Year 13					
Physics					
Half-Term 1 (Winter 1)					
Topic 20		Topic 21		Topic 22	
Module title	Gas Laws	**Module title**	Gravitational Fields	**Module title**	Electric Fields
Teaching hours	10 hours	**Teaching hours**	7 hours	**Teaching hours**	10 hours
Domains	Thermal Physics Pressure Forces	**Domains**	Fields Energy Forces Circular Motion	**Domains**	Fields Energy Forces Electricity
Textbook	Kerboodle pp. 48-56	**Textbook**	Kerboodle pp. 68-83	**Textbook**	Kerboodle pp. 88-105
Key Concepts		**Key Concepts**		**Key Concepts**	
Experimental Gas Laws Ideal gas Law Kinetic Theory of Gases		Drawing a gravitational field pattern Gravitational Potential Newton's Law of Gravitation Motion of bodies in space		Drawing electric field patterns Defining electric field strength Electric Potential Coulombs Law Force acting on point charges	
Declarative knowledge covered		**Declarative knowledge covered**		**Declarative knowledge covered**	
Boyle's Law Pressure Law Kinetic Theory of Gases Proof		Range of gravitational potential Using potential to calculate field strength		Force between two charged particles Drawing equipotential lines Comparing Fields	
Procedural knowledge covered		**Procedural knowledge covered**		**Procedural knowledge covered**	
Using the ideal gas equation		Variation of gravitational field strength with distance Definition of time period of satellite orbit		Comparison of Electric Fields with Gravitational Fields Determining the potential in a uniform field	
Key Experiments/Demos		**Key Experiments/Demos**		**Key Experiments/Demos**	
CPAC 8a – Boyle's Law (v2) (CP1, CP3) CPAC 8b – Charles' Law (CP1, CP3) Practical: Absolute Zero				Demo: Shuttling ball experiment Demo: Showing field lines (mineral oil) Practical: Electric Field plotting	
Retrieval focus	Thermal Physics	**Retrieval focus**	Gas Laws and Circular Motion	**Retrieval focus**	Gravitational Fields
Skills focus	Calibration and Comparison	**Skills focus**	None	**Skills focus**	Hypotheses
Assessment	P20 – Homework P20 – End of topic assessment	**Assessment**	P21 – Homework P21 – End of topic assessment	**Assessment**	P22 – Homework P22 – End of topic assessment

Year 13					
Physics					
Half-Term 2 (Winter 2)					
Topic 23		Topic 24		Topic 25	
Module title	Capacitors	**Module title**	Magnetic Fields	**Module title**	Electromagnetic Induction
Teaching hours	7 hours	**Teaching hours**	6 hours	**Teaching hours**	7 hours
Domains	Fields Forces DC Circuits Energy	**Domains**	Fields Forces Circular motion Charged Particles	**Domains**	Electric Fields AC Circuits Energy
Textbook	Kerboodle pp. 110-121	**Textbook**	Kerboodle pp. 126-135	**Textbook**	Kerboodle: pp. 140-
Key Concepts		**Key Concepts**		**Key Concepts**	
Capacitance Energy stored in a capacitor Charging and discharging capacitors Dielectrics		Magnetic Fields Fleming's left hand rule Force on charges in a magnetic field Charges in circular orbits		Electromagnetic Induction Electromagnetic Laws Alternating current generator Transformers	
Declarative knowledge covered		**Declarative knowledge covered**		**Declarative knowledge covered**	
Using logarithms to base e How dielectrics affect the capacitance Capacitor design		Definition of Flux density Synchrotrons Mass Spectrometer Hall effect (Magnetic sensors)		Lenz's law Faradays law of Electromagnetic induction	
Procedural knowledge covered		**Procedural knowledge covered**		**Procedural knowledge covered**	
Application of capacitors to thunderstorms Interpreting change of variables of capacitor design		Linking circular motion to charged particles in orbit Linking charge carrier deflection in a field to potential difference		Heating effect of alternating current Transformer efficiency	
Key Experiments/Demos		**Key Experiments/Demos**		**Key Experiments/Demos**	
CPAC 9 – Capacitors (CP1, CP3) Demo: Making a capacitor Practical: Investigating charge and capacitance Practical: Investigating the charge and discharge of capacitors Practical: Capacitor discharge		CPAC 10 – F=BIl (CP4, CP5) Practical: Investigating the force on a current-carrying wire Practical: Measurement of magnetic flux density		CPAC 11 – Flux Linkage (CP1, CP5) Practical: Induced Voltages Practical: Investigating back emf Practical: Transformer efficiency Practical: Using an oscilloscope Practical: The differential transformer	
Retrieval focus	Electric Fields	**Retrieval focus**	Capacitors	**Retrieval focus**	Magnetic Fields
Skills focus	Using natural logarithms	**Skills focus**	Explaining experimental errors	**Skills focus**	Using an oscilloscope, Safety in the lab
Assessment	P23 – Homework P23 – End of topic assessment	**Assessment**	P24 – Homework P24 – End of topic assessment	**Assessment**	P25 – Homework P25 – End of topic assessment

Year 13					
Physics					
Half-Term 3 (Spring 1)				**Half-Term 4 (Spring 2)**	
Topic 26		Topic 27		Topic 28	
Module title	Radioactivity	**Module title**	Nuclear Energy	**Module title**	Optional Topic (Astrophysics - A) Telescopes
Teaching hours	16 hours	**Teaching hours**	6 hours	**Teaching hours**	9 hours
Domains	Atomic Physics Particles	**Domains**	Radioactivity Atomic Physics Particles Energy	**Domains**	Astrophysics Optics Waves
Textbook	Kerboodle pp. 168-197	**Textbook**	Kerboodle pp. 202-214	**Textbook**	Additional pdf (1)
Key Concepts		**Key Concepts**		**Key Concepts**	
Discovery of the nucleus Properties of alpha, beta, gamma radiation Inverse square law Dangers of radioactivity Half-life Radioactive isotope use Decay modes Nuclear Radius		Einstein's Special Relativity Binding energy (Mass defect) Nuclear Stability Fission and Fusion Thermal nuclear reactor		Lenses Ray Diagrams Refracting telescope Angular magnification Power Reflecting telescopes Angular resolution Telescopes and technology	
Declarative knowledge covered		**Declarative knowledge covered**		**Declarative knowledge covered**	
Rutherford's experiment Geiger Muller tube Calculating activity		Fission processes Fusion processes Structure of thermal nuclear reactor		Spherical/Chromatic Aberration Advantages and disadvantages of different telescopes Discussion of telescope types	
Procedural knowledge covered		**Procedural knowledge covered**		**Procedural knowledge covered**	
Cloud chamber observations 9Determining the nuclear radius		Calculating the binding energy of atoms Linking binding energy to stability		Angular resolution of distant objects	
Key Experiments/Demos		**Key Experiments/Demos**		**Key Experiments/Demos**	
CPAC 12 – Radiation (CP3, CP5) Demo: Cloud chamber Practical: Investigating the absorption of beta particles Practical: Investigating the range of alpha particles in air Practical: The characteristics of a Geiger tube Practical: The inverse square law for gamma radiation		Virtual Lab: Nuclear Fission (PhET) Practical: Radioactive decay, binding energy and binding energy per nucleon.		Practical: Investigating converging lens Practical: Investigating the simple refracting telescope	
Retrieval focus	Electromagnetic Induction	**Retrieval focus**	Radioactivity	**Retrieval focus**	Nuclear Energy
Skills focus	Radiation safety	**Skills focus**	Analysis of graphed data	**Skills focus**	N/A
Assessment	P26 – Homework P26 – End of topic assessment	**Assessment**	P27 – Homework P27 – End of topic assessment	**Assessment**	Chapter 1 – Homework Chapter 1 – End of topic Assessment

Year 13					
Physics					
Half-Term 4 (Spring 2)				**Half-Term 5 & 6 (Summer)**	
Topic 26		Topic 27		Topic 28	
Module title	Optional Topic (Astrophysics - B) Surveying the Stars	**Module title**	Optional Topic (Astrophysics - C) Cosmology	**Module title**	Final Revision
Teaching hours	6 hours	**Teaching hours**	6 hours	**Teaching hours**	Remainder of course
Domains	Atomic Physics Particles Astrophysics Particles	**Domains**	Astrophysics Energy Waves Electromagnetic Spectrum	**Domains**	
Textbook	Additional pdf (2)	**Textbook**	Additional pdf (3)	**Textbook**	
Key Concepts		**Key Concepts**		**Key Concepts**	
Astronomical distances Star Magnitudes (Apparent magnitudes) Classifying stars – Stellar Spectral Classes Hertzsprung-Russell diagram Stellar Evolution Supernovae Black holes		The doppler effect Spectroscopic binary Hubble's Law Big Bang Theory Dark Energy Quasars Exoplanets			
Declarative knowledge covered		**Declarative knowledge covered**		**Declarative knowledge covered**	
Blackbody radiation Wien's Law Stefan's Law		Evidence for the Big Bang theory Properties of Quasars Transit method of exoplanet discovery			
Procedural knowledge covered		**Procedural knowledge covered**		**Procedural knowledge covered**	
Calculating distances using parallax		Determine the doppler shift Calculating Hubble's constant			
Key Experiments/Demos		**Key Experiments/Demos**		**Key Experiments/Demos**	
Retrieval focus	Telescopes	**Retrieval focus**	Radioactivity	**Retrieval focus**	N/A
Skills focus	N/A	**Skills focus**	Analysis of graphed data	**Skills focus**	N/A
Assessment	Chapter 2 - Homework Chapter 2 – End of topic assessment	**Assessment**	P27 – Homework P27 – End of topic assessment	**Assessment**	N/A