SUBJECT: Physics YEAR: 11 MTP TITLE: Radiation HALF TERM: 1 NO. OF LESSONS (approx): 10

Deliberate and specific retrieval of expected prior knowledge (be specific)

Atoms and Elements: Atoms are the basic units of matter; each element consists of atoms with a specific number of protons.

Subatomic Particles: Atoms are composed of protons, neutrons, and electrons.

Atomic Number and Mass Number: The atomic number represents the number of protons, and the mass number is the total number of protons and neutrons.

Isotopes: Atoms of the same element with different numbers of neutrons.

Ions: Atoms that have gained or lost electrons, resulting in a charged particle.

Academic transformation (be specific)

Understand when radioactive decay and the different forms of radiation

Describe the different types of radiation and how far they traveling in air, what they can be stopped by and their ability to ionize

Complete decay equations for alpha and beta

Define the term half life

Calculate half lives

Explain the difference between contamination and irradiation

Describe precautions needed when handling radioactive isotopes

Evaluate the uses of radiation

Triple only: describe the process of nuclear fission and fusion

Personal transformation (2 or 3)

Historical Development: The discovery of radioactivity by Henri Becquerel and the subsequent research by Marie and Pierre Curie.

Real-World Applications: The use of radiation in medicine (e.g., cancer treatment), industry (e.g., sterilisation of equipment), and energy production (e.g., nuclear power).

Ethical Considerations: Debating the ethical implications of using radioactive materials, especially in medicine and energy production.

Can I Learning Questions

Can I recall the properties of alpha, beta and gamma radiation?

Can I complete decay equations for alpha and beta?

Can I define and calculate half lives?

Can I describe how each type of radiation can be considered dangerous?

Can I evaluate the uses of radiation?

Can I describe nuclear fission?

Literacy and Oracy

Group Discussions: Debate the pros and cons of nuclear energy and the use of radiation in medical treatments.
Presentations: Create presentations on the history of radioactivity or the applications of radiation in various fields. (HWK)
Reports: Write reports on the safety measures required when handling radioactive materials.
Interactive Resources:
BBC Bitesize: Nuclear Radiation
Save My Exams: Types of Radiation

Misconceptions (5 or 6 examples)

Misconception: Gamma radiation is the most dangerous because it is the most penetrating.
Clarification: While gamma radiation is highly penetrating, it is less ionising than alpha and beta radiation. The danger depends on the type of radiation and the exposure context.

Misconception: Alpha particles are the most dangerous type of radiation.
Clarification: Alpha particles are highly ionising but have low penetrating power, making them dangerous only if ingested or inhaled.

Misconception: All radiation is harmful.
Clarification: Low levels of radiation, such as