

Basic Concepts

The key areas of study in this topic are:

- Revise basic chemical concepts
- Learn about isotopes and how to calculate relative atomic mass

By the end of this topic I should be able to:

	Start	End
0.1 Recall the formulae of elements, simple compounds and ions		
0.2 Write word equations		
0.3 Write balanced chemical equations, including the use of the state symbols		
0.5 Describe the use of hazard symbols on containers a to indicate the dangers associated with the contents b to inform people about safe-working precautions with these substances in the laboratory		
0.6 Evaluate the risks in a practical procedure and suggest suitable precautions for a range of practicals (to be developed throughout the course)		
2.1 Describe the arrangement, movement and the relative energy of particles in each of the three states of matter: solid, liquid and gas		
2.2 Recall the names used for the interconversions between the three states of matter, recognising that these are physical changes: contrasted with chemical reactions that result in chemical changes		
2.3 Explain the changes in arrangement, movement and energy of particles during these interconversions		
2.4 Predict the physical state of a substance under specified conditions, given suitable data		
1.1 Describe how the Dalton model of an atom has changed over time because of the discovery of subatomic particles		
1.2 Describe the structure of an atom as a nucleus containing protons and neutrons, surrounded by electrons in shells		
1.3 Recall the relative charge and relative mass of protons, neutrons and electrons		
1.4 Explain why atoms contain equal numbers of protons and electrons		
1.5 Describe the nucleus of an atom as very small compared to the overall size of the atom		
1.6 Recall that most of the mass of an atom is concentrated in the nucleus		
1.7 Recall the meaning of the term mass number of an atom		
1.8 Describe atoms of a given element as having the same number of protons in the nucleus and that this number is unique to that element		
1.9 Describe isotopes as different atoms of the same element containing the same number of protons but different numbers of neutrons in their nuclei		

1.10 Calculate the numbers of protons, neutrons and electrons in atoms given the atomic number and mass number		
1.11 Explain how the existence of isotopes results in relative atomic masses of some elements not being whole numbers		
1.12 Calculate the relative atomic mass of an element from the relative masses and abundances of its isotopes		
1.18 Identify elements as metals or non-metals according to their position in the periodic table, explaining this division in terms of the atomic structures of the elements		
1.19 Predict the electronic configurations of the first 20 elements in the periodic table as diagrams and in the form, for example 2.8.1		
1.20 Explain how the electronic configuration of an element is related to its position in the periodic table		
1.21 Explain how ionic bonds are formed by the transfer of electrons between atoms to produce cations and anions, including the use of dot and cross diagrams		
1.22 Recall that an ion is an atom or group of atoms with a positive or negative charge		
1.23 Calculate the numbers of protons, neutrons and electrons in simple ions given the atomic number and mass number		
1.24 Explain the formation of ions in ionic compounds from their atoms, limited to compounds of elements in groups 1, 2, 6 and 7		
1.25 Explain the use of the endings –ide and –ate in the names of compounds		
1.26 Deduce the formulae of ionic compounds (including oxides, hydroxides, halides, nitrates, carbonates and sulfates) given the formulae of the constituent ions		
1.28 Explain how a covalent bond is formed when a pair of electrons is shared between two atoms		
1.29 Recall that covalent bonding results in the formation of molecules		
1.30 Recall the typical size (order of magnitude) of atoms and small molecules		
1.31 Explain the formation of simple molecular, covalent substances, using dot and cross diagrams, including hydrogen, hydrogen chloride, water, methane, oxygen and carbon dioxide		

