



Learning Journey – C1 Atomic Structure and the Periodic Table

A Simple Model of the Atom

Ad Astra

What have I done previously in my learning journey?			
Previously....	You have learnt previously about particles. This has involved: - Describing the properties of different states of matter. You have also learnt about atoms. This has involved: - Describing a simple model of the atom - Describing differences between atoms, elements and compounds.		
In this topic...	You will learn more about atoms as the building blocks of all states of matter. This will include: - Describing how the model of the atoms has changed over time as new evidence has become available. - Calculating the numbers of the different sub-atomic particles in an atom. Linking the position of an element on the periodic table to its atomic structure.		
We will develop our learning by studying the following each lesson:		British Values	Skills in Science checklist
C1.01 Atoms - State the definition for the term 'atom'. - State the radius of an atom. - Describe how the radius of a nucleus compares to the radius of an atom. - State the relative electrical charge and mass of protons, neutrons and electrons. - Identify the atomic number and mass number of an atom of an element using the periodic table. - Calculate the number of protons, neutrons and electrons in an atom or ion, given its atomic number and mass number. - Explain why atoms have no overall electrical charge. - Identify an element from its chemical symbol using the periodic table. Relate the size and scale of atoms to objects in the physical world.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
C1.02 Elements - State the definition for the term 'element'. - Use the names and symbols of the first 20 elements, the elements in Groups 1 and 7 and other key elements. - Describe how the number of protons in an element relates to its atomic number - Describe how the number of protons and neutrons in an element relate to its mass number. - Define the term 'isotope'. - Explain how relative atomic mass is calculated based on the abundance of the isotopes of the element. - Calculate the relative atomic mass of an element given the percentage abundance of its isotopes.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
C1.03 Compounds - State the definition for the term 'compound'. - Explain how compounds are formed. - Name compounds from given formulae or symbol equations.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
C1.04 Chemical Equations - Write word equations for given chemical reactions. - Write formulae and balanced symbol equations for given chemical reactions. - Write balanced half equations and ionic equations where appropriate [HT only].		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills
C1.05 Mixtures and Chromatography - State the definition for the term 'mixture'. - Describe the physical processes used to separate a mixture of pigments. - Explain how chromatography works to separate a mixture.		☐ Democracy ☐ Rule of law ☐ Tolerance ☐ Individual liberty ☐ Mutual respect	☐ Development of scientific thinking ☐ Experimental skills and strategies ☐ Analysis and evaluation ☐ Scientific literacy ☐ Maths skills



Key Words									
Atomic number	Electron	Mass number	Neutron	Proton	Abundance	Element	Isotope	Relative atomic mass (Mr)	Symbol
Chemical formula	Compound	Molecule	Reactant	Subscript	Balance	Coefficient	Ionic equation	Product	Symbol equation
Chromato-graph	Chromato-graphy	Mobile phase	Pigment	Solvent	Distillation	Filtration	Fractionation	Purification	Residue
Alpha scattering	Electron shell	Nuclear model	Plum pudding model	Rutherford	Electron arrangement	Energy level	Ion	Outer shell	Valance electron
Future Learning		This topic provides the foundation for many areas of further study in GCSE and post-16 Chemistry. You will build on your understanding of atomic structure by studying ionic, covalent and metallic bonding, using electronic structure to explain why elements react and form compounds. You will develop a deeper understanding of the Periodic Table, learning how atomic structure explains trends in the properties and reactivity of elements. You will also use your knowledge of atoms, elements, compounds and chemical equations to explain quantitative chemistry, rates of reaction and chemical changes. At A Level, you will extend these ideas further by studying atomic models, electron configurations, bonding theories and how the structure of atoms influences the physical and chemical properties of substances.							
In careers		The ideas you learn in this topic are important in many careers involving chemistry, medicine and technology. • Chemical Engineers use their understanding of atoms, elements and compounds to design processes for making fuels, medicines and everyday products (average salary £35,000–£70,000+). • Analytical Chemists identify and test substances using techniques such as chromatography and other separation methods (average salary £25,000–£45,000+). • Pharmacists use their knowledge of elements, compounds and chemical reactions to prepare and dispense medicines safely (average salary £43,000–£65,000+). • Materials Scientists study atomic structure to develop new materials for electronics, transport and construction (average salary £30,000–£55,000+). • Nuclear Scientists and Engineers use their understanding of atomic structure and radiation to generate energy and develop medical technologies (average salary £35,000–£80,000+). Understanding atoms and the Periodic Table provides the foundation for careers in chemistry, medicine, engineering, materials science, forensic science and research, where scientists use evidence and mathematical skills to solve real-world problems.							