Caroline Chisholm School
Ambition Confidence Success
Everyone Every Lesson Every Opportunity

Year 11 Physics Curriculum

Unit	Core knowledge/skill development	Sequence	Assessment	Literacy, numeracy, PSHE, FBV, other links	Key areas of ACP and VAA development	Home learning and enrichment
Static Electricity	For those studying separate physics, there will be revision of static electricity from KS3 including charging through friction, common electrostatic phenomena, and electric fields.	SP11a Charges and Static Electricity SP11b Dangers and Uses of Static Electricity SP11c Electric Fields	Starter questions Exam-type questions Hinge questions Use of web-based applications to assess knowledge in lesson (e.g. Isaac Physics, Educake, Active Learn etc.) End-of-topic tests. End of year exam (PPE). Mathematical skills will be assessed through examinations. The minimum level of mathematics in the foundation tier examination papers will be equivalent to	Literacy: key words, definitions, summary notes. Numeracy: summary notes, equation practice, students are advised to practice using the free 23 Equations app General maths skills (e.g. rearranging equations, graph plotting, standards form , SI prefixes) Equations students are required to recall	**Meta-thinking – Meta-cognition,** transferring knowledge from one circumstance to another. For example, the concept of a field, ubiquitous in physics, is applied to electrostatic forces and effects. **Connection finding (linking)** to use connections from past experiences (KS3) of fields to develop understanding in this topic.	Homework typically set via online platforms such as Tassomai, Isaac Physics, Active Learn. Exam preparation via exam papers
Magnetism and the Motor Effect	Students will learn the difference between permanent and induced magnets and describe the uses of permanent and temporary magnetic materials. The Law of Magnetism will be reviewed and students will be able	SP12a Magnets and Magnetic Fields SP12b Electromagnetism SP12c Magnetic Forces			**Risk-taking** Being brave enough to work in unfamiliar contexts such as the application of the left hand rule to define the direction of the magnetic force vector. **Connection finding (linking)**	

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	to describe uniform magnetic fields and the field of bar magnets and know the shape of a magnetic field is represented by field lines which do not cross, an arrow gives the direction of the field and the closer the lines are together the stronger the magnetic field. Students will learn how to use a plotting compass to show the shape and direction of a magnetic field around a bar magnet, the shape and direction of a uniform magnetic field, and the Earth's magnetic field. Revision of electromagnetism leading to understanding that a current carrying		Key Stage 3 mathematics. The minimum level of mathematics in the higher tier examination papers will be equivalent to foundation tier GCSE in Mathematics.	and apply (list a) and which they are required to select from a list and apply (list b).	to use connections from past experiences of vectors. Magnitude of the magnetic force vector is found using F=B x Ix l, the direction by the LHR, see above, thus emphasising the properties of a vector	

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	conductor always produces a magnetic field. Investigating the shape and direction of the magnetic field of a long straight current carrying conductor using iron fillings and a compass. Investigating the magnetic field inside and outside a coil of wire carrying a current (solenoid). Investigating the force on a current carrying conductor in a magnetic field and using Flemings Left Hand Rule (Motor Rule) to find the direction of the force on a current carrying wire in a magnetic field. Using the equation F=B x Ix l to calculate the force on the conducting wire.					

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Electromagnetic Induction	Revise alternating currents (a.c). Structure of a transformers, action of a transformers in stepping up or stepping down voltages. The use of transformers to reduce the heat loss from the transmission lines of the National Grid. Transformers are used to step-up voltages produced by power stations to high voltages for transmission. The current is then low and heat loss reduced. The voltage is then stepped down by a transformer for use by homes and factories. Use of power equation for transformers that are 100% efficient.	SP13a Electromagnetic Induction SP13b The National Grid SP13c Transformers and Energy			**Generalisation** Knowledge of electromagnetism and prior knowledge about electrical power, current and voltage come together in the workings of the National Grid **Complex and multi-step problem solving** to break down a task (e.g., equations), decide on a suitable approach, and then act. For example, considering the transformer turns / voltages and power equations	

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The Particle Model	Revision of the states of matter, with reference to the movement and arrangement of particles. The equation used to determine density will also be revised. Core practicals, measuring density of a solid (regular and irregular) and liquids will be carried out with emphasis on accuracy of measurements, control variables taking averages and treatment of anomalous results. The models of the kinetic theory for the states of matter will then be used to explain the differences in the density of substances. Physical changes of state are compared	SP14a Particles and Density SP14a Core Practical – Investigating Densities SP14b Energy and Changes of State SP14c Energy Calculations SP14c Core Practical – Investigating Water SP14d Gas Temperature and Pressure SP14e Gas Pressure and Volume			Connection finding (linking) to use connections from the microscopic behaviour of particles to explain macroscopic properties such as density, temperature and pressure. This also leads to the idea of a scientific model, its applications and limitations Enquiring challenge assumptions/ concepts and seek evidence for assertions. For example, the adoption of the Kelvin scale, a system of temperature measurement new to students which is traceable to the thermodynamic behaviour of matter and therefore universal. The Celsius scale in contrast then appears arbitrary.	

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	with chemical changes. Students will learn that heating a system changes the energy stored within the system and either produces a change in temperature or a change in state. Students will then learn that the specific heat capacity of a substance is a measure of the amount of thermal energy required to change the temperature of 1 kg of a substance by 1°C and that specific latent heat is the amount of thermal energy required to change the state of 1kg of a substance. Both processes are then expressed quantitatively, and students practice the					

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	use of the equations ΔQ = m x c xΔ2 and Q =m x L. The processes will be exemplified by carrying out experiments to measure the specific heat capacity of water and by obtaining a temperature – time graph for melting ice. Students will learn that the pressure exerted by a gas is due to the motion of the particles of the gas and how temperature changes produce changes in pressure at constant volume. They will also learn the relevance of absolute zero and the conversion between °C and Kelvin (K). Students studying separate physics will relate pressure and volume at a constant					

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	temperature in terms of particle collisions with the walls of a container and quantitatively using the equation $P_1 \times V_1 = P_2 \times V_2$ and explain how doing work on a gas can raise the temperature of the gas.					
Forces and Matter	Students learn, by testing materials, the difference between elastic and plastic and the forces can extend compress or bend materials. Students investigate the extension of a spring and plot a graph of force against extension to find the spring constant k. The idea of work done is introduced as force x distance and that the work done in stretching the spring is the area under the	SP15a Bending and Stretching SP15b Extension and Energy Transfers SP15b Core Practical - Investigating Springs SP15c Pressure in Fluids SP15d Pressure and Upthrust			Risk-taking Being brave enough to work in unfamiliar contexts such as the idea of displacement of a fluid by an object and the resulting upthrust. Generalisation Knowledge of upthrust and pressure in fluids can be generalised from the classroom cork to ocean-going vessels and submarines.	

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	graph which equates to $\frac{1}{2}$ x k x x^2This topic revises the work done on density, Measuring Density, and Pressure, and takes a more quantitative approach. Students calculate the pressure they exert on the ground improving the accuracy of measurement and use the equation P=F/A Experiments which show the effect of air pressure and fluid pressure and liquid pressure are demonstrated to give students an understanding of the equation P=ρx g x h Spring balances are used to measure upthrusts of liquids and students are able to show that upthrust is equal to the weight of water displaced					

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	and apply this principle.					