

Year 12: Physics

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topics	Introduction to A-level Physics: Maths skills and Error Propagation, Intro to Mechanics, Particle interactions Focus: Remembering prefixes and mathematical operations	Mechanics and Projectile motion, Electricity Focus: Adding complexity to understanding of motion and Electricity from KS4	Material Properties Mechanics Focus: Forces and how they affect motion, behaviour of materials under tension/compression	Waves and Quantum Physics Focus: Furthering knowledge of wave behaviour from KS4, learning about the behaviour of the sub-atomic world	Waves and Astrophysics Focus: Describe formation and death of stars, explain evidence the big bang theory, investigate wave interference	Review of the year: Review of this years content prior to the paper 1 end of year exam Focus: developing exam technique and applicable maths/practical skills
Assessments	Introduction mathematics "suitability" assessment	Assessment based on Content taught so far	Assessment based on Content taught so far	AS Style exam assessment on all topics taught so far	A series of mini assessments based on lesson taught	Full OCR AS Exam paper
Building on Prior Learning	<p>Substantive Knowledge – From KS4 students will be building on the models and understanding from the end of GCSE. Mathematic knowledge will be pushed forward, in particular with units, unit conversions and standard form. Students will develop on their Forces knowledge in Mechanics, their waves knowledge in Waves and then deepening their knowledge of atomic structure in Particles and Quantum.</p> <p>Disciplinary/procedural Knowledge – Students will develop their ability to use equations in performing complex calculations from Year 11 to solving more complex, multi-step, problems. Their knowledge of standard form will also be expanded as it becomes common place for our answers to be standard form. Lab skills will be greatly improved and assessed through Required Practicals and presentation and data analysis skills developed through the analysis of these practicals.</p>					
Cultural Capital	<p>There is cultural capital in abundance in this programme of study: Students will learn about the development of scientific models, as well as the current scientific models in use. Students will learn about the current research ongoing in particle physics, as well as some of the background experiments and events behind quantum physics. In the process students will learn about the increase in quantum and particle physics research in the interwar and post war periods. They will also learn about collaborative international research projects, such as CERN, and have the opportunity to visit Switzerland to experience the culture as well as the Large Hadron Collider</p>					
Mastery	<p>In terms of mastery students will need to apply their Physics knowledge through increasingly varied and complex contexts & scenarios. In a change from GCSE, students are provided with almost all the equations they could need in examinations, so instead of a test of memory it is much more a test of identifying situations and using the appropriate tools. Students will be shown how to complete multi-step calculations through worked examples & modelling good practice, students will be given a range of opportunities to demonstrate their ability, both in lesson and through formal assessment. They will need to use and understand technical and scientific language, which will be introduced and used by teachers through the year to help familiarise students with the contexts and uses.</p>					
Development of Character	<p>A wide range of virtues are covered through the teaching of Physics: The intellectual virtues of curiosity and resilience are explored through the teaching of many different scientific theories. A logical approach to breaking down problems into smaller chunks is taught through the use of multi-step problem solving, both mathematical and experimental. These lessons can be applied more widely to personal and professional situations.</p>					
Extra-Curricular opportunities	<p>In School: STEM Club (across all 3 science) Outside of School: STEM trip to CERN (provisional) A Level Science Live (provisional)</p>					
Metacognitive Learning	<p>Students will initially be shown how to approach estimation of answers and values, to act as a check of their answers throughout the a-level. They will start with small, usually single step problems, focusing on one subject area. Over the course of the year, as more topics are introduced, questions touching on both subject areas will be introduced, modelled by the teacher to begin with and then passed onto the students. By the end of the year students will have seen the teacher talk through their thought process and steps in first identifying and then solving questions in a variety of contexts, and will be expected to start solving these problems themselves.</p>					

