Science Curriculum Long Term Planning

		Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 7	Big Idea	**Sound & Light:** What are the key properties of sound and light waves? **Speed:** How do objects move? **Current, Voltage and Resistance:** What are current, voltage and resistance?	**Gravity:** What is gravity? **Energy Transfers & Costs:** What are the different types of energy and how do we use them?	**Atoms, Elements & The Periodic Table:** What is the nature of matter? **Metals & Non-metals:** How are metals and non-metal different and how do metals react?	**Earth and The Universe:** What is the structure of the Earth and where are we positioned in the universe? **Acids and Alkalis:** What are acids and alkalis?	**Cells & Organisation:** What are living things made of?	**Human Reproduction:** How do humans reproduce? **Variation & Inheritance:** Why do we look like our parents?
	Key knowledge and skills	**Sound & Light** • Understanding how light behaves • Understanding reflection and drawing reflection diagrams • Understanding refraction and drawing refraction diagrams • Understanding how and why see different colours • Understanding what sound is • Describing a sound in terms of its amplitude and frequency	**Gravity:** • Explaining what a force is and describing the different types of force • Understanding the difference between 'mass' and 'weight' • Understanding the role that gravity plays in our solar system **Energy Transfers & Costs:** • Naming and describing the different stores of energy and how energy can be transferred	**Atoms, Elements & The Periodic Table:** • Understanding that everything in the universe is made of atoms. • Gaining an appreciation for the relative size of atoms • Understanding that different types of atoms are called elements and that all the known elements in the universe can be found on the periodic table. • Understanding the difference	**Earth and The Universe:** • Understanding the structure of the Earth • Describing and explaining the features of sedimentary, metamorphic and igneous rocks. • Explaining how all rocks are linked together by the rock cycle • Explaining how the rotation, tilt and orbit of the Earth is linked to days, years and the different seasons.	**Cells & Organisation:** • Understanding that all living things are made out of cells • Understanding the key features and differences between plant and animal cells • Understanding the key features of some specialised cells • Understanding how living things are organised in terms of cells, tissues and organs • Understanding how the muscles of the body work in pairs to	**Human Reproduction:** • Explaining the key features and importance of puberty • Describing and explaining the different features of the male and female reproductive system • Understanding the different stages of the female menstrual cycle and the purpose of each stage • Understanding the process of fertilisation • Describing the different stages of pregnancy

		• Explaining how the human ear functions in order to detect sounds **Speed** • Explaining how forces affect the motion of objects • Calculating the speed of different moving objects • Understanding how the motion of an object can be represented on a distance-time graph. **Current, Voltage & Resistance** • Investigating which materials can and cannot conduct electricity and understanding why • Constructing circuit diagrams • Constructing and understanding the difference between series and parallel circuits • Understanding what current,	between these stores • Investigating the amount of energy stored in different foods. • Evaluating the advantages and disadvantages of renewable and non-renewable methods of generating electricity • Understanding how household electricity bills are calculated based on energy consumption	between elements, compounds and mixtures • Describing and explaining the structure of the periodic table, including the trends that can be observed in the different groups of the periodic table **Metals & Non-metals:** • Understanding the key differences between metals and non-metals • Understanding how metals reaction with oxygen and with acids • Understanding how some metals can be more reactive than others and how this links to the reactivity series and displacement reactions • Understanding what a polymer is what their uses are • Understanding what ceramics	• Understanding the position of Planet Earth in relation to the rest of the solar system • Describing what the universe consists of and explaining the timeline of the universe and its potential future. **Acids and Alkalis:** • Describing and explaining, with examples, the difference between acids and alkalis • Explaining how the pH scale can be used to identify whether a substance is an acid or an alkali • Understanding what it meant by a neutralisation reaction and applying this knowledge to understand how indigestion remedies work	produce movement • Understanding the different functions of the skeleton	• Understanding how fertility can be manged via the use of different contraceptive methods (to prevent pregnancy) or the use of hormones and IVF to increase the likelihood of pregnancy. **Variation & Inheritance:** • Describing and explaining the different causes and types of variation • Explaining what is meant by the terms DNA, genes and chromosomes • Explaining how DNA, genes and chromosomes play a role in the inheritance of characteristics • Understanding how the structure of DNA links to its function • Describing the process of genetic medication and explaining why it might be beneficial.

		voltage and resistance are and how they differ in series and parallel circuits. • Understanding static electricity and its uses		and composites are and what their uses are.			
	End Point	Pupils will explain how light and sound behave, including reflection, refraction and wave properties; calculate and interpret motion using speed and graphs; and construct and analyse electrical circuits, understanding current, voltage, resistance, conductivity and static electricity in practical and theoretical contexts.	Pupils will describe different types of forces and distinguish between mass and weight, explain gravity's role in the solar system, and understand energy stores and transfers. They will evaluate energy sources, investigate energy in food, and calculate household energy use and costs	Pupils will explain atomic structure and the organisation of the periodic table, distinguishing between elements, compounds and mixtures, and describing trends. They will compare metals and non-metals, explain reactions with oxygen and acids, understand reactivity and displacement, and describe the properties and uses of polymers, ceramics and composites.	Pupils will describe Earth's structure, rock types and the rock cycle, and explain how Earth's motion influences time and seasons, situating it within the solar system and universe. They will distinguish acids and alkalis, use the pH scale, and explain neutralisation, including everyday applications such as indigestion remedies.	Pupils will explain that all living things are composed of cells, distinguish between plant and animal cells and specialised cells, and describe biological organisation from cells to organs. They will also explain how muscles work in pairs to create movement and describe the functions of the human skeleton.	Pupils will explain human reproduction, including puberty, reproductive systems, the menstrual cycle, fertilisation and pregnancy, and evaluate fertility management methods. They will describe variation and inheritance, explaining DNA, genes and chromosomes, their role in inherited characteristics, DNA structure and function, and the purpose of genetic modification
Year 8	Big Idea	**Interdependence:** How do living things rely on each other in an ecosystem? **Contact Forces & Pressure:** What are contact forces? **Magnets & Electromagnets:** What are magnets and how can we use them?	**Work:** What is work done? **Heating & Cooling**: How is heat energy transferred? **Wave Properties & Effects:** How do we use waves?	**Types of Reaction:** What are the different types of chemical reaction? **Chemical Energy**: What is happening in a chemical reaction in terms of energy?	**Particle Model**: How are particles arranged in substances and how can this change?	**Separating Mixtures**: How can we separate mixtures? **Digestion**: What is digestion and why does it happen?	**Respiration:** What is respiration and why do all living things need to do it? **Breathing**: What is breathing and why do we do it? **Plant reproduction & Photosynthesis:** How to plants survive and reproduce?

	Key Knowledge and skills	**Interdependence:** • Understanding the key features of an ecosystem • Understanding the relationship including predators and prey using food chains and food webs • Describing, explaining and evaluating the different ways to control pests • Comparing organic and conventional farming techniques **Contact Forces & Pressure:** • Understanding the difference between contact and non-contact forces • Explaining the key features and uses of friction, tension, elasticity and upthrust • Understanding how to calculate pressure • Comparing pressure in	**Work:** • Understanding the concept of work done in relation to forces and energy • Calculating work done • Understanding how levers and pulleys can be used to reduce the amount of work done **Heating & Cooling:** • Understanding the difference between heat and temperature • Understanding the key features of heat energy transfer through conduction, convection and radiation • Investigating how insulation can be used to reduce heat energy loss **Wave Properties & Effects:** • Understanding the uses and properties of longitudinal	**Types of Reaction:** • Understanding the difference between a chemical reaction and a physical change • Understanding how chemical reactions can be represented using word equations • Understanding the law of 'Conservation of mass' and how this applies to all chemical reactions • Understanding what takes place in a combustion reaction • Understanding what takes place in a thermal decomposition reaction • Understanding how chemical reactions can be represented using symbol equations. **Chemical Energy:** • Understanding the concept of thermal energy	**Particle Model:** • Understanding the 3 states of matter, including how the particles are arranged and how they move within these 3 states. • Understanding the concept of gas pressure and how this links to the process of diffusion • Understanding how states of matter can change and linking this to knowledge of melting and boiling points • Investigating how thermal energy and temperature is linked to expansion or contraction of an object.	**Separating Mixtures:** • Understanding the difference between pure substances and mixtures • Understanding the concept of solubility • Understanding the different methods of separating mixtures, including filtration, evaporation, distillation and chromatography. **Digestion:** • Describing the different components of a balanced diet and explaining why these different components are important to human health • Describing the different parts of the digestive system and explain what each part does • Understanding the purpose of digestion and the role that enzymes play in this process	**Respiration:** • Understanding the process and purpose of aerobic and anaerobic respiration • Understanding how respiration can be used in the process of fermentation **Breathing:** • Describing and explaining the structure and function of the lungs • Understanding how the alveoli in the lungs are adapted for gas exchange • Understanding the how exercise, smoking and asthma can affect a person's breathing. **Plant reproduction & Photosynthesis:** • Describing and explaining the structure and function of flowers and then linking this to plant reproduction.

		fluids to atmospheric pressure **Magnets & Electromagnets:** • Understanding what magnet is • Understanding what a magnetic field is and how it links to magnetic force, attraction and repulsion • Describing and explaining how to make an electromagnet, including how to vary their strength • Understanding the different uses of electromagnets	waves, with a particular focus on sound waves and the uses of ultrasound • Understanding the uses and properties of transverse waves • Describing the key features of the electromagnetic spectrum and explaining the properties and uses of the different types of electromagnetic waves.	flow from areas of high to low temperature • Describing and explaining the difference between an exothermic and endothermic reaction • Understanding the concepts of making and breaking chemical bonds in a chemical reaction and linking this to exothermic and endothermic reactions. • Understanding how a catalyst affects the rate of a chemical reaction.		• Understanding the consequences of an unbalanced diet • Understanding how the use of recreational drugs can effect the health of a person • Describing and explaining the different factors that contribute to the overall health of a person, including healthy routines that promote wellbeing.	• Understanding the different methods by which plants disperse their seeds and knowing why this is important • Understanding the process of photosynthesis and why plants do it. • Describing and explaining how plants are adapted to maximise the amount of photosynthesis they can carry out • Understanding some of the different factors which can affect the rate of photosynthesis
	End Point	Pupils will explain ecosystems and interdependence using food chains and webs, evaluate pest control and farming methods, and distinguish contact and non-contact forces, including pressure. They will also describe magnetism, magnetic fields, and electromagnets, explaining how they are made, varied in strength	Pupils will explain work done and calculate it, describing how simple machines reduce effort. They will distinguish heat and temperature, explain energy transfer and insulation, and describe wave properties, including sound and electromagnetic waves, linking their characteristics to practical uses such as	Pupils will distinguish between physical and chemical changes, represent reactions using word and symbol equations, and apply conservation of mass. They will describe key reaction types and explain energy changes, including exothermic and endothermic processes, linking these to bond breaking and forming,	Pupils will describe the particle model of solids, liquids and gases, explaining arrangement and movement, and relate this to changes of state. They will explain gas pressure and diffusion, and investigate how thermal energy causes expansion and contraction in different materials.	Pupils will distinguish pure substances and mixtures, explain solubility, and apply separation techniques including filtration, evaporation, distillation and chromatography. They will describe the digestive system, balanced diet and enzymes, evaluate health impacts of diet and drugs, and explain lifestyle factors that support overall wellbeing.	Pupils will explain respiration, including aerobic and anaerobic processes and fermentation, and describe the structure and function of the lungs and gas exchange. They will explain plant reproduction and photosynthesis, including adaptations and factors affecting rate, linking these processes to energy transfer and survival.

		and applied in real-world contexts	communication and medical applications.	and the role of catalysts in reaction rates.			
Year 9	Big Idea	**Evolution:** How have living things changed since the world began? **Climate & Earth's Resources:** What is happening to planet Earth and why is it important save it?	**Atomic Structure & The Periodic Table:** What is the nature of matter?	**Cell Biology:** What are the building blocks of life and how do they function? **Energy**: How is energy transferred between different stores?		**Particle Model of Matter:** How are particles arranged in substances and how can this change? **Chemical Energy Changes:** What is the relationship between chemical reactions and energy?	**Bioenergetics:** Why is glucose such an important molecule? **Chemical Analysis:** How can substances by analysed using chemical techniques?
	Key Knowledge and skills	**Evolution:** • Understanding the meaning and importance of Biodiversity • Describing the different resources that plants and animals compete for and explaining how they are able to do this • Understanding how organisms have evolved through the proves of natural selection • Describing and explaining the	**Atomic Structure & The Periodic Table:** • Understanding the difference between elements and compounds • Constructing and completing word equations, symbol equations and balanced symbol equations to represent chemical reactions • Understanding the structure of the atom and how scientists understanding of the model of	**Cell Biology:** • Understanding the structure, function and key differences between prokaryotic and eukaryotic cells • Understanding how to use a microscope and understanding their impact on our understanding of cells • Describing and explaining, with examples, how and why cells differentiate to become specialised • Understanding the purpose and process of cell division • Understanding the use features and uses of different types of stem cells, including meristem cells from plants • Describing and explaining the processes of diffusion, osmosis and active transport in relation to how cells get the materials they need to survive **Energy** • Naming and describing the different stores of energy and how energy can be transferred between these stores		**Particle Model of Matter:** • Understanding how the different states of matter can be represented using particle diagrams • Describing and explaining the arrangement, movement and forces between particles in different states of matter. • To understand how substances can change state and how this links to thermal and kinetic energy	**Bioenergetics:** • Understanding the process and purpose of photosynthesis • Investigating how light intensity affects the rate of photosynthesis • Understand how limiting factors influence the productivity of plants • Understanding the process and purpose of aerobic and anaerobic respiration • Understanding the different ways in which

		reasons for extinction **Climate & Earth's Resources:** • Understanding how carbon is continuously cycled between different parts of the environment • Understand what The Greenhouse Effect is, what contributes to it and how it can lead to climate change and Global Warming. • Describing and explaining the different ways in which humans can combat climate change • Describing the different resources that humans take from the Earth and explaining how these resources, particularly metals, are extracted • Understanding the importance of recycling	the atom has developed over time. • Understanding how electrons orbit around the nucleus of the atom • Describing and explaining how the early versions of the periodic table were put together and understanding how the work of Dimitri Mendeleev paved the way for the creation of the modern periodic table. • Understanding how the modern periodic table in arranged and how the elements in it behave, with a particular focus on Group 1, 7 and 0. • Understanding the different ways in which mixtures can be separated through techniques such as filtration,	• Understanding the concept of efficiency in relation to useful and wasted energy transfers • Understanding the concept of 'Work Done' and how to calculate it • Understanding how energy transfers relate to 'Power' and how this can be calculated • Calculating changes in gravitational potential energy • Understanding how unwanted energy transfers can be reduced with the use lubrication and insulation • Evaluating the advantages and disadvantages of renewable and non-renewable methods of generating electricity	• Understanding the term density and how it can be calculated for different objects • Understanding the concept of Internal Energy in relation to different substances **Chemical Energy Changes:** • Understanding the difference between exothermic and endothermic reactions • Interpreting Energy Profile Diagrams • Applying knowledge of exothermic and endothermic reactions to everyday uses	plants use glucose • Understanding how the human body responds to exercise in terms of breathing and respiration. • Understand why metabolic reactions are essential for life in plants and animals. **Chemical Analysis:** • Understanding the difference between pure substances, impure substances and formulations. • Understanding how substances can be separated using chromatography, particularly paper chromatography • Understanding how to test for common gases such a hydrogen, oxygen, carbon dioxide and chlorine.

		and its links to sustainability	crystallisation, distillation and chromatography.				
	End Point	Pupils will explain biodiversity, competition and natural selection, and describe causes of extinction. They will evaluate human impacts on the environment, explaining the carbon cycle, greenhouse effect and climate change, and describe how resources are extracted and managed sustainably, including the importance of recycling.	Pupils will explain atomic structure and the development of the periodic table, distinguish between elements and compounds, and represent reactions using balanced equations. They will describe group properties, including Groups 1, 7 and 0, and apply a range of techniques to separate mixtures effectively.	Pupils will explain cell structure and processes, including transport, division and differentiation, and describe the use of microscopes and stem cells. They will analyse energy stores, transfers and efficiency, calculate work, power and gravitational potential energy, and evaluate methods to reduce energy loss and generate electricity sustainably		Pupils will explain the particle model, describing states of matter, energy changes and density, and apply this to changes of state and internal energy. They will distinguish exothermic and endothermic reactions, interpret energy profile diagrams, and relate chemical energy changes to practical everyday applications.	Pupils will explain photosynthesis and respiration, including responses to exercise and uses of glucose, analyse substances using chromatography and gas tests, and describe plant structure and transport systems, explaining transpiration and factors affecting its rate in relation to plant function and survival.
Year 10	Big Idea	**Organisation:** How does organisation enable plants and animals to function, grow and survive? **Atomic Structure & Radioactivity**: What is nuclear radiation and what are its properties?	**Bonding and Structures:** How are atoms held together and what structures do they form? **Particle Model of Matter:** How are particles arranged in substances and how can this change? **Energy**: How is energy transferred between different stores?	**Chemical Changes:** How can we use chemical reactions to our advantage? **Infection & Response**: How does our body defend against pathogens?	**Electricity**: What are the properties of electricity? **Quantitative Chemistry:** How can we calculate the mass of reactants or products in a chemical reaction	**Organic Chemistry**: What is crude oil and how can it be used? **Rates of Reaction:** What affects the rate of a chemical reaction?	**Inheritance, Variation & Evolution:** What mechanisms have produced the variety of life we see on Earth today? **Forces:** What can affect the motion of an object?
	Key Knowledge and skills	**Organisation:** • Understanding how living	**Bonding and Structures:** • Understanding the features	**Chemical Changes:** • Understanding how we can use the	**Electricity:** • Understanding how to	**Organic Chemistry** • Describe and explain the	**Inheritance, Variation & Evolution**

		things are organised in terms of cells, tissues, organs and organ systems • Understanding the structure and function of the digestive system and explaining the role that substances such as bile and different enzymes play in the process of digestion • Stating the names and functions of the different digestive enzymes and understanding the importance of optimum conditions for enzyme function. • Understanding the structure and function of the human heart, including the structure	and differences between ionic, covalent and metallic bonding • Understanding the different types of structures formed as a result of the different types of chemical bond • Describing and explaining the characteristics of ionic, covalent and metallic structures • Understanding how covalent bonding can result in giant structures such as polymers, diamond, graphite and silicone dioxide. • Describing and explaining the properties of giant covalent structures.	reactivity series of metals to explain displacement reactions • Understanding how metals react with different acids and how we can we use this knowledge to make different salts? • Describing how we can use the pH scale to identify acids and alkalis • (HT Only) – Explaining the difference between weak and strong acids in terms of the hydrogen ion concentration • Explaining how we can extract metals the electrolysis of molten and aqueous solutions. **Infection & Response:** • Understanding that pathogens (such as bacteria, viruses,	construct circuit diagrams • Understanding the concept of voltage, current and resistance and how they are linked together via Ohm's law. • Understanding the difference between series and parallel circuits and the effect these circuits have on current, voltage and resistance. • Investigating the resistance of different components • Understanding how specific electrical components, such as LDRs and thermistors, can be used in everyday life. • Understanding the concept of electrical	formation of crude oil • Describe and explain the composition of crude oil, using the terms 'mixture, 'hydrocarbon' and 'alkanes' • Describing and explaining the different properties of alkanes • Describe and explain the process of fractional distillation and why it is necessary • Understanding the process of 'Cracking' and why it is carried out • Describe and explain the properties of Alkenes **Rates of Reaction:** • Understanding how collision theory can be used to explain why chemical	• Understanding the difference between sexual and asexual reproduction • Understanding the structure and function of DNA • Understanding how genetic information is passed from parent to offspring • Understanding the different types and causes of variation • Understanding the process of evolution through natural selection • Describing and explaining the evidence for evolution, including fossil formation • Describing and explaining the causes of extinction • Understanding how different organisms can be classified

		and function of blood itself and the three different types of blood vessels. • Understanding the causes, consequences and treatments for coronary heart disease. • Understanding the features, causes and consequences of a range of different non communicable health issues, including benign and malignant tumours • Describing and explaining the function of the different parts of a leaf • Understanding how substances such as water and glucose are transported around the plant	• Understanding the properties and uses of fullerenes and alloys. **Particle Model of Matter:** • Understanding how the different states of matter can be represented using particle diagrams • Describing and explaining the arrangement, movement and forces between particles in different states of matter. • To understand how substances can change state and how this links to thermal and kinetic energy • Understanding the term density and how it can be calculated for different objects • Understanding the concept of Internal Energy in relation to different substances	protists and fungi) are the cause of all communicable diseases. • Understanding how pathogens can spread from person to person and how this can be reduced. • Understanding the causes, symptoms, spread and treatment and/or prevention of measles, HIV, TMV, salmonella, gonorrhoea, rose black spot and malaria. • Understanding how the human body can defend itself against pathogens, including the role that white blood cells play in forming the second line of defence against infectious diseases. • Understanding the concept of immunity and	power and how this links to electrical appliances. • Understanding how electricity is distributed across the UK via the national gird. **Quantitative Chemistry:** • Understanding the law of conservation of mass and how this links to balanced chemical equations • Calculating relative formula mass and concentrations of solutions • (HT Only) Understanding what a 'Mole' is and how it can be calculated.	reactions take place at different rates • Explaining how changing the temperature, concentration, pressure and/or surface area of reactants can affect the rate of a chemical reaction. • Describing and explaining how catalysts affect the rate of a chemical reaction • Understanding what is meant by the term 'reversible reaction' • (HT ONLY) Understand the term 'dynamic equilibrium' and use Le Chatelier's principle to predict what will happen to the yield of a reaction when the concentration,	**Forces:** • Explaining the difference between scalar and vector quantities • Describing and explaining the difference between contact and non-contact forces • Explaining how different forces can be combined into a single, resultant force • Explaining how gravity and weight are related • Explaining how forces relate to energy through the concept of Work Done • Understanding the concept of elasticity and how it relates to forces, particularly when stretching or compressing a spring • Describing and explaining the concept of motion, including how to calculate speed and acceleration and

		• Understanding how water is lost from leaves by the process of transpiration and understanding the factors which affect the rate of transpiration **Atomic Structure & Radioactivity:** • Understanding basic atomic structure and linking this to knowledge of what an isotope is. • Understanding the process that scientists went through, over hundreds of years, to determine the structure of the atom. • Understanding the 3 different types of nuclear decay and their properties	• Understanding the meaning of specific heat capacity and specific latent heat, as well as how to calculate these quantities. **Energy** • Naming and describing the different stores of energy and how energy can be transferred between these stores • Understanding the concept of efficiency in relation to useful and wasted energy transfers • Understanding the concept of 'Work Done' and how to calculate it • Understanding how energy transfers relate to 'Power' and how this can be calculated • Calculating changes in	explaining how a vaccine can make someone immune to a disease. • Understanding the difference between painkillers and antibiotics as treatments. • Understanding the process and purpose of drug testing to ensure that medication is effective and safe to use.		pressure or temperature is changed.	how to interpret motion using distance time graphs and velocity time graphs • Explaining how Newtons 3 laws can be used to predict and explain the motion of an object • Explaining the forces involved in braking and the different factors that can affect the stopping distance of a car • Understanding the concept of momentum and how to calculate it (HT Only)

		• Understanding the concept of half-life in terms of radioactive decay. • Describing and explaining the differences between nuclear contamination and nuclear irradiation.	gravitational potential energy, kinetic energy and elastic potential energy • Understanding how unwanted energy transfers can be reduced with the use lubrication and insulation • Understanding the concept of Specific Heat Capacity and how it can be calculated. • Evaluating the advantages and disadvantages of renewable and non-renewable methods of generating electricity				
	End Point	Pupils will explain the organisation of the human body and plant, including digestion, circulation and enzyme function. They will explain atomic structure	Pupils will explain bonding and structure, distinguishing ionic, covalent and metallic substances and their properties, and describe carbon structures. They	Students will learn how the reactivity series explains displacement reactions, how metals react with acids to form different salts, how to use the pH scale to	Pupils will construct and analyse electrical circuits using key principles such as Ohm's law and power. They will apply quantitative chemistry, including conservation of	Pupils will explain the composition and processing of crude oil, including alkanes, alkenes, fractional distillation and cracking.	Pupils will explain inheritance, variation and evolution, including DNA and classification, and evaluate evidence for evolutionary change.

		and isotopes, describe types of nuclear radiation and half-life, and distinguish between nuclear contamination and irradiation.	will explain the particle model, including state changes, density and internal energy, and calculate specific heat capacity and latent heat for different substances. They will represent chemical reactions, analyse energy transfers and efficiency, and calculate work, power and energy changes, evaluating sustainable energy generation and reducing energy losses.	identify acids and alkalis, the difference between strong and weak acids (HT), and how metals are extracted using electrolysis of molten and aqueous solutions. They will describe how pathogens spread, how the body defends itself, and explain immunity, vaccination and the safe development and use of medicines.	mass and relative formula mass calculations.	They will explain factors affecting reaction rates using collision theory.	Pupils will be able to distinguish between scalar and vector quantities, explain contact and non-contact forces, and calculate resultant forces. They will understand the relationship between gravity and weight, and explain how forces transfer energy through work done. Pupils will describe elasticity and apply Hooke's Law to springs. They will calculate and interpret speed and acceleration using distance–time and velocity–time graphs. They will use Newton's three laws to explain and predict motion, analyse the forces and factors affecting vehicle stopping distances, and, at Higher Tier, calculate and explain momentum.
Year 11	Big Idea	**Homeostasis:** How do humans respond to changes in both their internal and external environment? **Chemistry of the Atmosphere:** How has Earth's atmosphere changed over time? **Using Resources:** How can we live sustainably to ensure that future generations have access to the resources they need?	**Ecology:** How do living things interact with their environment and what can affect these interactions? **Waves**: How does energy travel from one place to another? **Magnets**: What are magnets?				

	Key Knowledge and skills	**Homeostasis:** • Describing and explaining the concept of Homeostasis, including why it is important and what particular conditions in the human body need to be carefully controlled • Explaining the basic features of internal control systems • Explaining how the nervous system allows humans to respond to changes in the external environment, including how reflexes work • Explaining the different features of the human endocrine system and how it uses hormones and glands to	**Ecology:** • Understanding the terms community, population and ecosystem • Using predator-prey cycles to explain population numbers within an ecosystem • Describing the different resources that plants and animals compete for • Explaining how animals and plants are adapted to survive in the environment they live in, linking this to the three different categories of adaptation (including organisms which live in extreme environments) • Understanding the process of				

		control internal conditions • Explaining the role of the pancreas in the maintenance of blood glucose concentration, with a focus on type 1 and type 2 diabetes • Describing and explaining the role of different hormones in human reproduction, particularly looking at the hormones involved in the regulation of the female menstrual cycle • Describing and explaining the different approaches to contraception • HT Only: Explaining how hormones can be used to treat infertility, including the stages of IVF	sampling and field work to determine the distribution of organisms across a particular habitat • Describing and explaining what Biodviersity is and why it is important for the maintenance of healthy ecosytems. • Explaining the different ways in which human are reducing global biodiversity, including; waste management, land use, deforestation and destruction of peat bogs. • Explaining the different strategies that scientists are undertaking to try and protect				

		• HT Only: Explaining how the levels of hormones in the human body are controlled by a process called negative feedback **Chemistry of the Atmosphere** • Describing the composition of the current atmosphere • Comparing Earth's early atmosphere to the current atmosphere and explaining the changes that have occurred. • Understanding the greenhouse effect and how it can lead to climate change • Describing and explaining the impact of climate change • Understanding what is meant by a 'carbon footprint' • Describing the different	global biodiversity. **Waves:** • Understanding the difference between transverse and longitudinal waves • Understanding the key properties and characteristics of all waves, including the use of the wave equation • Describing and explaining the different features and uses of the electromagnetic spectrum • Investigating the properties of waves in water and waves on a string, with a particular focus on their wavelength, wave speed and frequency • Constructing ray diagrams to demonstrate the reflection and refraction of waves				

		atmospheric pollutants released from burning fuels and understanding the impact they have on the environment. **Using Resources** • Stating the resources that Planet Earth provides and explaining what these resources are used for. • Understanding what is meant by the term 'sustainable development' and how we can reduce the use of resources • Carrying out Life Cycle Assessments (LCAs) on plastic and paper products to assess their impact on the environment • Explaining how potable water is produced and how waste water is treated	**Magnets:** • Stating which materials are magnetic and understanding the concept of attraction and repulsion • Understanding the concept of permanent and induced magnets and how this links to magnetic fields • Understanding the key features of magnetic fields, including how to plot and how to interpret them to determine where the magnetic force is strongest • Understanding the concept of electromagnetism, including how to build an electromagnet and how to vary the strength of them.				

			• (HT ONLY) Understanding how permanent and induced magnets can interact to produce the motor effect • (HT ONLY) Describing and explaining how to use Flemings Left Hand Rule to determine the direction of force produced by the motor effect. • (HT ONLY) Understanding how the motor affect can be used to produce electric motors.				
	End Point	Pupils will be able to explain the importance of homeostasis and identify the conditions the body must regulate. They will describe how control systems maintain stable internal	Pupils will analyse ecosystems, explaining interactions, adaptations and biodiversity, and evaluate human impacts alongside strategies to conserve and protect the environment. Pupils will				

		conditions through the nervous and endocrine systems, including reflex actions and hormonal responses. Pupils will explain the role of the pancreas in controlling blood glucose levels and compare type 1 and type 2 diabetes. They will describe hormonal control of the menstrual cycle and evaluate different methods of contraception. Higher Tier pupils will explain hormone treatments for infertility, including IVF, and understand negative feedback in hormone regulation. They will apply principles of sustainability, including resource use, life cycle assessments, and water treatment.	explain wave properties and behaviour using diagrams and equations. They will explain magnetic materials, fields and electromagnetism, including the motor effect, and apply this to practical uses.				