Croxley Danes School : Key Stage 5 Curriculum Map

Subject: Physics **Exam Board: OCR A**

Key Concepts

Foundations of Physics	Forces and Motion	Electrons, waves and photons	Newtonian World and Astrophysics	Particles and Medical Physics	Practical component
Physical quantities SI units Measurements and uncertainties Scalars and vectors	Kinematics Linear and projectile motion Dynamics Motion with non-uniform acceleration Newton's laws of motion Collisions Energy and power Density and pressure Springs and materials	Electricity Waves Superposition and interference Photoelectric effect Wave-particle duality	Circular and simple harmonic motion Thermal physics Gravitational fields Astrophysics and cosmology	Electric fields Capacitors Electromagnetism Nuclear and particle physics Medical imaging	students are expected to do a minimum of 12 PAGs (Practical Assessment Group) as part of Practical Endorsement in Physics. Across these 12 PAGs, the following Common Practical Assessment Criteria (CPACs) are assessed. There are 5 of these CPACs which students need to demonstrate within their PAGs: CPAC 1: Following Written Procedures CPAC 2: Applies Investigative Approaches and methods when using instruments and equipment CPAC 3: Safely uses a range of practical equipment and materials CPAC 4: Makes and records observations CPAC 5: Researches and References and Reports

What is the Croxley vision for this subject at Key Stage 5 ?
Our vision is to inspire a deep understanding and lifelong appreciation of the physical world by delivering OCR A Level Physics through a range of engaging and evidence-based teaching. We aim to empower students to think critically, apply physical and mathematical principles to real-world contexts, and develop the scientific literacy and practical skills needed for further study, careers in science, and informed global citizenship. Through high expectations, inclusive practices, and a commitment to academic excellence, we aim to nurture curiosity, resilience, and a sense of wonder in every learner.

Key Stage 5 /	**Year Group: 12 - topics are taught concurrently across 2 teachers**			
	Autumn Term 1	**Autumn Term 2**	**Spring Term 1**	**Spring Term 2**
key concept	Foundations of Physics, Forces and motion, Waves		Energy and power, Materials, Electricity	
Content: **(Know what…)**	2.1.1 Physical quantities 2.1.2 SI units 2.2.1 Measurements and uncertainties 2.3.1 Scalars and vectors 3.1.1 Kinematics 3.1.2 Linear motion 3.1.3 Projectile motion 3.2.1 Dynamics 3.2.2 Motion with non-uniform acceleration 3.2.3 Equilibrium 3.5.1 Newton's laws of motion 3.5.2 Collisions 4.4.1 Wave motion 4.4.2 Electromagnetic waves 4.4.3 Superposition 4.4.4 Stationary waves 4.5.2 The photoelectric effect 4.5.3 Wave–particle duality ● PAG 1 Investigating motion ● PAG 5 Investigating waves ● PAG 6 Investigating quantum effects		3.3.1 Work and conservation of energy 3.3.2 Kinetic and potential energies 3.3.3 Power 4.1.1 Charge 4.1.2 Mean drift velocity 4.2.1 Circuit symbols 4.2.2 E.m.f. and p.d. 4.2.3 Resistance 4.2.4 Resistivity 4.2.5 Power 4.3.1 Series and parallel circuits 4.3.2 Internal resistance ● PAG 3 Investigating electrical properties ● PAG 4 Investigating electrical circuits	

Skills: **(know how…)**	Mathematical proficiency - algebra, data analysis, graphs and equations of straight lines, significant figures, error analysis, scalars vs vectors Experimental design, execution, data collection and analysis and evaluation including use of analogue and digital instruments, light gates and data loggers. Lines of best and worst fit.	Experimental design, execution, data collection and analysis and evaluation including use of analogue and digital instruments, light gates and data loggers. Lines of best and worst fit.
Key vocabulary	**Practical Skills & Data Handling** accuracy, precision, absolute and fractional uncertainty, calibration, random error, systematic error **Measurement & Units** SI units, base units, derived units, prefixes, unit conversions, standard form, dimensional analysis **Vectors & Scalars** scalar, vector, displacement, velocity, acceleration, resultant, vector components **Kinematics** displacement, velocity, acceleration, SUVAT equations, motion graphs, gradient, terminal velocity **Dynamics (Forces & Motion)** force, Newton's laws, mass, weight, friction, drag, free-body diagram **Energy, Work & Power** work, energy, power, efficiency, kinetic energy, potential energy, conservation **Materials** stress, strain, Young modulus, Hooke's law, elastic limit, spring constant, plastic deformation **Momentum & Impulse** momentum, impulse, conservation, elastic collision, inelastic collision, force-time graph, Newton's second law **Waves** wavelength, frequency, amplitude, wave speed, superposition, interference, stationary wave **Electricity** current, voltage, resistance, Ohm's law, power, potential difference, Kirchhoff's laws **Quantum Physics** photon, energy levels, Planck constant, photoelectric effect, work function, threshold frequency, wave-particle duality	

End of Half term assessment	Baseline assessment at start of Y12 end of topic tests PAG assessments	end of topic tests AP1 PAG assessments	end of topic tests PAG assessments	end of topic tests PAG assessments
Planned trips / Clubs / links				

Key Stage 5 / Year Group: 12		
	Summer 1	**Summer 2**
Key Concept	Materials, Electricity	
Content: **(Know what…)**	3.2.4 Density and pressure 3.4.1 Springs 3.4.2 Mechanical properties of matter 4.3.3 Potential dividers ● PAG 2 Investigating properties of materials Start Module 5 (Gravitational Fields and Circular Motion)	
Skills: **(Know how…)**	As above	
Key vocabulary	As above	
End of Half term assessment	end of topic tests PAG assessments	end of topic test PAG assessments Y12 mock exams
Planned trips / Clubs / links		

Key Stage 5 / Year Group: 13 - topics are taught concurrently across 2 teachers				
	Autumn Term 1	**Autumn Term 2**	**Spring Term 1**	**Spring Term 2**
key concept	Newtonian world and astrophysics		Astrophysics, Particles and medical physics	
Content: **(Know what…)**	5.1 Thermal physics 5.2 Circular motion 5.3 Oscillations 5.4 Gravitational fields 6.1 Capacitors 6.2 Electric fields ● PAG 8 Investigating gases ● PAG 9 Investigating capacitors ● PAG 10 Investigating simple harmonic motion ● PAG 11 Investigation (complete) ● PAG 12 Research Skills (complete)		5.5 Astrophysics and co6.3 Electromagnetism 6.4 Nuclear and particle physics 6.5 Medical imaging ● PAG 7 Investigating ionising radiation ● PAG 11 Investigation (complete) ● PAG 12 Research Skills (complete)	
Skills: **(know how…)**	Continue developing mathematical proficiency including more complex algebra, use of ratios in problem-solving. Use of exponentials and logarithms in exponential decay problems. Use of logarithms to linearise equations. Continue developing practical skills. increasing independence in planning and use of equipment. Research and referencing skills.		Continue developing mathematical proficiency including more complex algebra, use of ratios in problem-solving. Use of exponentials and logarithms in exponential decay problems. Use of logarithms to linearise equations. Continue developing practical skills. increasing independence in planning and use of equipment. Research and referencing skills. Safe use of radioactive materials.	
Key vocabulary	**Thermal Physics & Kinetic Theory**			

	thermal equilibrium, specific heat capacity, specific latent heat, ideal gas, root mean square speed, Boltzmann constant, internal energy **Circular Motion & Oscillations** centripetal force, angular frequency, period, simple harmonic motion, damping, resonance, angular velocity **Gravitational Fields & Astrophysics** gravitational field strength, escape velocity, Kepler's laws, gravitational potential energy, Hubble's law, cosmic microwave background, red shift **Capacitors & Electric Fields** capacitance, time constant, energy stored, electric field strength, Coulomb's law, electric potential, parallel plate capacitor **Electromagnetism** magnetic flux, electromagnetic induction, transformer, Fleming's left-hand rule, magnetic flux density, Lorentz force, a.c. generator **Nuclear & Particle Physics** radioactive decay, half-life, decay constant, quark, lepton, antimatter, fundamental force, pair production, annihilation **Medical Imaging** X-ray, CAT scan, attenuation coefficient, contrast medium, ionising radiation, pair production, medical imaging			
End of Half term assessment	end of topic tests PAG assessments	end of topic tests Mock exams PAG assessments	end of topic tests PAG assessments	end of topic tests Mock paper 3 PAG assessments
Planned trips / Clubs / links	Diamond Light Source virtual visit			