



Year: 10

Topic: 2.1 The nature of substances and chemical reactions

Knowledge and Understanding to be developed:

This topic brings together the fundamental ideas of Chemistry. It investigates the ideas of elements as pure substances; compounds as substances in which different atoms are chemically joined together and mixtures as substances in which particles are not chemically joined. It explores the ideas of separation of substances..

Skills : calculate percentage compositions and relative atomic and molecular masses. Use fractions in the calculations of Rf values. Higher tier learners will be able to rearrange the subject of equations in mole calculations and combine these principles with the ideas of ratios in reacting mass calculations

Key Terms to be learned this topic:

Elements	Compounds
Mixture	atom
Chromatography	Distillation
Relative formula mass	mole
Percentage composition	Reacting mass
	Percentage yield

Homework booklet in pupils assessment file.

**Learning Objectives and Outcomes:
Students should be able to :**

- (a) elements as substances that cannot be broken down into simpler substances by chemical means and as the basic building blocks of all substances
- (b) elements as substances made up of only one type of atom
- (c) compounds as substances made of two or more different types of atom that are chemically joined and having completely different properties to its constituent elements
- (d) how to represent elements using chemical symbols and simple molecules using chemical formulae
- (e) how to represent simple molecules using a diagram and key
- (f) how to write the formulae of ionic compounds given the formulae of the ions they contain
- (g) relative atomic mass and relative molecular (formula) mass
- (h) the percentage composition of compounds
- (i) atoms/molecules in mixtures not being chemically joined and mixtures being easily separated by physical processes such as filtration, evaporation, chromatography and distillation
- (j) chromatographic data analysis and Rf values
- (k) chemical reactions as a process of re-arrangement of the atoms present in the reactants to form one or more products, which have the same total number of each type of atom as the reactants
- (l) colour changes, temperature changes (exothermic/endothermic) and effervescence as evidence that a chemical reaction has taken place
- (m) how to represent chemical reactions using word equations
- (n) how to represent chemical reactions using balanced chemical equations where the total relative mass of reactants and products is equal
- (o) the percentage yield of a chemical reaction
- (p) how to calculate the formula of a compound from reacting mass data
- (q) how to calculate the masses of reactants or products from a balanced chemical equation
- (r) the Avogadro constant and the mole and how to convert amount of substance in grams to moles and vice versa

