Physics Curriculum Overview Plan 24/25

Whole school curriculum intent

Develop a broad and balanced curriculum that enables students to learn, recall and apply knowledge and skills across different contexts, supported by a robust and consistent approach to assessment. This will lead to successful and resilient lifelong learners who can cope in a range of changing contexts.

Key stage 3/4 subject curriculum intent

- ➔ Science teaching at TQEA will develop a deep understanding of a range of scientific ideas in the subject disciplines of biology, chemistry and physics. Pupils will make connections between these subject areas and become aware of many of the big ideas underpinning scientific knowledge and understanding. To support this, the design of Knowledge Organisers has been carefully planned and aligned to the curriculum narrative. KOs are carefully embedded into the curriculum structure to ensure that this meets the need for improving literacy and provides opportunities for retrieval practice. This also ensures that new key language is introduced, explained and modelled when building on prior learning.
- ➔ Pupils will be able to decide on the appropriate type of scientific inquiry to undertake to answer their own questions and develop a deeper understanding of factors to be considered when collecting, recording, processing and evaluating data. They will develop their literacy, numeracy and ICT skills in a range of practical and theoretical contexts.
- ➔ We will enrich our curriculum by giving pupils opportunities to equip themselves with the tools needed to access their learning, for example, by research projects, visiting speakers and visits to local and national sites of scientific interest, both physically and virtually.
- ➔ Incorporate the 4 pillars of curriculum design ensuring that we produce students that can compete nationally and globally in any career: Personal Development and Empowerment; Subject Capital; Employability Capital; Social and Cultural Capital
- ➔ For some students, studying the sciences will provide the platform for more advanced studies, establishing the basis for a wide range of careers. For others, it will be their last formal study of subjects that provide the foundations for understanding the natural world and will enhance their lives in an increasingly technological society.
- ➔ Science is changing our lives and is vital to the world's future prosperity. The sciences will be taught in ways that ensure students have the knowledge to enable them to develop curiosity about the natural world and an appreciation of the relevance of science to their everyday lives.

Year Group		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	**Topic**	**Introduction to science**	**Forces**	**Space**	**Energy stores and systems**	**Light Waves**	**Current Electricity**
	Core knowledge from this topic	• Identify careers that involve science outside of the obvious (N) • How we stay safe in the lab (N) • How we draw scientific equipment (N) • How we use a Bunsen Burner (N) • How we use the scientific equipment in a practica (N) • Interpret graphs to describe what they show (N) • Recognise the scientific method (N): • Identify Variables • Design a valid experiment • Write a method • Analyse simple data • Draw simple bar charts • Evaluate an experiment (N)	• What a force is • What drag and friction are (N) • What happens in equilibrium (N) • What gravitational field strength is (N) • The difference between mass and weight (N) • What happens when we stretch and compress (N) • What Hooke's law is, and how it works (N)	• State the effects caused by the motion of the Earth • Why the moon changes (N) • Who our neighbours in the universe are (N) • What stars and galaxies are (N)	• What an energy store is (N) • How we measure energy in foods (N) • What an energy transfer is (N) • What a Sankey diagram is (N) • What potential and kinetic energy are and how to calculate them • What elastic potential energy is (N)	• What the properties of light are • What happens in reflection • What happens in refraction (N) • What transverse and longitudinal waves are (N) • How we see colour (N) • How the eye works (N)	• What an electrical circuit involves • What happens to current in an electrical circuit (N) • What happens to current in a parallel circuit (N) • What resistance and voltage are • How we calculate resistance (N) • How the length of a wire affects resistance (N) • What static involves and how it happens (N)
	Links to the national curriculum	• ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience	• forces as pushes or pulls, arising from the interaction between two objects	• gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon,	• comparing energy values of different foods (from labels) (kJ) • comparing amounts of energy transferred (J, kJ, kW hour) • fuels and energy resources.	• waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel- superposition.	• electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge

Physics Curriculum Overview Plan 24/25

		• make predictions using scientific knowledge and understanding • select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate • use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety • make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements • apply mathematical concepts and calculate results • present observations and data using appropriate methods, including tables and graphs • interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions • All these skills will then be ongoing through years 7-11.	• using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; • resistance to motion of air and water • forces measured in newtons, measurements of stretch or compression as force is changed • force-extension linear relation; Hooke's Law as a special case • work done and energy changes on deformation • opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.	and between Earth and Sun (qualitative only) • our Sun as a star, other stars in our galaxy, other galaxies • the seasons and the Earth's tilt, day length at different times of year, in different hemispheres • the light year as a unit of astronomical distance.	• other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. • simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.	• 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 materials: absorption, diffuse scattering and specular reflection at a surface • use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye • light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras • colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.	• potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current • differences in resistance between conducting and insulating components (quantitative). • Static electricity separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects • the idea of electric field, forces acting across the space between objects not in contact.
	Previous content that this topic builds upon	From KS2 NC: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	From KS2 NC: • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	From KS2 NC: • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • describe the movement of the Earth, and other planets, relative to the Sun in the solar system • describe the movement of the Moon relative to the Earth • describe the Sun, Earth and Moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	There is no energy content in KS1 or KS2	From KS2 NC: • Recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change. • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	From KS2 NC: • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors. • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches

Physics Curriculum Overview Plan 24/25

		• identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings					• use recognised symbols when representing a simple circuit in a diagram.
	Key vocabulary	variables, independent, dependent, control, fair test, measurements, valid, repeatable, mean average, calculate, prediction, hypothesis, valid, metod, results, table, graph, bar chart, axes, label, units, equipment, beaker, test-tube, boiling tube, Bunsen burner, spatula, conical flask, funnel, filter, evaporating bowl, measuring cylinder, stirring rod, gauze, tripod, diagram, conclusion, evaluation, reproducible, the scientific method	force, pushes, pull, interaction, balanced, unbalanced, deformation, stretch, squashing, springs, extension, Hooke's Law, friction, compression, drag, equilibrium, resultant forces, gravity, gravitational field strength, contact force, non-contact force, mass, weight, work done, linear, newtons.	space, sun, seasons, day, night, hemisphere, Earth, moon, phases of the moon, eclipse, partial eclipse, total eclipse, universe, solar system, mercury, venus, mars, jupiter, saturn, uranus, dwarf planets, pluto, ceres, eris, stars, galaxies, astronomical distances.	energy stores, energy transfers, fuels, foods, burning, bomb calorimeter, created, destroyed, sankey diagram, potential, kinetic, chemical, conserved, elastic potential energy, compressing, stretching.	light, scattering, specular reflection, transparent, opaque, translucent, emit, absorb, luminous, non- luminous, shadows, reflection, mirror, diffuse reflection, law of reflection, refraction, medium, lenses, prism, transverse waves, longitudinal waves, frequency, ultraviolet light, colour, spectrum, wavelength, absorption, eye, vision, cornea, iris, retina, lens, image.	current, amperes, ammeter, electricity, series, parallel, voltage, volts, voltmeter, potential difference, resistance, ohm, circuit, length, static electricity, charge, electron, battery, bulb, conductor, insulator, electric field,
	Development of cultural capital	https://www.khanacademy.org/science/high-school-biology/hs-biology-foundations/hs-biology-and-the-scientific-method/a/the-science-of-biology The scientific method worksheet	Importance of forces in our everyday life. How friction can have uses and problems (and how to reduce)	Appreciation of our place in space, and how insignificant we are How the model of the solar system has changed as new evidence came to light	Energy in foods, and the meaning of calories/ kcal	How light is refracted and reflected through materials, How this impacts seeing items, How eye problems might be corrected,	Why this is important for electricity of houses/flats that students live in. Where these circuits are located in everyday life. Link to appliances they use everyday. Electric sausage- sausages are affected by static!
	Development of reading	Intro to Science- The scientific method word doc- students read and come up with another example to show they have understood the task- need to make a proforma!	Phys- KS3 The Meaning of Force word document	Development of a bigger picture of the universe and where these link to formation of solar systems. Phys KS3- Beginning of the universe word doc with comprehension questions	Phys- KS3 What is Energy word doc	Phys- KS3 The Science of light word doc	Phys- KS3 The Science of Light & Electricity word doc Development of components to ensure that they are safe. Why are bulbs safer and more efficient then in the past.

	Concepts –what will students be able to do at the end of the topic	• Identify careers that involve science
		• Describe how we stay safe in the lab
		• Draw scientific equipment
		• Learn how to use a Bunsen Burner
		• Use the scientific equipment in a practical
		• Interpret graphs to describe what they show
		• Use the scientific method to
		  ◦ Identify Variables
		  ◦ Design a valid experiment
		  ◦ Write a method
		  ◦ Analyse simple data
		  ◦ Draw simple bar charts
		  ◦ Evaluate an experiment
			• Recognise different examples of forces
			• list the main types of forces,
			• represent forces using arrow,
			• describe the effects of drag and other forces on the objects as they move,
			• calculate resultant forces,
			• describe gravity as a non-contact force,
			• explore the concept of gravitational field strength,
			• explain the difference between mass and weight,
			• explain the relationship between an applied force and the change of shape of an object.
				• Describe variation in length of day, apparent position, of the Sun and seasonal variations
				• name and describe the phases of the moon and how they happen,
				• explain how an eclipse occurs,
				• identify the objects and order in the solar system
				• recall that the light year is used to measure astronomical distances,
				• describe the characteristics of a star and relate our Sun to other star
				• explain the concept of galaxies and the position of our galaxy compared to others.
					• Describe energy stores and transfer
					• plan and carry out investigation into energy content in food,
					• describe the use of fuels in the home
					• explain that foods are energy stores and that the amount stored can be measured
					• explain that energy can neither be created or destroyed
					• use a sankey diagram as a model to represent simple energy changes
					• explain what potential and kinetic energy is
					• explain how energy is conserved,
					• describe what elastic potential energy is
					• describe different situations that use the energy stored in compressing and stretching elastic materials.
						• Describe how light passes through different materials,
						• explain the difference between scattering and specular reflection,
						• define transparent, opaque, translucent, luminous, non-luminous, emit, absorb;
						• explain how shadows are formed;
						• describe how a mirror reflects light
						• explain the difference between specular and diffuse reflection;
						• apply the law of reflection;
						• describe how light is refracted when it enters a different medium;
						• explain how a prism splits light;
						• describe transverse and longitudinal waves
						• describe UV light and its risks and uses
						• describe how a spectrum can be produced from white light;
						• describe how the human eye works
						• explain how the eye focuses on objects different distances away.
							• Describe and draw circuit diagrams
							• explain what is meant by current; define current and voltage
							• state the unit and equipment used to measure it
							• draw and describe a series and parallel circuit
							• describe how the current changes in series and parallel circuits
							• define resistance and explain how it affects the circuit
							• carry out calculations using V=IxR
							• recognize the effects of static charge
							• explain how static charge can be generated.

Year Group		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8	Topic	Forces and motion		Energy	Sound Waves	Pressure	Magnets and Electromagnets

Physics Curriculum Overview Plan 24/25

	Core knowledge from this topic	• How we calculate speed (N)
		• What happens in a distance time graph (N)
		• How we calculate speed from d-t graphs (N)
		• How we can investigate motion (N) (cars down ramps)
		• How we calculate work done (N)
		• How simple machines work (N)
			• How we generate electricity (N)
			• How we calculate the cost of electricity (N)
			• How we can use electricity responsibly (N)
			• What thermal energy is (N)
			• How energy is linked to temperature (N)
			• How heat can travel through materials (N)
			  ○ conduction
			  ○ convection
			  ○ radiation
				• How sounds are made
				• How we can describe sounds (N)
				• How we hear sounds (N)
				• How sounds travel through different materials
				• How sound is absorbed or reflected (N)
				• What Ultrasound involves (N)
				• How sound systems work (N)
					• What pressure involves (N)
					• How pressure acts in fluids (N)
					• How we calculate pressure (N)
					• How we calculate density (N)
					• Why objects float and sink (N)
						• What materials are magnetic
						• What a magnetic field looks like(N)
						• How electromagnets work (N)
						• How we can investigate the strength of electromagnets (N)
						• Uses of electromagnets (N)

	Links to the national curriculum	• forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) • change depending on direction of force and its size. • speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) • the representation of a journey on a distance-time graph • relative motion: trains and cars passing one another.	• comparing power ratings of appliances in watts (W, kW) • comparing amounts of energy transferred (J, kJ, kW hour) • domestic fuel bills, fuel use and costs • fuels and energy resources • heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.	• sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal • 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 • auditory range of humans and animals.	• atmospheric pressure, decreases with increase of height as weight of air above decreases with height • pressure in liquids, increasing with depth; upthrust effects, floating and sinking • pressure measured by ratio of force over area – acting normal to any surface.	• magnetic poles, attraction and repulsion • magnetic fields by plotting with compass, representation by field lines • Earth's magnetism, compass and navigation • the magnetic effect of a current, electromagnets, D.C. motors (principles only).
	Previous content that this topic builds upon	From KS3 Forces • Recognise different examples of forces • list the main types of forces, • represent forces using arrow, • describe the effects of drag and other forces on the objects as they move, • calculate resultant forces, • describe gravity as a non-contact force, • explore the concept of gravitational field strength, • explain the difference between mass and weight, • explain the relationship between an applied force and the change of shape of an object.	From KS3 Energy: • Describe energy stores and transfer • plan and carry out investigation into energy content in food, • describe the use of fuels in the home • explain that foods are energy stores and that the amount stored can be measured • explain that energy can neither be created or destroyed • use a sankey diagram as a model to represent simple energy changes • explain what potential and kinetic energy is • explain how energy is conserved, • describe what elastic potential energy is • describe different situations that use the energy stored in compressing and stretching elastic materials.	From KS2 NC: • identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases.	From previous KS3 Forces • Recognise different examples of forces • list the main types of forces, • represent forces using arrow, • describe the effects of drag and other forces on the objects as they move, • calculate resultant forces, • describe gravity as a non-contact force, • explore the concept of gravitational field strength, • explain the difference between mass and weight, • explain the relationship between an applied force and the change of shape of an object.	From KS2 NC: • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing.
	Key vocabulary	force, motion, speed, distance, time, metres, seconds, metres per second, distance-time graphs, relative motion, work, work done, machines, size, direction,	energy, generate, electricity, renewable, non-renewable, fuel,thermal, temperature, energy transfer, conductors, insulators, warming, cooling, heat, conduction, material, convection, radiation, colour, emitter, absorber, thermal equilibrium, domestic fuel bills, power, watts, kilojoules, joules, kilo-watt hour	sound, sound waves, energy, longitudinal, loud, quiet, pitch, frequency, hertz, wavelength, amplitude, vibrations, waveforms, audible range,ear, ear drum, ear canal, cochlea, small bones, auditory nerve, hearing, speed of sound, echoes, material, solids, liquids, gases, absorb, reflect, soundproofing, ultrasound, sound systems, microphones, speakers, loudspeakers	pressure, liquids, solids, gases, density, floating, sinking, displacement, upthrust, force, area, particles, gravity, height, depth, atmospheric pressure	magnets, magnetic field, magnetic poles, attraction, repulsion, compass, navigation, magnetic effect, electromagnet, relays, circuit breaker, electric bell, D.C.motors
	Development of cultural capital	Development of why our distance of journey is different to our displacement, why elasticity is important for roller coasters or car seat belts.	Where they come into contact with the national grid on a daily basis. Where it operates and its importance to our lives. Energy resources linked to their lifetimes (e.g. electric cars) Understanding of why different			Use of magnets in everyday life such as speaker systems, Use of electromagnets in industry such as scrap metal lifting, Magnetism on a universal scale too

			objects absorb or radiate heat differently, why this is important when cooking or investigating fire safety.			
	Development of reading	History of force development through Newton, Einstein et al., Why forces are important for everyday life such as when building or driving. Why forces across the solar system would be different here.	Modern day news around cleaner renewable energy and less pollution. Research around advantages and disadvantages of each type of energy resource.			Why magnetism is important for our planet and how it allowed us to survive as a species. The use of magnets in inventions that have pioneered technological advances.
	Concepts –what will students be able to do at the end of the topic	• List the factors involved in defining speed • use the speed formula • display the data to describe a journey on a distance-time graph • interpret distance-time graphs • describe the motion of an object whose speed is changing and in relation to each other • explain the concept of relative motion; recognise situations where work is done • use work done = force x distance and apply the equation to different situations • understand what simple machines are and explain why they are useful.	• Define renewable and non-renewable and describe ways of generating electricity • explain advantages and disadvantages of different methods • describe the information a typical fuel bill provides • explain the units used on a fuel bill; explain how the cost of energy used can be calculated • Explain the difference between conductors and insulators • describe the difference between heat and temperature • describe how heat can travel by conduction, convection and radiation.	• Identify how sounds are made • describe how sound waves transfer energy • explain how loud and quiet sounds are made • explain what is meant by pitch, frequency, wavelength and amplitude • understand how the ear detects sound and what is meant by audible range • explain why the speed of sound varies between solids, liquids and gases • explain how sound is absorbed or reflected • understand how sound waves vary in frequency • understand practical applications of ultrasound • describe the energy transfers in microphones and speakers • understand how audio equipment responds to different frequencies.	• Explain how pressure can be applied on a solid surface • describe some effects of varying pressure • describe how pressure in a liquid alters with depth • describe how pressure in a gas varies with height above the Earth • Explain pressure changes in relation to particles and gravity • identify the factors that determine the size of pressure on solid • calculate the size of pressure exerted • use the equation to calculate density • explain why some objects float and other sink, relate floating and sinking to density, displacement and upthrust.	• Name magnetic materials • know the laws of magnetic attraction • explain how a magnetic field can be represented by field lines • describe what an electromagnet is • understand the factors that affect the strength of electromagnets • describe different applications of electromagnets in relays and circuit breakers.

Year Group		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 9	**Topic**	**Particle Model of Matter (P1)**	**Energy Resources (P1)**	**Current and Electricity (P1)**	**Nuclear Radiation (P1)**	**Resistance and Power (P1)**	**Energy (P1)**
	Core knowledge from this topic	• What the Structure of an atom is. • What is a state change. • What is density (N) • How to calculate density of different objects (N) • Carry out the density required practical (N) • What gas pressure is (T)	• What are Energy stores and systems. • What are work done and power (N) • Calculate both work done and power (N) • Explain what energy Efficiency and sankey diagrams are (N) • What are National and global energy resources • What the National grid is (N)	• What are the differences between circuits • What is electrical charge flow. • what is potential difference • what is resistance • What is ohm's law (N)	• What is radioactive decay; (N) • how do alpha beta and gamma radiation behave (N) • how to write nuclear equations (N) • what is half life (N) • what is radioactive contamination (N) • What nuclear fission and fusion are (T)	• How can we measure resistance • what factors affect resistance of an electrical component • V-I characteristics of components (N) • ohmic and non-ohmic conductors (N) • How to calculate energy transferred (N) • What is power (N) • How is electricity used domestically • What static electricity is (T) • What electrical fields are (T)	• what is weight • what is work done; • what is elasticity; • how do we calculate work done in a spring (N) • how do we calculate elastic potential energy (N) • what is kinetic energy (N)
	Links to the national curriculum	6.3 Particle Model of Matter 6.3.1.1 Density, 6.3.1.2, change of state,	6.1. Energy; 6.1.1. Energy stores and systems 6.1.3 National and global energy resources, 6.1.1.4 Power, 6.1.2.2 efficiency, 6.2.4 The National Grid	6.2 Electricity; 6.2.1. Current, potential difference and resistance, circuit diagram, 6.2.2. series and parallel circuits,	6.4 Atomic Structure; 6.4.2 Atoms and Nuclear Radiation, 6.4.2.2 Nuclear Equations, 6.4.2.3 Half life and Radioactive contamination,	6.2 Electricity; 6.2.1.3 Current resistance and potential difference, 6.2.14. Resistors, 6.2.3 Domestic uses and safety, mains electricity, 6.2.4 Power, The National Grid	6.1 Energy; 6.1.1.2 Changes in Energy, 6.1.1.3 Energy changes in systems, 6.5.1.3 Weight, 6.5.2 Work Done
	Previous content that this topic builds upon	From KS3 'Particle model and separating' • What the difference is between solids, liquids and gases	KS3 topic energy usage/resources • comparing power ratings of appliances in watts (W, kW) • comparing amounts of energy transferred (J, kJ, kW hour)	KS3 topic current and Electricity • electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge	KS3 topic Atoms and Elements • What atoms and elements are • What compounds are • What mixtures are and the differences between all three	KS3 topic; current and electricity • potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current	KS3 topic; energy. • simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged

Physics Curriculum Overview Plan 24/25

		• Describe and explain the properties of solids, liquids and gases • Describe and explain the particle behaviour of solids, liquids and gases • Describe and explain diffusion • Identify the changes of state	• domestic fuel bills, fuel use and costs • fuels and energy resources • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions	• differences in resistance between conducting and insulating components (quantitative).	KS4 topic; Chemistry - Atomic Structure • What atoms, elements and compounds are • How electrons are arranged in atoms • How the structure of the atom was discovered • What are the differences between compounds and mixtures	• differences in resistance between conducting and insulating components (quantitative). KS4 topic; current and electricity topic. • electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge • differences in resistance between conducting and insulating components (quantitative).	• using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes. KS3 topic Forces • forces: associated with deforming objects; stretching and squashing – springs; • force-extension linear relation; Hooke's Law as a special case • work done and energy changes on deformation • opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface. KS4 topic; energy resources. • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change
	Key vocabulary	Eureka, volume, mass, scales, particles, solid, liquid, gases, density, multiply, dividing, displacement, melting, boiling, condensing, condensation, sublimation, reverse, freezing, solid, liquid, gas, vibration, fixed, spread, free to move, kinetic, potential, *Archimedes, Democritus, Newton, Dalton, De Gennes,*	Renewable, non-renewable, finite, replenished, replaced, transformer, turbine, generator, hydroelectric, solar, tidal, wave, resource, fossil, nuclear, biomass, biofuel, national grid, pylon, wind, geothermal, efficiency, consumption, demand, usefl, wasted, sustainable, cost effective, environmental, efficiency, sankey, global, appliances, *Hesterman-Merz, Tesla, Ferraris, Ayrton, Calland Williams,*	Current, ampere, amps, potential difference, voltage, volts, voltmeter, ammeter, battery, cell, bulb, lamp, switch, diode, LED, LDR, fuse, wire, variable, resistor, thermistor, resistance, ohms, omega, components, shared, split, parallel, series, paths, loops, *Ampere, Coulomb, Volta, Edison, Latimer, Goodenough, Whittingham, Yoshino*	contamination, irradiation, cosmic, rays, helium nucleus, alpha, beta, gamma, background radiation, geiger muller, count rate, half life, isotopes, nucleus, electron, proton, neutron, mass number, atomic number, radiation sickness, chernobyl, nuclear meltdown, fission, fusion, mutation, cancer, x rays, ultraviolet *Becquerel, Bohr, Chadwick, Curie, Einstein, Fermi,*	Current, ampere, amps, potential difference, voltage, volts, voltmeter, ammeter, battery, cell, bulb, lamp, switch, diode, LED, LDR, fuse, wire, variable, resistor, thermistor, resistance, ohms, omega, components, shared, split, parallel, series, paths, loops, ohmic, non-ohmic, directly proportional, linear, I-V graphs, filament, step up, step down, transformer, national grid, efficiency, consumption, power, energy transferred, calculations. *Faraday, Maxwell, Franklin, Ampere, Coulomb, Volta, Edison,*	weight, mass, newtons, gravitational field strength, potential, work done, elasticity, elastic potential, deformation, stress, loading, unloading, proportional, kinetic, velocity, acceleration, distance, height, *Newton, Einstein, Germain, Thomson (Kelvin), Cavendish*
	Development of cultural capital	• A greater understanding of the complexity and scale of particles and their interactions with other particles in different states. • Understanding of how ancient Greeks solved the issue of density without scientific equipment. • Understanding of the changes of state around us on a daily basis. • Appreciation of how change of states and what this occurs. • Use of Eureka can to solve density calculations- PROBLEM SOLVING **FOCUS CAREER: physiatrists and orthopaedists**	• Where they come into contact with the national grid on a daily basis. • Why the national grid is important and why blackouts occur. • Where it operates and its importance to our lives. • Energy resources linked to their lifetimes (e.g. electric cars) • Development and introduction of a large scale power grid. **FOCUS CAREER: Control Engineer, Electricity Systems Operator**	• Broader knowledge of how electrical components came about. • Understanding of how we have developed technology to the scale we now see. • Why this is important for electricity of houses/flats that students live in. • Where these circuits are located in everyday life. • Link to appliances they use everyday. **FOCUS CAREER: Electrician**	• Linking to world disasters such as Fukishima and Chernoybl. • Discussion around nuclear weapons and the impact during WW2. • How isotopes are used in dating objects. • Why contamination is bad for organisms and our planet. • Where we use irradiation and the uses of radiation. • Understanding the differences between background radiation and man-made. **FOCUS CAREER: Radiologist or Radiology Nurse**	• How this keeps everyday appliances in our homes safe. • How we know to look for this when buying items from shops. • Where this could go wrong and what to do in that situation. • Why we use specific components for specific jobs. • How we use circuits to get electricity to our homes. • AC and DC power supply and where we use this. • How large scale and smaller scale power sources work. **FOCUS CAREER: Electrical Engineer**	• Understanding of where this links to everyday life. • Use in car accidents and collisions. • Why kinetic energy is fundamentally important in the universe • Why fundamental forces differ across the solar system • Where we see these energy stores and systems in our everyday life. **FOCUS CAREER: Mechanic or Vehicle Safety test & Development Engineer**
	Development of reading	Development of how particles have begun to be understood and recently https://www.bbc.co.uk/news/science-environment-56491033 Phys Particle Model- Particle Physics word doc with questions to answer (comprehension)	Modern day news around cleaner renewable energy and less pollution, especially more modern ideas around improving the number and output of renewable energy. https://www.bbc.co.uk/news/uk-scotland-41652707	Why are bulbs safer and more efficient then in the past, issues with electrically unsafe appliances. https://www.bbc.co.uk/news/business-48938551	Phys Radiation- Chernobyl fears resurface as river dredging begins in exclusion zone word document with comprehension task Devastation and lasting impact caused by Chernoybl that is still being felt thirty years later.	Links to global and national electricity systems and the way that we update these to become more efficient https://www.bbc.co.uk/news/uk-england-hampshire-55750411	Reading around kinetic energy and elastic energy. Use in theme parks and why this is vital. Development of a bigger picture of the universe and where these link to formation of solar systems. https://eu.usatoday.com/story/travel/experience/america/theme-

Physics Curriculum Overview Plan 24/25

					https://www.theguardian.com/environment/2020/dec/23/chernobyl-fears-resurface-over-contract-to-dredge-river-in-exclusion-zone-aoe		parks/2017/03/21/designing-theme-park-rides-science/99415354/
	Concepts –what will students be able to do at the end of the topic	• Describe an atom. • Calculate volume of an object. • Take the mass of an object. Calculate density and use correct units. • Identify state changes and particle model diagrams.	• Name energy resources. • Describe how we use energy resources. • Explain advantages and disadvantages of energy resources. • Explain efficiency. • Describe the national grid.	• Identify the different circuits. • State the differences between the two circuits. • State the main units and measurements for observing circuits. • Build and construct circuits safely and confidently. • Draw circuits and components clearly and correctly.	• Identify charge and structure of each type of radiation. • Explain the uses of each type of radiation. • Describe properties of each type of radiation. • Explain count rate and half life. • Calculate half life using graphs. • Solve nuclear equations.	• Draw circuits and components clearly and correctly • Draw I-V graphs. • Analyse I-V graphs. • Carry out practical and circuit building competently. • Explain resistance and how to calculate this correctly. • Link the national grid to the resistance in a wire practical.	• Use energy equations correctly and rearrange these correctly. • Carry our analysis of graphs and practicals in detail. • Explain what is meant by the terms work done, weight, elasticity, elastic potential and kinetic.

Year Group		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 10	**Topic**	**Waves and EM Spectrum (P2)**	**Types of Waves (P2)**	**Force Interactions (P2)**	**Velocity (P2)**	**Internal Energy (P1)**	
	Core knowledge from this topic	• Describe the parts of a wave. • State the wave equation (N) • What is the EM spectrum (N) • What are the uses of EM waves (N) • measuring the speed of waves (N) • What is reflection and refraction • How light is reflected by different surfaces (T) • Investigate the reflection and refraction of light by different surfaces (RP) (T)	• The two different types of wave • Calculate frequency and speed of an EM wave • How the amount of IR radiation is absorbed or radiated (N) • How sound waves behave (T) • How we can use waves for detection and exploration (T) • How we see coloured objects (T) • How images are formed through a convex lean (T) • How images are formed through a concave lens (T) • How to find the magnification of a lens (T)	• How do we represent forces • What is resultant force • What is hooke's law • How do we calculate spring constant and elastic energy (N) • What is displacement (N) • What is speed (N) • Why is the speed of sound always constant.	• What is stopping distance (N) • How does force affect braking (N) • What is reaction time (N) • What is velocity • What is acceleration • What is uniform motion (N) • What is terminal velocity (N) • What is kinetic energy	• How the model of the atom changed • What is internal energy • What is specific heat capacity (N) • Investigating specific heat capacity and analysing data (N) • What is meant by latent heat (N) • How the particles in a gas behave. • Thermal insulation (RP) (T)	
	Links to the national curriculum (if applicable)	6.6 Waves 6.6.1 Waves and Properties of Waves 6.6.2 EM Waves, Properties of EM Waves, Uses and Applications of EM Waves	6.6 Waves; Waves and Properties of Waves, 6.6.2 EM Waves, Properties of EM Waves,	6.5 Forces; Scalar and Vector Quantities, contact and non-contact forces, 6.5.3 Forces and elasticity, 6.5.4 Distance and Displacement, Speed	6.5 Forces 6.5.4.1.3 Velocity, distance-time, Acceleration 6.5.4.3.1 Forces and braking, stopping distance, reaction time 6.1.1.2 changes in energy	6.4. Atomic Structure; structure of the atom, mass, isotopes, development of the atomic model, 6.3.2 Internal energy, temperature change, specific heat capacity, 6.3.3 particle model and motion of gases	
	Previous content that this topic builds upon	KS3 topic; light waves • Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel- superposition. • the similarities and differences between light waves and waves in matter • the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface • use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye KS3 topic; sound waves • sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal	KS3 topic; light waves • Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection • light waves travelling through a vacuum; speed of light KS3 topic; sound waves • 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 • auditory range of humans and animals. KS4 topic; Waves and EM spectrum • State the wave equation • What is the EM spectrum • What are the uses of EM waves • measuring the speed of waves	KS3 topic; Forces • forces as pushes or pulls, arising from the interaction between two objects • using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; • resistance to motion of air and water • forces measured in newtons, measurements of stretch or compression as force is changed • force-extension linear relation; Hooke's Law as a special case KS3 topic; Force and Motion • forces being needed to cause objects to stop or start moving, or to	KS3 topic; Force and motion • speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) • the representation of a journey on a distance-time graph • relative motion: trains and cars passing one another. KS3 topic Energy Stores and Systems • simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged	KS3 topic; energy. • heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators • energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change • using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes. KS4 topic; energy • what is kinetic energy KS4 topic Nuclear Radiation • What is radioactive decay • Different types of radiation KS4 topic Atomic Structure • What atoms, elements and compounds are • How electrons are arranged in atoms • How the structure of the atom was discovered	

Physics Curriculum Overview Plan 24/25

				change their speed or direction of motion (qualitative only) ● change depending on direction of force and its size. KS3 topic; sound waves ● sound needs a medium to travel, the speed of sound in air, in water, in solids KS4 topic; Energy ● what is elasticity; ● how do we calculate work done in a spring (N) ● how do we calculate elastic potential energy (N)		
	Key vocabulary	electromagnetic, radiation, Ultraviolet, x rays, gamma, microwave, radiowave, visible, light, infrared, cancer, medical, tracers, wave, wavelength, transverse, longitudinal, oscillation, rarefaction, compression, perpendicular, travelling, lambda, velocity, ionising, *Hertz, Huygens, Malus, Fresnel, Da Vinic, Einstein*	Transverse, longitudinal, amplitude, wavelength, node, antinode, standing wave, ripple, infrared, radiated, absorbed, frequency, speed, velocity, measurement, real image, visual image, eye, cornea, lens, convex, concave, leslie cube, *Maxwell, Herschel, Leslie, Wilhelm Ritter,*	scalar, speed, distance, displacement, velocity, vector, acceleration, time, air resistance, friction, mass, gravity, weight, newtons, *Newton, Oresme, Descartes, Galileo, Hooke, Boyle, Archimedes, Copercius*	distance-time graphs, distance-speed graphs, displacement-time graphs. constant, acceleration, deceleration, speed, velocity, thinking, braking, stopping time, metres, m/s, *Newton, Galileo, Archimedes,*	nucleus, proton, electron, isotope, neutron, mass, atomic, potential energy, kinetic, particle, vibration, movement, state, change, fusion, specific heat capacity, vaporisation, latent heat, internal, gas, pressure, explosion, explosive, atmosphere, equilibrium, *Democritius, Joule, Dalton, Thompson, Rutherford, Bohr, Chadwick, Bethe, Oliphant, Black,*
	Development of cultural capital	● How we use waves in our everyday life ● Broadband and use of light wave technology ● Use of waves in the universe and charting night skies. ● Use of EM waves in tanning and heating rooms. ● Dangers of waves and science that is investigating these. **FOCUS CAREER: Broadband cable engineer.**	● How light is refracted and reflected through materials ● How this impacts seeing items ● How eye problems might be corrected ● Use of telescopes and binoculars ● How periscopes helped battle during wars especially on submarines. ● **FOCUS CAREER: Opticians**	● Development of why our distance of journey is different to our displacement ● Why elasticity is important for roller coasters or car seat belts. ● Why this is used by motor companies when calculating insurance. **FOCUS CAREER: Roller coaster Designer**	● How this impacts driving a car and road safety, ● How we use this information to inform rules ● Use of data to analyse journey times. ● How this is used in car industry to impact 0-60 speed ● How acceleration can be used in sports to chart athlete.machinery travel **FOCUS CAREER: Car Engineer**	● Link to other Science topics such as chemistry and where this overlaps ● The use of this at CERN to understand particle physics and the beginning of the universe ● Understanding of how materials are tested to track how much heat they give off ● How specific heat capacity of an object is important in everyday life uses. **FOCUS CAREER: Gas Engineer**
	Development of reading	Use of waves in modern science and the new discoveries that are being made https://www.bbc.co.uk/news/science-environment-41476648	Where waves are found and used, sound waves why they change getting closer or further away, the uses that we can see so musical instruments producing waves such as tibetan bowls or as in the article being used to measure items. https://www.sciencenews.org/article/new-thermometer-measures-temperature-with-sound	History of force development through Newton, Einstein et al., Why forces are important for everyday life such as when building or driving. Why forces across the solar system would be different here. https://www.sciencedaily.com/releases/2020/02/200226131310.htm	Why all objects have terminal velocity, Use of this in why animals fall and land on their feet such as cats, Links to achievements such as Red Bull Space jump, Link to changing object's velocity when falling such as raindrops in article. https://www.sciencenewsforstudents.org/article/raindrops-break-speed-limit .	Introduce groups to other particles that are smaller than the subatomic and bridge the gap to A level, Begin to link the start of the universe to this and the idea that there are links to matter and energy (Einstein's equation), Further understanding of Dark Energy and Dark Matter used in Sci-Fi or Horror movies and its relevance, Understanding of why different objects absorb or radiate heat differently, why this is important when cooking or investigating fire safety. https://science.nasa.gov/astrophysics/focus-areas/what-is-dark-energy
	Concepts –what will students be able to do at the end of the topic	● Identify the Electromagnetic spectrum. ● Identify uses and properties of the EM Spectrum ● Identify two types of waves ● Describe reflection and refraction. ● Complete the practical using light rays and measure angles of reflection and refraction.	● Label and annotate diagrams of the two types of wave ● Describe the practicals for measuring speed of a wave ● Explain how IR is absorbed or radiated in different materials. ● Complete the practical with the Leslie Cube analysing data.	● How to draw force diagrams ● Direction forces operate ● Identify different types of energy ● Explain how elastic energy is impacted by spring constant ● Describe displacement and distance.	● Describe what is meant by the terms acceleration and velocity ● Describe how we stop a moving object ● Calculate using equations ● Define terminal velocity ● Explain what is meant by kinetic energy.	● Describe the atom model and it development through history ● Describe the contribution of scientists throughout the atom model development ● Describe internal energy and the factors that can impact this ● Determine latent heat and specific heat capacity and investigate this practically ● State how gases behave with reference to particles.

Year Group		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 11	Topic	**Magnets and Electromagnets (P2)**	**Forces and Newton (P2)**	**Space (P2) (Triple only)**			

Physics Curriculum Overview Plan 24/25

	Core knowledge from this topic	• How do magnets behave • What is a magnetic field • What is an electromagnet • What is fleming's left hand rule (N) • How do electric motors function (N) • What the generator effect is (T) • Uses of the generator effect)T) • How microphones and loudspeakers work (T) • How transformers work (T)	• What is newton's first law • What is newton's second law • What is newton's third law (N) • How do mass and acceleration affect force • What happens to momentum in collisions (N) • Combining force calculations (T) • What moments are (T) • Pressure in a fluid (T) • How pressure changes in a fluid (T)	• What is the life cycle of a star (T) • What is orbital motion (T) • What is Red Shift • What is black-body radiation (T)			
	Links to the national curriculum (if applicable)	6.7 Magnets and Electromagnets; poles of magnet, magnetic fields 6.7.2 Electromagnets, fleming left hand rule, eclectic motors.	6.5 Forces 6.5.4.2.1 Newtons 1st Law, second Law, third law 6.5.5 Momentum and conservation of momentum.	4.8 Space Physics 4.8.1 Solar system; stability of orbital motions; satellites 4.8.1.1 Our solar system 4.8.1.2 The life cycle of a stars 4.8.1.3 Orbital motion, natural and satellites 4.8.2 Red-shift	NA	NA	NA
	Previous content that this topic builds upon	KS3 topic; magnets and electromagnets • magnetic poles, attraction and repulsion • magnetic fields by plotting with compass, representation by field lines • Earth's magnetism, compass and navigation • the magnetic effect of a current, electromagnets, D.C. motors (principles only).	KS3 topic; Forces • forces as pushes or pulls, arising from the interaction between two objects • using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces • forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; • resistance to motion of air and water • forces measured in newtons, measurements of stretch or compression as force is changed KS3 topic; Force and Motion • forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) • change depending on direction of force and its size. • speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) • the representation of a journey on a distance-time graph • relative motion: trains and cars passing one another. KS4 topic; Force interactions • How do we represent forces • What is resultant force	• State the effects caused by the motion of the Earth • Why the moon changes • Who our neighbours in the universe are • What stars and galaxies are • gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only) • our Sun as a star, other stars in our galaxy, other galaxies • the light year as a unit of astronomical distance.			
	Key vocabulary	Magnets, electromagnets, poles, north, south, field, strength, gravity, solar winds, photons, aurora borealis, aurora australis, southern and northern lights, electrostatic, attraction, static, repulsion, field lines, induced, permanent, solenoid, fleming's left hand rule, flux, fleming's right hand rule, density, induced current, motor effect,	contact, shape, speed, direction, terminal, momentum, conservation, newton, newton's law, surface tension, upthrust, air resistance, gravity, weight, non-contact, magnetism, attraction, repulsion, static, acceleration, force, mass, Isaac Newton, repealed, conserved, equal, inertia, equilibrium,	Universe, solar system, star, blackhole, dwarf planets, planets, supernova, hubble, hubble's law, Neutron star, pulsar, quasar, galaxy, brown dwarf, white dwarf, red giant, super red giant, sequence star, HZ spectrum, hertzsprung-russell diagram, dark energy, dark matter, big bang, Lightyear, astronomical unit, oort cloud, kuiper belt, exoplanet, transit, binary			

		dynamo, generator, alternator, transformers, *Gilberts, Oersted, Fleming, Elasser, Faraday, Brush,*	*Newton, Galileo, Descartes, Einstein, Rankine*	system, orbit, elliptical, ellipse, conjunction, red shift, blue shift			
	Development of cultural capital	• Use of magnets in everyday life such as speaker systems • Use of electromagnets in industry such as scrap metal lifting • Magnetism on a universal scale too. **FOCUS CAREER: Train driver or Scrap metal worker**	• Where we come across the three laws in everyday life such as trampolines • Where inertia can be used to our advantage • Momentum of car accidents and how cars are tested against this impact collisions **FOCUS CAREER: Aerodynamicist, Aeronautical Engineer, Aerospace Engineer**	• How and where we locate planets in different star systems. • Why this aids the search for life on different planets/moons. • How we can chart our planets history looking at different stars. • Looking at stars for information about our own future. • Charting expansion of space and the universe. **FOCUS CAREER: Climatologist**			
	Development of reading	Why magnetism is important for our planet and how it allowed us to survive as a species. The most recent studies that have looked into damage to the field and why that is a problem. https://www.nbcnews.com/science/science-news/dent-earth-s-magnetic-field-puzzles-scientists-n1237328	How Newton developed his three laws and their importance to modern day physics still despite their age https://www.sciencemag.org/news/2007/04/no-twisting-out-newtons-law	The continual search for life and what this form may look like compared to Sci-Fi movies https://www.independent.co.uk/news/science/bacteria-space-plant-growth-nasa-b1823409.html			
	Concepts –what will students be able to do at the end of the topic	• How a magnet works • How an electromagnet operates • How magnetic fields operate and distribute items around them • Uses of magnets/electromagnets • Rules for magnetism. • How to distinguish where a magnetic field is	• Understand Newton's three laws and what they mean for Physics • What happens to forces when two objects collide • Describe what is meant by momentum • Use formulas to solve calculations correctly.	• Describe the Big Bang Theory • Explain red-shift and how this supports the Big Bang Theory • Explain how scientists are able to use observations to arrive at theories such as the Big Bang • Suggest reasons for why we do not fully understand the universe • Describe the role of gravity throughout the universe. • Explain the different stages of the star life cycle.			