



Year: 10

Topic: 2.2 ATOMIC STRUCTURE AND THE PERIODIC TABLE

Knowledge and Understanding to be developed:

This topic enables learners to understand the structure of the atom in detail and to link atomic and mass numbers to those of the sub-atomic particles. The arrangement of elements in the Periodic Table allows trends in properties of elements to be investigated.

They can identify patterns and trends and use these to make predictions. Writing chemical equations will enable them to correctly use formulae, symbols and correct nomenclature.

Numerical Skills : Simple order of magnitude calculations should be used in comparing the sizes of atoms with nuclei and with everyday objects. Learners use mathematical skills in this topic to balance ionic formulae and chemical equations. Trends in numerical data are explored and used to predict missing values

Homework booklet in pupils assessment file.

Key Terms to be learned this topic:

Protons Electrons

Isotope neutrons

Atomic number Mass number

Metalloids Electronic structure

Trend Physical properties

Chemical Properties

Learning Objectives and Outcomes:

Students should be able to demonstrate and apply their knowledge and understanding of :

- (a) atoms containing a positively charged nucleus with orbiting negatively charged electrons
- (b) atomic nuclei containing protons and neutrons
- (c) the relative masses and relative charges of protons, neutrons and electrons
- (d) atoms having no overall electrical charge
- (e) the terms atomic number, mass number and isotope
- (f) how the numbers of protons, neutrons and electrons present in an atom are related to its atomic number and mass number
- (g) elements being arranged in order of increasing atomic number and in groups and periods in the modern Periodic Table, with elements having similar properties appearing in the same groups
- (h) metals being found to the left and centre of the Periodic Table and non-metals to the right, with elements having intermediate properties appearing between the metals and non-metals in each period
- (i) the electronic structures of the first 20 elements
- (j) how the electronic structure of any element is related to its position in the Periodic Table
- (k) the similarities and trends in physical and chemical properties of elements in the same group as illustrated by Group 1 and Group 7
- (l) many reactions, including those of Group 1 elements and many of those of Group 7 elements, involve the loss or gain of electrons and the formation of charged ions
- (m) the trends in reactivity of Group 1 and Group 7 elements in terms of their readiness to lose or gain an electron
- (n) the reactions of the alkali metals with air/oxygen, the halogens and water
- (o) the test used to identify hydrogen gas
- (p) the reactions of halogens with alkali metals and with iron
- (q) the relative reactivities of chlorine, bromine and iodine as demonstrated by displacement reactions
- (r) the properties and uses of chlorine and iodine
- (s) the identification of Li^+ , Na^+ , K^+ , Ca^{2+} and Ba^{2+} ions by flame tests and Cl^- , Br^- and I^- ions by their reactions with silver nitrate solution (including ionic equations)
- (t) the unreactive nature of the Group 0 gases and the uses of helium, neon and argon

