Curriculum Overview: *A2 Physics*

Year 13 Spring Term 1			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
3.8.1.4 Nuclear instability **3.8.1.5 Nuclear radius** **3.8.1.6 Mass and energy**	Identify and explain regions of the graph that correspond to possible decay modes, Generate and/or complete simple decay equations. Describe the existence of nuclear excited states and applications. Understand and describe how closest approach and electron diffraction give an estimate size for nuclear radius. Use the Coulomb Law to carry out closest approach calculations. Use the equation $R = R0A^{1/3}$ to relate the radius of different nuclei to nucleon number. Given appropriate data calculate nuclear densities.	Students estimate the order of magnitude size of the nucleus and the relative size of the nucleus relative to an atom. An analogy using everyday objects is useful eg a small ball bearing for the nucleus. Students carry out closest approach and electron diffraction calculations to estimate the size of the nucleus. Use a spreadsheet to calculate and plot a graph of the nuclear radius of a range of atoms. Students calculate the density of the proton/neutron and then for a number of different nuclei to appreciate how nuclear density remains constant. Demonstrate knowledge and understanding of the size of the nucleus and evidence for this. Apply knowledge and understanding of Coulomb's Law and diffraction to calculate nuclear radii.	https://www.aqa.org.uk/subjects/science/as-and-a-level https:www.physicsandmathstutor.com http://www.senecalearning.com login http://www.npl.co.uk/educate-explore/

	Recall the order of magnitude radius for the nucleus		
Year 13 Spring Term 2			
What are we learning?	What knowledge, understanding and skills will we gain?	What does excellence look like?	What additional resources are available?
3.8.1.7 Induced fission **3.8.1.8 Safety aspects** **3.9 ASTROPHYSICS**	Describe the process of induced fission, chain reactions and the meaning of critical mass. Describe and explain the functions of the moderator (including use of a model of elastic collisions), control rods and coolant and the choice of material used for each. Describe the safety considerations in nuclear power stations including the handling and storage of radioactive waste. Describe and evaluate the arguments for and against nuclear power.	Extended writing on Nuclear Power stations, fission and fusion. Students should self and peer assess work before submission for marking. Nuclear Reactor Card loop game. Students construct a simple astronomical telescope using two lenses. Students sketch ray diagrams of arrangement in normal adjustment. This knowledge is consolidated through use of a simulation such as the Walter-Fendt applet. Students research Cassegrain arrangement and write a short report discussing the merits of reflectors and refractors including spherical and chromatic aberration. Demonstrate knowledge and understanding of spherical and chromatic aberration. Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to make judgements and reach conclusions on the development of nuclear power	https://www.aqa.org.uk/subjects/science/as-and-a-level https:www.physicsandmathstutor.com http://www.senecalearning.com login http://www.npl.co.uk/educate-explore/