KNOWLEDGE AND SKILLS OVERVIEW	HT1	HT2	HT3	HT4	HT5	HT6
Year 7	<u>Forces (in rotation with other subjects across Science)</u> Knowledge: representing forces, measuring forces, balancing forces, changes due to forces Skills: investigation planning, variables, taking measurements, error, units and conversion equations (N), calculation averages (N), graph plotting (N), free body diagrams			<u>Energy Stores (in rotation with other subjects across Science)</u> Knowledge: energy stores and transfers, efficiency, chemical, thermal fuels Skills: using fuel burners, control variables, evaluation, validity		
Year 8	<u>Waves (in rotation with other subjects across Science)</u> Knowledge: energy transfer by electromagnetic and mechanical waves. Wave types (longitudinal and transverse), properties of light, transmission of light through materials, reflection, refraction, colours and the spectrum, the eye, sound waves, pitch and loudness, the ear. Skills: Ray diagrams for angle measurements (N), using mathematical tools (protractor), real world application e.g. sound waves and mosquito, risk assessments, hearing ranges and graph analysis (N), presentations – oracy.			<u>Forces and Space (in rotation with other subjects across Science)</u> Knowledge: growth, movements and simple machines, motion, d-t graphs, relative motion, earth, moons and season, days, night and years, structures, solar system. Skills: equations (measuring) investigation real life machines, graph analysis, planning investigation with multiple variables.		
Year 9	<u>Matter</u> Knowledge: Matter characteristics, kinetic theory of matter, movement and energy, heat and energy Skills: resolution, mastering of equipment, practical applications	<u>Electricity</u> Knowledge: component symbols, modify, circuit formation, series / parallel, static, Ohm's law Skills: resistance calculations, manipulation of Ohm's law, interpreting and	<u>Magnetism</u> Knowledge: Magnetic fields, earth magnetic field, poles and interaction, electromagnets and applications Skills: making a compass, plotting magnetic fields and use of equipment	<u>Working scientifically</u> Working scientifically and investigation skills	<u>KS4 Preparation beginning</u> <u>Energy Resources</u> Energy demands, energy from wind, water, sun and earth, energy and the environment, big energy issues.	

	outside classroom, risk assessment, graph interpretations / analysis	constructing circuit diagrams				
Year 10 *SS only in italics*	Energy dissipation, efficiency, electrical appliances, power, energy transfer by heating – conduction *Infrared radiation*	Specific heat capacity, heating and insulating buildings. *Static electricity* Electric circuits – symbols, current and pd RP – specific heat capacity *RP – insulation*	Resistance, component characteristics, series and parallel circuits. RP – resistance RP - I-V graphs	Electricity in the home – A.C./D.C., plugs and cables, appliances – power, pd, efficiency. Molecules and matter – density and changes of state. Pressure. Latent heat Gas pressure, temperature and volume. RP – density	Internal energy, specific latent heat, gas pressure, temperature and *volume*. Radioactivity – atomic structure, discovery of the nucleus.	Properties of radiation, half-life, changes in the nucleus. *Nuclear fission, nuclear fusion and issues.* Forces in balance-vectors and scalars, resultant forces, centre of mass *Moments*
Year 11 *SS only in italics*	*Moments and levers and gears.* Parallelogram and resolution of forces. Motion, distance, time graphs, acceleration, velocity-time graphs, terminal velocity, forces and braking, momentum.	Forces and elasticity, *Forces and pressure*, waves – mechanical, electromagnetic, transverse, longitudinal, wave properties, reflection and refraction, *sound waves, ultrasound and seismic waves* RP – forces and elasticity	Electromagnetic waves – properties, uses and dangers of all, communications (including optical fibres), waves in medicine (x-rays and gamma). *Light, colour, lenses* RP – radiation and absorption *RP-reflection and refraction*	Electromagnetism – magnetic fields, materials and induced magnetism. Magnetic fields of electric currents, electromagnets, motor effect, *generator effect, a.c. generator and transformers.*	*Space – formation of solar system, life history of stars, orbits, expanding universe.*	Revision

	RP – resultant force and acceleration	RP – waves on a string and waves in ripple tank				
Year 12 (NB: 2 teachers run 2 topics simultaneously)	Practical skills Particles and radiation Quantum phenomena	Quantum phenomena Mechanics	Mechanics Waves and Optics	Electricity	Electricity Materials	A2 work – further mechanics
Year 13 (NB: 2 teachers run 2 topics simultaneously)	Simple Harmonic Motion Thermal Physics and Gases Gravitational fields	Electric fields Capacitors Magnetic fields	Radioactivity Nuclear Physics Turning Points – discovery of the electron	Turning Points – wave-particle duality Turning Points - special relativity	Revision Revision	Revision Revision
ORACY/LIT/NUM	Graph work, scientific reports, algebra, pupil responses, analysing data to make choices throughout Debate / presentation Many more included in descriptions already					
CULTURAL CAPITAL	H & S throughout Links to CERN, particle physicists – Liverpool	Car safety Energy efficiency ratings of properties Radioactivity – links to Curie's (Liverpool	EM waves - medical imaging, technology development Peer mentor and university research process	Alternative energy / sustainability Chernobyl Comparing origin of universe theories	Medical applications. Historical content of atom- Marie Curie (Poland, Paris), Niels Bohr (Copenhagen institute), Ernest Rutherford (Manchester University)	

	university and cloud chamber	Uni, Poland, Paris), Chernobyl, Hiroshima etc.	Links to industry Turning Points is about key discoveries in Physics – link to many famous scientists and scientific debates and changing theories e.g. Huygens and Newton for light.	Turning Points is about key discoveries in Physics – link to many famous scientists and their areas of research e.g. Einstein, war, Jewish community, Switzerland etc.	Y12/13 Higher Education opportunities – Nuffield, Liverpool University and Isaac Physics Women in Engineering Day

DEPARTMENT: PHYSICS

GC / JL / CM / DH

5/7/19

UPDATED AND AMENDED BY JY 21/06/22