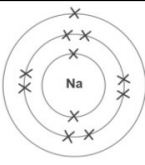

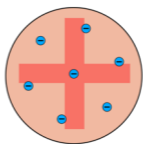
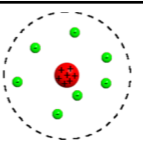
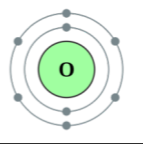


CHEMISTRY – YEAR 9 – ATOMIC STRUCTURE & THE PERIODIC TABLE

A ATOMIC STRUCTURE		
1	Atom	The smallest part of an element. Neutral. Number of protons = number of electrons. Radius roughly 0.1nm
2	Element	One type of atom. Examples: Hydrogen H ₂ , Helium He, Nitrogen N ₂ .
3	Compound	Two or more elements chemically bonded. E.g. water H ₂ O,
4	Proton	Positive subatomic particle found in the nucleus. Charge +1. Relative mass 1
5	Neutron	Neutral subatomic particle found in the nucleus. Charge 0. Relative mass 1.
6	Electron	Negative subatomic particle found around the nucleus in shells/energy levels. Charge -1. Relative mass 0 (negligible)
7	Shells	Energy levels that surround the nucleus and contain electrons. Electrons must occupy the lowest available energy levels (shells) first.
8	Octet rule	2,8,8. Shells must be filled from the inner shell to the outer shell. 1 st shell up to 2, 2 nd shell up to 8, 3 rd shell up to 8.

A ATOMIC STRUCTURE		
9	Electron configuration	A representation of how shells are filled in an element. E.g. 2,8,1 for sodium (11 electrons).
10	Dot-cross diagram for an atom	E.g. Sodium has 11 electrons, 1 st shell : 2, 2 nd shell: 8, 3 rd shell: 1 
11	Isotopes	Atoms of the same element which have different numbers of neutrons.
12	Calculating relative atomic mass	$A_r = \frac{\sum (\text{Isotope abundance} \times \text{Isotope mass number})}{\sum \text{Isotope abundance}}$

B HISTORY OF THE ATOM		
1	Dalton's atom 	Atom was described as a tiny sphere that could not be divided.
2	Plum pudding model 	Thompson discovered the electron. Thought the atom was a sphere of positive charge with negative electrons embedded in it.
3	Nuclear Model 	Rutherford discovered the nucleus by firing alpha particles at a gold sheet.
4	Bohr model 	Proposed electrons orbit the nucleus in shells.
5	Chadwick	Discovered the neutron – led to explanation of isotopes.

CHEMISTRY – YEAR 9 – ATOMIC STRUCTURE & THE PERIODIC TABLE

B PERIODIC TABLE		
1	Modern periodic table	Contains all known elements. Currently 118. Arranged by atomic number (No. of protons). Elements in same group have similar properties.
2	Mendeleev's table	Early period table arranged in order of atomic weight. Gaps were left for undiscovered elements. Discovery of neutrons and isotopes explained why ordering by atomic weight was not always correct.
3	Newland's Octaves	He arranged all the elements known at the time into a table in order of atomic weight.
4	Group number	Columns in the periodic table. All elements in a group have the same number of valence (outer shell) electrons.
5	Period	Rows in the periodic table.
6	Mass number	Sum of the protons and neutrons in an atom.
7	Atomic number	Number of protons in an atom. Also equal to the number of electrons in a neutral atom.
8	Metals and non-metals	Metals found on left of periodic table but non-metals are found on the top right. Metals form positive ions. Non-metals form negative ions.

B GROUPS		
1	Group 1	The alkali metals. 1 electron in outer shell. More reactive as you go down the group. Reacts with water to form metal hydroxide and hydrogen: E.g. $2\text{Na(s)} + 2\text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)} + \text{H}_2\text{(g)}$ Reacts with halogens to form salts: E.g. $2\text{Na(s)} + \text{Cl}_2\text{(g)} \rightarrow 2\text{NaCl(s)}$ Reacts with oxygen to form oxides: E.g. $2\text{Na(s)} + \text{O}_2\text{(g)} \rightarrow \text{Na}_2\text{O(s)}$
2	Group 2	The alkali earth metals. Forms +2 ions.
3	Transition metals	Used in goods and as catalysts in industry. Many form coloured ions with different charges. Properties are different to group 1 metals. Good conductors of heat & electricity; Malleable, high m.p (except mercury); usually hard & tough; high density.
4	Group 7	The halogens. Each have 7 electrons in outer shell. Reactivity decreases as you go down the group. As you go down the group, melting point, boiling point and mass all increase. A more reactive halogen can displace a less reactive halogen from its group. E.g. $\text{Cl}_2 + 2\text{KI} \rightarrow 2\text{KCl} + \text{I}_2$
5	Group 0	The noble gases. All have a full outer shell so very stable and unreactive. Boiling point increases going down the group as the atoms get larger.