Curriculum Map

Subject	Physics	Threshold Concepts	forces; vector, resultant
			motion; vector, scalar, speed, acceleration, direction
			electricity; current, voltage
Set			particle model; temp. heat energy, latent heat, internal energy,
			energy; store, transfer, conservation

Year 7

	Term Aut 1	Term Aut 2	Term Spr 1	Term Spr 2	Term Sum 1	Term Sum 2
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	Energy	Forces and motion	Forces and motion-Speed	Waves	Electricity	Electricity
Knowledge	Expectations. What is energy? Conservation of energy, Work done, Power calculations, Efficiency	Types of force; contact, non-contact; Representing forces, drawing to scale; Combining forces; Effect of forces. Friction investigation, skills planning variables, resolution. Friction investigation, conclusion and evaluation HSW: recognising patterns in graphs and data Mass and gravity, Streching and squashing	Balanced and unbalanced forces, Speed using formula and conversion of units, relative motion. Distance vs time skills drawing table of results. Distance vs time skills graph drawing. Force and acceleration. Turning forces.	What are waves? Speed of sound; Loudness and amplitude; frequency and pitch; the ear.	Conductors and insulators. Charge and current. Voltage. Building circuits. Current effects heating. Resistance investigation; Static electricity	1. Circuit symbols 2. Circuits series 3. Circuits parallel 4. Circuits, 5. IV characteristic of lamp
Investigative skills	Identifying energy changes in different devices	Invesitgate the effect of different forces on objects- identifying variables	Investigate effect of friction on the speef of an object	tuning forks to study sound	Create circuits to investigate current, voltage and resistance	Create circuits to investigate current, voltage and resistance
Lit / Num	Numeracy: substituting values into equations, converting units, numeracy skills using formulae and conversion of units Literacy: transfer, store, dissipate, conservation, thermal, chemical, electrical, kinetic, GPE, EPE, sound, light, useful, waste, power, work done	**Numeracy: Scale** **Literacy:** addition, subtraction, contact, non-contact, variables, independent, control, dependent, push, pull, weight, friction, upthrust, reaction, thrust, resultant, Newtons	**Numeracy: substituting values into equations, converting units,** **Literacy: resolution, accuracy, zero error, precise, Newtonmeter, increase, decrease, kilometres**	**Numeracy:** Ray diagrams - angles **Literacy:** anomalies, energy, transfer, vibrate, oscillate, loudness, pitch, vacuum, echo, incident, reflected, normal, angle, refraction, luminous	**Numeracy:** Calculate voltage, current and resistance **Literacy:** cell, battery, current, charge, voltage, resistance, potential difference, electrons, ammeter, voltmeter, amperes, volts, bulb, switch, resistor	**Numeracy:** Calculate current and voltage in series and parallel circuits **Literacy:** series, parallel, short circuit, branch
Enrichment				science week activities		
British Vals	Democracy: Students will learn to respect dispairing ideas to one's beliefs and to discuss those ideas in civilised debates. At certain points in the curriculum, students will also be offered the opportunity to take a democratic decision (e.g. majority rule, supermajority or consensus) on the next course of action during a (or series of) lesson(s). The rule of law: students will learn to respect everyone's rights for health and safety by following imposed rules that promote a safe environment for learning and for practical work, further developing the notion that actions are closely followed by consequences. Individual liberty: students are expected to exercise their rights and to respect those of others (e.g. the actions taken in class need to be limited so as to not stop others from learning). Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith: All students will have equal rights to voice their opinions and have their doubts answered, provided these do not offend others beliefs through the promotion of a polite and constructive rather than offensive and destructive discussion (e.g. sharing answers to 6-mark questions and offering/receiving constructive feedback to/from peers).					
Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
Careers						

Year 8

	Term Aut 1	Term Aut 2	Term Spr 1	Term Spr 2	Term Sum 1	Term Sum 2
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	Thermal Energy	Energy Costs	Forces and motion	Forces and motion	Waves	Electromagnetism
Knowledge	Heat energy and temperature: temperature is the measure of KE. Heat energy transfers from hot to cold objects) 0th law of TD, thermal equilibrium and measuring temperature. Expansion due to heating, linking to convection and how thermometers work. Conduction, how energy is transferred through contact. Making good insulators	Food and fuels; Energy resources heating our homes and pollution. Energy resources fossil fuels. Energy resources making electricity. Energy resources renewable; Energy and power; Domestic energy and bills	Turning forces; Gas pressure, particle model. Liquid pressure, particle model. stress on solids skills using pressure = f/A. skills plotting and analysing graphs	Representing forces vectors, scale drawing. Newton's laws 1 - balanced forces. Newton's laws 2 - unbalanced forces. Acceleration skills using f=ma. Newton's laws 3 - reaction forces	Light and colour filters. Types of waves transverse, longitudinal and mechanical. Describing waves frequency, time period and amplitude Reflection and refraction. Emission and absorption of IR (specific link to previous heating topics) Effects of absorption on materials and cells.	1. Magnetism - magnetic materials 2. Magnetism - magnetic fields 3. Electromagnetism - building electromagnets 4. Testing electromagnets 5. Using electromagnets (how microphones work, loud speakers)
Investigative skills	Investigating insulators. Radiation referenced in EM waves; investigating good conductors	How light intensity affects voltage in a photo cell.	Investigating weight, mass and gravity skills using newton meters and w=mg	Investigating Hooke's law as a special case of the force-extension linear; gas and liquid pressure using syringes; measuring a person's presssure on the ground	Investigate waves using the oscilloscope; Using slinky spring to describe waves	Investigate how the number of coils effects the strength of an electromagnet
Lit / Num	Numeracy: Graphical analysis Literacy: Thermal equilibrium, celsius, insulators, conductors	**Numeracy: Calculate energy transfer** **Literacy:** stress, pressure, particles collisions, temperature; volume	**Numeracy: Calculate resultant forces; force = mass x area; finding patterns in data sets** **Literacy: reaction force, acceleration, mass, vector, resultant**	Numeracy: pressure = force/area; graphical analysis; plotting graphs **Literacy:** energy resource, renewable, reliable, pollution, fuel	**Numeracy:** Interpret oscilloscope traces **Literacy:** detect, emission, absorption, transmission, frequency, amplitude, mechanical, infra red, peak, trough, longitudinal, transverse, compression, rarefaction, translucent, transparent	**Numeracy:** **Literacy: solenoid, electromagnet, magnetise, core, circuit breaker**

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Enrichment		Visit SELCHIP Science week activities	DDD - science museum or natural history museum?			
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Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
Careers	heat engineers	fossil fuel industry	draughtsperson, architect, cartography	structural engineers - mechanics	sound engineer, seismologists	renewable energy industry

Year 9

	Term Aut 1 Unit	Term Aut 2 Unit	Term Spr 1 Unit	Term Spr 2 Unit	Term Sum 1 Unit	Term Sum 2 Unit
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Energy**	**Particle model**		**Forces and motion**	**Waves**	**Waves**
Knowledge	Energy stores and transfers. Energy conservation and dissipation. Work done and friction. Work done against gravity. KE, GPE and EPE calculations. Efficiency. Power	Particle model arrangements in Solids, Liquids, Gases. Density of liquids and solids. Density Practical. Heat, temp, heating and cooling curves. Internal energy and latent heat. Gas pressure and temp. Energy resources.		Contact and non contact forces. Vectors and scalars, and free body diagrams. Combining forces, parallelograms. Resolving forces on a slope. Newtons 1st, 2nd and 3rd Laws. F=ma. Mass vs weight. Centre of mass. D vs t graphs. Using d vs t graphs. Hooke's Law Triple content: moments, principle of moments, lever	light vs sound, mechanical waves, transverse and longitudinal, describing waves. Wave features and what they mean; wave fronts and the wave equation; ripple tank speed of wave practical; waves on a string practical and sound wave speed	reflection, refraction and wavefronts Explaining refraction.
Investigate skills	Identifying energy transfers; insulation practical	RP: Density of regular and irregular objects		Hooke's Law	Investigating waves using a ripple tank and string	Investgating reflection and refraction
Lit / Num	Numeracy: Calculating efficiency, GPE & KE, rearranging equations **Literacy: kinetic energy, gravitational potential energy, efficiency, law of conservation of energy**	**Numeracy:** D=m/v **E=mcT** **E=mL**	**Literacy:** specific heat capacity; energy; latent heat of fusion; latent heat of evaporation; temperature; heat	**Numeracy: parallelograms of forces, calculating forces, graphical analysis** Literacy: vector, scalar, displacement, velocity, acceleration, gradient	Numeracy: draw ray diagrams, calculate angles of incidence, reflection and refraction **Literacy:** information, medium, boundary, displacement, equilibrium, wavefront, adjacent, neighbouring, disturb, maximum, minimum, velocity, lambda	**Numeracy: frequency = 1/time** **Literacy:** normal, incidence
Enrichment	History of science,	Archimedes				
British vals	Democracy: Students will learn to respect dispairing ideas to one's beliefs and to discuss those ideas in civilised debates. At certain points in the curriculum, students will also be offered the opportunity to take a democratic decision (e.g. majority rule, supermajority or consensus) on the next course of action during a (or series of) lesson(s). The rule of law: students will learn to respect everyone's rights for health and safety by following imposed rules that promote a safe environment for learning and for practical work, further developing the notion that actions are closely followed by consequences. Individual liberty: students are expected to exercise their rights and to respect those of others (e.g. the actions taken in class need to be limited so as to not stop others from learning). Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith: All students will have equal rights to voice their opinions and have their doubts answered, provided these do not offend others beliefs through the promotion of a polite and constructive rather than offensive and destructive discussion (e.g. sharing answers to 6-mark questions and offering/receiving constructive feedback to/from peers).					
Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
Careers	laboratory technician; material scientist	Electrician; electrical engineer	structural/civil engineer	systems designer	IT consultant	optician

	Term Aut 1 Unit	Term Aut 2 Unit	Term Spr 1 Unit	Term Spr 2 Unit	Term Sum 1 Unit	Term Sum 2 Unit
	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
Unit Title	**Electricity in the home and Electricity recap**	**Atomic structure**	**Waves part 1**	**Energy part 2**	**Forces and motion part 2**	**Revision of year 9 and 10 work, assessment**
Knowledge	Charge and conductors. Current, circuits and symbols. Circuits series and parallel. p.d. and resistance. Ohm's law. Resistance vs length practical. light bulb V vs I graph. diode V vs I graph. Graph analysis LED's, thermistors and LDR's. Combining components V and I.; ACDC; National grid; plug features; wiring a plug; power, I, Q t and R calculations to choose a fuse; using efficiency in calculations; practicing calculations;	Rutherford's experiment; changing models in science; The nucleus, numbers Z and A, isotopes. Properties of the 3 types of nuclear radiation; decay equations; activity and count rate over time; finding half life; uses of radiation tracers and radiotherapy. irradiation and contamination *Triple content: nuclear power; nuclear fusion; evaluation of risks* BEGIN NEW TOPIC recap wave properties and behaviour; Introduction to the EM spectrum sources and detectors	Introduction to waves, Time period and frequency; wave speed equation;drawing ray diagrams and wavefronts; Waves in solids and waves in liquids; reflection and refraction of waves; Tripple: Sound; Waves for detection	Recap energy stores and transfers and equations; kinetic energy using and rearranging the formula; heat energy stores and specific heat capacity; RP finding specific heat capacity; energy resources	Acceleration and motion in a circle H; velocity vs time graphs; interpreting v vs t graphs. Using the equations a=(v-u)/t and V2=U2 +2as; Recap resolving forces and f=ma. F=ma practical; falling and terminal velocity; stopping distance; momentum SEPARATE- (pressure; liquid and gas pressure; atmospheric pressure; floating and sinking; P vs V)	
Invetsigative skills	Wiring a plug	Demo Properties of alpha, beta and gamma	Radiation and absorption; reflection (Triple)	RP: Specific heat capacity	RP: Hooke's Law; F=ma RP	

Year	Row	Aut 1		Aut 2		Spr 1		Spr 2		Sum 1		Sum 2
Year 10	Lit / Num	**Numeracy: Calculating I, V in series and parallel,** calculating power	**Literacy:** oscilloscope, multi step calculations, transformers, earth wire, fuse	**Numeracy:** Decay equations, graphical analysis, calculating half-life, **Deducing isotopes**	**Literacy:** exponential, random, spontaneous, unpredictable, irradiation, contamination, tracers, radiotherapy, fusion, fissionable, chain reaction, induced, background radiation sources, detectors	**Numeracy:**	**Literacy: carrier waves, signal waves, electromagnetic spectrum, radiation, dose, Sieverts, ionising, hazardous, exposure, Triple - transparent, translucent, opaque, lens, retina, concave, convex, focal point, principle focus, diverging, converging, principle axis, magnfication, real image, virtual image, screen**	**Numeracy:** Calculate kinetic energy and specific heat capacity	**Literacy:** specific heat capacity, start up costs, decommissioning, running costs	**Numeracy:** Calculate acceleration, velocity and stopping distance, force = mass/area, graphical interpretation	**Literacy:** terminal velocity, initial, final, momentum, elastic limit, limit of proportionality	
	Enrichment			DDD's				Science week activities				
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	Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.										
	Careers	renewable energy revolution		radiographer, nuclear physicist		IT person, programmer		politician, engineer		traffic officer, designer, engineer		
Year 11		Term	Aut 1 Unit	Term	Aut 2 Unit	Term	Spr 1 Unit	Term	Spr 2 Unit	Term	Sum 1 Unit	Term Sum 2 Unit
		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage
	Unit Title	**Electromagnetism (7)**		**Space (SEPARATE)**		**Revision Paper 2**		**Revision RP's**		**Exams**		**Exams**
	Knowledge / Skills	Magnetic materials and forces; magnetism, induced magnetism and fields; plotting magnetic fields; electromagnetic field around a wire, strength and shape; coils of wire (solenoids) and their fields; Electromagnets; Motor effect and F=Bil; Flemings LHR ; electric motors SEPARATE- (Electromagnetic induction; generators and transformers)		Solar system. Life cycle of a star. Orbits. Red shift. Big bang **COMBINED and SEPARATE- Revision Paper 1**								
	Invetsigative skills	Investigate the effect of different factors on the strength of an electromagnet										
	Lit / Num	**Numeracy:** plotting magnetic fields	**Literacy:** field, induced, solenoids, split ring commutator	Numeracy:	Literacy: Big bang, Red shift							
	Enrichment											
	British Vals	Democracy: Students will learn to respect dispairing ideas to one's beliefs and to discuss those ideas in civilised debates. At certain points in the curriculum, students will also be offered the opportunity to take a democratic decision (e.g. majority rule, supermajority or consensus) on the next course of action during a (or series of) lesson(s). The rule of law: students will learn to respect everyone's rights for health and safety by following imposed rules that promote a safe environment for learning and for practical work, further developing the notion that actions are closely followed by consequences. Individual liberty: students are expected to exercise their rights and to respect those of others (e.g. the actions taken in class need to be limited so as to not stop others from learning). Mutual respect for and tolerance of those with different faiths and beliefs and for those without faith: All students will have equal rights to voice their opinions and have their doubts answered, provided these do not offend others beliefs through the promotion of a polite and constructive rather than offensive and destructive discussion (e.g. sharing answers to 6-mark questions and offering/receiving constructive feedback to/from peers).										
	Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.										
	Careers	Olympic time keeper, Astronaut, Traffic/Road design, NASA space Engineer, Astrophysicist, Aeronautical		Being an electrician, Electrical engineer, Sound engineer/recording.		Nutritionist, renewable energy station designer, physiotherapist, massage therapist,		Sound engineer, Gold Miner, Plant geneticist, Horticultural Scientist,				
r 12		Term	Aut 1 Unit	Term	Aut 2 Unit	Term	Spr 1 Unit	Term	Spr 2 Unit	Term	Sum 1 Unit	Term Sum 2 Unit
		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage		Curriculum/Syllabus Coverage
	Unit Title	**Electricity**		**Waves**		**Particles and Quantum**		**Mechanics and materials**		**Materials**		**Thermal physics, Revision,**
	Knowledge / Skills	Current & Voltage and resistance Series and Parallel Circuits (Kirchhoff's Laws) Potential Dividers Internal Resistance Potential difference and Power RP5: Determination of resistivity of a wire using a micrometer, a and voltmeter. RP6: Investigation of the emf and internal resistance of electric and batteries by measuring the variation of the terminal pd of th cell with current in		Longitudinal and Transverse Superposition and stationary waves Interference Diffraction Refraction Diffraction grating RP1: Investigation into the variation of the frequency of stationary waves on a string with length, tension and mass per unit length of the string. RP2: Investigation of interference effects to include the Young's slit experiment and interference by a diffraction grating.		Atomic structure - stable/unstable nuclei Particle interactions Standard Model Quarks Conservation The Photoelectric Effect Photon emission Wave-Particle Duality		Scalars and vectors Moments Newton's Laws Linear motion Projectile Motion Momentum Work, Energy and Power Conservation of Energy RP3: Determination of g by a free-fall method		Density and elasticity Young Modulus Conservation of Energy RP4: Determination of the Young modulus by a simple method.		Thermodynamics Ideal gases Kinetic theory RP8: Investigation of Boyle's (constant te (constant pressure) law for a gas

Yea	Lit / Num	Calculation, ratio, graph skills, units and SI, recording observati Comparative writing, following written procedure	Analysis of graphs, trigonometry, calculation Description and explanation, following written procedure. superpose, interference, diffraction, intensity	interpretation of behaviour as wave or particle behaviour, show changes with feynman diagrams, use the conservation laws to determine if a change is possible. Classification of matter/particles. Discrete, continuous, probablistic	Trigonometry, calculation, graph skills, units and SI, recording observations Explanation, following written procedure	Determination of Young Modulus	
	Enrichment				Science week activities		
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	Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
	Careers	Research physicist, electrical engineer,	Engineers	Astronomers	Theoretical physicists	material scientist, aeronautical engineer	gas engineer
Year 13		Term Aut 1 Unit	Term Aut 2 Unit	Term Spr 1 Unit	Term Spr 2 Unit	Term Sum 1 Unit 75	Term Sum 2 Unit
		Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage	Curriculum/Syllabus Coverage
	Unit Title	**Further mechanic Thermal Physics**	**Fields**	**Nuclear physics**	**Turning points**	**Revision**	
	Knowledge / Skills	Circular motion Simple Harmonic Motion Resonance Internal energy, specific heat capacity and latent heat Gas laws Kinetic theory RP7: Investigation into simple harmonic motion using a mass-s system and a simple pendulum	Gravitational Fields Electric Fields Potential Capacitors Magnetic Fields RP9: Investigation of the charge and discharge of techniques should include log-linear plotting leadir determination of the time constant RC. RP10: Investigate how the force on a wire varies v and length of wire using a top pan balance. RP11: Investigate, using a search coil and oscillos magnetic flux linkage of varying the angle betwee and magnetic field direction.	Types of radioactive decay Rutherford scattering Nuclear instability Rutherford scattering Nuclear radius, mass and energy Fission & fusion Safety RP12: Investigation of the inverse-square law for	Discovery of the electron; Wave-particle duality; Special relativity;		
	Lit / Num	**angular frequency/speed, centripetal force, centrifuge, radial, tangential**	**permitivity, recognising the inverse square law, analogies between fields, potential , field strength, potential energy, force**	using exponential reltionships in calculations, taking logs of an equation to solve it or plot a linear graph, calculating corrected count rate **binding energy, atomic mass unit, nuclear stability, metastable, fusion, CNO,**	Science week activities		
	Enrichment						
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	Character	Develop resilience, confidence and independence through the practice of 6-mark questions and other independent work, both in and out of lesson. Develop problem solving rationale by promoting students to work on challenges which reinforce links between different schema.					
	Careers	financial analyst, acturist	electronic engineer	nuclear physicist	radiographer, doctor	Physicist	External Examination