



Year 7

	Autumn 1 - Chemistry	Autumn 2 - Biology	Spring 1 – Physics	Spring 2 - Chemistry	Summer 1 - Biology	Summer 2 - Physics
	Particle Model of Matter Elements, Compound, and Mixtures	Cells Reproduction	Energy Waves	Chemical Reactions Acid Reactions	Inheritance, Variation and Survival	Forces Electricity
	<p>Particle Model of Matter Substantive knowledge headlines:</p> <ul style="list-style-type: none"> The properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and movement of these particles. observations where substances change temperature, or state can be described in terms of particles gaining or losing energy. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> Using models to represent the unobservable <p>Math skills:</p> <ul style="list-style-type: none"> Substitute numerical values into algebraic equations using appropriate units for physical quantities. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 solids, liquids, and gases <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE – Atomic structure <p>Elements, Compounds, and Mixtures Substantive knowledge headlines:</p> <ul style="list-style-type: none"> a pure substance consists of only one type of element substances have different properties because of the elements they contain most substances are not pure elements, but compounds or mixtures containing atoms of different elements. a compound and has a fixed melting and boiling point. mixtures may be separated due to differences in their physical properties. The method chosen to separate a mixture depends on which physical properties of the individual substances are different. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> Using models to represent the unobservable <p>Links to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Properties and changes of materials KS3 Particle Model of Matter <p>Link to knowledge in future units:</p> <p>GCSE combined science and chemistry – Atomic structure</p>	<p>Cells Substantive knowledge headlines:</p> <ul style="list-style-type: none"> multicellular organisms are composed of cells which are organised into tissues, organs, and organ systems to carry out life processes. specialised cells, each with a different structure or feature so it can do a specific job. plant and animal cells have a cell membrane, nucleus, cytoplasm, and mitochondria. plant cells also have a cell wall, chloroplasts and usually a permanent vacuole. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> Use a light microscope to observe cells. <p>Math skills:</p> <ul style="list-style-type: none"> Substitute numerical values into algebraic equations Solve simple algebraic equations <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Living things and their habitats; Plants. <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Cell structure and transport. A-Level biology – Cell structure <p>Reproduction Substantive knowledge headlines:</p> <ul style="list-style-type: none"> reproduction in humans, including the structure and function of the male and female reproductive systems the developing foetus relies on the mother for oxygen and nutrients and to remove waste fertilisation, gestation, and birth, to include the effect of maternal lifestyle on the foetus through the placenta menstrual cycle (without details of hormones) reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal. <p>Disciplinary knowledge headlines</p> <ul style="list-style-type: none"> quantitative investigation of dispersal mechanisms. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Living things and their habitats. <p>Link to knowledge in future units:</p> <p>GCSE Hormonal coordination</p>	<p>Energy Substantive knowledge headlines:</p> <ul style="list-style-type: none"> energy as a quantity that can be quantified and calculated conservation of energy comparing energy values of different foods comparing power ratings of appliances in watts domestic fuel bills, fuel use and costs energy resources <p>Math skills:</p> <ul style="list-style-type: none"> Substitute numerical values into algebraic equations Solve simple algebraic equations <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Animals including humans <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> KS3 Energy Model GCSE Energy Calculations <p>Waves Substantive knowledge headlines:</p> <ul style="list-style-type: none"> waves transfer energy from source to absorber 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 colours and the different frequencies of light, (qualitative only); differential colour effects in absorption and diffuse reflection <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> accuracy, precision, repeatability, and reproducibility <p>Math skills:</p> <ul style="list-style-type: none"> Plot two variables from date <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Light KS3 Energy <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> KS3 Waves <p>GCSE Wave properties, EM waves</p>	<p>Chemical Reactions Substantive knowledge headlines:</p> <ul style="list-style-type: none"> Chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved. combustion, thermal decomposition, oxidation, and displacement reactions exothermic and endothermic chemical reactions (qualitative) <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> write word equations from information about chemical reactions. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 solids, liquids, and gases <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Chemical Changes. <p>Acid reactions Substantive knowledge headlines:</p> <ul style="list-style-type: none"> defining acids and alkalis in terms of neutralisation reactions the pH scale for measuring acidity / alkalinity; indicators reactions of acids with metals to produce a salt plus hydrogen reactions of acids with alkalis to produce a salt plus water reactions of acids with metal carbonates to produce a salt plus water plus carbon dioxide <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> write word equations from information about chemical reactions use data and observations to determine the pH of a solution and explain what this shows <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Particle Model of Matter; KS3 Elements, Compounds and Mixtures. <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Chemical Changes 	<p>Inheritance, Variation and Survival Substantive knowledge headlines:</p> <ul style="list-style-type: none"> heredity as the process by which genetic information is transmitted from one generation to the next a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson and Crick in the development of the DNA model differences between species the variation between individuals within a species being continuous or discontinuous, to include graphical representation of variation the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> plot bar charts or line graphs to show discontinuous or continuous variation data use evidence to explain why a species has become extinct or adapted to changing conditions <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Living things and their habitats KS3 Cells, Reproduction <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> KS2 Living things and their habitats KS3 Cells, Reproduction GCSE Reproduction; Genetics, and evolution 	<p>Forces Substantive knowledge headlines:</p> <ul style="list-style-type: none"> the link between speed, distance, and time the representation of a journey on a distance-time graph forces as pushes or pulls using force arrows in diagrams, combining forces, balanced and unbalanced forces change in motion depending on direction of force and its size gravity: concept of forces acting at a distance weight = mass x gravitational field strength (g), on Earth $g=10\text{ N/kg}$, <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> use simple equations and carry out calculations <p>Math skills:</p> <ul style="list-style-type: none"> Substitute numerical values into algebraic equations using appropriate units for physical quantities <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Forces and magnets <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> KS3 Forces, Energy Model GCSE Motion and forces <p>Electricity Substantive knowledge headlines:</p> <ul style="list-style-type: none"> defining electric current, potential difference, and resistance rules for current and potential difference in series and parallel circuits the idea of electric fields and non-contact electrostatic force <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> use and derive simple equations <p>Math skills:</p> <ul style="list-style-type: none"> solve simple algebraic equations <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Electricity KS3 Particle Model of Matter; Energy <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> KS3 Magnetism <p>GCSE Electric Circuits, Domestic Electricity, Electricity Applications, Static Electricity, Magnetism and Electromagnetism</p>
Assessments	Test: Particle Model of Matter and Elements, Compounds, and Mixtures	Test: Cells and Reproduction	Test: Energy and Waves	Test: Acid Reactions and Chemical Reactions	Test: Inheritance, Variation and Survival Year 7 Test	Test: Forces and Electricity

	Autumn 1, Autumn 2, and Spring 1			Spring 2, Summer 1, and Summer 2		
	Biology Block 1: Organisms	Chemistry Block 1: Particle Model 2 / Solubility	Physics Block 1: Energy / Forces	Biology Block 2: Plant Biology / Respiration	Chemistry Block 2: Metal Reactions / Fuels and Energy	Physics Block 2: Magnetism / Waves
	<p>Organisms Substantive knowledge headlines:</p> <ul style="list-style-type: none"> the structure and functions of the human skeleton (support, protection, movement and making blood cells) biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles the function of muscles and examples of antagonistic muscles content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre, and water, and why each is needed calculations of energy requirements in a healthy daily diet the consequences of imbalances in the diet, including obesity, starvation, and deficiency diseases the tissues and organs of the human digestive system, including adaptations and how the digestive system digests food (enzymes simply as biological catalysts) the structure and functions of the gas exchange system in humans, including adaptations the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume the impact of exercise, asthma and smoking on the human gas exchange system the effects of recreational drugs (including substance misuse) on behavior, health, and life processes aerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> use word equations <p>Math skills:</p> <ul style="list-style-type: none"> calculate food requirements for a healthy diet <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Animals <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE – Organisation; Digestive System; Organising Plants and Animals; Non-communicable Diseases 	<p>Particle Model 2 Substantive knowledge headlines:</p> <ul style="list-style-type: none"> Density as the ratio of mass to volume Diffusion as the movement of particles of a substance from an area of higher to lower concentration. Gas pressure is caused by collisions of particles with the walls of a container. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> Measure and record the temperature of water at regular intervals as it is heated Interpret a heating curve to identify the melting and boiling point of water <p>Maths skills:</p> <ul style="list-style-type: none"> Density calculations <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Particle Model of Matter <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Particles, Bonding, Structure and properties <p>Solubility Substantive knowledge headlines:</p> <ul style="list-style-type: none"> dissolving, using ideas about particles the effect of different solvents on solubility why solutions become saturated and how to make a saturated solution the effect of temperature on the solubility of a solid solute pure substances have fixed melting and boiling points, and these are affected by the addition of impurities <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> write a concise method for a planned investigation tabulate results from an investigation analyse and interpret solubility curves <p>Math skills:</p> <ul style="list-style-type: none"> Graph plotting, interpretation <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Dissolving KS3 - Energy; Particle Model of Matter <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Particles, Bonding, Structure & properties 	<p>Energy Substantive knowledge headlines:</p> <ul style="list-style-type: none"> energy and temperature thermal equilibrium energy transfer by heating: conduction, convection, and radiation thermal insulation and rate of cooling energy transfer by forces: simple machines and calculating work done <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> make predictions using scientific knowledge and understanding apply mathematical concepts and calculate results use simple equations and carry out calculations <p>Math skills:</p> <ul style="list-style-type: none"> Use ratios, fractions, and percentages <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Forces KS3 (Y7) Energy; Particle Model of Matter <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Particle Model of Matter; Energy calculations <p>Forces Substantive knowledge headlines:</p> <ul style="list-style-type: none"> moment as the turning effect of a force forces: associated with deforming objects; with rubbing and friction between surfaces; resistance to motion of air and water force-extension linear relation; Hooke's Law as a special case work done and energy changes on deformation atmospheric pressure, pressure in liquids, upthrust effects, floating and sinking pressure measured by ratio of force over area – acting normal to any surface <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> understand and use SI units use simple equations and carry out calculations <p>Math skills:</p> <ul style="list-style-type: none"> Change the subject of an equation Substitute numerical values into algebraic equations using appropriate units for physical quantities <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Forces KS3 (Y7) Forces <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Forces and Motion; Energy Calculations 	<p>Plant Biology Substantive knowledge headlines:</p> <ul style="list-style-type: none"> the reactants in, and products of, photosynthesis, and a word summary for photosynthesis the dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere the adaptations of leaves for photosynthesis the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops the importance of plant reproduction through insect pollination in human food security how organisms affect, and are affected by, their environment, including the accumulation of toxic materials. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> effects of environmental changes and toxic materials on a species' population. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Plants KS2 Living things and their habitats <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE - Photosynthesis; Adaptations, interdependence, and competition; Organising an ecosystem <p>Respiration Substantive knowledge headlines:</p> <ul style="list-style-type: none"> the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> use word equations to describe aerobic respiration <p>Math skills:</p> <ul style="list-style-type: none"> Read values from a line graph <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Cells <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> 	<p>Metal Reactions Substantive knowledge headlines:</p> <ul style="list-style-type: none"> location of metals on the Periodic Table typical physical properties of metals metals can be mixed to form alloys with desired properties. alloys are harder than pure metals in terms of distortion of the layers of atoms in the structure of a pure metal products of chemical reactions of metals with water, oxygen, and acids comparing the reactivity of metals reactivity of metals is given as their place in the electrochemical series more reactive metals can displace less reactive metals from compounds <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> write a plan for an investigation from a given hypothesis <p>Math skills:</p> <ul style="list-style-type: none"> balance chemical equations <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 Materials KS3 Particle Model of Matter; Elements Compounds, and Mixtures; Chemical Reactions <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Particles, Bonding, Structure & properties <p>Fuels and Energy Substantive knowledge headlines:</p> <ul style="list-style-type: none"> Hydrocarbons from Crude Oil are important fuels that have been used by humans for the last 250 years in ever increasing quantities. The increase in the greenhouse effect and climate change as a result of human activity. Chemical reactions involve energy changes The differences in exothermic and endothermic reactions in terms of temperature changes of surroundings. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> Use equations to represent the combustion of hydrocarbons Link the products of combustion to the productions of greenhouse gases and climate change Use equipment to measure temperature changes in chemical reactions KS3 - Energy; Particle Model of Matter; Chemical Reactions <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Chemical Changes, Energy Changes, Atmosphere 	<p>Magnetism Substantive knowledge headlines:</p> <ul style="list-style-type: none"> magnetic poles and the non-contact magnetic force of attraction and repulsion representation of magnetic field by field lines the magnetic effect of an electric current <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> show magnetic fields by plotting with a compass identifying patterns and using observations, measurements and data to draw conclusions <p>Math skills:</p> <ul style="list-style-type: none"> Translate information between graphical and numeric form <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 – Forces, Magnets KS3 - Forces, Electric circuits <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Magnetism & electromagnetism <p>Waves Substantive knowledge headlines:</p> <ul style="list-style-type: none"> waves transfer energy without transferring matter transverse and longitudinal waves waves can be reflected, and add or cancel (superposition) <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> The importance of publishing results and peer review Evaluate risks <p>Math skills:</p> <ul style="list-style-type: none"> Translate information between graphical and numeric form <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS2 - Light, Sound KS3 – (Y7) Waves <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE - Wave properties; Electromagnetic Waves; Radioactivity
Assessments	Biology block 1 test - Organisms	Chemistry block 1 test – Solubility and Metal Reactions	Physics block 1 test – Energy and Forces	Biology block 2 test – Plant Biology and Respiration	Chemistry block 2 test – Chemical Reactions and Atomic Structure	Physics block 2 test – Magnetism and Waves Year 8 Test

	Autumn 1, Autumn 2, and Spring 1			Spring 2, Summer 1, and Summer 2		
	Biology Block 1: Cell Structure and Transport	Chemistry Block 1: Atoms, and acids	Physics Block 1: Models and Electric Circuits	Biology Block 2: Ecology	Chemistry Block 2: Periodic Table and Rates of Reaction	Physics Block 2: Motion and Forces (Part 1)
	<p>Cell Structure and Transport</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> cells as the basic structural unit of all organisms adaptations of cells related to their functions the main sub-cellular structures of eukaryotic and prokaryotic cells the need for transport systems in multicellular organisms, including plants <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> use a light microscope to observe, draw and label a selection of plant and animal cells investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. <p>Math skills:</p> <ul style="list-style-type: none"> recognise and use expressions in decimal form recognise and use expressions in standard form Make order of magnitude calculations <p>Plot two variables from experimental or other data</p> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Cells <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Cell Division 	<p>Atoms and acids</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> development of the model of the atom (Dalton-Bohr) atoms as neutral particles (as they have the same number of protons as electrons) Conservation of mass in reactions Reactions of acids with metals and bases Neutralisation and the pH scale <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> represent atoms according to the Bohr model use a variety of concepts and models to develop scientific explanations and understanding Write equations to represent the reactions of acids with metals and bases testing for common gases: oxygen, carbon dioxide, hydrogen Naming salts form common acids. Use equipment to make some common salts. Use indicators to show neutralisation <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 – Particle Model of Matter, Chemical Reactions <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE- Atomic structure, Periodic Table, Chemical changes 	<p>Models</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> The Energy Model: Energy stores and transfers The nuclear model of the atom and its development in the light of changing evidence <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> Using a variety of concepts and models to develop scientific explanations and understanding The ways in which scientific methods and theories develop over time <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Energy <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE – Energy Resources, Particle Model of Matter, Energy Calculations <p>Math skills:</p> <ul style="list-style-type: none"> Using prefixes and powers of ten for orders of magnitude <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 - Particle Model of Matter; Atomic Structure <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE – Energy; Radioactivity <p>Electric circuits</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> circuit symbols and circuit diagrams charge flow and the link between charge flow, current and time potential difference and the link between charge flow, energy transfer and potential difference resistance and the link between resistance, potential difference and current circuit rules for current and potential difference in series and parallel circuits <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> interpreting and constructing circuits from circuit diagrams <p>Math skills:</p> <ul style="list-style-type: none"> substitute numerical values into algebraic equations change the subject of an equation use SI units and prefixes <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Electricity <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE - Electricity applications; Magnetism and Electromagnetism 	<p>Biodiversity and Ecosystems</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> the importance of biodiversity levels of organisation within an ecosystem positive and negative human interactions with ecosystems the importance of interactions between organisms in a community. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> interpret graphs used to model predator-prey cycles explain how waste, deforestation and global warming have an impact on biodiversity. understand the conflict between the need for cheap available compost to increase food production and the need to conserve peat bogs and peatlands as habitats for biodiversity and to reduce carbon dioxide emissions. evaluate the environmental implications of deforestation understand that the scientific consensus about global warming and climate change is based on systematic reviews of peer reviewed publications evaluate given information about methods that can be used to tackle problems caused by human impacts on the environment explain and evaluate the conflicting pressures on maintaining biodiversity given appropriate information. <p>Math skills:</p> <ul style="list-style-type: none"> extract and interpret information from charts, graphs and tables relating to the interaction of organisms within a community in relation to abundance of organisms: understand the terms mean, mode and median; calculate arithmetic means; plot and draw appropriate graphs selecting appropriate scales for the axes <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Plant biology <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE– Adaptations; Interdependence, and competition; Organising an ecosystem. A-Level Biology – Populations in ecosystems. 	<p>Periodic table</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> the Periodic Table was developed as scientists attempted to classify elements, Mendeleev's Periodic table is the current version the Periodic Table is a list of the elements in order of increasing atomic (proton) number. elements are grouped in the Periodic Table according to their properties atoms are particles made up of subatomic particles called protons, electrons, and neutrons proton, electron, and neutron relative mass and charge values <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> developments in science can be because of many people working on the same problem represent electron configuration and relate it to position in the periodic table. <p>Rates of reaction</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> identifying reactants and products in a chemical equation mass is conserved in chemical reactions relate conservation of mass in reactions to formula mass of compounds rate of reaction is calculated by change in concentration ÷ time. chemical reactions start fast and slow down before stopping temperature, concentration, surface area, catalysts all affect the rate of a chemical reaction <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> use control variables to ensure valid data is collected show chemical reactions as word and symbol equations balance chemical symbol equations explain the rate of chemical reactions in terms of collisions between particles <p>Math skills:</p> <ul style="list-style-type: none"> plot rates of reaction graphs. calculate mean rate of reaction from a graph or table of results calculate the rate of reaction at a given time by calculating the gradient of a tangent to the rates curve <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 – Particle Model of Matter; Chemical Reactions <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Atomic structure, Periodic Table, Rates and Equilibrium 	<p>Motion and Forces (Part 1)</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> typical speeds and estimating speeds in everyday contexts the speed of sound interpreting quantitatively graphs of distance, time, and speed scalars and vectors acceleration caused by forces, Newton's laws of motion weight and gravitational field strength forces and fields: gravity terminal velocity <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> applying a knowledge of a range of techniques, apparatus, and materials to select those appropriate both for experiments communicating the scientific rationale for investigations, including the methods used, the findings and reasoned conclusions <p>Math skills:</p> <ul style="list-style-type: none"> recognise and use expressions in decimal form make estimates of the results of simple calculations calculate arithmetic means change the subject of an equation substitute numerical values into algebraic equations using appropriate units for physical quantities solve simple algebraic equations translate information between graphical and numeric form <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> KS3 Forces <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> GCSE Motion and Forces (Part 2)
Assessments	Block 1 Biology test – Cell Structure and Transport	Block 1 Chemistry test – Atoms, Ions and Analysis	Block 1 Physics test - Models and Electric Circuits	Block 2 Biology test - Organising Animals and Plants	Block 2 Chemistry test – Rates of Reaction	Block 2 Physics test - Motion and Forces (Part 1) Year 9 Test