

Year 9 Physics Curriculum – 2021-22

	Autumn Term		Spring Term		Summer Term	
	1	2	1	2	1	2
Key Concepts	New Technology		Turning Points in Physics		Detection	
National Curriculum Knowledge & Understanding	<p>Physics in the home</p> <p>In this topic pupils will look at the applications of Physics in the technology in the home and sports settings. They will apply their knowledge of waves to the electromagnetic spectrum and investigate how these waves are utilised in everyday appliances such as mobile phones, internet, tv and microwave ovens. Pupils will build upon their knowledge of electricity and</p>	<p>Physics for medicine and energy</p> <p>In this topic pupils will build upon their existing knowledge of wave properties and light to investigate how reflection and total internal reflection is used in medical imaging. Pupils will continue to develop their knowledge and understanding of electricity as they research how defibrillators and ventilators are used in hospitals to keep patients alive. Pupils will evaluate the issues countries face to produce</p>	<p>Discovering the Universe</p> <p>In this topic pupils will look at early models of the universe and how the development of imaging devices and techniques such as the telescope have led to development of new models of the solar system and universe. Pupils will apply their knowledge of waves to evaluate the creation of the universe by the Big Bang Theory and look at the role of satellites and space missions in providing evidence</p>	<p>Radioactivity</p> <p>Pupils will apply their knowledge of sub-atomic structure to investigate alpha, beta and gamma radiation. Pupils will evaluate the uses and dangers of radiative sources and make conclusions about benefit and risk. Pupils will apply mathematical skills to look at the relationship of radioactive decay over a time period and define the term half-life.</p>	<p>Electromagnetism</p> <p>Pupils will apply their knowledge of magnets and electricity to explain the phenomenon of electromagnetism. Pupils will investigate how to induce an electrical current using magnets and how to produce a magnetic field using an electric current. Pupils will then investigate the uses of electromagnetic waves for communication including radio</p>	<p>Particles and planets</p> <p>Pupils will build upon their previous knowledge of light, space and electromagnetic waves to explore how scientists are searching for the existence of unknown sub-atomic particles, Pupils will draw on their previous knowledge of solar system models and telescopes to evaluate how scientists are searching for life on other planets within in the universe and describe how radio</p>

	energy transfers investigating how energy is utilised in the home and investigate the efficiency of many household appliances and devices. Pupils will also build circuits with resistive devices including LDR's and thermistors to investigate how external factors affect their resistance.	energy but reduce carbon dioxide and other emissions from fossil fuels. Pupils will apply their knowledge of energy stores and transfers and investigate other potential energy sources such as renewables and nuclear fusion.	for the theory and further space exploration.		waves and microwaves.	waves can be used to send and receive messages.
Assessment	Assessed project comprising of unit test, practical assessment of skills in circuit building and further independent development project on new uses of electromagnetic radiation in the home.	Assessed project comprising of unit test, practical assessment of skills in in light reflection and finding the critical angle of total internal reflection and further independent development project on medical	Assessed project comprising of unit test, practical assessment of skills in using lenses and making a telescope and further independent development project on mission to Mars.	Assessed project comprising of unit test, practical assessment of skills in predicting what materials can reduce the count rate from different radioactive sources and further independent development project on the uses	Assessed project comprising of unit test, practical assessment of skills in making an a/c generator and motor and further independent development project on transformers.	Assessed project comprising of unit test, and further independent development project on known hadrons and leptons.

		imaging using nuclear radiation.		of radiation in medicine.		
Why this? Why now?	<p>Pupils should have a secure understanding of basic wave properties from year 7 and year 8 and this unit seeks to extend this knowledge further by applying known content to electromagnetic radiation and its applications in the home.</p> <p>Pupils should have a secure knowledge of circuits and basic circuit building skills which will be needed to successfully access the practical element of this unit. Good practical planning and investigative skills are important to develop before progress in to KS4.</p>	<p>Pupils will have a basic knowledge of organ systems from their year 7 and 8 Biology by this point and should also have a secure knowledge of light and electricity needed to successfully complete this unit. Pupils mathematical skills should be developed enough by this stage to complete all the practical and calculation elements of this unit. Good practical planning and investigative skills are important to develop before progress in to KS4.</p>	<p>Pupils should have a secure understanding of basic wave properties from year 7 and year 8 and this unit seeks to apply this to Space exploration and how scientific models are developed. Pupils observation and investigative skills should be developed enough by this unit for pupils to objectively evaluate what makes a good model and realise when newer models need to be proposed. Good practical planning and investigative skills are important to develop before progress in to KS4.</p>	<p>Pupils have a basic knowledge of sub-atomic structure from their year 7 and 8 Chemistry studies and this unit will expand upon this. Pupils should have the appropriate mathematical skills to plot graphs relating to half-life and use this to make evaluations about the use of radioactive sources in medicine. Good practical planning and investigative skills are important to develop before progress in to KS4.</p>	<p>Pupils should have a secure knowledge of magnetism and electromagnetism from their studies in year 7 and year 8 Physics by this point, which makes this unit a good choice to bridge the gap to GCSE. Pupils must be able to plan, observe and assess their practical work, along with using electrical sources safely. Pupils need to be able to read meters correctly and should have the appropriate mathematical skills to use and manipulate given formula. Good practical planning and investigative skills are important to</p>	<p>Pupils have a basic knowledge of sub-atomic structure from their year 7 and 8 Chemistry and of models of the universe from their year 9 unit. Pupils will need this content to apply to the theory of unknown particles and how they can be detected. Pupils need to evaluate data and missing/incomplete evidence to offer models for planets that potentially host life forms, and this is an abstract skill. Good practical planning and investigative skills are important to develop before progress in to KS4.</p>

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Skills & Characteristics	<p>Resilience Being able to look at practical results, identify anomalies and carrying out repeats are all essential skills to build resilience</p> <p>Collaboration Lessons involve practical group work to improve lab skills and communication. Pupils understand the importance of discussion and peer review in the scientific community.</p> <p>Creativity Application of knowledge and logical thinking skills are integral to scientific investigation</p>					
Aspirations & Careers	<p>CEIAG Medical Experience days: These events link with scientific content and bring 'real-life', everyday experiences into the classroom which specifically link to new technology and waves in the curriculum. Careers Fairs: Provides an opportunity to students to practice presenting themselves in front of potential employers. This is also a great way for students to compare employers, and find out what area of science/ scientific skills they need to focus on in the classroom in order to be considered for future posts. Work Experience: Students are introduced to different scientific skills by work colleagues during work experience which includes; the ability to problem solve, handling/ analysing data and communicate effectively. All skills which are used daily during day – to day lessons.</p> <p>Cultural Capital Pupils are encouraged to make links between current events, like renewable energy sources, and our Physics learning in the classroom. All pupils take advantage of our excellent links with the Engineering department at Sunderland University, the Reece Foundation and the Ogden Trust for external visits and in school activities.</p> <p>Extracurricular Stem club: Help to inspire, attract and develop STEM talents during school. The purpose of a STEM club is to raise student's engagement and achievement in these subject areas. Lego Robotics league: Students apply their mechanical and electronic skills which they have gained from the classroom and apply them in a competition; whilst gaining extra knowledge and team working skills along the way. "Physics is Fun" schools' competition: This involves students focusing on an area in physics they wish to explore, then to create a presentation on this area for physicists to judge. Another good example to encourage teamwork, problem solving and research skills.</p>					

	"Schools Physicist of the year" award: Encourages students to explore and research areas of physics they want to broaden their knowledge on – not just limited purely to classroom teaching.
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