

Overall Curriculum Intent

By the end of their 5-year journey students will know the fundamental principles from biology, chemistry and physics that will provide a foundation for understanding and navigating the world. Student knowledge is structured around the Big Ideas in science which range from the particulate nature of matter to the cellular basis of living organisms, to the structure of the universe.

Students will understand the process of scientific enquiry that leads to the creation and development of concepts and theories. Students will understand how science can be used to explain observation and make predictions about natural phenomena.

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Knowledge Introduced	Laboratory Safety and Practices Forces Effects of forces on objects Contact and Non-contact Forces Equilibrium Drag Stretch and Compression Forces Hooke's Law	Energy Stores and Transfers Energy stores Energy Transfers Principle of conservation of energy. Particle Model Arrangement and behaviour of particles in solids, liquids and gases. Changes of state. Density of solids, liquids and gases. Gas pressure.	Particle Model Arrangement and behaviour of particles in solids, liquids and gases. Changes of state. Density of solids, liquids and gases. Gas pressure. Organs and the skeleton Major human organs and organ systems. Structure and function of the human skeleton. Joints and Muscles. Problems with the human skeleton.	Organs and the Skeleton Major human organs and organ systems. Structure and function of the human skeleton. Joints and Muscles. Problems with the human skeleton. Atoms, Elements and Compounds Atoms. Chemical formula and symbols Naming Compounds. Polymers.	Breathing Gas Exchange System Process of Breathing Lung Capacity Factors affecting breathing. End of Year Assessment and Review	Breathing Gas Exchange System Process of Breathing Lung Capacity Factors affecting breathing. Wave Properties Features of waves Transverse and Longitudinal Waves. Wave Speed.
Key vocabulary/ concepts/ideas students must master	Forces <i>Equilibrium, Contact Force, Resultant Force, Deformation, Newton, Friction, Tension, Hooke's Law, Compression</i>	Particle Model <i>Particle, Diffusion, Gas Pressure, Density, Evaporate, Boil, Condense, Melt, Freeze, Sublime</i> Energy Transfers <i>Thermal Energy Store, Chemical Energy Store, Kinetic Energy Store, Gravitational Potential Energy Store, Elastic Potential Energy Store, Dissipated, Conservation of Energy.</i>	Particle Model <i>Particle, Diffusion, Gas Pressure, Density, Evaporate, Boil, Condense, Melt, Freeze, Sublime</i> Organs and the Skeleton <i>Organ, Organ System, Joints, Bone Marrow, Ligaments, Tendons, Cartilage, Antagonistic Muscle Pair.</i>	Organs and the Skeleton <i>Organ, Organ System, joints, Bone Marrow, Ligaments, Tendons, Cartilage, Antagonistic Muscle Pair.</i> Atoms, Elements and Compounds <i>Atom, element, Molecules, Compounds, Chemical Formula, Polymer.</i>	Breathing <i>Breathing, trachea, bronchi, bronchioles, Alveoli, Diaphragm, Ribs, Lung Volume.</i> End of Year Assessment and Review <i>This provides an opportunity to review the key knowledge this year and assess pupils to identify what they know and can do, before they progress into Y8. This information is used to inform planning for the next year.</i>	Breathing <i>Breathing, trachea, bronchi, bronchioles, Alveoli, Diaphragm, Ribs, Lung Volume.</i> Wave Properties <i>Amplitude, Frequency, Wavelength, Wave Speed, Transverse, Longitudinal, Reflection, Absorption, Transmission.</i>
Knowledge revisited	Forces During KS2, pupils have learnt the effects of water resistance, air resistance and friction. Comparing how objects move on	Particle Model From KS2, pupils revisit their learning of solids, liquids and gases and changes of state, extending this to learn about the	Particle Model From KS2, pupils revisit their learning of solids, liquids and gases and changes of state, extending this to learn about the	Organs and the Skeleton From KS2, pupils will revisit and build upon their knowledge of the major human organs and skeleton, extending this to	Breathing Building on KS2 knowledge of organs and the KS3 learning of organs, the skeleton and diffusion, the process of	Breathing Building on KS2 knowledge of organs and the KS3 learning of organs, the skeleton and diffusion, the process of

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	<p>different surfaces. The idea that some forces need contact between objects and others act at a distance. They will build on this knowledge and extend it to stretching and compression forces, including Hooke's Law, the idea of equilibrium, drag and friction. This topic provides a fundamental knowledge base for many topics going through KS3 including particles, joints, work, speed and pressure.</p>	<p>density of objects and gas pressure. Forces knowledge from half term 1 is also interleaved here when learning about the forces acting between particles.</p> <p><u>Energy Transfers</u> This is new learning for pupils as energy transfers is not taught explicitly in KS2. The topic is introduced here as it is an essential prerequisite for many future topics, across all 3 disciplines. Ideas introduced in the forces topic will be revisited when discussing dissipation of energy.</p>	<p>density of objects and gas pressure. Forces knowledge from half term 1 is also interleaved here when learning about the forces acting between particles.</p> <p><u>Organs and the Skeleton</u> From KS2, pupils will revisit and build upon their knowledge of the major human organs and skeleton, extending this to consider how the muscles and joints work, and problems associated with the skeleton</p>	<p>consider how the muscles and joints work, and problems associated with the skeleton.</p> <p><u>Atoms, elements and compounds</u> This is new learning for pupils as this content is not explicitly taught at KS2. Knowledge of the particle model, forces and energy will be revisited here when pupils learn about how molecules and compounds form. This unit provides a crucial foundation for future learning of chemical reactions.</p>	<p>breathing is introduced in detail. Pupils will apply their prior learning of diffusion to gas exchange.</p> <p><u>End of Year Assessment and Review</u> This provides an opportunity to review the key knowledge this year and assess pupils to identify what they know and can do, before they progress into Y8. This information is used to inform planning for the next year.</p>	<p>breathing is introduced in detail. Pupils will apply their prior learning of diffusion to gas exchange.</p> <p><u>Wave Properties</u> This is new learning for pupils as the content is not explicitly taught at KS2. Pupils may have some experience of common waves such as light and sound, however, they are unlikely to have described them as waves. Prior learning of energy transfers and particle model will be revisited here and applied to waves. This content will provide a foundation for learning about light and sound as waves later in KS3.</p>
<p>CEIAG Links/ Opportunities</p>	<p>During the half term, pupils will learn about the wide variety of careers in science as part of the induction week. This links to <i>Gatsby benchmark 4.</i></p>			<p>As part of National Science week pupils will learn about how science applies to different job roles such as policing, healthcare (visit from a HCP) and food science. Pupils will also link their learning to a variety of STEM careers.</p> <p><i>Gatsby benchmark 4 and 5.</i></p>		

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Students will understand the process of scientific enquiry that leads to the creation and development of concepts and theories. Students will understand how science can be used to explain observation and make predictions about natural phenomena

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Knowledge Introduced	<p>Digestion Balanced Diets Process of digestion. Adaptations of the digestive system. Energy in food. Enzymes and digestion.</p> <p>Chemical Reactions Physical and Chemical Reactions. Using chemical equations. Combustion. Oxidation. Thermal Decomposition. Conservation of Mass.</p>	<p>Puberty Puberty Changes in boys and girls during puberty Human reproductive system Periods</p> <p>Sound Pupils have learnt about sounds in KS2, in terms of volume and pitch. Pupils also studied wave properties in Y7. This topic builds on this prior knowledge so that pupils can develop their knowledge of sound as a wave, transmission, absorption and reflection of sounds and auditory ranges. Pupils will revisit this knowledge when studying waves in KS4.</p>	<p>Respiration Aerobic Respiration Anaerobic Respiration Fermentation of Yeast.</p> <p>Photosynthesis Process of photosynthesis. How leaves are adapted for photosynthesis. Importance of photosynthesis. Factors affecting the rate of photosynthesis.</p>	<p>Light Light can travel through a medium or in a vacuum. When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. When light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal. Some materials allow light to pass through, while others absorb some or all the light. Refraction through lenses and prisms can be described using a ray diagram as a model. The retina in the human eye detects light to form an image.</p> <p>Cells Structure of plant and animal cells. How to use a microscope to view cells. Specialised cells and their adaptations. Relationship between cells, tissues and organs. Diffusion in cells. Multicellular and unicellular organisms</p>	<p>Cells Structure of plant and animal cells. How to use a microscope to view cells. Specialised cells and their adaptations. Relationship between cells, tissues and organs. Diffusion in cells. Multicellular and unicellular organisms</p> <p>Mixtures Mixtures, chromatography, Evaporation and Filtration, Distillation, Solutions and Solubility.</p>	<p>Mixtures Mixtures, chromatography, Evaporation and Filtration, Distillation, Solutions and Solubility.</p> <p>Electricity Standard circuit symbols. Conductors and Insulators Current. Voltage. Series and Parallel Circuits. Resistance. Static Electricity. Domestic Electricity and electricity costs. Energy Resources</p>
Key vocabulary/ concepts/ideas students must master	<p>Digestion <i>Carbohydrates, Lipids, Protein, Fibre, Enzymes, Small Intestine, Large Intestine, Gut Bacteria</i></p> <p>Chemical Reactions <i>Atom, element, Molecules, Compounds, Chemical Formula, Polymer, Oxidation, Combustion, Thermal Decomposition, Conservation of Mass.</i></p>	<p>Puberty <i>Puberty, body changes in boys and girls, periods, reproductive system.</i></p> <p>Sound <i>Vibration, Longitudinal wave, Volume, Pitch, Amplitude, Wavelength, Frequency, Vacuum, Oscilloscope, Absorption, Auditory range, Echo.</i></p>	<p>Respiration <i>Aerobic Respiration, Anaerobic Respiration, Fermentation.</i></p> <p>Photosynthesis <i>Photosynthesis, Chlorophyll, Stomata, Fertilisers</i></p>	<p>Light <i>Incident ray, reflected ray, Normal line, Angle of reflection, Angle of incidence, Refraction, Absorption, Scattering, Transparent, Translucent, Opaque, Convex lens, concave lens, Retina,</i></p> <p>Cells <i>Cell, Multi-cellular, Uni-cellular, Nucleus, Cytoplasm, Cell Membrane, cell wall, chloroplasts, vacuole, mitochondria, Tissue, Diffusion, Structural Adaptation.</i></p>	<p>Cells <i>Cell, Multi-cellular, Uni-cellular, Nucleus, Cytoplasm, Cell Membrane, cell wall, chloroplasts, vacuole, mitochondria, Tissue, Diffusion, Structural Adaptation.</i></p> <p>Mixtures <i>Mixture, Chromatography, Soluble, Insoluble, Solute, Solvent, Evaporation, Filtration, Distillation, Pure Substance.</i></p>	<p>Mixtures <i>Mixture, Chromatography, Soluble, Insoluble, Solute, Solvent, Evaporation, Filtration, Distillation, Pure Substance.</i></p> <p>Electricity <i>Current, voltage, series and parallel circuits, resistance, static electricity, domestic electricity, kWh, negatively charged, positively charged, electrostatic force, electrons, energy resource.</i></p>
Knowledge revisited	<p>Digestion From KS2, pupils will revisit their learning of balanced diets, digestive organs and nutrient transport from KS2. Pupils will extend their learning by developing knowledge of how different nutrients are absorbed using enzymes and how the digestive organs are adapted to aid digestion. Pupils will link their learning to the concept of energy and how this applies to food. The concept of diffusion covered during the particle model in Y7 will now be applied to digestion.</p> <p>Chemical Reactions Knowledge of energy transfers, particle model and atoms, elements and compounds are revisited and built upon here as pupils learn the fundamental reactions of combustion, oxidation and thermal decomposition. Conservation of mass is a crucial concept introduced here.</p>	<p>Puberty Pupils have learnt about the major body organs and systems in Y7. In addition, pupils have learnt about some of the changes they will experience during puberty during KS2. This topic builds on this knowledge allowing pupils to learn about the human reproductive system and more detailed changes that occur in boys and girls during puberty. This knowledge is developed further in year 9 and KS4.</p> <p>Sound Pupils have learnt about sounds in KS2, in terms of volume and pitch. Pupils also studied wave properties in Y7. This topic builds on this prior knowledge so that pupils can develop their knowledge of sound as a wave, transmission, absorption and reflection of sounds and auditory ranges. Pupils will revisit this knowledge when studying waves in KS4.</p>	<p>Respiration In KS2, pupils have learnt how exercise affects their body and the function of the blood. Here, pupils build upon and extend their knowledge, also linking knowledge to the chemical reactions topic, to study the process of respiration. This will underpin future study of cells and health.</p> <p>Photosynthesis In KS2, pupils learn about what plants need to grow and the different parts of a plant. This will be extended, along with using knowledge from the chemical reactions topic to develop knowledge of the process of photosynthesis. The concept of photosynthesis will then be built upon when studying plant cells and interdependence of organisms.</p>	<p>Light Pupils have previously studied the properties of waves, energy transfers and how sound behaves as a wave. In this topic, they will build upon their previous learning to understand how light behaves as a wave and how it can be transmitted, absorbed and reflected/refracted. Pupils will compare the similarities and differences between light and sound waves. Pupils will build upon their KS2 knowledge and learn how the human eye refracts light so that an image is formed on the retina. Pupils will further develop their knowledge of light waves through the study of the electromagnetic spectrum in KS4, which includes the visible light region.</p> <p>Cells During year 7, pupils studied the particle model, respiration, photosynthesis and organs of the body. They will use this knowledge to study the microscopic structures of cells, applying their knowledge of diffusion, respiration and photosynthesis and organs to understand how cells aid life processes and how cells are the building blocks of life, forming organs and tissues. The knowledge developed here provides a foundation for the study of inheritance, evolution and reproduction at KS3, as well as preparing pupils for KS4 Biology.</p>	<p>Cells During year 7, pupils studied the particle model, respiration, photosynthesis and organs of the body. They will use this knowledge to study the microscopic structures of cells, applying their knowledge of diffusion, respiration and photosynthesis and organs to understand how cells aid life processes and how cells are the building blocks of life, forming organs and tissues. The knowledge developed here provides a foundation for the study of inheritance, evolution and reproduction at KS3, as well as preparing pupils for KS4 Biology.</p> <p>Mixtures During KS2, pupils will have learnt how to separate simple mixtures using everyday equipment such as sieves and magnets. Using this knowledge and their knowledge of atoms, elements and compounds from earlier in Y7, pupils will learn how to separate more complex mixtures using techniques such as filtration, chromatography and distillation. Pupils</p>	<p>Mixtures During KS2, pupils will have learnt how to separate simple mixtures using everyday equipment such as sieves and magnets. Using this knowledge and their knowledge of atoms, elements and compounds from earlier in Y7, pupils will learn how to separate more complex mixtures using techniques such as filtration, chromatography and distillation. Pupils</p> <p>Electricity Pupils learnt the basics of electricity at KS2, and we will build upon this knowledge to understand the concepts of current, voltage and resistance and how series and parallel circuits work. Pupils studied the particle model and energy</p>

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				<p>microscopic structures of cells, applying their knowledge of diffusion, respiration and photosynthesis and organs to understand how cells aid life processes and how cells are the building blocks of life, forming organs and tissues. The knowledge developed here provides a foundation for the study of inheritance, evolution and reproduction at KS3, as well as preparing pupils for KS4 Biology.</p>	<p>will extend this knowledge when learning about Earth's resources and through their KS4 studies</p>	<p>transfers in year 7, which will be applied to circuits in this unit. Pupils will learn about how electricity is generated and used domestically, including the cost of electricity in kWh. Non-contact forces are revisited and applied to learning of electrostatic force. The knowledge gained here will be built upon through the electromagnetism topic and provides a foundation for KS4 learning.</p>
<p>CEIAG Links/ Opportunities</p>			<p>During National Science Week, pupils will have the opportunity to listen to visiting speakers delivering presentations about specific science careers.</p>			

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Knowledge Introduced	<p>Electricity Standard circuit symbols. Conductors and Insulators Current. Voltage. Series and Parallel Circuits. Resistance. Static Electricity. Domestic Electricity and electricity costs.</p> <p>Human Reproduction Male and female reproductive organs. Process of fertilisation, including egg and sperm cells. The menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm. Development of the foetus. The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances Contraception Sexually Transmitted Diseases.</p> <p>Plant Reproduction Plants have adaptations to disperse seeds using wind, water or animals. Plants reproduce sexually to produce seeds, which are formed following fertilisation in the ovary Describe the main steps that take place when a plant reproduces successfully. Identify parts of the flower and link their structure to their function.</p>	<p>Metals and Non-metals Metals and non-metals react with oxygen to form oxides which are either bases or acids.</p> <p>Metals can be arranged as a reactivity series in order of how readily they react with other substances.</p> <p>Some metals react with acids to produce salts and hydrogen. Iron, nickel and cobalt are magnetic elements.</p> <p>Mercury is a metal that is liquid at room temperature. Bromine is a non-metal that is liquid at room temperature.</p> <p>Describe an oxidation, displacement, or metal acid reaction with a word equation.</p> <p>Interdependence Organisms in a food web (decomposers, producers and consumers) depend on each other for nutrients. So, a change in one population leads to changes in others. The population of a species is affected by the number of its predators and prey, disease, pollution and competition between individuals for limited resources such as water and nutrients.</p> <p>Acids and Alkalis Acids have a pH below 7, neutral solutions have a pH of 7, alkalis have a pH above 7. Acids and alkalis can be corrosive or irritant and require safe handling. Hydrochloric, sulfuric and nitric acid are strong acids. Acetic and citric acid are weak acids. The pH of a solution depends on the strength of the acid: strong acids have lower pH values than weak acids. Mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water.</p>	<p>Heating and Cooling The thermal energy of an object depends upon its mass, temperature and what it's made of. When there is a temperature difference, energy transfers from the hotter to the cooler object. Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation. Explain how a method of thermal insulation works in terms of conduction, convection and radiation</p> <p>Speed If the overall, resultant force on an object is non-zero, its motion changes and it slows down, speeds up or changes direction. Use the formula: speed = distance (m)/time (s) or distance-time graphs, to calculate speed. A straight line on a distance-time graph shows constant speed, a curving line shows acceleration. The higher the speed of an object, the shorter the time taken for a journey.</p> <p>Magnetism Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction. The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences. Two 'like' magnetic poles repel and two 'unlike' magnetic poles attract. Field lines flow from the north-seeking pole to the south-seeking pole. An electromagnet uses the principle that a current through a wire causes a magnetic field. Its strength depends on the current, the core and the number of coils in the solenoid. The magnetic field of an electromagnet decreases in strength with distance.</p>	<p>Universe The solar system can be modelled as planets rotating on tilted axes while orbiting the Sun, moons orbiting planets and sunlight spreading out and being reflected. This explains day and year length, seasons, and the visibility of objects from Earth. Our solar system is a tiny part of a galaxy, one of many billions in the Universe. Light takes 8 minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.</p> <p>Gravity Mass and weight are different but related. Mass is a property of the object; weight depends upon mass but also on gravitational field strength. Every object exerts a gravitational force on every other object. The force increases with mass and decreases with distance. Gravity holds planets and moons in orbit around larger bodies. weight (N) = mass (kg) x gravitational field strength (N/kg). g on Earth = 10 N/kg. On the moon it is 1.6 N/kg.</p> <p>Chemical Energy During chemical reactions bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic.</p> <p>Pressure Pressure acts in a fluid in all directions. It increases with depth due to the increased weight of fluid, and results in an upthrust. Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust. Different stresses on a solid object can be used to explain observations where objects scratch, sink into or break surfaces. Use the formula: fluid pressure, or stress on a surface = force (N)/area (m²).</p>	<p>Periodic Table The elements in a group all react in a similar way and sometimes show a pattern in reactivity. As you go down a group and across a period the elements show patterns in physical properties. Metals are generally found on the left side of the table, non-metals on the right. Group 1 contains reactive metals called alkali metals. Group 7 contains non-metals called halogens. Group 0 contains unreactive gases called noble gases.</p> <p>Inheritance Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction. Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.</p> <p>Evolution Natural selection is a theory that explains how species evolve and why extinction occurs. Biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans.</p>	<p>Earth's Structure The Earth is made of layers known as the core, mantle and crust. Sedimentary, igneous and metamorphic rocks can be inter converted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.</p> <p>Work Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work. Turning forces are known as moments and the moment of a force is dependent on the force applied and the perpendicular distance from the pivot. Machines make work easier by reducing the force needed. Levers and pulleys do this by increasing the distance moved, and wheels reduce friction.</p> <p>Climate and Earth's Resources Carbon is recycled through natural processes in the atmosphere, ecosystems, oceans and the Earth's crust (such as photosynthesis and respiration) as well as human activities (burning fuels). Greenhouse gases reduce the amount of energy lost from the Earth through radiation and therefore the temperature has been rising as the concentration of those gases has risen. Scientists have evidence that global warming caused by human activity is causing changes in climate. Methane and carbon dioxide are greenhouse gases. Earth's atmosphere contains around 78% nitrogen, 21% oxygen. Use of resources impacts on climate change and the need to reduce, reuse and recycle materials to reduce impact.</p>
Key vocabulary/ concepts/ideas students must master	<p>Electricity <i>Current, voltage, series and parallel circuits, resistance, static electricity, domestic electricity, kWh, negatively charged, positively charged, electrostatic force, electrons.</i></p> <p>Human Reproduction <i>Gamete, Fertilisation, Ovary. Testicle, Oviduct, or fallopian tube, Uterus, or womb, Ovulation, Menstruation, Reproductive system, Penis, Vagina, Foetus, Gestation, Placenta, Amniotic fluid, Umbilical cord, Contraception, Sexually Transmitted Disease.</i></p> <p>Plant Reproduction <i>Pollen, Ovules, Pollination, Fertilisation, Seed, Fruit, Carpel.</i></p>	<p>Metals and Non-Metals <i>Metals, Non-metals, Displacement, Oxidation, Reactivity, Electrolysis, Extraction of metals from Ores</i></p> <p>Interdependence <i>Food web, Food chain, Ecosystem, Environment, Population, Producer, Consumer, Decomposer.</i></p> <p>Acids and Alkalis <i>Indicator, pH, base, concentration, neutralisation.</i></p>	<p>Heating and Cooling <i>Thermal conductor, thermal insulator, Temperature, Thermal Energy, Conduction, Convection, Radiation</i></p> <p>Speed <i>Speed, average speed, acceleration, relative motion.</i></p> <p>Magnetism <i>Magnetic Force, Magnetic Poles, Magnetic Field, Permanent Magnet, Core, Electromagnet, Solenoid.</i></p>	<p>Universe <i>Galaxy, Light year, stars, exoplanets, Orbit.</i></p> <p>Gravity <i>Weight, mass, gravitational field strength, non-contact force, field.</i></p> <p>Chemical Energy <i>Catalysts, exothermic reaction, endothermic reaction, chemical bond.</i></p> <p>Pressure <i>Fluid, Pressure, Upthrust, Atmospheric Pressure.</i></p>	<p>Periodic Table <i>Physical properties, chemical properties, groups, periods</i></p> <p>Inheritance <i>DNA, Chromosomes, Genes, Inherited Characteristics.</i></p> <p>Evolution <i>Population, Natural selection, Extinction, Biodiversity, Competition, Evolution</i></p>	<p>Earth's Structure <i>Rock cycle, weathering, erosion, minerals, sedimentary rocks, igneous rocks, metamorphic rocks, strata.</i></p> <p>Work <i>Work, Moment, Lever, Input force, output force, deformation, displacement.</i></p> <p>Climate and Earth's Resources <i>Global warming, greenhouse effect, Fossil fuels, carbon sink, Carbon Cycle, Recycling, Natural Resources</i></p>

<p>Knowledge revisited</p>	<p>Electricity Pupils learnt the basics of electricity at KS2, and we will build upon this knowledge to understand the concepts of current, voltage and resistance and how series and parallel circuits work. Pupils studied the particle model and energy transfers in year 7, which will be applied to circuits in this unit. Pupils will learn about how electricity is generated and used domestically, including the cost of electricity in kWh. Non-contact forces are revisited and applied to learning of electrostatic force. The knowledge gained here will be built upon through the electromagnetism topic and provides a foundation for KS4 learning.</p> <p>Human Reproduction Pupils learnt about life cycles and the basic process of reproduction in KS2. They have also studied cells earlier in Y8. In this topic, pupils build on this to learn about the process of reproduction in humans, covering reproductive organs, fertilisation, and foetal development. Pupils also learn about the various methods of contraception and their importance for preventing pregnancy and sexually transmitted diseases. The learning from this unit will support pupils understanding of inheritance and variation in Y9 and KS4 learning on reproduction, genetics, and inheritance.</p> <p>Plant Reproduction In KS2, pupils have learnt the basic parts of a plant and the life cycle of a plant. Building on this knowledge and using the knowledge gained from studying cells and human reproduction, pupils learn how plants reproduce both sexually and asexually. They learn that plants have male and female reproductive organs. Pupils will further build upon this knowledge in KS4.</p>	<p>Metals and Non-metals In KS2, pupils learnt the material properties of metals and non-metals. In term 1 of Y8, pupils learnt about chemical reactions including oxidation, thermal decomposition and combustion alongside the core knowledge of atoms, elements and compounds. Pupils will retrieve this knowledge and extend it to learn about how metals and non-metals react, including displacement reactions and the reactivity series. Pupils will develop their understanding of how different metals are extracted from ores. The process of electrolysis is also introduced briefly as part of this unit. This knowledge will provide a core foundation for pupils to build on when studying chemical reactions at KS4.</p> <p>Interdependence Pupils have studied food chains in KS2, human and plant reproduction and photosynthesis in Y8. Here pupils will build upon this previous knowledge to develop their understanding of interdependence of organisms and the role of decomposers and the nutrient cycle. Pupils will retrieve and build upon this knowledge later in Y9 through the study of inheritance and evolution, ensuring a solid foundation of knowledge for progression to KS4, when these ideas are developed further.</p> <p>Acids and Alkalis This is a new topic for pupils as this is not covered at KS2. However, pupils will further expand on their knowledge of chemical reactions when considering neutralisation reactions. The concepts of acids and alkalis are introduced using concrete examples first and then more abstract examples. The knowledge gained here will provide a good foundation for pupils' KS4 studies on acids and alkalis, including titration reactions.</p>	<p>Heating and Cooling Pupils will have learnt about temperature and conductors and insulators in KS2. Pupils have learnt about energy transfers in Y7. We will revisit this knowledge and build on it to develop pupils' knowledge of conduction, convection and radiation and thermal energy transfers. Pupils will develop this knowledge further in their KS4 studies.</p> <p>Speed Pupils learnt about the concept of a resultant force in Y7 and will build upon this knowledge here, as they learn how speed is calculated. The learning from this unit provides a foundation for progression to KS4, where pupils will study forces and speed in greater depth.</p> <p>Magnetism Pupils have studied non-contact forces in Y7, magnets at KS2 and electricity in Y8. This unit brings together ideas from all these areas of prior learning to enable pupils to learn more about magnetic forces and fields before they move on to learn about electromagnets. Knowledge gained in this unit will support pupils learning about the Universe and provides a foundation knowledge for further study of magnetism in KS4</p>	<p>Universe Pupils have learnt a basic model of the solar system in KS2, in addition, pupils have learnt about light and forces in Y7 and Y8 and speed in half term 1 of Y9. In this topic, pupils will use their knowledge of relative motion, forces and the behaviour of light to develop greater knowledge of our solar system, the motion of moons and planets and our place in the wider universe. Pupils also learn more about the stars. From this unit, pupils will have a core knowledge of the universe and our place within it. Pupils who study triple science in KS4 will study the universe in more depth, but this unit ensures all pupils have access to the core knowledge</p> <p>Gravity Prior learning of non-contact forces from Y7 and the idea of fields from the magnetism unit support pupils to learn about weight and mass and how these are different. Pupils also use their knowledge of the solar system to understand that gravity is different on different planets and celestial objects. Pupils will use the knowledge gained here to support their KS4 learning on weight and mass.</p> <p>Chemical Energy Pupils prior learning on energy transfers and chemical reactions will support their learning in this topic, as they develop their understanding of exo and endo thermic reactions, the formation of bonds and bond energies. This will provide an important foundation of knowledge which pupils will need for their study of Chemistry at KS4.</p> <p>Pressure Pupils will use the knowledge they have gained from previous learning about forces, including weight, and fluids to learn about pressure in fluids and relate pressure to force and area. Pupils develop their understanding of how forces affect whether an object floats or sinks. Pressure will be studied in more depth at KS4, and pupils will use the knowledge from this unit to support their learning.</p>	<p>Periodic Table Pupils have previously learnt about atoms, elements and compounds and chemical reactions. Here, they will develop their knowledge of the periodic table, to include groups and periods and the different patterns of reactivity. Pupils develop understanding of groups 1,7 and 0. In KS4, pupils will learn more about groups in the periodic table and chemical reactions, so this unit provides an important foundation for progression.</p> <p>Inheritance Pupils have learnt about organs of the body and reproduction during Y7 and Y8 and interdependence earlier in Y9. Here, they will build upon their knowledge of reproduction to learn about how we inherit characteristics through genes. This unit provides a foundation of knowledge which will support pupils understanding of inheritance and prepare them for further study at KS4.</p> <p>Evolution In this topic, pupils will build on their knowledge of inheritance, interdependence and their learning about evolution from primary school to develop their understanding of how evolution occurs. Pupils will understand that this is the accepted scientific theory. Pupils will develop their learning of evolution at KS4.</p>	<p>Earth's Structure Pupils have learnt about pressure and heating and cooling earlier in Y9 as well as forces earlier in KS3. The geography curriculum also covers rocks. Pupils will combine knowledge from previous learning in science, along with knowledge from Geography to learn about the structure of the Earth and how rocks are formed. Although this does not form part of the GCSE Science course, pupils, regardless of whether they choose to study Geography at KS4 or not, will understand the processes of rock formation.</p> <p>Work Pupils have previously learnt about forces and their effects, energy and pressure. In this unit, pupils' use their prior learning to understand how work is done on an object and why this is useful. Pupils will learn about how different machines can make work easier. Pupils will further build on this knowledge at KS4.</p> <p>Climate and Earth's Resources Pupils will use their knowledge of atoms and elements and the Earth's structure, along with knowledge from Geography to learn about how carbon is cycled and the impact of human activity on climate change. Pupils will learn about how recycling can help to conserve resources and what the issues with this process are. Pupils will study climate in more depth at KS4.</p>
<p>CEIAG Links/ Opportunities</p>						