

Year 13 Exploring Physics Learning Programme 4

<p>The LORIC skill focus for his LP is: INITIATIVE. The Moral Virtues focus for this LP are: INTEGRITY and GRATITUDE.</p> <p>Integrity - Having strong moral principles. I will show integrity by taking responsibility for my actions. Gratitude - Feeling and expressing thanks. I will show gratitude by saying please and thank you.</p> <p>What will I be learning about in this Learning Programme? Pupils will explore the fundamental constituents of matter and radioactive decay, gaining insight into how subatomic interactions and binding energy govern both the stability of the nucleus and the massive energy releases in fission and fusion. In the medical imaging module, students will master the physics behind non-invasive diagnostic tools, examining how X-rays, ultrasound, PET scans, and MRIs interact with human tissue to produce detailed medical imagery.</p> <p>Where have I seen this learning before? This topic builds on the atomic structure topics studied at KS4 in both physics and chemistry.</p> <p>What could I use it for? This part of the course is useful for anyone wanting to study particle or nuclear physics, and is also useful for those wanting to study medicine.</p>		<p>Literacy Non-Negotiables:</p> <ul style="list-style-type: none"> • Capital letters must be used at the start of sentences and for the first letter of proper nouns • Full stops must be used at the end of a sentence • Question marks must be used at the end of a question • Apostrophes should only be used for possession or omission • Days of the week and months must be spelled correctly • Key words must be spelled correctly • Vocabulary to be taught using the Frayer model
<p>In LP4.1, I will know: 09/03/26 - (WK 2)</p> <p>How to describe the observations and conclusions from the alpha-particle scattering experiment; evidence of a small charged nucleus; How to describe the simple nuclear model of the atom, the strong nuclear force and the radius of nuclei; How to describe particles and their corresponding antiparticles, classification of leptons.</p>	<p>Frayer Model Words</p> <p>Isotope</p>	<p>Homework</p> <p>Nuclear and particle physics booklet</p>
<p>In LP4.2, I will know: 16/03/26 - (WK 1)</p> <p>How to describe the classification of hadrons; How to describe the simple quark model of hadrons in terms of up (u), down (d) and strange (s); How to describe beta-minus (β^-) decay and beta-plus (β^+) decay in terms of the quark model.</p>	<p>Frayer Model Words</p> <p>Fundamental Forces</p>	<p>Homework</p> <p>Nuclear and particle physics booklet</p>
<p>In LP4.3, I will know: 23/03/26 - (WK 2)</p> <p>How to describe α-particles, β-particles and γ-rays; nature, penetration and range of these radiations; How to describe the change in the nucleus during nuclear decay, and equations for alpha, beta-minus and beta-plus decays; balancing nuclear transformation equations; How to use equations to find the half-life of an isotope. Extended Task.</p>	<p>Frayer Model Words</p> <p>Mass Defect and Binding Energy</p>	<p>Homework</p> <p>Nuclear and particle physics booklet</p>
<p>In LP4.4, I will know: 13/04/26 - (WK 1)</p> <p>How to use graphical methods and spreadsheets to model the radioactive decay of nuclei (dice); How to describe the radioactive dating, e.g. carbon-dating; How to describe Einstein's mass-energy equation, and the creation and annihilation of particle-antiparticle pairs.</p>	<p>Frayer Model Words</p> <p>Half-Life</p>	<p>Homework</p> <p>Nuclear and particle physics booklet</p>
<p>In LP4.5, I will know: 20/04/26 - (WK 2)</p> <p>How to describe mass defect, binding energy and binding energy per nucleon; How to describe induced nuclear fission, chain reaction and the basic structure of a fission reactor; How to describe nuclear fusion, fusion reactions and evaluate the decision making process when building new nuclear power stations.</p>	<p>Frayer Model Words</p> <p>Ionising</p>	<p>Homework</p> <p>Nuclear and particle physics booklet</p>
<p>In LP4.6, I will know: 27/04/26 - (WK 1)</p> <p>PAG 7.1 The random nature of radioactive decay How to describe the basic structure of an X-ray tube, and attenuation of X-rays and X-ray imaging with contrast media; barium and iodine; How to describe the components for computerised axial tomography (CAT) scanning, and the advantages of a CAT scan over an X-ray Extended Task.</p>	<p>Frayer Model Words</p> <p>PET scanner</p>	<p>Homework</p> <p>Medical imaging booklet</p>
<p>In LP4.7, I will know: 04/05/26 - (WK 2)</p> <p>How to describe the components and diagnosis using gamma camera, with medical tracers; technetium-99m and fluorine-18; How to describe the components and diagnosis using positron emission tomography (PET) scanner, with medical tracers fluorine-18; How to describe ultrasound A-scan and B-scan, transducers and the piezoelectric effect;</p>	<p>Frayer Model Words</p> <p>Acoustic Impedance</p>	<p>Homework</p> <p>Medical imaging booklet</p>
<p>Resources to support learning: Textbook, revision guide, booklet and www.physicsandmathstutor.com</p>		
<p>FFET Award Challenge for this Learning Programme: Complete a full Paper 2 - Exploring Physics paper independently.</p>		

PRT Task 1

PRT Task 2