

Key points to learn

1. Atom	Smallest part of an element that can exist Hydrogen atoms (4H) $(\text{H}) (\text{H}) (\text{H}) (\text{H})$
2. Molecule	Two or more atoms chemically bonded Hydrogen molecule (H_2) $(\text{H}) (\text{H})$ Water molecule (H_2O) $(\text{H}) (\text{H}) (\text{O})$
3. Element	Only one type or atom present. Can be single atoms or molecules Both examples of the (N_2) $(\text{N}) (\text{N})$ Nitrogen element (N) (N)
4. Compound	Two or more different elements chemically bonded Carbon dioxide (CO_2) $(\text{O}) (\text{O}) (\text{C})$ Methane (CH_4) $(\text{H}) (\text{H}) (\text{H}) (\text{H}) (\text{C})$
5. Nuclear atom model	<ul style="list-style-type: none"> Electrons orbit Protons and neutrons in nucleus Number of protons = electrons
6. Nucleus	The centre of the atom. Contains neutrons and protons
7. Proton	Charge of +1. Mass of 1. Found inside the nucleus
8. Neutron	Charge of 0. Mass of 1. Found inside the nucleus
9. Electron	Charge of -1. Mass of almost 0. Found orbiting around the nucleus

Key points to learn

10. Mixture	Two or more chemicals not chemically bonded Used to separate mixtures. Ones you need to know: Filtration - get an insoluble solid from a liquid Crystallisation - get a soluble solid from a liquid by evaporating liquid off Distillation - get a pure liquid from a mixture of liquids Chromatography - separate mixtures of coloured compounds
11. Separation techniques	Where electrons are found. The shells can each hold this many electrons maximum: 2,8,8
12. Electron energy levels	A list of all the elements in order or atomic number. Columns called Groups . Rows called Periods
13. Periodic Table	In a chemical reaction the total mass of reactants = total mass of products
14. Conservation of mass	Number of neutrons + protons $\Rightarrow 11B$ $6 \text{ Neutrons} + 5 \text{ Protons}$
15. Mass number	Number of protons $\Rightarrow 5B$ 5 Protons
16. Atomic number	Same number of protons different number of neutrons
17. Isotope	Atom where number of protons is not equal to electrons (+ve or -ve)
18. Ion	Early model: ball of positive charge with electrons in it
19. Plum pudding atom model	

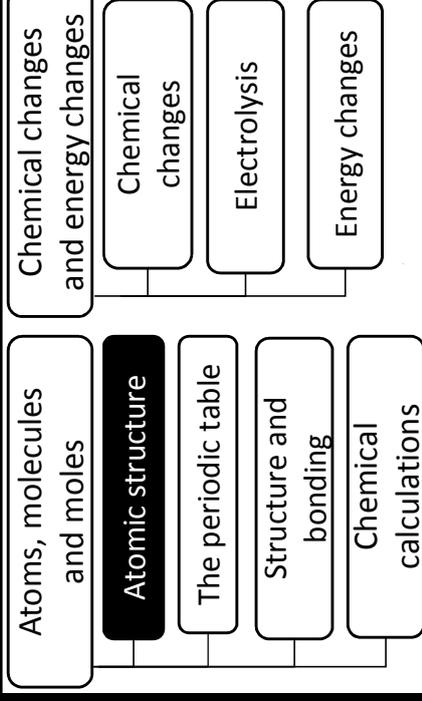
Trilogy C1: Atomic structure

Collins revision guide: Atomic structure and the periodic table

Knowledge Organiser



Big picture (Chemistry Paper 1)



Background

Atoms are the building blocks of us, our world and our universe. Everything that we can touch is made of atoms.

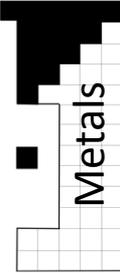
The Periodic Table organises them into a way that helps us make sense of the physical world.

Even though they make everything atoms are mostly (99.9%) empty space. If an atom was as big as Wembley, the nucleus would be pea-sized.

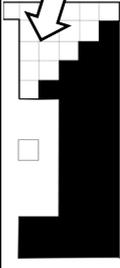
Additional information

A great deal of this topic is also covered in your Paper 1, Physics lessons during Electricity and Radioactivity.

Key points to learn

1. Chemical symbol	An abbreviated name for every element. Maximum of two letters always starts with a capital letter
2 Reactivity	How easily an element will react
3. Group	Columns in the Periodic Table. Elements in the same group have similar properties
	Tells you how many electrons that atom has in its outer shell
4. Period	Rows in the periodic table
5. Mass number	Tells you how many electron shells that atom has
6. Atomic number	Number of neutrons + protons $\rightarrow 7$ <i>Li</i>
	Number of protons $\rightarrow 3$ <i>Li</i>
7. Ion	Atom where number of protons is not equal to electrons (+ 've or - 've)
8. Mendeleev	Scientist who placed elements in order of atomic weight but left gaps for undiscovered elements
	Have delocalised (free) electrons that can move
9. Metals	Atoms lose electrons and become positive (+ 've) ions
	 Metals

Key points to learn

10. Non-metals	Have electrons that cannot move
	Nearly always gain electrons and become (negative - 've) ions
11. Group 0	 Non-metals
	He, Ne, Ar, Kr, Xe, Rn
Noble gases	Unreactive: full outer shell
	Boiling point increases as you go down the group
Li, Na, K, Rb, Cs, Fr	Very reactive: only one electron in their outer shell
	Reactivity increases as you go down the group
12. Group 1	React with oxygen to give metal oxides eg MgO
	React with water to give metal hydroxide (alkali) and hydrogen eg MgOH
Alkali metals	React with chlorine to give metal chloride eg MgCl
	F, Cl, Br, I
13. Group 7	Melting and boiling point increase as you go down group
	Reactivity decreases as you go down the group
Halogens	A more reactive halogen will displace a less reactive one

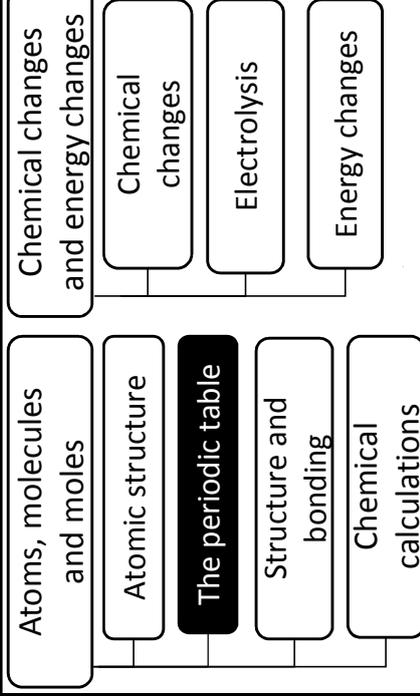
Trilogy C2: The Periodic Table

Collins revision guide: Atomic structure and the periodic table

Knowledge Organiser



Big picture (Chemistry Paper 1)



Background

The periodic table is amazing because it allows us to predict and explain the properties of elements even before they are discovered.

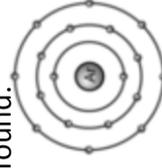
Maths skills

Losing - 've charge makes you more + 've.
Gaining - 've charge makes you more - 've.

Additional information

Remember
Electron energy levels

Where electrons are found.
The shells can each hold this many electrons
maximum: 2,8,8





Quick fire questions;

This worksheet is fully supported by a video tutorial; https://youtu.be/mjIPJ_c018

1. What element is represented by W?
2. What element is represented by Na?
3. What element is represented by Si?
4. What element is represented by Co?
5. What element is represented by Fe?
6. What group is oxygen in?
7. What group is argon in?
8. What group is potassium in?
9. What group is sulfur in?
10. What group is chlorine in?
11. What period is phosphorous in?
12. What period is nitrogen in?
13. What period is calcium in?
14. What period is gallium in?
15. What period is carbon in?
16. What is a compound?
17. What is a mixture?
18. Give three ways of separating out mixtures.
19. What is the name for CO_2 ?
20. What is the name for H_2O ?
21. What did Chadwick discover?
22. What experiment did Rutherford do?
23. What type of foil did Rutherford use?
24. What did Rutherford fire at the foil?
25. What model of the atom was Rutherford testing?
26. What did Rutherford discover?
27. What was the new model of the atom called?
28. Where are electrons?
29. Where are protons?
30. Where are neutrons?
31. What charge do protons have?
32. What charge do neutrons have?
33. What charge do electrons have?
34. What mass do protons have?



35. What mass do electrons have?
36. What mass do neutrons have?
37. What does the atomic number tell us?
38. What does the mass number tell us?
39. How do you find the number of protons in an atom?
40. How do you find the number of electrons in an atom?
41. How do you find the number of neutrons in an atom?
42. How do you find the number of protons in an ion?
43. How do you find the number of electrons in an ion?
44. How do you find the number of neutrons in an ion?
45. How many electrons fit on the first shell?
46. How many electrons fit on the second shell?
47. How many electrons fit on the third shell?
48. What element has the electronic structure 2,8,1?
49. What element has the electronic structure 2,3?
50. What element has the electronic structure 2,8,5?
51. What element has the electronic structure 2?
52. What element has the electronic structure 2,8,8,1?
53. What type of ions do metals form (positive/negative)?
54. What type of ions do non-metals form (positive/negative)?
55. What bonding occurs between two non-metals?
56. What bonding occurs between a metal and a non-metal?
57. What happens to the electrons in covalent bonding?
58. What happens to the electrons in ionic bonding?
59. How did Mendeleev organise his periodic table?
60. Why did Mendeleev leave gaps in his periodic table?
61. On which side (left/right) of the periodic table are metals found?
62. On which side (left/right) of the periodic table are non-metals found?
63. What is another name for group 1?
64. How reactive are group 1 elements?
65. How does reactivity change as you go down group 1?
66. How does sodium react with water?
67. How does sodium react with oxygen?
68. How does sodium react with chlorine?
69. What is another name for group 0/8?
70. How reactive are group 0 elements?
71. How does boiling point change as you go down group 0?
72. What is another name for group 7?



73. How reactive are group 7 elements?
74. How does boiling point change as you go down group 7?
75. How does reactivity change as you go down group 7?

GCSE Chemistry Separate Science Only

76. What are the properties of transition metals?
77. Give a use for transition metals
78. What colour does iron (II) go?
79. What colour does iron (III) go?
80. What colour does copper (II) go?