

Yr7 Long Term Plan (Physics)



Year 7 Intent / End Point: Students will study part of each of the “Big Ideas” in Physics. Beginning with a study of Energy, pupils will develop a strong foundation of the different energy stores, how energy can be transferred, the variety of energy resources used and the need to make informed decisions about how humans use these resources. This extends into the study of Electricity. Pupils will then learn the names of both contact & non-contact forces & describe their effects on moving & stationary objects. Finally students will learn about Sound, how it’s produced & how it may be transmitted through different media.

	<u>Phase 1 (HT1 & HT2)</u>	<u>Phase 2 (HT3 & HT4)</u>		<u>Phase 3 (HT5 & HT6)</u>
<u>Unit title</u>	<u>7I Energy</u>	<u>7J Current Electricity</u>	<u>7K Forces</u>	<u>7L Sound</u>
Subject Knowledge	<ul style="list-style-type: none"> Energy, comparing results. Energy stores and transfers, fossil fuels. Renewable/non renewable energy sources (advantages/disadvantages) Energy & efficiency 	<ul style="list-style-type: none"> Electric current, measured in amperes, in circuits, series and parallel circuits and the domestic ring Current and the flow of charge Potential difference and measuring voltage Resistance 	<ul style="list-style-type: none"> The effect of contact and non-contact forces on an object How force affects the extension of a spring The effects of friction and how it can be changed The effect of pressure and how to calculate it Identifying balanced and unbalanced forces 	<ul style="list-style-type: none"> How sound is produced & how it travels through solids, liquids & gases Understand that sound waves transfer energy
Working Scientifically	Students learn to use ratio notation to make fair comparisons	Students will learn to identify when a physical model is being used, and what its parts represent. Use a simple physical model to explain a simple phenomenon.	Students will learn the use of conventions when communicating scientific knowledge and be able to take notes from presentations and videos (including the ordering of notes).	Students will learn to identify patterns in line graphs and scatter graphs and extract simple information from them.
Literacy and Numeracy	Students learn to identify key points in texts (including topic sentences) and develop clear summaries (using key points & key points) Students will learn to calculate the efficiency of different energy transfers & be able to identify transfers which are efficient.	Students will learn to describe the benefits of organising information or data in tables. Use of symbols when communicating in Science.	Students will learn to record numbers using appropriate units for common measurements. Convert measurements into the same units in order to compare them. Recall the meanings of some prefixes used in the SI system (centi-, milli-, kilo-).	Students will learn to present data in line graphs and scatter graphs. Evaluate different ways of remembering information (concept maps, diagrams & mnemonics)
Middle Stake Testing	EOU Test - 7I Purposeful Practice (Try now)	EOU Test - 7K Purposeful Practice (Try now)	EOU Test - 7J Purposeful Practice (Try now)	EOU Test - 7L Purposeful Practice (Try now)
High Stake Testing		Assessment 1		End of Year Assessment
Skills development	Students will learn how to present data graphically & learn how to interpret different data sets. They will also learn how to use simple physical models to understand & explain scientific phenomena.			

Yr8 Long Term Plan (Physics)



Year 8 Intent / End Point: Students continue their learning journey into the “Big Ideas” in Physics. They will recap the idea of energy & how energy cannot be made or destroyed, only transferred from one store to another. Pupils will then learn about the nature of Light and begin to link ideas on Light to those already formed on Sound. The unit of Force Fields & Electromagnets will revisit some key ideas from the Electricity unit before pupils add to their knowledge of Forces by linking balanced & unbalanced forces to the effect on the motion of an object. Finally students will describe & begin to explain the nature of the Solar System.

	<u>Phase 1</u> <u>(HT1 & HT2)</u>	<u>Phase 2</u> <u>(HT3 & HT4)</u>	<u>Phase 3 (HT5 & HT 6)</u>			
<u>Unit title</u>	<u>8K Energy Transfers</u>	<u>8J Light</u>	<u>9J Force Fields & Electromagnets</u>	<u>9I Forces & Motion (2 lessons)</u>	<u>8L Earth & Space</u>	<u>8I Fluids (2 lessons)</u>
Subject Knowledge	<ul style="list-style-type: none"> The difference between internal energy & temperature Transferring energy by conduction, convection & radiation How do we control energy transfers to make them more efficient? Calculate the power & efficiency of appliances 	<ul style="list-style-type: none"> Light waves, reflection light scattering, straight lines path, Ray diagrams, mirrors, refraction, lens, ray box, the eye comparison Colour, objects in different coloured lights, filters The spectrum of white light 	<ul style="list-style-type: none"> What surrounds a magnet? Static electricity & its effects Changing the flow of current in an electrical circuit. Factors affecting resistance Investigating electromagnets 	<ul style="list-style-type: none"> Identify load effort & pivot on a lever diagram Calculating the turning effect & identifying factors which may increase the effect Calculation of Work Done 	<ul style="list-style-type: none"> Different models of the Solar System Seasonal changes The earth & its magnetic field Gravity in space Studying beyond the Solar System 	<ul style="list-style-type: none"> How fluids exert a pressure Why some objects float & some objects sink Balanced & unbalanced forces Ways to reduce drag
Working Scientifically	Students will learn to state the meaning of accuracy. State the meaning of: precision. Use information about resolution to choose measuring instruments. Explain how to avoid systematic and random errors.	Students will learn how to draw & use ray diagrams to investigate light	Students will learn to round numbers to a given number of decimal places or significant figures. Decide on an appropriate level of accuracy before rounding numbers	Students will learn to draw & interpret force diagrams	Students will learn to use ratio notation to compare things. Convert fractions to decimals and percentages to help with comparisons	
Literacy and Numeracy	Students will learn to use the right language for their audience & produce authoritative texts by using appropriate vocabulary for a stated audience.	Students will learn to present information using a mixture of text, diagrams, charts and graphs. Develop clear points to present ideas and opinions, structure paragraphs in a clear manner and develop logical sequences of points in writing. Outline some ways in which the same scientific information should be presented for named audiences. Evaluate different ways of presenting the same information.	Students will learn to use cohesive devices to make text clearer and easier to read.	Students will learn to recall & use scientific equations used to calculate Work Done & the turning effect (moment).	Students will learn to present arguments Students will learn to recall & use scientific equations to determine an object's weight.	Students will learn to use how to use prepositional phrases in writing to make information clearer.
Middle Stake Testing	<u>EOU Test - 8K</u> Purposeful Practice (Try now)	<u>EOU Test - 8J</u> Purposeful Practice (Try now)	EOU Test- 9J Purposeful Practice (Try now)		EOU Test - 8L Purposeful Practice (Try now)	
High Stake Testing		Assessment 1				End of Year Assessment
Skills development	Students will learn how to make the data gathered during investigations both accurate & precise by adapting their method appropriately. They will also increase their confidence in the recall & use of scientific equations, giving answers to a suitable number of sf.					



Yr9 Long Term Plan (Physics)

Year 9 Intent / End Point: Students will study part of each of the “Big Ideas” in Physics (as outlined on the Learning Journey). Beginning with a study of how an object’s motion may be tracked and analysed. Students will then learn to explain how external factors may affect the motion of an object. The idea of different stores of energy and the conservation of energy will be studied allowing students to evaluate our use of energy & the different energy resources we use to generate electricity. This completes the coverage of the national Curriculum and overlaps with the Physics GCSE. Students will also learn how to tackle 6 mark questions on GCSE papers.

	<u>Phase 1</u> <u>HT1/HT2/HT3</u>		<u>Phase 2</u> <u>HT1/HT2/HT3</u>		<u>Phase 3</u> <u>HT4/HT5/HT6</u>	
<u>Unit title</u>	<u>SP1 Motion</u>		<u>SP2 Motion & Forces</u>		<u>SP3 Conservation of Energy</u>	
Subject Knowledge	This unit introduces quantities that have directions (such as forces). Students will find out how to calculate speeds and accelerations, and how to represent changes in distance moved and speeds on graphs.		This unit introduces Isaac Newton's Laws of Motion and how these can help the government to work out what the speed limits should be on different roads.		This unit introduces ways in which energy can be transferred and stored, how to reduce energy transfers, and the renewable and non-renewable resources we use in everyday life.	
Working Scientifically	Investigating the relationship between speed, distance & time using ticker tape trolley.		CORE Practical - Investigating the relationship between force, mass & acceleration by varying the masses added to trolleys		Investigating the effects of the thickness and thermal conductivity of the different types of insulation on the rate of cooling.	
Literacy and Numeracy	Understand and use the symbols: =, <, <<, >>, >, \propto , \sim . Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Solve simple algebraic equations. Translate information between graphical and numeric form. Plot two variables from experimental or other data. Determine the slope and intercept of a linear graph. Calculate areas of triangles and rectangles, surface areas and volumes of cubes.		Use a scatter diagram to identify a correlation between two variables. Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Plot two variables from experimental or other data. Determine the slope (and intercept) of a linear graph. Recall and apply Newton's Third Law to equilibrium situations. H (Apply Newton's Third Law) to collision interactions.		Recognise and use expressions in decimal form. Use ratios, fractions and percentages. Make estimates of the results of simple calculations. Use an appropriate number of significant figures. Understand and use the symbols: =, <, <<, >>, >, \propto , \sim . Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Solve simple algebraic equations. Construct and interpret frequency tables and diagrams, bar charts and histograms. Translate information between graphical and numeric form.	
Middle Stake Testing	6 Mark Q - Structure Strip Describe Motion in a D/T graph EOU Test SP1 / CP2	6 Mark Q - Structure Strip - Acceleration due to Gravity	6 Mark Q - SP2 - CORE Practical EOU Test SP1 / CP2	6 Mark Q - Structure Strip - Balanced / Unbalanced Forces	6 Mark Q - Structure Strip - Energy Transfers in a Pendulum EOU Test SP3	6 Mark Q - Structure Strip- Energy Transfers in a Swing
High Stake Testing			Assessment 1			End of Year Assessment
Skills development	Students develop the skills needed to plan and carry out investigations that allow them to discover how acceleration, mass & force are related. They will take accurate and precise measurements, analyse the data and identify anomalous results. They will also be able to calculate the efficiency of a device and evaluate the different types of energy resources we can use to generate electricity..					

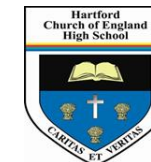
Yr10 Long Term Plan (Combined Physics)



Year 10 Intent / End Point: Students will continue to study part of each of the “Big Ideas” in Physics. Beginning with the study of Waves, they will study the properties & behaviours of both light & sound waves before using this knowledge to describe & explain the properties, uses & dangers of EM Waves. Students then learn the nature of atomic structure before extending this work to form the basis for an understanding of radioactivity & its dangers. Finally, students will use prior knowledge to help extend their understanding of Energy in the sense of energy transfers and work done.

	<u>HT1</u>	<u>HT2</u>	<u>HT3</u>	<u>HT4</u>	<u>HT5</u>	<u>HT5 & HT6</u>
<u>Unit title</u>	<u>CP4 - Waves</u>	<u>CP5 - Light & the Electromagnetic Spectrum</u>		<u>CP6 - Radioactivity</u>		<u>CP7&8 - Energy - Forces Doing Work & Forces & Their Effect</u>
Subject Knowledge	This unit introduces waves' characteristics and how they transfer energy and information.	This unit will help students learn about the electromagnetic spectrum, harmful effects of waves from this spectrum and that light is part of this family of waves, which all have some properties in common.		This unit looks at the structure of atoms, types of radiation and their effect on atoms, and the dangers of radioactive substances and sources.		This unit introduces the ways in which energy can be changed in a system, and how to calculate power and work done. CP8 covers objects affecting each other and vector diagrams.
Working Scientifically	CORE Practical - Investigate the suitability of equipment to measure the speed, frequency & wavelength of a wave in a solid & fluid.	CORE Practical - Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic waves with matter.		Explain how the dangers of ionising radiation depend on half-life and relate these to the precautions needed		Investigate the factors which affect Work Done & Power. Use multi-step calculations to determine the power of an individual from practical data.
Literacy and Numeracy	Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use an appropriate number of significant figures. Find arithmetic means. Understand and use the symbols: =, <, <<, >>, >, ~, ∞. Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Solve simple algebraic equations. Find arithmetic means. Recognise and use expressions in standard form.					Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects. Find arithmetic means. Translate information between graphical and numeric form. Plot two variables from experimental or other data. Draw and use the slope of a tangent to a curve as a measure of rate of change.
Middle Stake Testing	6 Mark Q - Structure Strip CORE Practical Wave Speed	6 Mark Q - Structure Strip Core Practical EOU Test - CP4 & CP5	6 Mark question CORE Practical Refraction	6 Mark Q - Structure Strip EOU Test – CP6	6 Mark Question Structure Strip - Contamination v Irradiation	6 Mark Q - Structure Strip Determining Power Output EOU Test – CP7/8
High Stake Testing			Assessment 1			End of Year Assessment
Skills development	Students will plan and carry out investigations that allow them to discover how wave speed, frequency & the wavelength of a wave may be determined. They will take accurate and precise measurements, analyse the data and identify anomalous results. They will then evaluate their method and suggest improvements. They will be able to judge if their results are repeatable, reproducible and accurate.					

Yr10 Long Term Plan (Separate Physics)



Year 10 Intent / End Point: Students will study part of each of the “Big Ideas” in Physics. Beginning with the study of Waves, pupils will study the properties & behaviours of both light & sound waves before using this knowledge to describe & explain the properties, uses & dangers of EM Waves. Students then learn the nature of atomic structure before extending this work to form the basis for an understanding of the uses & dangers of radioactivity. Finally, students will use prior knowledge to help extend their understanding of Energy in the sense of energy transfers and work done.

	<u>HT1</u>	<u>HT2</u>	<u>HT3</u>	<u>HT4</u>	<u>HT5</u>	<u>HT5/6</u>
<u>Unit title</u>	<u>SP4 - Waves</u>	<u>SP5 - Light & the Electromagnetic Spectrum</u>	<u>SP6 - Radioactivity</u>		<u>SP7 - Astronomy (separates only)</u>	<u>SP8&9/CP7&8 - Energy - Forces Doing Work & Forces & Their Effect</u>
Subject Knowledge	This unit introduces you to waves' characteristics and how they transfer energy and information.	This unit will help students learn about the electromagnetic spectrum, harmful effects of waves from this spectrum and that light is part of this family of waves, which all have some properties in common.	This unit looks at the structure of atoms, types of radiation and their effect on atoms, and the dangers of radioactive substances and sources.		In this unit, students will learn about the Solar System, origin of the Universe, and the life cycles of stars.	This unit introduces the ways in which energy can be changed in a system, and how to calculate power and work done. CP8 covers objects affecting each other and vector diagrams.
Working Scientifically	CORE Practical - Investigate the suitability of equipment to measure the speed, frequency & wavelength of a wave in a solid & fluid.	CORE Practical - Investigate refraction in rectangular glass blocks in terms of the interaction of electromagnetic waves with matter.	Explain how the dangers of ionising radiation depend on half-life and relate these to the precautions needed.		Students will learn how theories can be developed and changed due to improving technology.	Investigate the factors which affect Work Done & Power. Use multi-step calculations to determine the power of an individual from practical data.
Literacy and Numeracy	Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use an appropriate number of significant figures. Find arithmetic means. Understand and use the symbols: =, <, <<, >>, >, α, ~. Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Solve simple algebraic equations. Find arithmetic means. Recognise and use expressions in standard form.					Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects. Find arithmetic means. Translate information between graphical and numeric form. Plot two variables from experimental or other data. Draw and use the slope of a tangent to a curve as a measure of rate of change.
Middle Stake Testing	6 Mark Q - Structure Strip CORE Practical Wave Speed EOU Test - SP4	6 Mark Q - Structure Strip Core Practical EOU Test - SP4	6 Mark Q CORE Practical Refraction	6 Mark Q - Structure Strip EOU Test - SP6 Core Practical	6 Mark Q - Structure Strip – Life Cycle of a Star EOU Test SP7	6 Mark Q - Structure Strip Determining Power Output EOU Test - SP8/9
High Stake Testing		Assessment 1				End of Year Assessment
Skills development	Students will plan and carry out investigations that allow them to discover how wave speed, frequency & the wavelength of a wave may be determined. They will take accurate and precise measurements, analyse the data and identify anomalous results. They will then evaluate their method and suggest improvements. They will be able to judge if their results are repeatable, reproducible and accurate.					



Yr11 Long Term Plan (Combined Physics)

Year 11 Intent / End Point: Students will continue the study of each of the “Big Ideas” in Physics. Beginning with Electricity students will revisit previous work and use it to extend their understanding of patterns in both series & parallel circuits. Knowledge of individual electrical components will also be covered allowing students to describe & explain the effect of these components in electrical circuits. This is extended into Magnetism & the Motor Effect where they will learn the nature of the relationship between electricity & magnetism. Finally students will use previous knowledge of the different states of matter to explain phenomena such as density & gas pressure.

	<u>HT1</u>	<u>HT2</u>	<u>HT3</u>	<u>HT4</u>	<u>HT5</u>
<u>Unit title</u>	<u>CP9 Electricity & Circuits</u>		<u>CP10/11 Magnetism and the Motor Effect</u>	<u>CP12/13 The Particle Theory and Forces & Matter</u>	<u>EXAM PREPARATION</u>
Subject Knowledge	This unit introduces electric circuits, current and potential difference, charge and energy, resistance, transferring energy, and power.		CP10 introduces magnets and magnetic fields, electromagnetism and magnetic forces. CP11 covers transformers and energy.	CP12 introduces particles and density, energy and changes of state, energy calculations, and gas temperature and pressure. CP13 covers bending and stretching, and extension and energy transfers.	
Working Scientifically	CORE Practical - Construct electrical circuits to: a) Investigate the relationship between potential difference, current & resistance for a resistor & a filament lamp. b) Test series & parallel circuits using resistors & filament lamps.		Students will learn investigate the factors which affect the strength of an induced magnetic field	CORE Practical - Investigate the densities of solids & liquids. CORE Practical - Investigate the properties of water by determining the specific heat capacity of water. CORE Practical - Investigate the extension & work done when applying a force to a spring.	
Literacy and Numeracy	Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use an appropriate number of significant figures. Find arithmetic means. Understand and use the symbols: =, <, <<, >>, >, \propto , \sim . Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Solve simple algebraic equations. Find arithmetic means. Recognise and use expressions in standard form.				
Middle Stake Testing	6 Mark Q CORE Practical Resistance EOU Test CP9	6 Mark Q - Structure Strip	6 Mark Q - Structure Strip EOU Test CP10/11	6 Mark Q - CORE Practical 6 Mark Q - Density 6 Mark Q - CORE Practical 6 Mark Q - Water 6 Mark Q - CORE Practical 6 Mark Q - Springs	
High Stake Testing		Mock Exam 1		Mock Exam 2	
Skills development	Students will plan and conduct full investigations into the factors affecting current, resistance, induced magnetic field strength & density, and make valid conclusions based on results. They will also use the data gathered in complex scientific equations. In addition, they will further develop their ability to evaluate & improve any method used.				



Yr11 Long Term Plan (Physics)

Year 11 Intent / End Point: Students will continue the study of each of the “Big Ideas” in Physics. Beginning with Electricity students will revisit previous work and use it to extend their understanding of patterns in both series & parallel circuits. Knowledge of individual electrical components will also be covered allowing students to describe & explain the effect of these components in electrical circuits. This is extended into Magnetism & the Motor Effect where they will learn the nature of the relationship between electricity & magnetism. Finally students will use previous knowledge of the different states of matter to explain phenomena such as density & gas pressure.

	<u>HT1</u>	<u>HT2</u>	<u>HT3</u>	<u>HT4</u>	<u>HT5</u>
<u>Unit title</u>	<u>SP10 Electricity & Circuits & SP11 Static Electricity</u>		<u>SP12 Magnetism and the Motor Effect & SP13 Electromagnetic Induction</u>	<u>SP14 The Particle Theory & SP15 Forces & Matter</u>	<u>EXAM PREPARATION</u>
Subject Knowledge	This unit introduces electric circuits, current and potential difference, charge and energy, resistance, transferring energy, and power.		SP12 introduces magnets and magnetic fields, electromagnetism and magnetic forces. SP13 covers transformers and energy.	CP12 introduces particles and density, energy and changes of state, energy calculations, and gas temperature and pressure. CP13 covers bending and stretching, and extension and energy transfers.	
Working Scientifically	CORE Practical - Construct electrical circuits to: a) Investigate the relationship between potential difference, current & resistance for a resistor & a filament lamp. b) Test series & parallel circuits using resistors & filament lamps.		Students will learn investigate the factors that affect the strength of an induced magnetic field.	CORE Practical - Investigate the densities of solids & liquids. CORE Practical - Investigate the properties of water by determining the specific heat capacity of water. CORE Practical - Investigate the extension & work done when applying a force to a spring.	
Literacy and Numeracy	Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use an appropriate number of significant figures. Find arithmetic means. Understand and use the symbols: =, <, <<, >>, >, \propto , \sim . Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Solve simple algebraic equations. Find arithmetic means. Recognise and use expressions in standard form.				
Middle Stake Testing	6 Mark Q CORE Practical Resistance EOU Test SP9 EOU Test SP10	6 Mark Q - Structure Strip	6 Mark Q - Structure Strip EOU Test SP10/11	6 Mark Q - CORE Practical 6 Mark Q - Density 6 Mark Q - CORE Practical 6 Mark Q - Water 6 Mark Q - CORE Practical 6 Mark Q – Springs EOU Test SP14/15	
High Stake Testing		Mock Exam 1		Mock Exam 2	
Skills development	Students will plan and conduct full investigations into the factors affecting current, resistance, induced magnetic field strength & density, and make valid conclusions based on results. They will also use the data gathered in complex scientific equations. In addition, they will further develop their ability to evaluate & improve any method used.				

