MOOR PARK HIGH SCHOOL: CURRICULUM

Long Term Planning

Year 10 Trilogy

Curriculum Area: Physics

Year 10	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Syllabus	AQA Physics Physics 4.1 Matter		AQA Physics Physics 4.2 Energy Conservation	AQA Physics Physics 4.3 Movement	AQA Physics Physics 4.4 Electric Circuits	AQA Physics Physics 4.5 Radioactivity
Connections to prior KS3 learning	Particle diagrams Changes of state Density and measuring density Gas pressure Internal energy Calculating density Measuring density Convection is thermal transfer when particles in a heated fluid rise (the area is less dense) Gas pressure and movment of particles Relationship between temperature and kinetic energy Pressure and applications of pressure Gravity and gravitational field strength		Energy stores and transfers Internal Energy Thermal transfers Gravitational potential energy" Power, energy and time Power in circuits" Energy transfers and efficiency" Energy resources Using resources"	Speed, distance, time Distance-time graphs Scalars and vectors Velocity-time graphs Acceleration (a = (v-u)/t)" W=mg Features of a velocity-time graph Newton's First Law" Definition of acceleration Speed = distance/time Effects of drugs and alcohol on the body Different types of drugs Difference between mass and weight Law of Conservation of Mass" Extension of springs Energy stores and transfers"	common circuit symbols and how to draw and set up simple electrical circuits. circuits need a complete path for current to flow and a source of potential difference. differences between series and parallel circuits and the rules for current and voltage in series and parallel circuits. concept of resistance and how to calculate it using Ohm's Law. resistance is affected by the length of a wire calculate total resistance in series and how resistance is affected when adding more resistors in parallel. how to use an ammeter and voltmeter to take readings and how to use these readings to calculate resistance.	Structure of the atom Charges and relative masses of subatomic particles Isotopes ultrasound is used in medical imaging for unborn babies because it is not a form of harmful radiation

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				current and resistance are inversely proportional (in Ohmic conductors). power is the rate at which energy is transferred. energy transfers by appliances, including the equations E = Pt and E = VQ.	
Knowledge	Density Measuring Density Gas Pressure	Kinetic Energy Elastic Potential Energy Gravitational Potential Energy Conservation of Energy Power Efficiency Non-renewable energy resources Renewable energy resources	Maths in Science: Forces Terminal Velocity Acceleration Equations Newton's Second Law RPA Newton's Second Law RPA Analysis Stopping Distance Factors affecting stopping distance (HT) Momentum (HT) Conservation of Momentum Work done by forces Hooke's Law Hooke's Law Analysis Elasticity	Ohm's Law and Resistance Investigating Resistance of a Wire Resistance of a Wire Analysis Investigating Resistance of Components Resistance in Components Electrical power Energy Transfers in Circuits Circuit Applications	Activity and Types of Radiation Nuclear Equations Half Life Uses of Radioactivity & Safety
Skills	Determine densities of solid and liquid objects	Safe use of appropriate apparatus to measure energy changes/ transfers and associated values such as work done Describe and explain specified examples of the technological	Suggest a hypothesis to explain given observations or data. Explain why a certain hypothesis was chosen, with reference to scientific theories and explanations Describe a practical procedure	Measurements are affected by random error due to results varying in unpredictable ways; these errors can be reduced by making more measurements and reporting a mean value. Measurements can also be	Recognise that scientific models and theories change over time Explain, with an example, why new data from experiments or observations led to changes in model or theories Recognise, draw and interpret

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		applications of science. Describe and evaluate, with the help of data, methods that can be used to tackle problems caused by human impacts on the environment.	for a specified purpose. Include a coherent and sensible order of steps, with sufficient detail to obtain valid results, including suggested equipment. Measure and observe the effects of forces including the extension of springs Measure motion, including determination of speed and rate of change of speed (acceleration/deceleration)	affected by systematic error. Use of appropriate apparatus to measure current, potential difference (voltage) and resistance, and to explore the characteristics of a variety of circuit elements Use of circuit diagrams to construct and check series and parallel circuits including a variety of common circuit elements	diagrams Use models in explanations, or match features of a model to observationsCritique and evaluate models, including Make predictions or calculate quantities based on a model or show its limitations Evaluate the strengths and limitations of a model Describe a practical procedure for a specified purpose Include a coherent and sensible order of steps, with sufficient detail to obtain valid results, including suggested equipment
Assessment	End of unit test	End of unit test	End of unit test	End of unit test	End of unit test
Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions				
Cultural enrichment including Trips, Visits, Experiences, Extra-curricular	During the course of the academic year, Year 10 students will attend the University of Central Lancashire. This visit will enable students to: Explore Advanced Scientific Concepts: Students will have the opportunity to engage with scientific research and technology, enhancing their understanding of key topics covered in their science curriculum. Hands-On Learning: Through interactive workshops and laboratory sessions, students will apply theoretical knowledge in practical settings, fostering a deeper comprehension of scientific principles. Inspiration and Aspiration: Exposure to a university environment and interaction with university faculty and students will inspire Year 9 pupils to consider future educational and career paths in science and related fields. Curriculum Integration: The visit is designed to complement and enrich the current science curriculum, providing real-world context to classroom learning and helping students see the relevance of their studies. This experience aims to ignite a passion for science, encourage critical thinking, and support the academic growth of our students.				

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Literacy	Keywords that students may find difficult: Particle diagram, density, states of matter, forces of attraction, Density, mass, volume, regular, irregular, length, breadth, height, irregular, displacement, eureka can, Fluid, compressible, incompressible, pressure, force, collision, kinetic energy, Pressure, fluid,, density, weight, upthrust, atmosphere	Keywords that students may find difficult: "Energy, store, transfer, kinetic, gravitational potential, elastic potential, chemical, thermal, radiation, mechanically, heating, waves, specific heat capacity, specific latent heat, internal energy", temperature, insulation, thermal conductivity, Kinetic energy, mass, velocity Elastic, elastic potential energy, extension, length, spring constant, Gravitational potential energy, mass, weight, gravitational field strength, Energy, conservation, Energy, power, work, rate Energy, transfer, power efficiency, useful, wasted, input, output, Non-renewable, coal, oil, natural gas, climate change, global warming, acid rain Renewable, biofuel, wind, hydroelectricity, geothermal, tides, solar, water waves, replenished	Keywords that students may find difficult: Vector, resultant, component, horizontal, vertical, direction, magnitude, terminal velocity, weight, balanced forces, air resistance, Newton's Second Law, mass Resultant, acceleration, force, mass, weight, variable, error, systematic, random, precise, accurate, stopping distance, thinking distance, reaction time, braking distance, stopping distance, reaction, conditions, momentum, mass, velocity, product, conservation, momentum, mass, velocity, momentum, force, acceleration, work, force, distance, displacement, Hooke's Law, extension, spring constant, proportionality spring constant, elastic, limit of proportionality, elastic potential, energy, work done, store, transfer, moment balanced, unbalanced, lever, pivot	Keywords that students may find difficult: "current, Charge, potential difference, series, parallel, component, ammeter, voltmeter, resistance, Ohm's Law, ammeter, voltmeter, Ohm's Law, proportional, fixed resistor, variable resistor, diode filament lamp, Ohmic conductor, non-Ohmic, conductor, fixed resistor, variable resistor, thermistor, light-dependent resistor, diode filament lamp, Ohmic conductor, non-Ohmic conductor, power, Watts, energy, current, potential difference, resistance, energy, energy transfer, power rating, charge flow, potential difference, energy, National Grid, power, transformer, current, potential difference	Keywords that students may find difficult: "Subatomic particle Proton, Neutron, Electron, Isotope, Plum pudding Nuclear model, Theory, Scattering experiment, Alpha Beta, Gamma, Decay, Ionising, Activity, Geiger Muller counter, Count rate, Mass, Charge, Nuclear equation Emission, Half-life, Precaution, Exposure Contamination, Background radiation, Irradiation Dose, Sieverts, Chain reaction, Control rods,
Numeracy		Construct and interpret bar charts, pie charts and histograms	Draw a line of best fit Understand that y=mx + c represents a linear relationship	Calculate current from charge and time Calculate the current through	Construct and interpret bar charts, pie charts and histograms

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		Change the subject of an equation Use percentages calculate percentage increase and decrease.	Change the subject of an equation Determine the slope and intercept of a linear graph Understand the physical significance of area between a curve and the x-axis and measure it by counting squares as appropriate. Apply the following ideas to evaluate data to suggest improvements to procedures and techniques. An accurate measurement is one that is close to the true value. Measurements are precise if they cluster closely. Measurements are repeatable when repetition, under the same conditions by the same investigator, gives similar results. Measurements are reproducible if similar results are obtained by different investigators with different equipment.	different branches of a parallel circuit Calculate the potential difference across components in a series circuit" Calculate total resistance in series Draw conclusions from tables and graphs Plot a graph of a relationship Take measurements for current and potential difference across difference components Use the equations V=IR, P=VI, $P=1^2R$, E = Pt, E=VQ Q=It	Decide on a suitable scale for the x and y-axis when drawing a graph Interpret a line (scatter) graph Plot two variables from experimental or other data Recognise and use expressions in decimal form. Recognise and use expressions in standard form Use percentages Use SI units and IUPAC nomenclature unless inappropriate Use prefixes and power of 10 for orders of magnitude (e.g. tera, giga, mega, kilo, centi, milli, micro and nano.) Interconvert units.
CIAG	What workplace skills does physics develop? Critical thinking: The ability to scrutinise information you're presented with is important not only for scientists but for lawyers, police, medics, journalists and more. Data analysis: From actuaries and financial advisors to social media specialists and market researchers, data analysis is one of the most sought after skills. Problem solving: Complex problem solving is vital for engineers, researchers, marketers, social workers, designers, and even customer service workers. Attention to detail: From nurses and scientists to accountants and writers, attention to detail is vital to carrying out many roles safely and effectively.				

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Year 11 Trilogy

Curriculum Area: Physics

Year 11	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Syllabus	AQA PhysicsCollins - Chapter 6 Waves	AQA PhysicsCollins - Chapter 7 Electromagnetism	Revision in preparation for GCSE exams	Revision in preparation for GCSE exams	
Links to prior KS3 learning	Frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound Sound needs a medium to travel, the speed of sound in air, in water, in solids Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal Auditory range of humans and animals the similarities and differences between light waves and waves in matter Light waves travelling through a vacuum; speed of light The transmission of light through	Magnetic poles, attraction and repulsion Magnetic fields by plotting with compass, representation by field lines Earth's magnetism, compass and navigation			

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	materials				
Knowledge	Transverse and longitudinal waves, Properties of waves, Electromagnetic Waves, Reflection, Refraction, Wavefronts	Permanent and induced magnetism, magnetic, forces and fields The motor effect			
Skills	Use scientific theories and explanations to develop hypotheses. Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. Make and record observations and measurements using a range of apparatus and methods. Evaluate methods and suggest	Test hypotheses, check data or explore phenomena. Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. Evaluate methods and suggest possible improvements and further investigations			

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	possible improvements and further investigations Presenting observations and other data using appropriate methods. make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.				
Assessment	End of unit test for Chapter 6 Waves	End of unit test for Chapter 7 Electromagnets			
Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions				
Literacy	Keywords:Amplitude, Angle of Incidence, Colour Filters, Temperature, Convex Lens, Diffuse, Reflection, Electromagnetic Waves, Focal Length, Frequency, Hertz, Infrared Radiation, Ionising Radiation, Lens, Longitudinal Waves, Magnification, Microwaves, Period, Radiation Dose, Radio Waves, *Reflection,	Keywords: Alternator, Attraction, Current-Carrying Wires, Dynamo, Electric Motor, Electromagnet, Fleming's Left-Hand RuleInduced Magnet, Magnetic Compass, Magnetic Field Lines, Magnetic Field, Magnetic Materials, Magnetic Poles, Microphone, Motor Effect, Permanent Magnet, Solenoid, Step-Down Transformer, Step-Up Transformer, Tesla, Transformer			

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	Specular Reflection, waves, Ultrasound Scanning, Ultraviolet, Visible Light, Wave Speed, Wavelength				
Numeracy	Calculate the wavelength of a wave from a labelled diagram of a wave. Equation linking the wave speed, frequency and wavelength should be known. Calculate the speed of a wave. Rearrange the equation to find any unknown given the other two values. Perform calculations on ultrasound scans using the equation: distance = speed x time Draw conclusions from given data about the risks and consequences of exposure to radiation.	Recall and use Fleming's left-hand rule.			
CIAG	What workplace skills does physics develop? Critical thinking: The ability to scrutinise information you're presented with is important not only for scientists but for lawyers, police, medics, journalists and more. Data analysis: From actuaries and financial advisors to social media specialists and market researchers, data analysis is one of the most sought after skills. Problem solving: Complex problem solving is vital for engineers,				

	researchers, marketers, social workers, designers, and even customer service workers. Attention to detail: From nurses and scientists to accountants and writers, attention to detail is vital to carrying out many roles safely and effectively.			