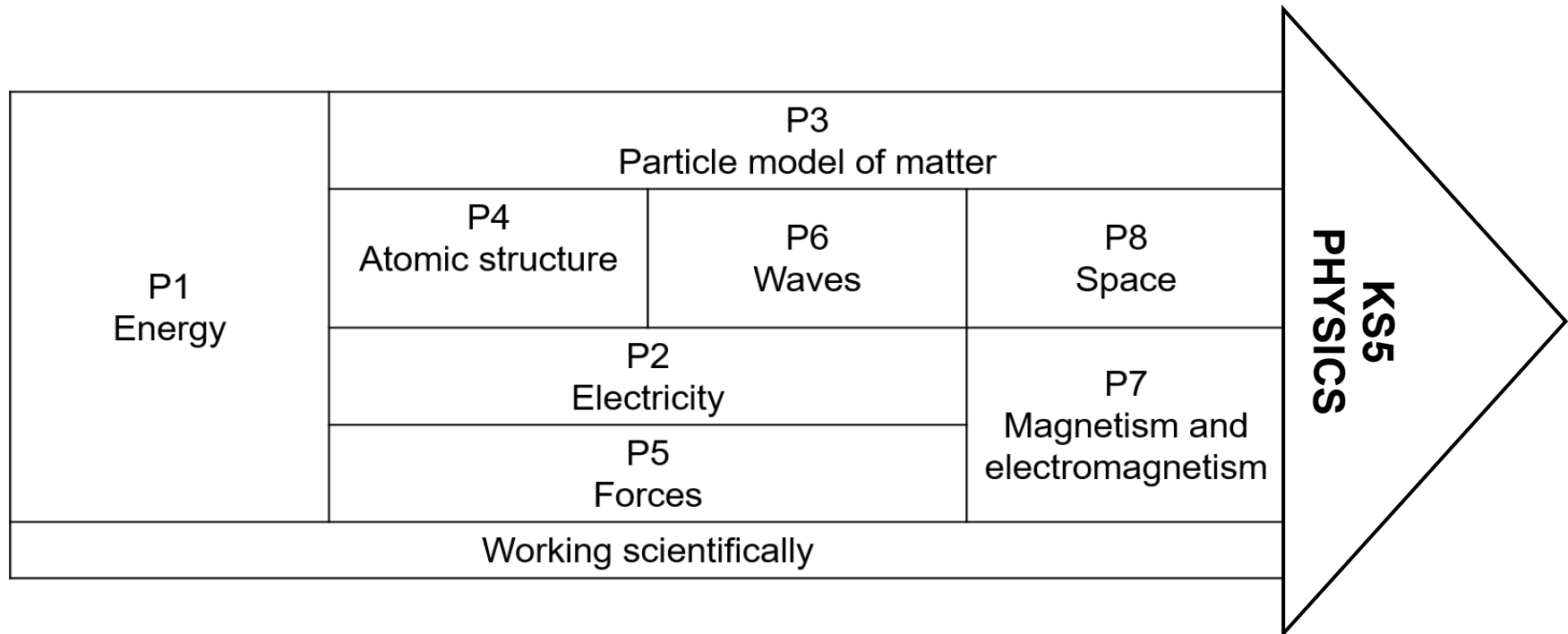


KS4 Physics – Curriculum overview



The above arrow shows the progression of physics topics across Key Stage 4. It shows how substantive knowledge is built upon in a sequential nature to prepare learners for KS5 physics. Running alongside and integrated throughout is the thread of working scientifically whereby students develop their knowledge of scientific methods, apparatus and data analysis.

KS4 Physics – Curriculum intent

Intent	What new knowledge/content do we introduce?				
By the end of KS4 students are able to...		Year 10	Year 11	Choices	How does this curriculum incorporate the National Curriculum and go beyond? How does going beyond the NC ensure challenge?
<ul style="list-style-type: none"> • Explain the structure of the atom and relate this to radiation. • Explain a variety of energy changes and transfers in different contexts (heating, mechanical and electrical work) • Understand types of waves, including their uses and dangers. • Understand that anything mechanical can be analysed with forces and be able to calculate these mathematically. • Have a secure understanding of 	Autumn	Particle model of matter <ul style="list-style-type: none"> • Using particle model to understand density • Internal energy and changes of state • Investigating and calculating density. • Internal energy and specific latent heat • Particle motion in gases and gas laws. 	Forces <ul style="list-style-type: none"> • Scalar and vector quantities, contact and non-contact forces. • Types of forces and motion. • Forces and elasticity • Distance time-graphs, speed and velocity. • Newton's Laws. • Stopping and braking distances. • Momentum. • Triple: moments, levers and gears • Triple: Pressure and pressure differences in fluids. 	<p>This scheme of work deviates from that of the specification to maximise the connections between topics. Year 10 begins with particle model of matter to establish the basics before introducing the specific of atomic structure. Only then is electricity introduced, where it is given the entirety of the spring term to ensure students can embed and practice their skills through practical lessons. Similarly, forces is taught at the start of Year 11 so that students begin this important topic with experience of mathematics and a working knowledge of energy.</p>	<p>KS4 physics goes beyond the national curriculum by providing opportunity for additional challenge and extension within each scheme of work. This often bridges the content between GCSE and A-level physics and permits students the opportunity to discover the depth of A-level physics and uncover potential career pathways within the scientific fields. Further, there are also opportunities to enrich learning beyond the curriculum through the use of trips in the local area (e.g. treasure trails around Cambridge) or visiting guest speakers. There are also after-school sessions run</p>
	Spring	Electricity <ul style="list-style-type: none"> • Current, potential difference and resistance • Series and parallel circuits • Domestic uses and safety • Energy transfers • Triple: static electricity 			

data gathering, analysis and presentation.			<ul style="list-style-type: none"> • Triple: induced potential, transformers and national grid 		weekly for students to learn, revisit or further their understanding of a particular area of science.
			Paper 1 and 2 revision Focusing on drawing ideas together from across Years 7-11, making scientific links & understanding the results and conclusions from scientific investigations.		
	Summer	Waves <ul style="list-style-type: none"> • Transverse and longitudinal waves • Properties of waves • Electromagnetic waves, including properties and uses • Lenses – convex and concave. • Triple: black body radiation 	GCSE external examinations		
		Space (Triple only) <ul style="list-style-type: none"> • Solar systems and the lifecycle of a star • Orbits and types of satellite • Red-shift and evidence for an expanding space 			

	<p>Rationale for this sequence</p>	<p>Year 10 students begin with an existing understanding of energy from Year 9. Year 10 builds on this immediately with particle model, whereby the effects of energy transfers at the particle level are examined.</p> <p>This is followed by atomic structure whereby the use of the word 'particle' is examined and superseded by an understanding of atomic structure. Here, substantive knowledge is integrated with disciplinary knowledge to uncover the history and development of atomic structure. Moreover, the knowledge of energy levels and gamma radiation will provide the foundation for an understanding of electromagnetic waves in later topics.</p> <p>With an understanding of energy and charge established, students apply knowledge of energy transfer through the medium of the movement of charges. The electricity topic allows students to develop their scientific skills through assembling circuitry and applying formulae.</p> <p>With knowledge of energy and waves foregrounded, the final term allows students to delve deeper and expand upon their domain knowledge through exploring the various types of waves and, for triple students, seeing how this links to evidence for scientific theories.</p>	<p>Year 11 begins with Forces – a key fundamental to physics. This topic begins the year so that students arrive with a requisite understanding of related concepts (such as energy), have a secure knowledge of equations and are afforded an uninterrupted term to complete it.</p> <p>It then leads into magnetism and electromagnetism which requires students to combine knowledge from the electricity and forces topic – two topics which have been established beforehand.</p>		
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	How does the KS4 Curriculum build on previous learning at KS3?	<p>It is important to consider that we cannot assume the KS3 science curriculum has been effectively delivered; Covid-19 remote learning implications are evident in student's cumulative disfluency.</p> <p>Therefore the KS4 curriculum largely revisits, and then builds upon, many of the basic tenets of chemistry established in KS3. This is achieved by an increase in both depth and breadth as well as more complicated practical work.</p>	
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