

YEAR 12 PHYSICS CURRICULUM PROGRESSION OVERVIEW

On this course students will develop skills that can be transferred to just about any area of work, from setting up a business to saving the planet. For students not going on to become a physicist, learning to think like one will help them develop the skills to get to the root of any problem and draw connections that aren't obvious to others. Physics won't give all the answers, but it will teach students how to ask the right questions.

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Topic	Measurements and errors, particles and electricity	Electromagnetic radiation, quantum phenomena and electricity	Mechanics and waves	Mechanics and waves	Mechanics and materials	Further mechanics
Core Knowledge/ Threshold Concept	3.1.1 Use of SI units and their prefixes 3.1.2 Limitation of physical measurements 3.1.3 Estimation of physical quantities 3.2.1.1 Constituents of the atom 3.2.1.2 Stable and unstable nuclei 3.2.1.3 Particles, antiparticles and photons 3.2.1.4 Particle interactions 3.2.1.5 Classification of particles 3.2.1.6 Quarks and antiquarks 3.2.1.7 Applications of conservation laws 3.5.1.1 Basics of electricity 3.5.1.2 Current-voltage characteristics	3.2.2.1 The photoelectric effect 3.2.2.2 Collisions of electrons with atoms 3.2.2.3 Energy levels and photon emission 3.2.2.4 Wave-particle duality 3.5.1.4 Circuits 3.5.1.5 Potential divider 3.5.1.6 Electromotive force and internal resistance	3.3.1.1 Progressive waves 3.3.1.2 Longitudinal and transverse waves 3.3.1.3 Principle of superposition of waves and formation of stationary waves 3.4.1.1 Scalars and vectors 3.4.1.2 Moments 3.4.1.3 Motion along a straight line 3.4.1.4 Projectile motion	3.3.2.1 Interference 3.3.2.2 Diffraction 3.3.2.3 Refraction at a plane surface 3.4.1.5 Newton's laws of motion 3.4.1.6 Momentum 3.4.1.7 Work, energy and power 3.4.1.8 Conservation of energy	3.4.2.1 Bulk properties of solids 3.4.2.2 The Young modulus	3.6.1.1 Circular motion 3.6.1.2 Simple harmonic motion (SHM) 3.6.1.3 Simple harmonic systems 3.6.1.4 Forced vibrations and resonance

	3.5.1.3 Resistivity					
Why this learning now?	Basic introductions to A-Level Physics, the measurement and errors topic will lay the basic fundamentals needed for the rest of the course.	The second part of the electricity topic builds upon the first part of the topic.	The waves and the mechanics topic carry on from the GCSE Physics course.	The waves and the mechanics topic carry on from the GCSE Physics course.	The materials topic leads directly on from the mechanics topic.	The further mechanics topic is the first part of the Y13 course and builds on from the mechanics topic.
Assessment Opportunities:	<ul style="list-style-type: none"> ➤ Recall starter activities (crucial knowledge) ➤ AFL in lessons ➤ End of topic tests at regular intervals throughout the year & exam questions (develop exam skills) 					
			Year 12 mock paper (content from Y12 so far)			Year 12 mock paper, a full AS mock
Learning at Home	<ul style="list-style-type: none"> ➤ Exam questions ➤ Online learning (SENECA, IsaacPhysics, YouTube, etc.) ➤ Recall activities (quizzes, revision tasks, etc.) 					
Key Vocabulary	Leptons, hadrons, mesons, baryons, quarks, antiquarks, current, potential difference, resistance, resistivity	Photon, photoelectric, potential divider, emf, internal resistance	Longitudinal, transverse, superposition, stationary, scalar, vector, velocity, acceleration, moment, equilibrium	Interference, diffraction, reflection, refraction, momentum, energy, conservation	Stress, strain, Young Modulus, density, elastic	Simple harmonic motion, circular motion, angular velocity
Spiritual, Moral, Social and Cultural concepts covered	<p>The aims of the A-Level in Physics are to develop scientific knowledge and conceptual understanding, follow the scientific process to answer questions about the world to equip pupils with the knowledge required to understand the uses and implications of Physics. There SMSC is covered in a variety of contexts throughout the teaching order.</p> <p>Spiritual: Big Bang Theory</p> <p>Moral: Nuclear fuels</p> <p>Social: Electromagnetic waves for communication, Nuclear power</p> <p>Cultural: Contributions of scientists, Star formation</p>					
Links to careers and the world of work	Staff will regularly link the learning in lessons to real-life contexts in order to engage and enthuse the pupils. For example, the mechanics and electricity topics will link to everyday life with household appliances and world of engineering.					

YEAR 13 PHYSICS CURRICULUM PROGRESSION OVERVIEW

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	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Topic	Thermal physics, gravitational fields	Electric fields, capacitance	Magnetic fields, nuclear physics	Astrophysics, nuclear physics	Synoptic Content & Exam Skills	Synoptic Content & Exam Skills
Core Knowledge/ Threshold Concept	3.6.2.1 Thermal energy transfer 3.6.2.2 Ideal gases 3.6.2.3 Molecular kinetic theory model 3.7.1 Fields 3.7.2.1 Newton's law 3.7.2.2 Gravitational field strength 3.7.2.3 Gravitational potential 3.7.2.4 Orbits of planets and satellites	3.7.3.1 Coulomb's law 3.7.3.2 Electric field strength 3.7.3.3 Electric potential 3.7.4.1 Capacitance 3.7.4.2 Parallel plate capacitor 3.7.4.3 Energy stored by a capacitor 3.7.4.4 Capacitor charge and discharge	3.7.5.1 Magnetic flux density 3.7.5.2 Moving charges in a magnetic field 3.7.5.3 Magnetic flux and flux linkage 3.7.5.4 Electromagnetic induction 3.7.5.5 Alternating currents 3.7.5.6 The operation of a transformer 3.8.1.1 Rutherford scattering 3.8.1.2 α , β and γ radiation 3.8.1.3 Radioactive decay	3.8.1.4 Nuclear instability 3.8.1.5 Nuclear radius 3.8.1.6 Mass and energy 3.8.1.7 Induced fission 3.8.1.8 Safety aspects 3.9.1 Telescopes 3.9.2 Classification of stars 3.9.3 Cosmology	Synoptic Content & Exam Skills	Synoptic Content & Exam Skills
Why this learning now?	Fundamentals of fields are taught, in preparation for the later topics in year 13.	Builds on the fields introduced earlier in the year.	The nuclear physics makes links back to the particles topic studied at the start of year 12, so serves as useful revision.	The final optional unit on Astrophysics is taught last, to ensure it can build on all the maths skills developed over the two year course.	In this final term, the lessons are spent on review of key concepts and revision techniques ready for the A-Level exam.	
Assessment	<ul style="list-style-type: none"> ➤ Recall starter activities (crucial knowledge) ➤ AFL in lessons 					

Opportunities:	End of topic tests at regular intervals throughout the year & exam questions (develop exam skills)					
	Y13 mock paper, AS Level paper 1		Year 13 mock papers, Paper 1 and Paper 2			
Learning at Home	<ul style="list-style-type: none"> ➤ Exam questions ➤ Online learning (SENECA, IsaacPhysics, YouTube, etc.) ➤ Recall activities (quizzes, revision tasks, etc.) 					
Key Vocabulary	Specific heat capacity, specific latent heat, pressure, volume, temperature, Boyles Law, Charles Law, gravitational field, orbit	Coulomb, field, charge, potential, capacitance	Magnetic flux, flux density, Rutherford, alpha, beta, gamma, decay, half-life, exponential	Fission, fusion, mass defect, stars, Hertzsprung-Russel	n/a	n/a
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