic Structure & the Periodic Table

Atomic structure review lesson

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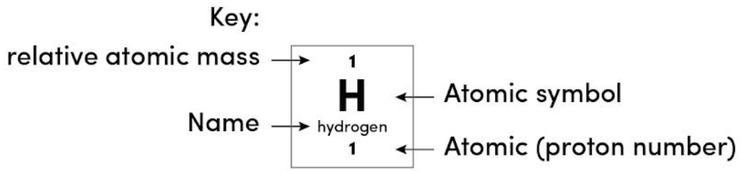
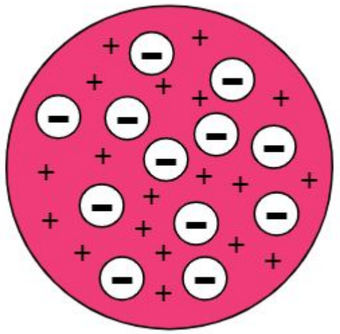
Periodic Table of Elements

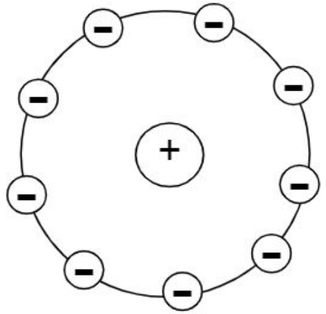


1 H hydrogen 1																	4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 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 copemicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[293] Ts tennessine 117	[294] Og organesson 118

Atoms and Subatomic particle key facts

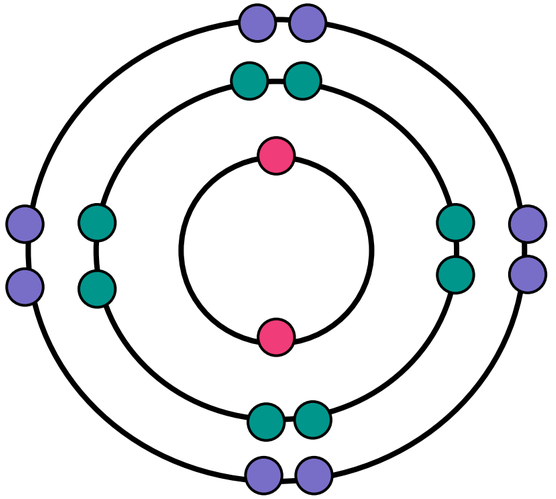
- Elements are made of one type of atom
- Protons: +1, mass 1, nucleus
- Neutrons: 0, mass 1, nucleus
- Electrons: -1, mass 1/2000, shells
- Atomic mass = number of protons and neutrons
- Atomic number = number of protons (same as electrons)
- Isotope - same number of protons and a different number of neutrons
- Relative atomic mass = $\frac{(\%\text{ of isotope 1} \times \text{mass}_1)}{100} + \frac{(\%\text{ of isotope 2} \times \text{mass}_2)}{100}$





Molecules and ions

- Diatomic molecule = two atoms joined together
- First electron shell = 2 electrons
- Second and third electron shells = 8 electrons
- Metals lose electrons from their outer shell
- Non-metals gain electrons to their outer shell
- Metals form positive ions
- Non-metals form negative ions
- Ion - an atom that has lost or gained outer shell electrons



Periodic table key facts

- Metals on the left, non-metals on the right of the staircase
- Groups = columns, elements have similar properties
- Group = number represents the number of electrons on the outer shell
- Periods = rows (represent number of electron shells)
- Group 1 - reactivity increases as you go down the group
- Group 7 - reactivity decreases as you go down the group
- Noble gases - unreactive, full outer shell
- Group 7 melting and boiling points - increase
- Group 1 - low density

Independent task

Create at least 5 flashcards using the key facts shown at the start of today's lesson. You must choose 5 facts you'd forgotten or find it difficult to remember.

Do:

- Start with the key facts you don't know!
- Use images
- Use colour
- Use keywords
- Keep it concise
- Be precise
- Make them neat
- Use them!

Don't

- Use full sentences
- Rush

Independent practice

1. Sulphur has 2 naturally occurring isotopes:

   94.99% of mass number 32. 5.01% of mass number 34.

   Calculate the relative atomic mass of Sulphur. Give your answer to 1 decimal place.

2. Copper has two naturally occurring isotopes.

   69% of all Copper has a mass number of 63. 31% of all Copper has a mass number of 65

   Calculate RAM to 3 significant figures.

Independent practice

3. Magnesium has three naturally occurring isotopes.

   79% of all Magnesium is Mg^{24}

   11% of all Magnesium is Mg^{25}

   10% of all Magnesium is Mg^{26}

   Calculate the RAM of Mg. Give your answer to 3 significant figures

4. Silicon has 3 naturally occurring isotopes. Calculate the RAM to 3 decimal places.

   92% of Silicon is Si^{28}

   5.5% of all Silicon is Si^{29}

   2.5% of the sample is Si^{30}