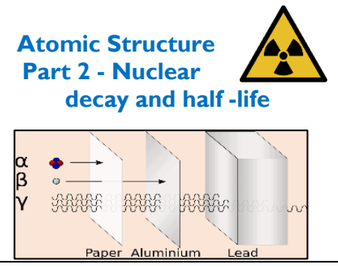
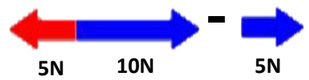
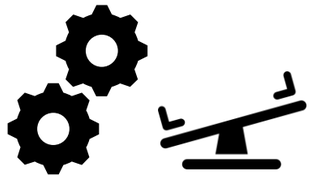
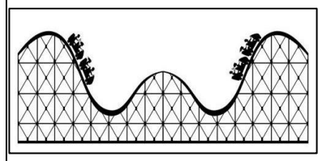
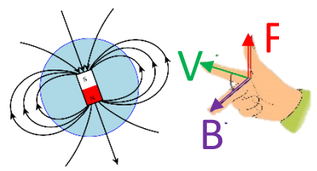
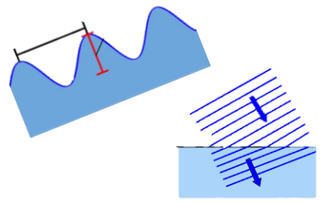
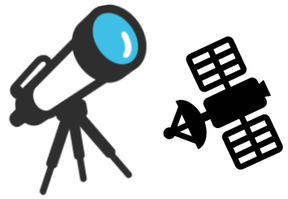
Key Stage 4 Curriculum Journey: Physics (1xGCSE)

Physics is one of the oldest scientific disciplines. Our Physics curriculum 'forces' 😉 pupil engagement in addressing some of the biggest questions in Science. How do objects (systems) behave and move as they do through space and time? The subject is comprised of two main entities; energy and force. Check out the topics below and you will see how they all fall into one, or both, of these categories!

YEAR 10 CURRICULUM JOURNEY

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Topic	**Circuits Required practicals.** **Mains Electricity** 	**Atomic Structure Part 1 - Development of the Model of the Atom** 	**Atomic Structure Part 2 - Nuclear decay and half -life** 	**Forces part 1** 	**Forces part 2** 	**Forces part 3** 
Key Knowledge, Skills & Understanding ***RP = Required Practical** ****HT = higher tier content only**	Circuits continued. • Resistance in a filament bulb, fixed resistor and diode. <u>Mains Electricity</u> • Recall mains Potential difference and frequency and evaluate its safety • Recall energy transfer equations • Apply equations • Explain why the National Grid system is an efficient way to transfer energy	• use standard form to describe the size of atoms • recognise and explain the term isotope • describe how evidence from key experiments led to the development of the atomic model • compare the plum pudding and nuclear atomic models	• state the properties of alpha, beta and gamma rays • explain their use • write nuclear decay equations • define and determine half-life • compare hazards and precautions of using radioactive materials • state the sources of background radiation • explain that hazards associated with different radioactive materials differ in relation to half-life • evaluate medical uses of radiation and their perceived risk based on evidence • draw and interpret diagrams relating to nuclear fission and fusion • describe how chain reactions occur.	• give examples of scalar and vector quantities • use vector diagrams to resolve forces • explain weight is a force • recall work is done when a force moves an object • investigate the relationship between force and extension of a spring (RP)	• describe examples in which forces cause rotation • calculate magnitudes of moments • explain how levers and gears transmit the rotational effects of forces • recall and apply equations for pressure in fluids and gases • calculate differences in pressure at different depths (HT) • explain why the Earth's atmospheric pressure varies with height	• recall typical values of speed • explain scalar and vector with application to distance, displacement, speed and velocity • explain motion in a circle • determine speed from distance-time graphs • interpret enclosed areas in speed–time graphs to determine distance (HT) • interpret velocity-time graphs including that for terminal velocity • interpret enclosed areas in velocity–time graphs to determine displacement (HT) • apply equation for uniform velocity
GCSE Assessment Objectives-	**Working scientifically (WS)** - Students develop their working scientifically skills so that they can fully understand the scientific process. These skills fall broadly into four main strands and exams will include questions that assess all of these strands: 1. the development of scientific thinking 2. experimental skills and strategies 3. analysis and evaluation 4. vocabulary, units, symbols and nomenclature. **Maths Skills (MS)** – In Physics, a minimum of 30% of marks will test mathematical skills. **Assessment Objectives (AO)** - The exams will measure how students have achieved the following assessment objectives. AO1-Demonstrate knowledge and understanding of scientific ideas, scientific techniques and procedures AO2-Apply knowledge and understanding of scientific ideas, scientific enquiry, techniques and procedures AO3-Analyse information and ideas to interpret, evaluate, make judgements, draw conclusions, develop and improve experimental procedures					
MAPs	MAP 1 – Circuits Required Practicals. MAP 2-Mains Electricity	MAP 3- Atomic Structure	MAP 4- Radioactivity, fission and fusion)	MAP 5- Forces and elasticity	MAP 6-Forces, velocity and acceleration	P2S3- Yr10 Mock Exam Paper 1 P2S3- Yr10 Mock Exam Paper 1 P2S3- Yr10 Mock Exam Paper 1

YEAR 11 CURRICULUM JOURNEY						
	Half Term 1	**Half Term 2**	**Half Term 3**	**Half Term 4**	**Half Term 5**	**Half Term 6**
Topic	**Forces Part 3 Continued** 	**Electromagnetism** 	**Electromagnetism continued** 	**Waves** 	**Space** 	**Revision** 
Key Knowledge, Skills & Understanding ***RP = Required Practical** ****HT = higher tier content only**	• apply Newton's 1st Law • describe inertia (HT) • recall and apply Newton's 2nd Law (F=ma) • investigate the effect of varying force on the acceleration of an object of constant mass (RP) • apply Newton's 3rd Law to equilibrium situations • Define stopping distance • Explain factors that affect stopping distance • Interpret graphs relating speed to stopping distance • Define momentum (HT) • Describe and explain examples of conservation of momentum (HT) • Explain safety features in the context of changing momentum • Moments, Levers, Gears	• Describe the difference between like and unlike poles for permanent and induced magnets • Describe how to plot a magnetic field pattern using a compass for both a single wire and a solenoid • Show how the behaviour of a compass evidences the Earth's core as being magnetic • Describe how the magnetic effect of current can be demonstrated and how it can be made stronger • Interpret diagrams of electromagnetic devices to explain how they work • Apply Fleming's left-hand rule (HT) • Apply the $F=BIl$ equation when a current carrying conductor is at right angles to magnetic field • Explain how the force on a conductor in a magnetic field causes rotation in an electric motor. Apply principles of the generator effect to alternators and dynamos (HT)	• Explain how loudspeakers and microphones work (HT) • Recall factors that effect the size of induced potential difference • explain basic transformers containing primary and secondary coils (HT) • explain how the ratio of the potential differences across the two coils depends on the ratio of the number of turns on each (HT) • apply equations to show the advantages of power transmission at high voltages (HT) • Give examples and explain the uses of electromagnetic waves and their associated hazards (HT) • Explain how different substances reflect, refract, absorb and transmit electromagnetic waves (HT) **Waves** • Describe differences between the properties of longitudinal and transverse waves • Describe methods to measure the speed of waves (RP) • Explain how different substances reflect, refract, absorb and transmit electromagnetic waves (HT) (RP)	• Construct ray diagrams to illustrate reflection and refraction (RP) • State the hearing range of humans • describe the effect of sound waves on the ear drum • explain qualitatively, how different types of wave can be used both for detection and exploration of structures which are hidden from direct observation, eg. echo sounding and the study of seismic waves (HT) • Construct ray diagrams to illustrate the similarities and differences between convex and concave lenses. • Calculate magnification • Explain why opaque objects have a particular colour • Interpret data for the emission and absorption of infrared radiation (HT) • Describe black bodies as the best possible emitters and absorbers of infrared radiation (HT)	• Describe the lifecycle of a star • Explain that nuclear fusion is responsible for the formation of stars and new elements • describe the similarities and distinctions between planets, their moons, and artificial satellites in terms of their velocities and radii (HT) • Explain red-shift qualitatively and how it provides evidence for the Big Bang model • Explain that there is still much about the universe that is not understood, for example dark mass and dark energy.	• Focus on exam practise and the skills required to answer questions at each of the assessment objectives
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MAPs	MAP 1-Moments, Levers gears	MAP 2- Magnetism and electromagnetism P2S2- Yr11 Mock Exam Paper 1	MAP 3- Electromagnetic Waves	MAP 4-Loud speakers and microphones P2S3- Yr11 Mock Exam Paper 2	MAP 5- Space	