Curriculum Map: Physics year 10

	Autumn	Spring	Summer
Content Declarative knowledge 'I Know'	**<u>Electricity</u>** To recognise the circuit symbols for a range of electrical components. To know that a current is a flow of electrical charge and that a potential difference is needed to make current flow. To know that electrical resistance limits the size of an electric current. To recall the equations for voltage, charge, power and energy. To recognise the characteristic current-voltage graphs for resistors, lamps and diodes. To recognise series and parallel electric circuits and to know the circuit type affects the sharing of voltage and the flow of electric current. The difference between direct current and alternating current. To know that the UK Mains electricity supply has a frequency of 50 Herts and a size of 230 Volts. To state the colours and functions of wires in a plug To describe the purpose and the design of the National Grid. (T only) Draw the electric field pattern for an isolated, electrically charged sphere.	Speed equation Equation for acceleration Where to find distance and time on displacement-time graph Where to find velocity and time on velocity-time graph The effect of mass and resultant force on acceleration **Definition of inertia** Newton's Second Law Difference between mass and weight What terminal velocity is Define stopping, braking and thinking distance Factors affecting braking distance and thinking distance **Definition of momentum** **What momentum means for a closed system** **Recall the equation for momentum** What a crumple zone is for (T only) The relationship between impact force and impact time in a collision (T only)	I know that a magnet has a N (north) and S (south) pole, which materials are magnetic, like poles repel and unlike poles attract, the earth has a magnetic field, the N-pole of a magnet points to the magnetic North, the shape of the magnetic field around a bar magnet and between the poles of two magnets, a wire carrying an electric current has a magnetic field around it, an iron core makes an electromagnet stronger, the shape of the magnetic field around a coil of wire carrying an electric current, **Higher Tier: I know that a wire carrying a current in a magnetic field moves, an electric motor uses magnetic fields** (T only) I know that magnetic fields are used in electromagnetic devices
Skills Procedural Knowledge 'I know how to'	Perform calculations involving the quantities voltage, current and resistance. Explain the design and use of a circuit to measure voltage across and current through an electrical component. Relate current-voltage 'curves' to the function and the properties of an electrical component. Describe a method to measure the resistance of a wire and calculate the resistance from this. Perform calculations involving the quantities charge, current and time. Calculate the energy transferred by an electric current and the power of any such energy transfer.	Calculate speed Calculate acceleration **Find displacement** and acceleration on a velocity-time graph Find velocity on a displacement-time graph Describe the changes in motion shown on a motion graph Calculate resultant force from mass and acceleration Describe and explain the changes in motion of an object in freefall Calculate weight Calculate stopping distance **Calculate deceleration using $v^2 = u^2 + 2as$** **Calculate momentum**	I know how to find out whether a material is magnetic or not, draw the shape of a magnetic field, make an electromagnet stronger, **Higher Tier: I know how to apply Flemings left hand rule, use the formula $\boldsymbol{F = B \times I \times l}$, make an electric motor, make an electric motor change direction and speed** (T only) I know how to describe how magnetic fields are used in electromagnetic devices I know how to calculate the number of turns, power, current or the potential difference of a transformer.

	Identify the safety features of a 3-pin plug and be able to correctly identify the live, neutral and earth wires and connect securely to the plug. Describe and explain the role of transformers in the National Grid. Explain static electrical phenomena in terms of the loss or gain of electrons by an insulating material. Describe the forces that exist between charged objects. (T only) Explain the existence of non-contact forces between charged objects in terms of the electric fields around those objects. (T only)	Conduct an experiment to investigate how force and mass affect acceleration of a trolley Calculate the force and change in momentum for a collision (T only) Explain how side impact bars, cycle helmets, seat belts and airbags work (T only).	**Higher Tier: I know how to induce an electric current, a generator and dynamo work, describe how a loudspeaker works**
Strategies Conditional Knowledge 'I know when to'	Rearrange equations to make any one of the terms the subject and apply to the context Evaluate the suitability of electrical circuits (and components within those circuits) to perform specified functions. Compare and contrast the energy demand of a range of electrical appliances. Interpret data on circuit components and evaluate their efficiency and cost effectiveness. Analyse graphs to make predictions and spot any sources of error To know when to exclude anomalies in an experiment	Rearrange the speed equation Rearrange the acceleration equation **Use a tangent to find speed (displacement-time graphs) and acceleration (velocity-time graphs)** Use data from graphs of motion to describe the change in speed or acceleration for an object. Rearrange equation F = ma Interpret data from the acceleration practical and analyse the effect of increasing the force. Evaluate the effectiveness of the acceleration practical and list any areas of error. Interpret the information or diagram to identify which of Newton's laws would be needed. **Use total momentum of a system to calculate momentum, mass or velocity for a single object** Combine equations for acceleration and resultant force to find the impact force of a collision (T only)	**Higher Tier: I know how make an electric motor, make an electric motor change direction, make an electric motor turn faster** **Higher Tier: I know how and when to apply Fleming's left hand rule** (T only) I know when to rearrange the equations for transformers to calculate the number of turns, current, power, potential difference or the efficiency of a transformer I know how and when to apply Fleming's right hand rule
Key Questions	How does increasing the length of a conductor affect its resistance? Why does combining resistors in parallel reduce the total of their individual resistances? Why is an earth wire a necessary inclusion on some electrical appliances?	What information is a motion-graph giving you? How and shy does the motion of a skydiver in freefall change? What affects the stopping distance of a car? How do car safety features reduce injury? (T only)	How to investigate the strength of an electromagnet **Higher Tier: applying Flemings LH rule and applying** $\boldsymbol{F = B \times I \times l}$ (T only) Describing electromagnetic induction and transformer calculations
Assessment topics	End of topic test after topic (12 lessons) and then again at end of year.	Mid-topic test (after 4 lessons) End of topic test after topic (5 lessons after mid-topic- 7 lessons for triple) End of year test	End of topic test after topic (Foundation 3 lessons, Higher 5 lessons, GCSE Physics 10 lessons) and then again at end of year.

Cross curricular links/Character Education	Maths – calculations using equations containing three variables/terms. Design technology – the function and application of resistors (including thermistors & LDRs) and LEDs.	.	Maths- graphical analysis, gradients, calculations PE – speed, motion graphs	Music – loudspeaker Art – drawing fields Maths – $F = B \times I \times l$, transformer calculations Geography – national grid