MOOR PARK HIGH SCHOOL: CURRICULUM

Key Stage 4 Long Term Planning

Year 9 2020-2022

Faculty Area: Physics Trilogy Science

Year 9	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Syllabus			AQA Physics Collins - Chapter 3 Particle model of matter		AQA Physics Collins - Chapter 1 Energy	
Links to prior learning						
Knowledge			Changes of state and the particle model Internal energy and energy transfers Particle model and pressure		Energy changes in a system, and the ways energy is stored before and after such changes Calculations to include kinetic energy, elastic potential energy and gravitational potential energy. Conservation and dissipation of energy	
Skills			Make models of solids, liquids and gases Investigate the heating curve for water by heating some ice in a beaker Plan a practical to investigate the rate of heating of various metals using a joulemeter to determine the energy input.		Plan and carry out an investigation to find the amount of energy transferred when various electrical appliances are in use. Compare the ways that different energy resources are used. The uses to include transport, electricity generation and heating. write descriptions and explanations and present ideas Work critically with primary and secondary evidence Evaluate data and working methods. Research the different types of energy resources that are available to generate electricity.	
Assessment			End of unit test for Chapter 3 Particle model of matter		End of unit test for Chapter 1 Energy	
Homework			GCSE past paper exam questions Analysis /		GCSE past paper exam questions	

MOOR PARK HIGH SCHOOL: CURRICULUM

			Evaluation of investigations Extended answer questions	Analysis / Evaluation of investigations Extended answer questions
Cultural enrichment including Trips, Visits, Experiences, Extra-curricular	**School and University Network** Trip 1-Health and Medicine Trip 2-Law and Business Trip 3-Media and Higher Education			
Literacy			Critically evaluate the models used to describe and explain the behaviour of solids, liquids and gases. Draw diagrams to show the particle arrangement of solids, liquids and gases. Research how the gas pressure in a submarine stops it from crushing at depth. Evaluate newspaper articles of local fires that have involved gas canisters exploding and the reasons for the explosion in terms of gas pressure. Keywords: Change in Thermal Energy, Chemical Changes, Condensation, Density, Evaporation, Freezing, Gas Temperature, Internal Energy, Latent Heat, Pascals, Physical Changes, Pressure, Capacity, Specific Latent Heat of Fusion, Specific Latent Heat, Sublimation	Compare three of the machines investigated showing their similarities and differences. Present the findings to the group. Evaluate the benefits and drawbacks of using lower power devices such as compact fluorescent lamps (CFLs). Evaluate the use of various types of insulation in the home. Prepare a presentation on different types of light bulb Role-play a meeting between a group of local councillors/MPs, local environmental groups and electricity companies trying to get a new power station built. Ask students to explore questions such as: Why do the wheels of a bike get very hot when braking hard? Keywords: Energy, Closed System, Conservation of Energy, Efficiency, Elastic Potential Energy, Fossil Fuels, Gravitational Potential Energy, Joule, Kinetic Energy, Power, Renewable Energy Resource, Specific Heat Capacity, Spring Constant, System, Thermal Conductivity, Waste Energy, Watt, Work Done
Numeracy			Equation for density should be known. Evaluate data on the melting points and boiling points of different substances linked to the strength of the forces between the	Calculate the kinetic energy of a moving object, stored by a stretched spring and an object raised above ground level. calculate elastic potential energy

MOOR PARK HIGH SCHOOL: CURRICULUM

			particles. Use temperature sensors/data loggers to record the temperature at fixed intervals, Equation for specific heat capacity should be known. convert to SI units and use standard form in their answers Interpret a heating or cooling graph to explain what is happening at each stage of the graph. Equation for pressure and volume	calculate gravitational potential energy: Use calculations to show how the overall energy in a system is redistributed when the system is changed. Calculate the increase in stored energy when a substance is heated. Carry out calculations involving specific heat capacity Carry out calculations to determine power, using energy transferred divided by time and work done divided by time. Calculate the efficiency of a machine as either a decimal or a percentage. Rearrange the equation to determine the total power input the machine or the useful power output.
CIAG	Future Morph resources aim to show students that there is a wide choice of options open to those who study sciences		NCW STEM lessons – where can science take you?	Future Morph Careers Quest-students quiz exhibitors at The Big Bang Fair about their chosen career, why they chose it and what it involves

MOOR PARK HIGH SCHOOL: CURRICULUM

Key Stage 4 Long Term Planning

Year 10 2020-2022

Curriculum Area: Physics Trilogy Science

Year 10	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Syllabus	AQA Physics Collins - Chapter 2 Electricity		AQA Physics Collins - Chapter 4 Atomic Structure		AQA Physics Collins - Chapter 5 Forces	
Links to prior learning						
Knowledge	Current, potential difference and resistance Series and parallel circuits Domestic uses and safety Energy transfers		Atomic structure Atoms and isotopes Atoms and radiation		Forces and their interactions Work done and energy transfer Forces and elasticity Forces and motion Momentum	
Skills	Construct circuit diagrams using standard symbols. Demonstrate models of electricity Draw a circuit that can be used to measure the current, voltage, resistance in a circuit		Demonstrate the penetration of alpha, beta and gamma radiation. Link the penetration of each type of radiation to the nature of the radiation and the uses of the radioactive sources. Plan an experiment to determine the type of radiation emitted by an unknown radioactive source. Produce a risk assessment Produce a timeline to show how our ideas about atoms have changed since ancient Greek times. Research decontamination techniques for workers exposed to radioactive sources. Evaluate the use of the uranium-lead ratio to determine the age of rocks		Draw vector diagrams for vectors where the size and direction of the arrow represents the size and direction of the vector. Investigate contact and non-contact forces. Research uses of springs in compression and in tension. Investigate the spring constants of springs in compression and in tension Draw distance – time graphs of a journey described by another Compare the accelerations of different vehicles. Draw force diagrams to show Newton's third law Creative writing: Produce a leaflet to encourage motorists to switch off mobile phones before driving. Presentation: Present an argument for or against the compulsory use of seat belt in cars.	

MOOR PARK HIGH SCHOOL: CURRICULUM

Assessment	End of unit test for Chapter 2 Electricity	End of unit test for Chapter 4 Atomic Structure	End of unit test for Chapter 5 Forces
Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions
Cultural enrichment including Trips, Visits, Experiences, Extra-curricular	**<u>School and University Network</u>** Trip 1- Magnets and Motors Trip 2- Life on Mars		
Literacy	Model the effect of resistance on a circuit. explain real world applications of thermistors, LDRs, thermostats and switching on lights. Research what resistance is and why some materials have no resistance Research the use of direct and alternating potential difference. Find out why the USA used direct potential difference, then changed to an alternating potential difference.. Keywords: Alternating Potential Difference, Amperes (Amps), Attraction, Coulomb, Diode, Direct Potential Difference, Earth Wire, * Electrical Current, Electrical Work, Filament Lamp, Insulation, Light Dependent Resistor (LDR), Live Wire, Mains Electricity, Neutral Wire, Non-Contact Force, Ohmic Conductor, Ohms, Parallel, Potential Difference, Repulsion, Series, , Step-Down Transformers, Step-Up Transformers, The National Grid, Thermistor, Volt	Research the types of food irradiated and the sources of radiation used in this process. Justify the use of radioactive sources Use simple modelling techniques to show that the number of protons in an isotope of an element remains constant but the number of neutrons changes. Evaluate the use of different shielding materials for use when handling radioactive sources Evaluate the use of irradiating fruit in terms of cost of goods and potential risk due to the exposure of workers and consumers of the irradiation process Keywords: Activity, Alpha Particle, Atomic Number, Becquerel, Beta Particle, Bohr Model, Count-Rate, Energy Levels, Gamma Ray, Half-Life, Irradiation, Isotopes, Mass Number, Negative Ions, Neutrons, *Nuclear Explosions, Nucleus, Plum Pudding Model, Positive Ions, Protons, Radioactive Contamination, Radioactive Decay,	Use vector diagrams to illustrate: resolution of forces; equilibrium situations and determine the resultant of two forces including magnitude and direction Evaluate the best spring to use for a given situation when given the spring constants of the springs. analyse the data to find why high spring constants are more suited for some functions than springs with low spring constants Keywords: Acceleration, Braking Distance, Centre of Mass, Changes of Momentum, Conservation of Momentum, Contact Forces, Displacement, Distance, Elastic Deformation, Elastic Limit, Elastic Potential Energy, Equilibrium, Forces, Inertia, Inertial Mass, Limit of Proportionality, *Moment, Momentum, Newton's First Law, Newton's Second Law, Newton's Third Law, Non-Contact Forces, Deformation, Resolution of Forces, resultant Force, , Scalar Quantities, Speed, Spring Constant, Stopping Distance, Thinking Distance, Upthrust, Vector Quantities, Velocity, Weight, Work Done,

MOOR PARK HIGH SCHOOL: CURRICULUM

Numeracy	Equation for electric current as the rate of flow of charge should be known Equation linking potential difference, current and resistance should be known. Current-potential difference graphs for electrical components Formula for working out the resistance in a series and parallel circuit Equations for electrical power should be known Equations for energy transfer should be known .	Calculate the size of an atom given the size of the nucleus and the scale of the nucleus compared to the atom. Produce a table showing the mass number, atomic number and number of neutrons for an element Calculate the mass number for a particular element given the number of protons and neutrons in the atom. Rearrange the equation to find number of protons or number of neutrons and the mass number. Nuclear decay equations Determination of half-life using calculations and graphical methods Convert quantities into SI units	Identify the limit of proportionality on a graph showing the force applied against extension. Calculate the amount of energy stored by various objects including stretched springs and objects raised above the ground Calculate the pressure at the surface of a fluid when given the applied force and the surface area that the force is applied to. Rearrange the equation to find the two other unknowns. Calculate the speed of an object given the distance travelled and the time taken. Rearrange the equation to find either unknown quantity. Draw and interpret distance – time graphs. Calculate the speed of an object from a distance – time graph Calculate the speed of an object that is accelerating from a distance – time graph by finding the tangent to the curve at a given point then finding the gradient of the tangent Calculate the acceleration of a vehicle when given the initial and final speed and the time taken for the change in speed to occur. Rearrange the equation to find other unknown quantities. Draw and interpret velocity – time graphs. Calculate the distance travelled using the area under the line on a velocity – time graph. calculate the final velocity of an object at constant acceleration. Calculate the resultant force acting on an object calculate the force that acts on an object when the momentum of that object changes Find patterns between the speed of a vehicle and the thinking distance Give the correct units of weight and mass.
CIAG		NCW STEM lessons – where can science take you?	Careers in Physics Lesson (Step Up resources)

MOOR PARK HIGH SCHOOL: CURRICULUM

Key Stage 4 Long Term Planning

Year 11 2020-2022

Curriculum Area: Physics Trilogy Science

Year 11	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Syllabus	AQA Physics Collins - Chapter 6 Waves		AQA Physics Collins - Chapter 7 Electromagnetism		
Links to prior learning					
Knowledge	Waves in air, fluids and solids Electromagnetic waves		Permanent and induced magnetism, magnetic, forces and fields The motor effect		
Skills	Draw diagrams to show the features of transverse and longitudinal waves. Investigate the laws of reflection, refraction, diffraction		Investigate and draw the shape of the magnetic field pattern around a permanent magnet. Find the magnetic field pattern of a solenoid using iron filings or a plotting compass Investigate both the size and direction of the force on a conductor in a magnetic field Model the National Grid.		
Assessment	End of unit test for Chapter 6 Waves		End of unit test for Chapter 7 Electromagnets		

MOOR PARK HIGH SCHOOL: CURRICULUM

Homework	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions	GCSE past paper exam questions Analysis / Evaluation of investigations Extended answer questions		
Cultural enrichment including Trips, Visits, Experiences, Extra-curricular	**<u>School and University Network</u>** Trip 1-Young Scientist Centre (details to be confirmed) Trip 2-Young Scientist centre			
Literacy	Construct labelled ray diagrams to illustrate the reflection of a wave at a surface. Research the parts of the electromagnetic spectrum Plan an investigation to find out which sun screen is the most effective. Explain the precautions taken in a hospital when carrying out an X-ray. Produce a leaflet to show the uses and dangers of electromagnetic radiation. Research the use of lenses to correct short-sightedness and long-sightedness. Research how the Earth's atmosphere absorbs emits and reflects radiation. Find out how different gases in the atmosphere affect the rate of absorption, emission and reflection of radiation. 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, Specular Reflection, waves, Ultrasound Scanning, Ultraviolet, Visible Light, Wave Speed, Wavelength	Explain how the behaviour of a magnetic compass is related to evidence that the core of the Earth must be magnetic. Explain how a moving-coil loudspeaker and headphones Research to find how the generator in a power station differs from a simple generator (coil of wire spinning between two magnets). 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		
Numeracy	Calculate the wavelength of a wave from a labelled diagram of a wave. Equation linking the wave speed, frequency and wavelength should	Recall and use Fleming's left-hand rule. Calculate the force on a		

MOOR PARK HIGH SCHOOL: CURRICULUM

	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 user data loggers to measure the intensity of ultraviolet light Draw conclusions from given data about the risks and consequences of exposure to radiation. Calculate the magnification of a lens using the magnification equation.	conductor in a magnetic field. Draw/interpret graphs of potential difference generated in the coil against time. Perform calculations to determine the potential difference on the primary or secondary coil or the number of turns on the primary or secondary coil when given the other values.		
CIAG	Year 11: Studying science at KS5 lesson		NCW STEM lessons – where can science take you?	