Subject	Physics	Year Group:	7		
Unit/Topic	**Forces**	**Sound**		**Light**	**Space**
Skills	AF2 Understanding the applications and implications of science Within this scheme the focus is on AF2 – Understanding the applications and implications of science (level 4) •Describe some simple positive and negative consequences of scientific and technological Developments e.g. space missions, streamlining of race cars, technology within cycling; (helmets/bike/clothing). •Recognise applications of specific scientific ideas e.g. implications of how gravity varies for space missions and what is experienced by an astronaut. •Identify aspects of science used within particular jobs or roles e.g. Forces-Levers making moving loads easier e.g. gardening; wheel barrow, mechanic; spanner, construction; crane	In this scheme there is a focus on **AF1 – Thinking scientifically** Use abstract ideas or models or more than one step when describing processes or phenomena e.g. Use slinky to describe wave movements. Use oscilloscope to 'see' wave patterns. Identify the use of evidence and creative thinking by scientists in the development of scientific ideas E.g. Use of ultra sound for scans, cleaning, physiotherapy. Knowledge of safe sound ranges, knowledge of how the ear works to treat hearing problems.		In this scheme there is a focus on **AF1 – Thinking scientifically** Use abstract ideas or models or more than one step when describing processes or phenomena e.g. models of the eye, filters AF2 Understanding the applications and implications of science Within this scheme there is a focus on AF2 Understanding the applications and implications of science (level 3) •Link applications to specific characteristics or properties e.g. development of vision treatments	In this scheme there is a focus on **AF3 – Communicating and collaborating in science** •Identify lack of balance in the presentation of information or evidence e.g. •Choose forms to communicate qualitative or quantitative data appropriate to the data and the purpose of the communication e.g. make deductions form observation data of planets, stars and galaxies. •Distinguish between data and information from primary sources, secondary sources and simulations, and present them in the most appropriate form.
Knowledge	Features of different materials Social and economic Impact of producing materials.	Wave properties Wave effects Sound		Wave properties Wave effects Light	Models of the solar system Our place in the universe Stars Measurements
Recall/review from previous learning	1-5 recall starters (recall from previous lessons) Lessons building on from KS2	1-5 recall starters (recall from previous lessons) Lessons building on from KS2		1-5 recall starters (recall from previous lessons) Lessons building on from KS2	1-5 recall starters (recall from previous lessons) Lessons building on from KS2

	In KS2 Pupils should be taught to: •describe the movement of the Earth and other planets relative to the sun in the solar system •describe the movement of the moon relative to the Earth •describe the sun, Earth and moon as approximately spherical bodies •use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky •explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object •identify the effects of air resistance, water resistance and friction, that act between moving surfaces •recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	Relationships between sound and the size of the object producing them.	Shadows, opaque, light, how light travels	Seasons of the year •describe the movement of the Earth and other planets relative to the sun in the solar system •describe the movement of the moon relative to the Earth •describe the sun, Earth and moon as approximately spherical bodies •use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky •explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
Assessment	Formative assessment – end of topic tests. (Pupil receives percentage, step and band taken for data analysis) Summative Interleaving Assessments In class questioning Literacy – extended writing tasks. Self and peer assessment.	Formative assessment – end of topic tests. (Pupil receives percentage, step and band taken for data analysis) Summative Interleaving Assessments In class questioning Literacy – extended writing tasks. Self and peer assessment.	Formative assessment – end of topic tests. (Pupil receives percentage, step and band taken for data analysis) Summative Interleaving Assessments In class questioning Literacy – extended writing tasks. Self and peer assessment.	Formative assessment – end of topic tests. (Pupil receives percentage, step and band taken for data analysis) Summative Interleaving Assessments In class questioning Literacy – extended writing tasks. Self and peer assessment.

Cultural Capital	Appliance and transport production, including shape and function (Engineering)	Links to health with hearing . Career links with entertainment industry	Links to health for vision . Career links with entertainment industry	Example of collaborative research Understanding of the world around us. Career links: aeronautics
Literacy/Numeracy	Literacy – Extended writing tasks Spelling tests, Class discussions (Scientific talking) Numeracy – interpreting graphs and resultant forces	Literacy- Extended writing tasks, spelling tests Numeracy- calculations, comparing ranges of hearing.	Literacy- Extended writing tasks, spelling tests Numeracy- Calculating speed and angle size	Literacy – Extended writing tasks Spelling tests, Class discussions (Scientific talking) Numeracy – interpreting distances

Subject	**Physics**	Year Group:	**8**
Unit/Topic	**Electricity**	**Energy**	**Motion & Pressure**
Skills	AF2 Understanding the applications and implications of science Within this scheme there is a focus on AF2 Understanding the applications and implications of science (level 3) •Explain the purposes of a variety of scientific or technological developments e.g. explain the purpose of a dimmer/ switch •Link applications to specific characteristics or properties e.g. explain the choice of electromagnet or permanent magnet for a device in terms of their properties •Identify aspects of our lives, or of the work that people do, which are based on scientific ideas e.g. electrical circuits to power a television and light our homes	The skills assessed in this topic are **AF5 – Working critically with evidence** •Identify patterns in data presented in various formats, including line graphs e.g. describe how an objects temperature changes over time when heated or cooled. •Draw straightforward conclusions from data presented in various formats e.g. conclude which device is best by comparing running costs of a fluorescent and filament light bulb •Identify scientific evidence they have used in drawing conclusions e.g. reference to diagram of useful/ waste energy pupils quote data showing temperature change/ energy usage over time to support conclusion. •Suggest improvements to their working methods, giving reasons e.g. Investigation into preventing heat loss by conduction, convection and radiation; pupils suggest improvements with reasons (range of materials, number of repeats, precision of apparatus, accuracy of measurements, intervals tested etc)	Within this scheme the focus is on AF2 – Understanding the applications and implications of science (level 4) •Describe some simple positive and negative consequences of scientific and technological Developments e.g. space missions, streamlining of race cars, technology within cycling; (helmets/bike/clothing). •Recognise applications of specific scientific ideas e.g. implications of how gravity varies for space missions and what is experienced by an astronaut. •Identify aspects of science used within particular jobs or roles e.g. Forces- Levers making moving loads easier e.g. gardening; wheel barrow, mechanic; spanner, construction; crane
Knowledge	Circuit rules Safety and electricity	Energy stores and transfers Conservation of Energy Conduction, Convection and Radiation	Motion Pressure Levers
Recall/review from previous learning	1-5 recall starters (recall from previous lessons) Lessons building on from KS2	1-5 recall starters (recall from previous lessons) Lessons building on from KS2	1-5 recall starters (recall from previous lessons)

	Links to KS2 curriculum on conductors and circuits • Recognising electrical appliances • Recognise the use of a switch in a circuit • Construct simple circuits Recognise simple conductors and insulators	Compare and group materials (solid. liquid, gas); Observe materials change; measure	Lessons building on from KS2 Motion, calculating speed, particles
Assessment	Formative assessment – end of topic tests. (Pupil receives percentage, step and band taken for data analysis) Summative Interleaving Assessments In class questioning Literacy – extended writing tasks. Self and peer assessment.	Formative assessment – end of topic tests. (Pupil receives percentage, step and band taken for data analysis) Summative Interleaving Assessments In class questioning Literacy – extended writing tasks. Self and peer assessment.	Formative assessment – end of topic tests. (Pupil receives percentage, step and band taken for data analysis) Summative Interleaving Assessments In class questioning Literacy – extended writing tasks. Self and peer assessment.
Cultural Capital	Safety and electricity Production of electrical material (Electrical Engineering)	Understanding fuels and introducing alternative energy; how energy transfers and how useful the transfers are eg saving energy Career Links: Green Energy Jobs; Gas Fitter; Car Designer	Understanding of the world around us. Career associated with material production.
Literacy/Numeracy	Literacy – extended writing assessments, describe and explain work. Numeracy – Equations	Literacy – extended writing assessments, describe and explain work. Numeracy – Equations	Literacy – extended writing assessments, describe and explain work. Numeracy – Equations

Subject	**Physics**	Year Group: **9**		
Unit/Topic	**Forces and Motion**	**Energy**	**Waves, sound and light**	**Electricity and Magnetism**
Skills	Scientific skills – investigating forces and their effects. Use of various scaled instruments to accurately read and measure values, Maths skills - using experimental data to calculate values and transpose equations to calculate forces or mass and weight.	Scientific skills - Using models (explaining models/ why we use models) -modelling a power station and comparing it to the generation of electricity in renewables. Maths skills - SI Units, Converting Units, Significant Figures, Decimals, ratios, percentages, fractions, transposing equations.	Scientific skills – investigating sound and lights effects through objects or its interactions. Maths skills - Angles to calculate refraction and calculation information from sound waves. Transposing equations for power and potential difference. Maths skills: Decimals, ratios, percentages, fractions, transposing equations.	Scienctific skills - Evaluating risks, Converting units ie mA Maths skills: Transposing equations for power and potential difference. Maths skills: Decimals, ratios, percentages, fractions, transposing equations.
Knowledge	Forces and interactions Mass weight and fields Speed and distance time graphs Balanced and unbalanced forces Resultant forces Acceleration and speed time graphs	Energy stores Energy transfers Energy resources Conservation and dissipation Work and power Efficiency Elastic energy and Hooke's Law	Waves and properties. Sound and its applications Reflection and refraction Applications of reflection and refraction Light and colour Electromagnetic spectrum applications of the electromagnetic spectrum.	Static electricity and magnetism Current and resistance Series and parallel Magnetism Electromagnetism Alternating current National grid
Recall/review from previous learning	Knowledge used previously in year 7 and 8 about forces and their effects on objects.	Knowledge will be from KS3 drawing in ideas of fossilisation, photosynthesis, breathing. Students may have knowledge from home/ media as climate change is an evocative subject.	Knowledge from KS3 work on colour and light, wave type and names of the wave parts.	Drawing from the electricity unit in KS3. Manipulation of electrical components. Drawing of electrical diagrams in KS3. Electrical components met in KS3.
Assessment	Formative assessment (end of topic tests) Questioning during class Extended writing literacy activities. Both peer and self-assessment interleaving assessment. Summative interleaving assessment	Formative assessment (end of topic tests) Questioning during class Extended writing literacy activities. Both peer and self-assessment interleaving assessment. Summative interleaving assessment	Formative assessment (end of topic tests) Questioning during class Extended writing literacy activities. Both peer and self-assessment interleaving assessment.	Formative assessment (end of topic tests) Questioning during class Extended writing literacy activities. Both peer and self-assessment interleaving assessment.

			Summative interleaving assessment	Summative interleaving assessment
Cultural Capital	The dangers and uses of forces on everyday life, e.g. pulleys door handle positions wheel barrows Crashes and explosions.	Climate change and global warming concerns. Limited resources and global economic need, technologic advancement. Job of the lesson emphasised in each lesson Cross curriculum links – Health and social care, geography, environmental science, sociology	Methods used to communicate using ideas of the many forms of waves. Dangers associated by various wavelengths of the electromagnetic spectrum and uses of the electromagnetic waves for medicine .	Electricity safety and dangers in everyday life and linking to national grid and generators Causes of thunder and lightning, Job of the lesson emphasised in each lesson. Cross- curricular links – DT, computer science, geography. PSHE, health and social care
Literacy/Numeracy	Collaborative learning opportunities created from practical work. Literacy - discussions regarding forces and collisions/effects Numeracy – interpreting graphs and calculating effects of various forces on objects.	Collaborative learning opportunities created from practical work. Literacy- discussions regarding resource use and sharing and implications Numeracy – interpreting graphs and pie charts within lesson time. Some calculations.	Collaborative learning opportunities created from practical work. Literacy - discusssions and research regarding uses and dangers of EM waves Numeracy – interpreting graphs and pie charts within lesson time. Some calculations.	Collaborative learning opportunities created from practical work. Numeracy - recording data from scientific equipment. Drawing technical diagrams

Subject	**Physics**	Year Group:	**10**	
Unit/Topic	**Radiation**	**Energy conservation**		**Energy Transfer**
Skills	WS 4.4 Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano). WS 4.1 Use scientific vocabulary, terminology and definitions. WS 1.1 Understand how scientific methods and theories develop over time. WS 1.6 Recognise the importance of peer review of results and of communicating results to a range of audiences.	WS 1.3 Appreciate the power and limitations of science and consider any ethical issues which may arise. WS 1.4 Explain everyday and technological applications of science; WS 4.4 Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano).		WS 4.4 Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano). WS 1.2 Recognise/draw/interpret diagrams. WS 4.3 Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. WS 4.5 Interconvert units. WS 4.6 Use an appropriate number of significant figures in calculation.
Knowledge	Structure of the atom; development of the structure of the atom; mass number, atomic number and isotopes; decay and nuclear radiation; nuclear equations; half life; radioactive contamination	Conservation and dissipation of energy; efficiency; national and global energy resources		Changes in energy; energy systems; power;
Recall/review from previous learning	1-5 pre starter questions; exam questions relating to content;	1-5 pre starter questions; exam questions relating to content;		1-5 pre starter questions; exam questions relating to content;
Assessment	End of topic tests; mid topic assessments; Educake; Required Practicals	End of topic tests; mid topic assessments; Educake; Required Practicals		End of topic tests; mid topic assessments; Educake; Required Practicals
Cultural Capital	Medicine, industry, agriculture and electrical power generation. Cross-curricular: Geography, environmental science, LS & W	Cross-curricular: Geography, environmental science, LS & W Environmental careers Awareness of environmental issues Students should be able to consider the environmental issues that may arise from the use of different energy resources; show that science has the ability to identify environmental issues arising from the use of energy resources but not always the power to deal with the issues because of political, social, ethical or economic considerations.		Cross-curricular: Geography, environmental science, LS & W Environmental careers Awareness of environmental issues

Literacy/Numeracy	Nuclear equations Atomic number, mass number	Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano)	Rearrange and apply equations: kinetic energy = 0.5 × mass × speed^2 elastic potential energy = 0.5 × spring constant × extension^2 gpe = mass × gravitational field strength × height change in thermal energy = mass × specific heat capacity × temperature change power = energy transferred/time efficiency = useful output energy transfer/total energy input

Subject	**Physics**	Year Group:	**10**	
Unit/Topic	**Wave Properties**	**EM waves**		
Skills	WS 1.2 Recognise/draw/interpret diagrams. WS 2.2 Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena WS 2.3 Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. WS 2.4 Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations WS 2.6 Make and record observations and measurements using a range of apparatus and methods WS 2.7 Evaluate methods and suggest possible improvements and further investigations	WS 1.2 Recognise/draw/interpret diagrams. WS 1.5 Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences (HT only) WS 1.4 Explain everyday and technological applications of science;		

	WS 3.1 Presenting observations and other data using appropriate method WS 3.5 Interpreting observations and other data		
Knowledge	Waves in air, fluids and solids; Transverse and longitudinal waves; Properties of waves	Types of electromagnetic waves; Properties of electromagnetic waves; Uses and applications of electromagnetic waves	
Recall/review from previous learning	1-5 pre starter questions; exam questions relating to content;	1-5 pre starter questions; exam questions relating to content;	
Assessment	End of topic tests; mid topic assessments; Educake; Required practical activity 20: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements.	End of topic tests; mid topic assessments; Educake; Required practical activity 21: investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface	
Cultural Capital	Designing comfortable and safe structures such as bridges, houses and music performance halls requires an understanding of mechanical waves.	Modern technologies such as imaging and communication systems show how we can make the most of electromagnetic waves.	
Literacy/Numeracy	period = 1/ frequency wave speed = frequency × wavelength	1000 millisieverts (mSv) = 1 sievert (Sv	

Subject	Physics	Year Group:	11	
Unit/Topic	**Forces in balance**	**Motion graphs**		**Forces and motion**
Skills	**MS 3a** Students should recognise and be able to use the symbol for proportionality, ∝ **WS 1.2** Recognise/draw/interpret diagrams. **MS 4a** Translate information between graphical and numeric form **MS 5a** Use angular measures in degrees **MS 5b** Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects **MS 1c** Use ratios, fractions and percentages	**MS 1, 3c** Students should be able to use ratios and proportional reasoning to convert units and to compute rates. **MS 2f** Understand the terms mean, mode and median **MS 4d** Determine the slope of a linear graph		**AT 1, 2, 3** Investigate collisions between laboratory trollies using light gates, data loggers or ticker timers to measure and record data. **AT 1** Measure the effect of distractions on reaction time. **MS 3.3** Substitute numerical values into algebraic equations using appropriate units for physical quantities
Knowledge	Scalar and vector quantities, Contact and non-contact forces, Gravity, Resultant forces, Work done and energy transfer, Forces and elasticity, Moments, levers and gears (physics only), Pressure and pressure differences in fluids (physics only)	Distance and displacement, Speed, Velocity, The distance-time relationship, Acceleration		Newtons First Law, Newtons Seconds Law, Newtons Third Law, Stopping Distances, Reaction Time, Factors affecting braking distances, Momentum
Recall/review from previous learning	Pressure from KS3: p = F/A	Speed from KS3: speed = distance/time		Reaction time common with Biology topic
Assessment	Educake homework, Extended response questions, End of topic tests, Required Practical: Hooke's Law	Educake homework, Extended response questions, End of topic tests, Required Practical: Acceleration		Educake homework, Extended response questions, End of topic tests
Cultural Capital	What forces do and how we experience them around us including their usefulness and disadvantages.	Relationships of real or raw data can be represented and interpreted in graphical form. Analysis can then be carried out using this data.		Engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. Anything mechanical can be analysed in this way. Recent developments in artificial limbs use the analysis of forces to make movement possible.
Literacy/Numeracy	Equations,	Equations, Graphs skills, drawing, interpreting, gradients, shape and area underneath graphs		Equations; Extended response vehicle safety, airbags, seat belts, crumple zones

Subject	Physics	Year Group:	11	
Unit/Topic	**Electromagnetism**			

Skills	**WS 1.2** Model the direction of a force based on the direction of a current and magnetic field using Flemmings left hand rule		
Knowledge	Permanent and induced magnetism, magnetic forces and fields; The motor effect; Induced potential, transformers and the National Grid (physics only)(HT only);		
Recall/review from previous learning	KS3 Magnets, forces and their interaction.		
Assessment	Educake homework, Extended response questions, End of topic tests		
Cultural Capital	Magnets and magnetism is all around us but like gravity the magnetic fields are not visible. Magnetism and electricity go hand in hand, where there is one there is the other. Electromagnets are in all-most all forms of technology in the form of motors and where voltage and current increases of decreases.		
Literacy/Numeracy	Equations		

Subject	A level Physics	Year Group:	12	
Unit/Topic	**Particles and Quantum**	**Waves**		
Skills		**RP1: waves on a string** **RP2: young's slits and diffraction grating** **Use of apparatus and techniques**		
Knowledge	Chpt 1 matter and radiation Chpt 2 Quarks and leptons Chpt 3 Quantum phenomena	Chpt 4 waves Chpt 5 optics		
Recall/review from previous learning	GCSE: particle model of matter, radioactivity	GCSE: Waves		
Assessment	End of chapter tests, section test, paper 1 and 2 mocks	End of chapter tests, section test, paper 1 and 2 mocks		
Cultural Capital	CERN, collaborative working	Sound and light engineering, university trips		
Literacy/Numeracy	**Numeracy : Arithmetic and numerical computation, handling data, algebra, graphs**	**Numeracy: arithmetic and numerical computation, handling data, algebra, graphs, geometry and trigonometry.**		

Subject	A level Physics	Year Group:	12	
Unit/Topic	**Mechanics and materials**	**Electricity**		
Skills	**RP3: G by freefall** **RP4: Young's modulus** **Use of apparatus and techniques**	**RP5: Resistivity of a wire** **RP6: EMF** **Use of apparatus and techniques**		
Knowledge	Chpt 6 Forces in equilibrium Chpt 7 On the move Chpt 8 Newton's laws of motion Chpt 9 Force and momentum Chpt 10 work, energy, and power Chpt 11 materials	Chpt 12 electric current Chpt 13 DC circuits		
Recall/review from previous learning	GCSE: Forces, Energy	GCSE: Electricity		
Assessment	End of chapter tests, section test, paper 1 and 2 mocks	End of chapter tests, section test, paper 1 and 2 mocks		
Cultural Capital	University links	Electrical safety		

Literacy/Numeracy	**Numeracy: arithmetic and numerical computation, handling data, algebra, graphs, geometry and trigonometry.**	**Numeracy: arithmetic and numerical computation, handling data, algebra, graphs, geometry and trigonometry.**	

Subject	A level Physics	Year Group:	13	
Unit/Topic	**Further mechanics and thermal physics**	**fields**		
Skills	RP7: Pendulum RP8: Gas laws **Use of apparatus and techniques**	RP9 Capacitor discharge RP10 F=BIL RP11 Flux linkage **Use of apparatus and techniques**		
Knowledge	Chpt 17 motion in a circle Chpt 18 simple harmonic motion Chpt 19 Thermal physics Chpt 20 Gases	Chpt 21 Gravitational fields Chpt 22 electric fields Chpt 23 capacitors Chpt 24 magnetic fields Chpt 25 electromagnetic induction		
Recall/review from previous learning	Synoptic link: Y12 mechanics GCSE: forces, particle model of matter, thermal energy	Synoptic link: Y12 electricity GCSE: electricity, forces, electricity and magnetism.		
Assessment	End of chapter tests, section test, A level paper 1 and 2 mocks	End of chapter tests, section test, A level paper 2 mocks		
Cultural Capital	Real life applications of circular motion	Space travel, university lab work		
Literacy/Numeracy	**Numeracy: arithmetic and numerical computation, handling data, algebra, graphs, geometry and trigonometry.**	**Numeracy: arithmetic and numerical computation, handling data, algebra, graphs, geometry and trigonometry.**		

Subject	A level Physics	Year Group:	13	
Unit/Topic	**nuclear**	**Option:**		**Option:**
Skills	RP12: Inverse square law of gamma **Use of apparatus and techniques**	Application of knowledge to a specific field of study.		
Knowledge	Chpt 26 radioactivity, nuclear diameter, decay. Chpt 27: nuclear fission, nuclear fusion, binding energy	Astrophysics engineering		
Recall/review from previous learning	Synoptic link: Y12 particles and quantum GCSE: P7 radioactivity	Mechanics Waves		

		Further mechanics Thermal	
Assessment	End of chpt test, section test A level paper 2	End of chapter tests, paper 3 mocks	
Cultural Capital	Use of nuclear power and the energy crisis Nuclear disaster Radiation in medicine	Understanding the universe Solving mechanical problems in real life	
Literacy/Numeracy	**Numeracy: arithmetic and numerical computation, handling data, algebra, graphs, geometry and trigonometry.**	**Numeracy: arithmetic and numerical computation, handling data, algebra, graphs, geometry and trigonometry.**	