STEM **Physics**

Year 7

School Vision	**Challenging all of our students supportively to become confident and curious enhancing lives now and in the future**		
Faculty Intent	To engender a desire and passion to learn and be Inspired in STEM subjects, experiencing STEM outside the class - applying learning in unfamiliar situations.		
Subject Intent	"To understand how the physical world works, and to use this knowledge to solve real-life problems"		
	Term 1	**Term 2**	**Term 3**
Topic Name **Key Content**	***Forces*** This explores speed, and how it can be described through calculation and graphically. Speed is then related to forces which is extended from KS2 to combining and balancing forces. Finally, ideas about gravity are explored to the concept of fields, the relationship between mass and weight, and the context of space travel.	***Electricity*** This explores static electricity, charge, and fields before linking current, voltage, and resistance to circuit behaviour. It introduces resistance and discusses parallel and series circuits using current and voltage (or potential difference) concepts.	***Energy*** This introduces the concept of energy and explores key features of energy, starting with food as a personal energy store and examining energy transfers at different rates. It applies the concept of energy to electricity supply, highlighting its usefulness in facilitating easy transfer. Later, it introduces and explains the concepts of kinetic energy, elastic potential energy, and gravitational potential energy as tools for understanding energy transfers.
Intent			
How does this link to your intent?	By calculating speed students then relate to car speeds and how speed cameras work. It also follows on to gravity and a little part of space physics, which lots of students enjoy.	Explains real life experiences, static shocks, and the everyday living of the need & demand of electricity.	How energy is produced to meet our needs and how we use it every day in our lives, from food to skydiving.
Sequencing			
Why this and why now?	Introduces the scientific method we follow and maths we encounter throughout physics.	A very difficult concept to understand and so introducing it early in Y7 aids embedding	Relates to electricity so close to the previous unit helps.

		retention & future understanding in GCSE.	
National Curriculum Audit			
Energy			✓
Motion & Forces	✓		
Waves			
Electricity & Electromagnetism		✓	
Matter			
Space Physics	✓		
Key concepts / Vocabulary			
12 or less	• Average speed • Time-lapse sequence • Acceleration • Independent variable • Dependent variable • Control variable • Correlation • Relative motion • Relative speed • Gravitational field	Electrical conductor Electrical insulator Current Ampere Voltage Potential difference Resistance Ohm Series circuit Parallel circuit Ring main	• Joule • Kilojoule • Energy resource • Power • Watt • Kilowatt • Kilowatt-hour • Dissipated • Energy transfer diagram • Efficient

	• Weight • Mass	Electric field	• Sankey diagram • •
Learning Outside the Classroom / Cultural Capital			
Opportunities	Measure the student's running speeds outside the classroom. Measure the distance over time to walk to the tuck shop and back and then draw a d-t graph. Activity to measure relative motion of paper helicopters dropped from top floor.		
Homework			
Description	SENECA SECTIONS EVERY 2 WEEKS	SENECA SECTIONS EVERY 2 WEEKS	SENECA SECTIONS EVERY 2 WEEKS
Assessment			
Type	SUMMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT
Why this style of assessment and why now?	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.

Year 8

School Vision	**Challenging all of our students supportively to become confident and curious enhancing lives now and in the future**		
Faculty Intent	To engender a desire and passion to learn and be Inspired in STEM subjects, experiencing STEM outside the class - applying learning in unfamiliar situations.		
Subject Intent	"To understand how the physical world works, and to use this knowledge to solve real-life problems"		
	Term 1	**Term 2**	**Term 3**
Topic Name **Key Content**	***Waves*** This covers light and sound; it discusses wave properties and characteristics to help understand the nature of waves. It also explores sight, hearing, and colour perception. It uses models to explain phenomena like refraction.	***Forces 2*** This expands on forces, building upon Y7. It first covers opposing forces like friction and drag, and then delves into Hooke's Law, adopting a more quantitative approach. The second part examines pressure in solids and fluids, including concepts like floating and sinking, and provides calculations to determine pressure.	***Electromagnetism*** This discusses magnets and magnetic fields, starting with the comparison between the fields produced by a bar magnet and the Earth. It also covers the concept of fields, their strength, and how they can be described. The second part focuses on electromagnets and their various applications, utilizing the previously discussed ideas about fields and their representation.
Intent			
How does this link to your intent?	Explains how we see & hear, which is important in our everyday lives.	This relates to sports/ flying where you wish to reduce drag.	Relates to the Earth's magnetic field and how navigation works. How we use the concepts to make devices to aid our lives, doorbells.
Sequencing			
Why this and why now?	It has different concepts from the previous content and more accessible to students at the start of Y8.	This starts introducing more difficult concepts in preparation for GCSE.	Less demanding content with is nice after the previous unit.
National Curriculum Audit			

STEM **Physics**

Energy			
Motion & Forces		✓	
Waves	✓		
Electricity & Electromagnetism			✓
Matter		✓	
Space Physics			
Key concepts / Vocabulary			
12 or less	• Decibel (dB) • Pitch • Frequency • Wavelength • Amplitude • Transparent • Opaque • Translucent • Angle of incident • Angle of reflection • Refraction • Convex lens • Concave lens	• Balanced forces • Equilibrium • Resultant force • Fluid • Drag • Compression • Tension • Deformation • Linear relationship • Pressure • Density • Buoyancy • Upthrust	• Electromagnet • Solenoid • Armature • Circuit breaker • Variable • Discrete • Continuous
Learning Outside the			

STEM **Physics**

Classroom / Cultural Capital			
Opportunities			
Homework			
Description	SENECA SECTIONS EVERY 2 WEEKS	SENECA SECTIONS EVERY 2 WEEKS	SENECA SECTIONS EVERY 2 WEEKS
Assessment			
Type	SUMMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT
Why this style of assessment and why now?	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.

Year 9

School Vision	**Challenging all of our students supportively to become confident and curious enhancing lives now and in the future**		
Faculty Intent	To engender a desire and passion to learn and be Inspired in STEM subjects, experiencing STEM outside the class - applying learning in unfamiliar situations.		
Subject Intent	"To understand how the physical world works, and to use this knowledge to solve real-life problems"		
	Term 1	**Term 2**	**Term 3**
Topic Name **Key Content**	***Energy 2*** This builds on an exploration and application of energy. It explores concepts such as work, thermal energy and energy transfer. It develops the idea that when things happen, they don't happen because energy has been transferred – but the model of transfer is a useful way of describing what has happened.	***Waves 2*** This is about properties of waves in water and light, including energy transfer, frequency and wavelength. It explores about the reflection, refraction and absorption of light by materials, and use models to explain light's properties. This builds on Y8 and helps students understand the properties and applications of different types of waves. It's important to understand both the generic and specific characteristics of waves.	***GCSE Physics Unit 1 Energy*** This unit is about different types of energy, transfers between them, work, power, temperature, specific heat capacities, the law of conservation of energy, efficiency, and energy resources of Earth. Pupils will learn to calculate efficiency and explore advantages and disadvantages of different energy resources. The unit includes two core practicals to develop scientific skills.
Intent			
How does this link to your intent?	This unit is more conceptual than others and relates everyday observations to theories.	This shows how waves are used in various everyday uses from music equipment to ultrasound machines to dangers of sunbathing.	How energy is produced to meet our needs and how we use it every day in our lives.
Sequencing			
Why this and why now?	Difficult unit which is vital in preparation for GCSE.	An add on to the previous waves unit in Y8 and adds the uses of waves in greater detail.	Great introduction to GCSE Physics.

National Curriculum Audit			
Energy	✓		✓
Motion & Forces			
Waves		✓	
Electricity & Electromagnetism			
Matter	✓		
Space Physics			
Key concepts / Vocabulary			
12 or less	• Deformation • Displacement • Machine • Force • Temperature • Thermal energy • Conduction • Convection • Insulation • Radiation	• Ultrasound • Microphone • Signal • Loudspeaker • Diaphragm • Compression • Wavelength • Transverse • Amplitude • Frequency • Crest • Trough • Superposition	• Kinetic Energy • Energy Transfer • Work • Power • Specific heat capacity • Conduction • Energy dissipation • Radiation • Thermal • Conductivity • Conservation of energy • Energy efficiency

STEM **Physics**

Learning Outside the Classroom / Cultural Capital			
Opportunities		Go to a bay where superposition occurs in the water?	
Homework			
Description	SENECA SECTIONS EVERY 2 WEEKS	SENECA SECTIONS EVERY 2 WEEKS	SENECA SECTIONS EVERY 2 WEEKS
Assessment			
Type	SUMMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT
Why this style of assessment and why now?	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.

Y10

School Vision	**Challenging all of our students supportively to become confident and curious enhancing lives now and in the future**					
Faculty Intent	To engender a desire and passion to learn and be Inspired in STEM subjects, experiencing STEM outside the class - applying learning in unfamiliar situations.					
Subject Intent	"To understand how the physical world works, and to use this knowledge to solve real-life problems"					
Exam Board & Specification						
	Term 1		**Term 2**		**Term 3**	
	1	**2**	**3**	**4**	**5**	**6**
Topic Name **Key Content**	***GCSE Physics Unit 1 Energy*** This unit is about different types of energy, transfers between them, work, power, temperature, specific heat capacities, the law of conservation of energy, efficiency, and energy resources of Earth. Pupils will learn to calculate	***GCSE Physics Unit 2 Electricity*** This unit is about static and current electricity. Pupils learn key features of each type of circuit. They distinguish between current and potential difference and investigate factors that affect resistance in a circuit. They will discover how electricity is	***GCSE Physics Unit 3 Particle Model of matter*** This unit links the role of particles with density, changes between states of matter, pressure and volume. Pupils will learn how to apply their understanding of particle behaviour to the energy in closed systems of solids, liquids and gases, with a particular focus on internal energy, specific	***GCSE Physics Unit 4 Atomic Structure*** This unit is about current models of the atoms, and how ideas about the structure of the atom have changed over the years. They will be introduced to the three types of ionising radiation and consider hazards related to and uses of	***GCSE Physics Unit 5 Forces*** In this unit, students will learn about contact and non-contact forces, how force can cause acceleration (and deceleration), how motion can be calculated, Newton's three laws of motion, the turning effect of a force and pressure in solids, liquids and gases. Pupils carry out investigations, draw conclusions	***GCSE Physics How science works*** It captures the core logic of science: testing ideas with evidence. This is a cross cutting theme and helps students use their practical skills to make observations and to draw conclusions from them about the links between different units in the syllabus. This unit offers opportunities for students to investigate changing ideas through research, work collaboratively with peers and evaluate evidence critically before drawing conclusions.

	efficiency and explore advantages and disadvantages of different energy resources.	transmitted to homes and the features of mains electricity. Pupils will investigate power and energy transfers and calculate power.	heat capacity and latent heat. Pupils will measure specific heat capacity and learn some of the fundamental theory behind the gas laws.	each type of radiation.	from their investigations, perform calculations to model motion and refine their graph-plotting skills.	The unit also offers opportunities for students to practise their maths skills including using equations, rearranging equations and graph interpretation.
Intent						
How does this link to your intent?	This unit is more conceptual than others and relates everyday observations to theories.	An add on to the previous electricity unit in Y8 and adds the uses in greater detail.	This unit is more conceptual than others and relates everyday observations to theories.	This unit is more conceptual than others and links to theories and themes in other sciences.	An add on to the previous units on forces completed in Y8 & Y9 The unit adds more maths and practical skills.	Key cross-cutting skills that link to themes in other sciences.
Sequencing						
Why this and why now?	Units build on work done in KS3. The Exam Board AQA recommends the same basic sequencing as it helps pupils draw links; strengthen and build on existing knowledge.					This helps students build essential skills while revisiting and focussing on the links between different units in the syllabus.
Key concepts / Vocabulary						
	Efficiency Elastic Potential Energy Joule	Diode Direct Current Earth Wire	Thermal Energy Condensation Density Evaporation	Geiger-Muller Half-Life Ions Irradiation	Moment Momentum Deformation Pressure	Unit Formula Independent variable Dependent variable

	Kinetic Energy Power Specific Heat Capacity Spring Constant Thermal Conductivity Waste Energy Watt Work Done	Electric Field Lines Light Dependent Resistor (LDR) Live Wire Mains Electricity Neutral Wire Ohmic Conductor Ohms Repulsion Resistance. Series Static Charge Thermistor	Freezing Gas Temperature Internal Energy Latent Heat Pressure Specific Heat Specific Latent Heat	Isotopes Mass Number. Nuclear Explosions Nuclear Fission Nuclear Fusion Nucleus Radioactive Contamination Radioactive Decay Sieverts	Resultant Force Resultant Moment Sinking Speed Spring Constant Stopping Distance Thinking Distance Upthrust	Control variable Correlation Linear relationship Scalar Quantities Vector Quantities Accuracy Precision Error Mean Mode
Prior knowledge / Obstacles to Learning						
Description	Energy itself is a tricky concept. It is often used incorrectly in everyday speech – “I have no energy today”.	Students often confuse the terms ‘current’ and ‘potential difference’ and think that current, energy and voltage get ‘used up’	Many students believe that a liquid loses mass when evaporating or boiling and do not always consider that mass is conserved with the vapour produced	Students struggle with the concept of half-life thinking that the nuclei must eventually ‘die’ of they have a ‘half-life’. Students might mistakenly think that if it takes x time to lose half the activity, in 2x	Common misconceptions that keeping going requires a force. A lack of an idea about momentum and the idea that if an object is resting on a table, there are no forces acting on it.	

				time it should all be gone.		
Required Practicals						
Description	Determine the specific heat capacity of different substances Investigate cooling curves for different thicknesses of material	Investigating factors that affect resistance in a circuit	Measure the volume of an irregularly shaped object	Demonstration of simple properties of each type of ionising radiation, e.g. penetrating power	Hooke's law investigating the properties of springs	
Assessment						
Type	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	EXAM QUESTIONS COVERING KEY CONCEPTS. STUDENTS THEN ANALYSE QUESTIONS TO SEE HOW TO IMPROVE.
Why this style of assessment?	Class test and in-class questioning is used to assess knowledge. The use of exam style questions in Unit Tests allow student to understand and prepare for their GCSE finals.					

Y11

School Vision	**Challenging all of our students supportively to become confident and curious enhancing lives now and in the future**					
Faculty Intent	To engender a desire and passion to learn and be Inspired in STEM subjects, experiencing STEM outside the class - applying learning in unfamiliar situations.					
Subject Intent	"To understand how the physical world works, and to use this knowledge to solve real-life problems"					
Exam Board & Specification						
	Term 1		**Term 2**		**Term 3**	
	1	**2**	**3**	**4**	**5**	**6**
Topic Name **Key Content**	***GCSE Physics Unit 6 Waves*** This unit is about light and sound as examples of transverse and longitudinal waves. They will investigate the behaviour of waves and learn about some applications of waves in medicine and other situations. The students will learn the key terms used to describe waves and be able to use these in context.	***GCSE Physics Revision & Mock Exams*** This unit provides opportunity for pupils to consolidate and review concepts learned in prior units. It includes opportunity to explore the cross-cutting nature of Physics. Pupils will practice exam style questions and identify any gaps in knowledge and understanding of their GCSE Physics.	***GCSE Physics Unit 7 Electromagnetism*** This unit is about the link between electricity and magnetism, the effect of a magnetic field on a wire when current is moving, and the applications of these effects. This includes studying motors, generators, speakers, microphones and transformers.	***GCSE Physics Unit 8 Space*** In this unit, students will learn about the origin and life cycles of stars. They will discover how we are able to state that the Universe is expanding, and at an increasing rate. They will investigate phenomena such as red-shift and the Big Bang. The students will learn about the role of gravity in space physics, linking this to the life cycle of stars. They will discover how and why our ideas about the Universe have developed over time.	***GCSE Physics Maths for Physics*** This unit offers opportunities for students to practise their maths skills including using equations, rearranging equations and graph interpretation, using scale and standard form.	***GCSE Physics Exam Preparation*** This unit provides opportunity for pupils to consolidate and review concepts learned in prior units. Pupils will practice exam style questions and identify any gaps in knowledge and understanding of their GCSE Physics.

	The unit concludes with some work on lenses and the difference between convex and concave lenses.					
Intent						
How does this link to your intent?					Helps students apply principles learned in Maths to their physics	
Sequencing						
Why this and why now?	Units build on work done in KS3 and in Year 10. The Exam Board AQA recommends the same basic sequencing as it helps pupils draw links; strengthen and build on existing knowledge.					
Key concepts / Vocabulary						
	Convex Lens Diffuse Reflection Echo Sounding Focal Length Infrared Radiation Ionising Radiation P-Waves Perfect Black Body Radiation Dose Radio Waves Reflection S-Waves		Dynamo Electric Motor Electromagnet Generator Effect Induced Magnet Magnetic Field Magnetic Materials Magnetic Poles Microphone Motor Effect	Big Bang Theory Circular Orbits Dark Energy Dark Mass Main Sequence Star Milky Way Galaxy Natural Satellites Nebula Protostar Red Giant Star Red-Shift Star Life Cycle	Normal Magnification Scalar Quantities Vector Quantities Accuracy Precision Error Mean Mode	

	Seismic Waves Specular Reflection Scanning Ultrasound Waves		Permanent Magnet Solenoid Tesla Transformer	Sun Supernova White Dwarf		
Prior knowledge / Obstacles to Learning						
	Common misconceptions that sounds cannot travel through solids and liquids, matter moves along waves (as waves in the sea move sand around) or that big waves travel faster than small waves		Students may get confused to learn that the north pole of a compass is the south pole of the magnet since opposite poles attract	Imagining stars as gas (which is largely invisible) and dust can be challenging, as can the fact that these lumps of dust and gas can be seen despite being such a long way away (and older than most students can imagine)		
Required Practicals						
Description	Investigating convex and concave lenses Investigating the emission and		The magnetic effect of a solenoid The strength of an electromagnet	Investigating red shift Modelling how gas compresses in the Sun Modelling the life cycle of stars		

	absorption of infrared radiation		The force on a wire carrying a current in a magnetic field The factors that affect the speed and direction of a motor			
Assessment						
TYPE	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	EXAM QUESTIONS COVERING KEY CONCEPTS. STUDENTS THEN ANALYSE QUESTIONS TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	EXAM QUESTIONS COVERING KEY CONCEPTS. STUDENTS THEN ANALYSE QUESTIONS TO SEE HOW TO IMPROVE.
Why this style of assessment?	Class test and in-class questioning is used to assess knowledge. The use of exam style questions in Unit Tests allow student to understand and prepare for their GCSE finals.					

Y12

School Vision	**Challenging all of our students supportively to become confident and curious enhancing lives now and in the future**
Faculty Intent	To engender a desire and passion to learn and be Inspired in STEM subjects, experiencing STEM outside the class - applying learning in unfamiliar situations.
Subject Intent	“To understand how the physical world works, and to use this knowledge to solve real-life problems”

Exam Board & Specification						
	Term 1		**Term 2**		**Term 3**	
	1	**2**	**3**	**4**	**5**	**6**
Topic Name **Key Content**	**Topic 1: Working as a Physicist** In this unit students develop their competence in manipulating quantities and units, including making estimates. The focus is on planning and evaluating experiments to become knowledgeable of how the professional scientific community functions.	**Topic 2: Mechanics** In this unit student carry out a range of practical experiments include strobe photography, the use of a video camera to analyse projectile motion, determine the centre of gravity of an irregular rod, investigate the conservation of momentum using light gates and air track. Mathematical skills include plotting two variables from experimental data, calculating rate of change from a graph showing a	**Topic 3: Electric Circuits** This unit includes estimating power output of an electric motor, using a digital voltmeter to investigate the output of a potential divider and investigating current/voltage graphs for a filament bulb, thermistor and diode. Students increase their proficiency in substituting numerical values into algebraic equations using appropriate units for physical	**Topic 4: Materials** This unit includes the study of liquids to understand density, viscosity and upthrust. The unit builds on GCSE knowledge of springs to understand materials and properties including Youngs Modulus. Mathematical skills include determining the slope of a linear graph and calculating or estimating the area between a curve and the *x*-axis and realising the physical significance of the area that has been determined.	**Topic 5: Waves and Particle Nature of Light** The unit starts with light and sound determining the refractive index of solids and liquids, measuring the focal length of a lens, and using models of structures to investigate stress concentrations. Students then progress to electron diffraction, interference patters and the dual nature of light and matter and it's relevance to medical physics. Student practice	**Exam Practice / Topic 6: Further Mechanics** The focus is on exam techniques and exam questions. Students are introduced to key aspects A2 Mechanics investigating the effect of mass, velocity and radius of orbit on centripetal force. Students start using radians and trigonometric functions.

		linear relationship, drawing and using the slope of a tangent to a curve as a measure of rate of change, distinguishing between instantaneous rate of change and average rate of change and identifying uncertainties in measurements, using simple techniques to determine uncertainty when data are combined, using angles in regular 2D and 3D structures with force diagrams and using sin, cos and tan in physical problems.	quantities and applying the equation $y = mx + c$ to experimental data.		using calculators to handle sin x, identifying uncertainties in measurements and using simple techniques to determine uncertainty when data are combined.	
Required Practicals						
		Determine the acceleration of a free-falling object	Determine the electrical resistivity of a material	Use a falling-ball method to determine	Determine the speed of sound in air	The relationship between force

			Determine the emf and internal resistance of an electrical cell	the viscosity of a liquid Determine the Young modulus of a material	Investigate the frequency of a vibrating string	and change of momentum
Key concepts / Vocabulary						
12 or less	Accuracy Base Units Estimation Precision Random Error Repeatability Reproducibility Resolution Systematic Error Uncertainty	Centre of Mass Drag Elastic Collision Equilibrium Force Friction Impulse Kinetic Moment Momentum Resultant Force Work Done	Conventional Current Flow Detecting Circuit Diode Electromotive Force (EMF) Internal Resistance Kirchoff's Laws Light Dependent Resistors (LDR) Ohmic Conductor Potential Divider Circuit Resistivity Semiconductors Superconductor Thermistor Variable Resistors Voltmeter	Breaking Stress Ductile Elastic Deformation Elastic Limit Hooke's Law Laminar Flow Limit of Proportionality Plastic Deformation Stoke's Law Tensile Strain Tensile Stress Turbulent Flow Viscosity Upthrust Yield Point Young's Modulus	Angle of Incidence Angle of Reflection Angle of Refraction Antinode Coherence Critical Angle De-excitation Destructive Interference Diffraction Emission Spectrum Excitation Focal Length Focal Point Progressive Wave Pulse-Echo Technique	Angular Displacement Angular Velocity Centripetal Acceleration Centripetal Force Conservation of Momentum Impulse Inelastic Collision
Learning Outside the Classroom / Cultural Capital						
Opportunities						

Assessment						
Type	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.

Y13

School Vision	**Challenging all of our students supportively to become confident and curious enhancing lives now and in the future**					
Faculty Intent	To engender a desire and passion to learn and be Inspired in STEM subjects, experiencing STEM outside the class - applying learning in unfamiliar situations.					
Subject Intent	“To understand how the physical world works, and to use this knowledge to solve real-life problems”					
Exam Board & Specification						
	Term 1		**Term 2**		**Term 3**	
	1	**2**	**3**	**4**	**5**	**6**

Topic Name **Key Content**	**Topic 6: Further Mechanics** Building on the mechanics of AS Physics, students apply the principles to circular motion. They investigate the effect of mass, velocity and radius of orbit on centripetal force and apply this to gravitational field and equipotential lines. Mathematical skills include translating between degrees and radians and using trigonometric functions.	**Topic 7: Electric and Magnetic Fields** This unit includes calculating the charge of an electron from Millican's oil drop experiment, verifying Coulombs Law and advanced circuit calculations using capacitors. Mathematical skills include sketching relationships which are modelled by $y = k/x$, and $y = k/x^2$ using logarithmic plots to test exponential and power law variations, interpreting logarithmic plots and sketching relationships that are modelled by $y = e^{-}x$.	**Topic 8: Nuclear and Particle Physics** This unit forms the basis for understanding quantum physics. The unit includes the photoelectric effect, modern particle accelerators and subatomic particle interactions. Mathematical skills include using appropriate units in calculations. **Topic 9: Thermodynamics** The focus of the unit is on space technology. Students investigate pressure laws and the relationship between the volume and temperature of a fixed mass of gas.	**Topic 10: Space** The unit includes the formation and evolution of stars and the history and future of the universe. Mathematical skills include using approximations and sketching relationships which are modelled by $y = k/x^2$. **Topic 11: Nuclear Radiation** The unit includes applications that relate to nuclear radiation, for example nuclear power stations and medical physics. Students measure the half-life of a radioactive material and study fission and fusion.	**Topic 12: Gravitational Fields** The unit explores space and with a focus on gravitational potential in radial fields. Mathematical skills include sketching relationships that are modelled by $y = k/x$, $y = k/x^2$. **Topic 13: Oscillations** The unit introduces simple harmonic motion with experiments that include measuring gravitational field strength using a simple pendulum and measuring a spring constant from simple harmonic motion.	

			Mathematical skills include substituting numerical values into algebraic equations using appropriate units for physical quantities.	Students solve equations involving rates of change, for example. $\Delta x / \Delta t = -\lambda x$ using a graphical method or spreadsheet modelling and probability in the context of radioactive decay.	Mathematical skills include sketching and calculating relationships that are modelled by $y = \sin x$, $y = \cos x$. Including angular frequency, displacement and acceleration.	
Required Practicals						
	Use ICT to analyse collisions between small spheres Investigating centripetal force	Display and analyse PD across a capacitor	Investigating AC with an oscilloscope	The photoelectric effect Calibrate a thermistor in a potential divider circuit	Determine specific latent heat of ice Relationship between pressure and volume of a gas The absorption of gamma rays by lead	
Key concepts / Vocabulary						
12 or less	Angular Displacement Angular Velocity Centripetal Acceleration Centripetal Force	Capacitance Dielectric Eddy Current Electric Potential Electromagnetic Induction Electrostatic Force	Baryon Cyclotron Gauge Boson Gluon Hadron Lepton Lepton Number	Astronomical Unit Cosmic Microwave Background Radiation (CMBR) Doppler Effect Dark Energy	Equipotential Geostationary Orbit Low Orbit Synchronous Orbits Critical Damping	

STEM **Physics**

	Conservation of Momentum Impulse Inelastic Collision	Equipotential Lenz's Law Magnetic Flux Oscilloscope Radial Field Root-Mean-Square (RMS) Value Time Constant	Quark Quark Confinement Relativistic Motion Strangeness Thermionic Emission Weak Interaction	Dark Matter Hertzsprung-Russell Diagram Hubble's Law Light Year Standard Candle Parallax Parsec	Damping Natural Frequency Overdamping Pendulum Oscillator Resonance Simple Harmonic Motion Spring Oscillator	
Learning Outside the Classroom / Cultural Capital						
Opportunities						
Assessment						
Type	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	END OF UNIT TEST and EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.	EXAM PRACTICE SELF-TESTS TO ASSESS PROGRESS. STUDENTS THEN ANALYSE TEST TO SEE HOW TO IMPROVE.
Why this style of assessment?	Class test and in-class questioning is used to assess knowledge. The use of exam style questions in Unit Tests allow student to understand and prepare for their GCSE finals.					

STEM

Physics