

Subject: Science Physics Trilogy

	Half Term 1 Sept-Oct	Half Term 2 Oct-Dec	Half Term 3 Jan-Feb	Half Term 4 Feb-April	Half Term 5 April-May	Half Term 6 May-July
7	<p><b>Laboratory safety</b> - Covering the basics of lab safety and how to operate within the lab setting. Includes health and safety, lab rules and introduction to equipment and simple practicals.</p> <p><b>Solids, Liquids and Gasses – Why does an ice cube disappear on a hot day?</b> Introduction to particles and particle diagrams, melting and freezing, making salts, diffusion and gas pressure.</p> <p><b>Chemical Reactions – How can chemical reactions keep you warm?</b> Oxidation, Gas tests for Hydrogen, Oxygen and Carbon Dioxide, reactions of metals and nonmetals and exothermic and endothermic reactions</p>	<p><b>Reproduction – How is new life made?</b> Reproductive systems, fertilisation and implantation, sexual reproduction, development of the foetus, menstrual cycle, puberty and growth, flowers and pollination</p> <p><b>Cells – What do cells look like under a microscope?</b> Microscopes, animal, plant and specialised cells, cell division, unicellular,</p>	<p><b>Light - Why do we see rainbows?</b> How light travels, reflection and refraction, colours, transverse waves, EM Spectrum</p> <p><b>Energy – How many energy stores are present during a PE lesson?</b> Energy stores and transfers, power, work done, energy resources, temperature and energy, insulation</p>	<p><b>Energy Transfer - Why is it better to be a prey rather than predator?</b> Food chains and webs, energy transfer, Predator prey relationships, pyramids of number, pyramids of biomass, bioaccumulation, investigating abundance and distribution of plants and insects and food security</p> <p><b>Classification – Why did giraffes necks get longer?</b> Inherited and environmental variation, continuous and discontinuous variation, predicting inheritance, classification of organisms, adaptations, Natural Selection, extinction and conservation</p>	<p><b>Space – Why would your weight change on different planets?</b> Mass, weight and gravity, solar system, exploring space, the universe, meteors, days and months, seasons, light years.</p> <p><b>Sound – How can a drummer avoid disturbing their neighbours?</b> Sound as waves, transverse vs longitudinal waves, how sound travels, describing sounds, hearing, reflection and absorption of sounds, sound insulation, speed of sound</p>	<p><b>Physical Reactions – How can you separate pen ink to solve a crime?</b> Physical properties, physical reactions and atoms, separating mixtures, crystallisation, chromatography, burning candles,</p> <p><b>Earth and its atmosphere – How is our Earth so resourceful?</b> Earth structure, type of rock, rock cycle, limestone analysis, atmosphere, carbon cycle</p>
	<p>Skill development: Science skills focus; Hypothesis and Variables. Each unit will have dedicated investigations with these skills as a focus.</p> <p>Mathematics/Science Links: Balancing symbol equations, line graphs, using data in scientific explanations,</p>	<p>Skill Development: Science skills focus; Method and risk assessment. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Mathematics/Science Links: Calculating magnification, converting metric units, line graph</p>	<p>Skill Development: Science skills focus; Tables and Graphs. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Mathematics/Science Links: Tables and graphs, evaluation,</p>	<p>Skill development: Science skills focus; Describe, Explain and Conclude. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Mathematics/Science Links: Graph skills, predicting inheritance (%'s), calculating percentage,</p>	<p>Skill Development: Science skills focus; Evaluation. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Mathematics/Science Links: Calculating speed of sound, calculating gravity, rearranging equations, calculating mean, graph skills, calculating speed of light,</p>	<p>Skill Development: Students will plan and carry out full investigations in these units, based on skills developed in previous topics throughout the year.</p> <p>Mathematics/Science Links: Interpretation of a pie chart, calculate mean, calculate Rf value of chromatogram,</p>
	<p>Assessment End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment: End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment: End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment: End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment: End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment: End of topic test (/25). The test consists of both topics covered.</p>
8	<p>Content: <b>Respiration – How does exercise affect the body?</b> Aerobic respiration, the heart, heart rate, structure of the lungs, Diffusion of gasses, blood and blood vessels,</p>	<p>Content: <b>Forces and motion – Why does a see-saw need two people?</b> Measuring forces, Moments, Levers, Speed, distance and time graphs, gravity</p>	<p>Content: <b>Acids and Alkalis - Will vinegar treat both a wasp and bee sting?</b> Hazards of acids and alkali, indicators, universal indicator, Neutralisation, Neutralisation equations, neutralisation of</p>	<p>Content: <b>Magnets - Why is the North pole not actually the North pole?</b> Magnetic and non-magnetic, magnetic fields, compasses and magnets, making a magnet, electromagnets, electric bells, motors</p>	<p>Content: <b>Reactivity series – How could you make the statue of liberty shiny again?</b> Metals in air, metals in water and acid, group 1 metals, displacement,</p>	<p>Content: <b>Microbes and disease – Is immunity important for survival?</b> Types of pathogen, clean hands, antibiotics, body defences, immune response, vaccinations, heart disease, smoking, drug development.</p>

<p><b>Food and Digestion – Why do we need to digest food?</b> Food groups, food tests, enzymes, digestive system, Case study: Obesity, deficiency diseases,</p>	<p><b>Matter and Pressure – Why doesn't a beach ball sink in the sea?</b> States of matter, density of regular objects, density of irregular objects, ship building, gas pressure, atmospheric pressure, pressure in liquids, stress in solids</p>	<p>carbonates, metals in acid, Acid strength</p> <p><b>Elements, compounds and mixtures –What is everything made from?</b> Elements, periodic table, compounds, Naming compounds, making compounds, mixtures, salt and boiling water, chemical formulae</p>	<p><b>Circuits – Why do we get static shocks?</b> What is electricity?, series circuits, parallel circuits, potential difference, how does potential difference affect current, resistance, equations, static</p>	<p>Copper cycle, obtaining metals using carbon, obtaining results, catalysts</p> <p><b>Combustion - How are OUR chemical reactions affecting the planet?</b> Fire triangle, fire extinguishers burning candles, complete and incomplete combustion, climate change, reducing climate change, thermal decomposition, conservation of mass.</p>	<p><b>Plant Growth – What factors affect plant growth?</b> Photosynthesis, leaves, growing cress, testing a leaf for starch, factors affecting photosynthesis, moving water, plant hormones, plant diseases.</p>
<p>Skill development Science skills focus; Hypothesis and Variables. Each unit will have dedicated investigations with these skills as a focus.</p> <p>Maths/Science Links: Extracting data from external articles, calculating mean, line graph skills, using data, drawing pie charts, use data to explain recovery from exercise, evaluation,</p>	<p>Skill development Science skills focus; Method and risk assessment. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Maths/Science Links: Drawing results table, graph skills, calculating moments, calculating speed, drawing distance time graphs, calculating speed from graph, calculating rate, calculating gravity. calculating and rearranging density equations, converting units, calculating pressure</p>	<p>Skill development Science skills focus; Method and risk assessment. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Maths/Science Links: Results table, drawing graph, rearranging balanced symbol equation,</p>	<p>Skill development Science skills focus; Describe, Explain and Conclude. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Maths/Science Links: Results table for current and potential difference, calculating resistance, rearranging equations, describing a relationship between variables,</p>	<p>Skill development Science skills focus; Evaluation. Each unit will have dedicated investigations with these skills as a focus, whilst also continuing the skills developed in previous topics.</p> <p>Maths/Science Links: Balanced symbol equation, calculate conservation of mass, use data to identify errors in an investigation,</p>	<p>Skill development Students will plan and carry out full investigations in these units, based on skills developed in previous topics throughout the year.</p> <p>Maths/Science Links: calculate area of a circle (zone of inhibition), evaluate evidence, plan a drug trial, results table, drawing graphs.</p>
<p>Assessment End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment End of topic test (/25). The test consists of both topics covered.</p>	<p>Assessment End of topic test (/25). The test consists of both topics covered.</p>

9	<p>Content</p> <p><b>What energy stores and transfers do you experience riding a roller coaster?</b></p> <p>Energy Stores and transfers, Conservation of Energy, Work Done, Gravitational Potential Energy, Kinetic Energy, Linking GPE and KE. Dissipation and Friction,</p>	<p>Content:</p> <p><b>What energy stores and transfers do you experience riding a roller coaster?</b></p> <p>Efficiency, Energy and Power</p> <p><b>How can you have both ice and water at the same temperature?</b></p> <p>States of Matter, Density, Density Required Practical, Changing States,</p>	<p>Content:</p> <p><b>How can you have both ice and water at the same temperature?</b></p> <p>Internal Energy, Specific Latent Heat, Gas Pressure and Temperature, Gas Pressure and Volume, Revisit</p> <p><b>How can you keep a takeaway meal warm during delivery?</b></p> <p>Conduction, Infrared Radiation, More About Infrared radiation,</p>	<p>Content:</p> <p><b>How can you keep a takeaway meal warm during delivery?</b></p> <p>Specific Heat Capacity theory, Specific Heat Capacity RP, Heating and Insulation, Payback, Revisit</p> <p><b>Why can we not handle Marie Curies Notebook?</b></p> <p>Atoms and Radiation</p>	<p>Content:</p> <p><b>Why can we not handle Marie Curies Notebook?</b></p> <p>Discovery of the nucleus, Changes in the nucleus, More about Alpha beta and Gamma, Revisit</p> <p><b>WS 1.1, 1.2, 1.6, 4.1</b></p> <p><b>How can a graph tell a story?</b></p> <p>Vectors and Scalars, Speed and Distance Time Graphs.</p>	<p>Content</p> <p><b>How can a graph tell a story?</b></p> <p>Velocity and acceleration, More about Velocity time graphs, Analysing motion graphs (Some of this is higher only content but all need the <math>v^2 - u^2 = 2as</math>, Revisit Forces and Elasticity, Elastic Energy P1.5 Only</p> <p><b>WS 2.1, 2.2, 2.3, 2.4, 2.6, 3.1, 3.2, 3.3, 3.5, 3.7, 3.8, 4.6</b></p>
	<p>Skill development</p> <p>WS 1.2, 1.4, 4.3, 4.4, 4.5, 4.6</p> <p>Maths/Science Links: Frequency tables, bar charts and histograms, Collecting data by changing a variable, Changing the subject of an equation, Quantities and SI units, Decimal Form, Ratios, fractions and percentages, Quantities and SI Units</p>	<p>Skill development:</p> <p>WS 1.2, 1.3, 1.4, 4.4,</p> <p>Maths/Science Links: Changing the subject of an equation, Quantities and SI units, Standard Form, Ratios, Fractions and percentages, Frequency tables, bar charts and histograms, Collecting data by changing a variable</p>	<p>Skill development:</p> <p>WS 1.2, 1.3, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.2, 4.3, 4.4, 4.6</p> <p>Maths/Science Links: Decimal Form, Ratios, Fractions and percentages, Frequency tables, bar charts and histograms, Collecting data by changing a variable, standard form, Changing the subject of a formula, Quantities and SI Units, Area, Surface area and volume, Plotting data, solving simple equations</p>	<p>Skill Development:</p> <p>WS 1.2, 2.1, 2.2, 2.3, 2.4, 2.6, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 4.2, 4.3, 4.4, 4.6</p> <p>Maths/Science Links: Decimal Form, Changing the subject of an equation, Quantities and SI Units, Solving simple equations, Collecting data by changing a variable, straight line graphs, Scatter diagrams and correlations,</p>	<p>Skill Development:</p> <p>WS 1.1, 1.2, 1.4, 1.6, 3.3, 4.1</p> <p>Maths/Science Links: Estimates and order of magnitude, Quantities and SI units, decimal form, standard form, ratios, fractions and percentages, Estimating the result of calculation, Changing the subject of an equation, Quantities and SI units, Collecting data by changing a variable, Straight line graphs, Determining the slope and interception, plotting data, Measuring the area of graphs</p>	<p>Skill development:</p> <p>WS 2.1, 2.2, 2.3, 2.4, 2.6, 3.1, 3.2, 3.3, 3.5, 3.7, 3.8, 4.6</p> <p>Maths/Science Links: Changing the subject of an equation, Quantities and SI Units, Collecting data by changing a variable, Straight line graphs, Determining the slope and interception, plotting data, Measuring the area of graphs</p>
	<p>Assessment</p>	<p>Assessment</p> <p>50 mark assessment on the previous two half terms</p>	<p>Assessment</p>	<p>Assessment</p> <p>50 mark assessment on the previous two half terms and a revisit questions from previous topics</p>	<p>Assessment</p>	<p>Assessment</p> <p>End of year examination</p>

10	<p>Content</p> <p><b>We can't rely on fossil fuels forever; what are our alternatives?</b></p> <p>Energy Demands, Energy from wind and water, Power From the Sun and Earth, Energy and the Environment, Big Energy Issues, Revisit,</p> <p><b>Why do we make Christmas Tree Lights out of parallel circuits and not series?</b></p> <p>Current and Charge,</p>	<p>Content:</p> <p><b>Why do we make Christmas Tree Lights out of parallel circuits and not series?</b></p> <p>Potential Difference and Resistance, Resistance Required Practical, Components, Componentes required Practical, Series and Parallel, Resistance Required Practical</p>	<p>Content:</p> <p><b>How does the National grid make it safe to use electricity in your home?</b></p> <p>Alternating &amp; Direct Current, National Grid, Cables and Plugs, Electrical Power and Potential Difference, Electrical Current and Energy Transfer, Appliances and Efficiency</p> <p><b>Why can't we handle Marie Curie's Notebook?</b></p> <p>Half Life</p>	<p>Content:</p> <p><b>Why didn't a T-Rex topple over?</b></p> <p>Vectors and Scalars, Forces Between Objects, Resultant forces, Centre of Mass, Parallelogram of Forces (Higher only).</p>	<p>Content:</p> <p><b>Why didn't a T-Rex topple over?</b></p> <p>Resolution of Forces(Higher Only),</p> <p><b>Why does a skydiver need a parachute?</b></p> <p>Forces and Acceleration, Weight and Terminal Velocity, Forces and Braking, Momentum,</p>	<p>Content:</p> <p><b>Why does a skydiver need a parachute?</b></p> <p>Weight and Terminal Velocity, Forces and Braking, Momentum,</p>
	<p>Skill development:</p> <p>WS 1.2, 1.4,</p> <p>Maths/Science Links: Changing the subject of an equation, Quantities and SI Units, PLOtting data, Determining the slope and intercept, Using transects with curved graphs, Ratios, fractions and percentages, Solving simple equations</p>	<p>Skill development:</p> <p>WS 1.2, 1.4, 1.5,</p> <p>Maths/Science Links: Collecting data by changing a variable, Changing the subject of an equation, Quantities and SI units</p>	<p>Skill development:</p> <p>WS 1.1, 1.2, 1.4, 4.1</p> <p>Maths/Science Links: Decimal form, Standard Form, Significant figures, Quantities and SI Units, Ratios, fractions and percentages, Estimating the result of calculation, Solving simple equations, Collecting data by changing a variable, Changing the subject of an equation, Quantities and SI units</p>	<p>Skill development:</p> <p>WS 1.2, 4</p> <p>Maths/Science Links: Decimal Form, Significant figures, <b>Quantities and SI Units, Standard form</b>, Measuring and using angles, Representation of 3D Objects</p>	<p>Skill development:</p> <p>WS 1.2, 1.4, 1.5, 2.2</p> <p>Maths/Science Links: Representation of 3D Objects, Estimating the result of calculation, mathematical symbols, Changing the subject of an equation, Quantities and SI Units, Frequency tables, bar charts and histograms, scatter diagrams and correlations, plotting data, Decimal form, ratios, fractions and percentages, order of magnitude calculations, Solving simple equations, Collecting data by changing a variable, straight line graphs</p>	<p>Skill development:</p> <p>WS 1.2, 1.4, 1.5, 2.2</p> <p>Maths/Science Links: Representation of 3D Objects, Estimating the result of calculation, mathematical symbols, Changing the subject of an equation, Quantities and SI Units, Frequency tables, bar charts and histograms, scatter diagrams and correlations, plotting data, Decimal form, ratios, fractions and percentages, order of magnitude calculations, Solving simple equations, Collecting data by changing a variable, straight line graphs</p>
	<p>Assessment</p>	<p>Assessment</p> <p>50 mark assessment on the previous two half terms and a revisit questions from previous topics</p>	<p>Assessment</p> <p>25 mark assessment covering forces in action</p>	<p>Assessment</p> <p>10 mark assessment covering Acceleration</p>	<p>Assessment</p> <p>25 mark assessment covering end of forces</p>	<p>Assessment</p> <p>End of year examination</p>
11	<p>Content:</p> <p><b>Why do ducks bob up down on the water?</b></p> <p>The Nature of Waves, The Properties of Waves, Ripple Tank Required Practical, Reflection and Refraction (Higher Only), More about Waves,</p> <p><b>Could we live without the electromagnetic spectrum?</b></p>	<p>Content:</p> <p><b>Could we live without the electromagnetic spectrum?</b></p> <p>Microwaves and radiowaves, Infrared Required Practical Communication, UV, X-rays and Gamma rays, X-rays in Medicine</p> <p><b>How does a compass work?</b></p>	<p>Theoretical Content:</p>	<p>Theoretical Content:</p>	<p>Theoretical Content:</p>	<p>Theoretical Content:</p>

Electromagnetic Spectrum, Light, Infrared,	Magnetic Fields, Magnetic fields of current, Electromagnets in devices, The Motor Effect				
Skill development WS 2.1, 2.2, 2.3, 2.4, 2.6, 3.1, 3.2, 3.3, 3.5, 3.7, 3.8, 4.6 Maths/Science Links: Changing the subject of an equation, Quantities and SI Units, Collecting data by changing a variable, Straight line graphs, Determining the slope and interception, plotting data, Measuring the area of graphs	Skill development WS 1.4, Maths/Science Links: Collecting data by changing a variable, Decimal Form, Standard Form, Ratios, Fractions and percentages, Scatter diagrams and correlations,	Skill development Maths/Science Links:	Skill development Maths/Science Links:	Skill development Maths/Science Links:	Skill development Maths/Science Links:
Assessment: 10 mark assessment	Assessment: November PPE	Assessment: 10 mark assessment	Assessment: Feb PPE	Assessment:	Assessment:

KS4 - Scientific Skills - Working Scientifically

1 Development of scientific thinking		2 Experimental skills and strategies		3 Analysis and evaluation		4 Scientific vocabulary, quantities, units, symbols and nomenclature	
WS 1.1	Understand how scientific methods and theories develop over time.	WS 2.1	Use scientific theories and explanations to develop hypotheses.	WS 3.1	Presenting observations and other data using appropriate methods.	WS 4.1	Use scientific vocabulary, terminology and definitions.
WS1.2	Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.	WS 2.2	Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena.	WS 3.2	Translating data from one form to another.	WS 4.2	Recognise the importance of scientific quantities and understand how they are determined.
WS 1.3	Appreciate the power and limitations of science and consider any ethical issues which may arise.	WS 2.3	Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment.	WS 3.3	Carrying out and represent mathematical and statistical analysis.	WS 4.3	Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate.
WS 1.4	Explain everyday and technological applications	WS 2.4	Carry out experiments appropriately having	WS 3.4	Representing distributions of results and	WS 4.4	Use prefixes and powers of ten for

	of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments.		due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.		making estimations of uncertainty.		orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano).
WS 1.5	Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences.	WS 2.5	Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative.	WS 3.5	Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions.		
WS 1.6	Recognise the importance of peer review of results and of communicating results to a range of audiences.	WS 2.6	Make and record observations and measurements using a range of apparatus and methods.	WS 3.6	Presenting reasoned explanations including relating data to hypotheses.		
		WS 2.7	Evaluate methods and suggest possible improvements and further investigations.	WS 3.7	Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error.		
				WS 3.8	Communicating the scientific rationale for investigations, methods used, findings and reasoned conclusions through paper-based and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms.		