

Year 10 Physics Curriculum

Students follow the Ark Curriculum + Science Mastery Scheme which is a 5 year programme of study commencing in year 7 and aligns to the AQA Exam board for final assessment in year 11. This is the first year that the course has been run, therefore some of the content for the Science Mastery topics has been covered previously. The content currently taught is identified in the sequence column. The switch to Science Mastery took place after the half term break in October.

Students either follow the combined science course or the separate 'triple' science course. Content that is separate science only is marked in bold as 'triple only'.

Unit:	Core knowledge/skill development:	Sequence:	Assessment:	Literacy, numeracy, PSHE, FBV, other links	Key areas of ACP and VAA development:	Home learning and enrichment
Waves	Students will revise the terms used to describe waves and the definitions of transverse and longitudinal waves with reference to different types of waves. They will apply the equations $v=f \times \lambda$ and $v= x/t$ to different types of waves. Students will also learn how to measure the velocity of sound in air and determine the speed of ripples on a water surface. All students will investigate refraction and find that waves	SP4a Describing Waves SP4b Gravity and Orbits SP4b Core Practical- Investigating Waves SP4c Refraction SP4d Waves Crossing Boundaries SP4e Ears and Hearing SP4f Ultrasound SP4g Infrasound	End-of-topic test	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, students are advised to practice using the free 23 Equations app, General maths skills (e.g. rearranging equations, graph	Connection finding (linking) to use connections from past experiences (KS3) to seek generalisations in the topic Speed and accuracy to work at speed and with accuracy when working through tasks such as the plotting of angles of incidence and refraction	Homework set via online platforms such as Isaac Physics or Seneca. Exam preparation via exam papers

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	<p>change direction when passing from one medium into another. Students will also find out how different substances absorb transmit and reflect waves and consider the suitability of equipment to measure speed, frequency, and wavelength of waves in solids and fluids. For students following the separate Physics route we extend those key ideas by studying total internal reflection, the use of reflection in echo sounding, sonar and radar including the use of ultrasound and infrasound. Refraction can be revisited and then extended by studying its application in</p>			<p>plotting, standards form , SI prefixes)</p> <p>Equations students are required to recall and apply (list a) and which they are required to select from a list and apply (list b).</p>		

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	converging and diverging lenses.					
Light and the Electromagnetic (EM) Spectrum	Students will learn the properties common to all electromagnetic waves and be able to recall the groupings of the spectrum in order of decreasing wavelength. Learn the colours of the visible spectrum and recognise that visible light is the limited range of frequencies in the electromagnetic spectrum that can be detected by the human eye. A core practical will also be carried out to investigate the refraction of light as it passes from air into a glass block. For Separate Physics, ray diagrams to include reflection, total	SP5a Ray Diagrams SP5b Colour SP5c Lenses SP5d EM waves SP5e The EM Spectrum SP5f Using the Long Wavelengths SP5g Radiation and Temperature SP5g Core Practical – Investigating Radiation SP5h Using the Short Wavelengths SP5i EM Radiation Dangers			<p>Connection finding (linking) to use connections from past experiences (KS3) and Waves to seek generalisations in the topic.</p> <p>Self-regulation to monitor, evaluate and self-correct as this topic generalises ‘waves’ to EM waves then onto specific properties depending on the type of EM wave differentiated only by frequency and wavelength.</p>	

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	<p>internal reflection and some properties of lenses are needed. For a longitudinal wave, the determination of speed of sound in a solid is studied. For transverse waves, the absorption, transmission, and reflection of electromagnetic waves is also covered and the uses of each of the groupings of waves in the electromagnetic spectrum. Students learn that almost all the waves in the electromagnetic spectrum are radiated due to changes in the electron structure of the emitting energy. It is only gamma rays that are produced by changes in the nucleus of the atom</p>					

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	<p>and radio waves are generally produced by oscillations in electrical circuits. The potential danger of exposure to electromagnetic radiations is linked to increasing frequency and specific dangers of exposure for particular groups of radiation are studied. For Separate Physics, the radiation and absorption of thermal energy is studied, and this is exemplified by the core practical investigating how the nature of a surface affects the amount of thermal energy (infrared) radiated or absorbed.</p>					
<p>Switch to Ark Curriculum+ Science Mastery Course. Pearsons Active Learn and Science Mastery course were cross referenced to ensure all curriculum content was covered. This resulted in some Science Mastery topics being slightly shorter in length as the content may have already been covered.</p>						

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3.2 Heating (from Energy is Conserved)	<p>In this unit, pupils will explore the internal energy of substances and how heating affects it. They will study energy transfer methods—conduction, convection, and radiation—examining their similarities and differences. Pupils will investigate specific heat capacity, use its equation, and interpret its values for various materials. They will also learn about specific latent heat (fusion and vaporisation), calculate it for different materials, and compare it with specific heat capacity in terms of energy changes.</p>	<p>Pupils will build on their knowledge of energy stores, heating as an energy transfer pathway, and the particle model of solids, liquids, and gases. They will revisit concepts like density, thermal conductors and insulators, and the properties of particles, which are key to understanding convection and thermal transfer.</p> <p>The unit begins with a review of prior learning before introducing internal energy, followed by specific heat capacity and latent</p>	End-of-topic test			<p>Homework set via online platforms such as Isaac Physics or Seneca.</p> <p>Exam preparation via exam papers</p>

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		<p>heat. Teaching thermal transfer methods first simplifies understanding and helps link heating processes to practical investigations. Pupils will explore why experimental values differ from theoretical ones, applying this skill in future experiments.</p> <p>3.2.2 Internal Energy 3.2.3 Thermal transfers 3.2.4 Thermal transfers 2 3.2.5/6 Specific Heat Capacity 3.2.7 Specific Latent Heat</p>				
P3.4 Home Electricity (from Electricity Transfers Energy)	In this unit, pupils will study mains electricity, including alternating and direct current, home circuit wiring,	In KS3 pupils learned about energy transfers, circuits, and electrical concepts like current, voltage, and	End-of-topic test			

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	<p>plug design for safety, and calculating electricity costs. They will explore power ratings, energy transfers, and the relationship between appliance power and energy use. Pupils will also examine electricity generation, energy resources, and its transport via the National Grid, including the role of transformers. The unit concludes with an introduction to static electricity, all within the big idea of "Electricity Transfers Energy."</p>	<p>resistance (including Ohm's Law). The unit transitions from home circuits to the broader context of electricity generation, culminating in static electricity and its link to atomic structure and safety. Pupils will also practise identifying relevant quantities and equations, preparing them for GCSE topics like electric circuits, transformers, and resistance.</p> <p>3.4.2 Mains electricity 3.4.3 Plugs 3.4.4 Power 3.4.5 Cost of electricity 3.4.6 Power in circuits 3.4.7 Power in appliances 3.4.9 National Grid 3.4.10 Static Electricity</p>				

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4.1 Matter (from Energy is conserved)	<p>Students will revisit density concepts, practising calculations for regular and irregular solids and liquids, including the required practical for measuring density.</p> <p>Physics-only students will explore Boyle's law, fluid pressure, hydraulic systems, and pressure relationships with surface area, depth, and atmospheric height</p>	<p>Students should by this point be very secure with the particle model and the movement of particles in each state of matter and what happens during changes of states. They should also recall that density is a measure of the amount of substance in a given volume and be able to describe how to measure this for regular and irregular solids.</p> <p>4.1.2 Density 4.1.3 Measuring Density 4.1.4 Pressure 4.1.5 Pressure in fluids</p>	End-of-topic test			<p>Homework set via online platforms such as Isaac Physics or Seneca.</p> <p>Exam preparation via exam papers</p>
4.3 Movement (from Forces predict motion)	<p>In this unit, students will explore the effects of forces on motion. They will review resultant vectors, resolve vectors into components, and calculate resultants. Topics include acceleration, Newton's laws (with a focus on</p>	<p>The earlier part of this topic has been taught following the Active Learn Scheme. Students are taught the last section of the unit which moves on to look at compression and</p>	End-of-topic test			<p>Homework set via online platforms such as Isaac Physics or Seneca.</p> <p>Exam preparation via exam papers</p>

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	<p>the second), equations of motion, stopping distance, and momentum, including its conservation and car safety applications for physics students. Students will study elasticity, the extension of elastic objects, and the relationship between work done and elastic potential energy. Physics students will also learn about moments as the turning effects of forces.</p>	<p>stretching effects of forces, building on their prior knowledge from year 7 by looking at Hooke's Law quantitatively. They will then combine their understanding of work done with their understanding of elasticity and potential energy.</p> <p>4.3.12 Hooke's Law 4.3.13 Hooke's Law analysis 4.2.5 Elastic potential energy 4.3.14 Elasticity 4.3.15 Turning effects</p>				
<p>4.4 Electric Circuits (from Electricity transfers energy)</p>	<p>This unit begins with a review of circuits, including series vs parallel, current, potential difference, and resistance (Ohm's Law). Students then complete practicals on resistance in a wire and characteristics of different circuit components, analysing</p>	<p>Students first learned about current, potential difference, and circuit models in Y7 (P1.4), including series and parallel circuits and the rules for current and voltage. In Y8 (P2.3), they explored resistance and Ohm's Law. In Y9 (P3.4), they</p>	<p>End-of-topic test</p>			<p>Homework set via online platforms such as Isaac Physics or Seneca.</p> <p>Exam preparation via exam papers</p>

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	<p>IV graphs for Ohmic and non-Ohmic conductors. Next, students calculate power using current, voltage, and resistance. They practise applying multiple equations to written scenarios and circuit diagrams, revisiting energy transfers and appliance functions. The unit concludes with a review of all electricity equations, linking to prior learning about the National Grid.</p>	<p>studied domestic electricity, mains power, energy transfers, the National Grid, and energy resources.</p> <p>4.4.1 Series and parallel circuits review 4.4.2 Ohm's law and resistance 4.4.3 Investigating the resistance of a wire 4.4.4 Analysis of resistance of a wire 4.4.5 Investigating the resistance of components 4.4.6 Resistance in components 4.4.7 Electrical power 4.4.8 Energy transfer in circuits 4.4.9 Circuit applications</p>				
4.5 Radioactivity	<p>This unit starts with a review of atomic structure from C3.1, focusing on isotopes, which leads into radioactivity and types of radiation. Students will write nuclear</p>	<p>This unit covers the topic of radioactivity, including the shared content with chemistry on the structure of the atom and isotopes, and the development</p>	End-of-topic test			<p>Homework set via online platforms such as Isaac Physics or Seneca.</p> <p>Exam preparation via exam papers</p>

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	<p>equations and learn about the random nature of radioactive decay, half-life, and how to calculate it. They will also explore how radioactive sources are chosen based on half-life, penetrating power, and safety. Students apply maths skills with fractions and percentages when calculating half-life. The unit concludes with a look at nuclear fission, fusion (to be revisited in Y11), and the pros and cons of nuclear power. Physics students will further study fission and fusion in energy sources and stars</p>	<p>of atomic theory over time.</p> <p>4.5.1 Structure of the atom review 4.5.2 Atomic Theory review 4.5.3 Activity and types of radiation 4.5.4 Nuclear Equations 4.5.5 Half life 4.5.6 Use of radioactivity and safety 4.5.7 Nuclear fission</p>				