	Half term 1	Half term 2	Half term 3	Half term 4	Half term 5	Half term 6
Year 13 Physics	**Content delivered:** **Topics 6.2.1 - 6.2.2** Circular motion basics Centripetal force **Topics 9.1.3 - 9.1.5** Heat transfer Ideal gases Kinetic theory equations **Topics 7.1.1 - 7.1.4** Electric fields Millikan's oil drop experiment Radial electric fields Coulomb's Law	**Content delivered:** **Topics 7.2.1 - 7.2.3** Capacitor basics Charging and discharging capacitors Capacitor maths **Topics 7.3.1 - 7.3.5** Magnetic fields Electric motors Magnetic forces Generating electricity Alternating current **Topics 13.1.1 - 13.1.4** Simple harmonic motion SHM maths SHM energy Resonance and damping	**Content delivered:** **Topics 8.1.1 - 8.1.2** A nuclear atom Electrons from atoms **Topics 8.2.1 - 8.2.3** Particle accelerators Particle detectors The Large Hadron Collider **Topics 11.1.1 - 11.1.2** Gravitational forces Gravitational fields	**Content delivered:** **Topics 8.3.1 - 8.3.4** Particle interactions The particle zoo Particles and forces Particle reactions **Topics 10.1.1 - 10.1.4** Nuclear radiation Rate of radioactive decay Fission and fusion Nuclear power stations	**Content delivered:** **Topics 12.1.1 - 12.1.5** Starshine Stellar classification Distance to the stars The age of the Universe The fate of the Universe Revision and catch-up if necessary.	Summer Exams
Key Words **Level 2** **Level 3**	**Topics 6.2.1 - 6.2.2:** radian, degree, circular motion, angular velocity, centripetal acceleration, centripetal force, tangent, angular displacement, frequency **Topics 9.1.3 - 9.1.5:** specific heat capacity, specific latent heat, black body radiator, state of matter, kelvin, thermal energy, insulation, state of matter, phase change, Boyle's Law, pressure, volume, (inversely) proportional, Charles' Law, pressure law, ideal gas, equation of state, mole, monatomic, root mean square speed **Topics 7.1.1 - 7.1.4:** electric field, field lines, electric field strength, electric potential, equipotential, Coulomb, Coulomb's Law, uniform field, radial field, potential difference, inverse square law, Millikan's Oil Drop Experiment, viscosity, terminal velocity, Stokes force, density,	**Topics 7.2.1 - 7.2.3:** charge, capacitance, potential difference, farad, Coulomb, electric potential energy, time constant, nano-, pico-, discharge curve, charging curve, exponential **Topics 7.3.1 - 7.3.5:** magnetic flux, magnetic flux density, tesla, flux linkage, magnetic field strength, Weber, poles, Fleming's left-hand rule, motor effect, mass spectrometer, electromagnetic induction, Lenz's Law, Faraday's Law, rate of change, induced emf, alternating current, frequency, period, mains electricity, peak voltage, peak current, rms voltage, rms current, electromagnet, transformer, primary coil, secondary coil **Topics 13.1.1 - 13.1.4:** oscillation, period, frequency, simple harmonic motion, simple pendulum, restoring force, displacement, velocity, acceleration, angular velocity, total energy, free oscillation, natural frequency, forced oscillation, driving frequency, resonance, damping, critically damped, over-damped, underdamped	**Topics 8.1.1 - 8.1.2:** Plum Pudding Model, alpha particle, nucleon number, mass number, atomic number, Rutherford Model, Bohr Model, Dalton's Model, Democritus' Model, scattering, repulsion, neutron, nucleus, isotope, proton, strong nuclear force, neutron number, photoelectric effect, thermionic emission, cathode ray, diffraction pattern, de Broglie wavelength **Topics 8.2.1 - 8.2.3:** linear accelerator, potential difference, cyclotron, synchrotron, cyclotron frequency, annihilation, Geiger-Muller detector, bubble chamber **Topics 11.1.1 - 11.1.2:** gravitational field, inverse square law, point mass, gravitational attraction, radial field, gravitational potential	**Topics 8.3.1 - 8.3.4:** electron, positron, annihilation, pair-production, electron volt, charge, mass, momentum, quark, lepton, hadron, baryon, meson, standard model, anti-particle, strong nuclear force, pion, kaon, graviton, exchange particle, boson, electromagnetic interaction, weak interaction, photon, alpha decay, beta decay, baryon number, lepton number, conservation law, strangeness **Topics 10.1.1 - 10.1.4:** background radiation, gamma radiation, decay, Becquerel, count per second, absorption, unstable	**Topics 12.1.1 - 12.1.5:** star, red giant, white dwarf, supergiant, luminosity, Wien's Law, Stefan-Boltzmann Law, black body, stellar class, Hertzsprung-Russell diagram, line spectra, emission spectra, Doppler shift, main sequence, protostar, neutron star, black hole, planetary nebula, black dwarf, supernova, light year, parsec, parallax, parallax angle, astronomical unit, standard candle, variable star, red shift, blue shift, Hubble's Law, Hubble constant, Big Bang, Big Crunch, dark matter, dark energy, gravitational lensing	
Where previous knowledge has occurred and future development **KS2 → KS3 → KS4 → KS5**	KS2: Scientific Enquiry KS3: Electricity KS4: Kinetic theory	KS2: Forces and magnets KS3: Electricity KS4: Properties of Waves	KS2: States of matter KS3: Atoms and molecules KS4: Atomic models	KS2: States of matter KS3: The electromagnetic spectrum KS4: Vectors and scalars	KS2: Earth and Space KS3: Space KS4: Space physics	
Common Misconceptions	There is a centrifugal force that acts on objects moving in a circle.	Combining capacitors in series increases the charge stored.	Astronauts are not affected by the Earth's gravity.	Ionising radiation is always dangerous.	Brighter stars are always hotter stars.	
Literacy	Required practical write-ups. Completion of extended writing exam questions. NHTW grids completed.	Required practical write-ups. Completion of extended writing exam questions. NHTW grids completed.	Required practical write-ups. Completion of extended writing exam questions. NHTW grids completed.	Required practical write-ups. Completion of extended writing exam questions. NHTW grids completed.	Required practical write-ups. Completion of extended writing exam questions. NHTW grids completed.	
Numeracy	Rearranging and substituting into equations. Converting between units. Calculation of spherical volumes. Sketching and comparing inverse and inverse-square-law graphs.	Rearranging and substituting into equations. Converting between units. Plotting and interpretation of periodic graphs showing induced emf. Use of sin and cos in equations.	Rearranging and substituting into equations. Converting between units. Calculations of frequencies and particle energies.	Rearranging and substituting into equations. Converting between units. Use of exponentials in problem-solving and graph work. Calculation of half-thickness and half-life.	Use and manipulation of formulae involving logarithms. Calculations involving numbers with large exponents. Calculations and conversion between apparent and absolute magnitude.	
Homework	Completion of Doddle section quizzes	Completion of Doddle section quizzes	Completion of Doddle section quizzes	Completion of Doddle section quizzes	Completion of Doddle section quizzes	
Assessment this half-term	Mini-test 7.1.1 - 4 CP9, CP10, CP11, CP12, Cp13	Mock Exam – Papers 1, 2, 3 CP11, 14, 16	Mock Exam – Papers 1, 2, 3	Mock Exam – Papers 1, 2, 3	Practice Papers 1, 2, 3 CP15	
Career opportunities Employment Links	LIFE SKILLS: Understanding why the charge on object is always in multiples of 'e'. EMPLOYMENT: Electrical engineer	LIFE SKILLS: Knowledge of how electricity generation works. EMPLOYMENT: Electrician	LIFE SKILLS: Understanding how new evidence can alter scientific models. EMPLOYMENT: Medical physicist	LIFE SKILLS: Understanding the interactions that took place in our early universe.	LIFE SKILLS: Understanding the origin of our solar system and wider universe. EMPLOYMENT: Astrophysicist, Astronomer	

				EMPLOYMENT: Particle Physicist, Cosmologist		
Enrichment						
Practical activities/HSW	CP9 – F = ma CP10 – Collisions between bodies CP12 – Thermistors CP13 – Specific latent heat of ice	CP11 – Capacitors CP14 – Boyle's Law CP16 – Resonant frequencies	Catch-up if required	Catch-up if required	CP15 – Absorption of gamma radiation	
Employability Skills	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	Aiming high Literacy Creativity Numeracy Leadership Independence Listening Communication Presenting Teamwork Problem solving Staying positive	
IT Skills	IT1 & IT2: Appropriate websites and research for homework as well as recall quizzes	IT1 & IT2: Appropriate websites and research for homework as well as recall quizzes	IT1 & IT2: Appropriate websites and research for homework as well as recall quizzes	IT1 & IT2: Appropriate websites and research for homework as well as recall quizzes	IT1 & IT2: Appropriate websites and research for homework as well as recall quizzes	
Notes/developments /standardisation comments						