

Scheme of Learning: Atomic Structure and the Periodic Table

Topic Sequence:

1	2	3	4	5	6	7	8	9	10
Cell Biology	Particle Model of Matter	Infection & Response	Atomic Structure & the Periodic Table	Atomic Structure (Physics)	Bonding & Structure	Energy	Bioenergetics	Rates of Reaction	Chemistry of the Atmosphere

Topic Overview:

The periodic table provides chemists with a structured organisation of the known chemical elements from which they can make sense of their physical and chemical properties. The historical development of the periodic table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges. The arrangement of elements in the modern periodic table can be explained in terms of atomic structure which provides evidence for the model of a nuclear atom with electrons in energy levels.

Lesson Sequence:

We begin by building upon key stage three knowledge of elements, compounds and mixtures and experience a variety of separation techniques including filtration, chromatography, distillation and crystallisation.

We then look more closely at the atom, learning about sub-atomic particles and the scientific discoveries that lead to our current understanding of the atom's structure. We introduce the concept of atomic mass and isotopes before discovering how the periodic table came into existence through the work of Mendeleev and other scientists.

Once we have introduced ions and how the metals and non-metals vary in the ions they form, we spend the next few lessons focusing on groups in the periodic table. We look at the properties and trends of groups 1, 7, 0 and the transition metals.

The focus skill for this topic is 'compare'. We do this by comparing the groups in the periodic table, and the different models of the atom through history.

Sequence of Lessons:

1	Elements & Compounds
2	Chemical Equations & Mixtures
3	Filtration & Crystallisation
4	Distillation & Chromatography
5	History of the Atom
6	Atomic Structure
7	Relative Atomic Mass & Isotopes
8	Development of the Periodic Table mid-topic assessment
9	Ions, Metals & Non-Metals
10	Group 1 mid-topic assessment
11	Group 7
12	Group 0 & Transition Metals
13	Revision
14	Test

Supportive Reading:

Literacy tasks	Writing longer answer opportunities in various lessons and peer marking
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Assessment:

Knowledge: Multiple choice and short answer questions.

Application of Knowledge: Exam questions based on the skill of 'compare'.

Resources:

1	Worksheets in shared area folder
2	3 Demos: top pan balance, NaOH + CuSO ₄ , vinegar & baking powder, zip lock bag, approx. 4g iron wool, 4g plasticine, metre stick and fulcrum, tin tray (e.g. takeaway carton)
3	Class practical: rock salt
4	Demo: Simple distillation of ink and water. Class practical: Chromatography – variety of pens, paperclips, chromatography paper slips.
5	Worksheets in shared area folder
6	Worksheets in shared area folder
7	Worksheets in shared area folder
8	n/a
9	n/a
10	Group 1 metals, water trough & lid, universal indicator, scalpel, white tile
11	Dimple tiles, pipettes, Chlorine, bromine & iodine water, potassium chloride, bromine & iodide solutions
12	sodium hydroxide solution, solutions of Cu ²⁺ , Fe ²⁺ , Fe ³⁺ and transition metal sheets in filing cabinet
13	Resources in shared area folder
14	Test in shared area folder