

# Scheme of Learning: Atomic Structure (Physics)

## 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:

Ionising radiation is hazardous but can be very useful. Although radioactivity was discovered over a century ago, it took many nuclear physicists several decades to understand the structure of atoms, nuclear forces and stability. Early researchers suffered from their exposure to ionising radiation. Rules for radiological protection were first introduced in the 1930s and subsequently improved. Today radioactive materials are widely used in medicine, industry, agriculture and electrical power generation.

## Lesson Sequence:

We begin with a recap of the history of the atomic structure model and the diagram we use today. This was covered in topic on Atomic Structure and the Periodic Table as it is a fundamental idea behind most of the Chemistry topics and but also many of the Physics topics too. However, at this point we move away from the focus on electron shells and bonding and towards the nucleus with its protons and neutrons.

The topic then moves onto the idea that large, heavy atoms are unstable and will randomly decay to become a different element. This decay causes particles and energy to be emitted either as an alpha particle, a beta particle or a gamma wave (energy), possibly more than one of these at a time. The lessons then go on to look at the effect the emission of these particle has on the original nucleus.

Next in the topic we look at the different ways to measure radioactivity, including background radiation and consider the statistical constant that is the half-life of a radioactive element.

The uses of radioactivity and its associated risks are then considered; from tracers and medical applications to radio-carbon dating. Finally, the processes of nuclear fission and fusion are looked at in more detail.

## Sequence of Lessons:

1	Structure of the Atom
2	Radioactive Decay
3	Nuclear Equations
4	Activity & Half-Life
5	Dangers of Radiation – <i>mid-topic assessed question</i>
6	Uses of Radiation
7	Nuclear Fission & Fusion
8	Revision
9	Test

## Resources:

1	n/a
2	Summary Qs and comparison table
3	PT with mass numbers, decay worksheet
4	Skittles, big measuring cylinders x4, half-life questions
5	Background pie chart, exam Q, Geiger-Müller tube, counter
6	Uses of Radiation Qs
7	Fission & Fusion Qs (use the level 3 Qs for top set)
8	Resources in shared folder
9	Test in shared folder

## Supportive Reading:

TBC
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## Assessment:

**Knowledge:** Multiple choice and short answer questions.

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