



Wollaston School: 2023/24 Curriculum Map for (**Science**).
Curriculum Lead: (**Eliot Pugh**)



Curriculum Aim and scope:

The science curriculum nurtures students’ innate curiosity by providing learners with a range of core scientific knowledge, concepts, and skills that they will be able to choose and apply in their future learning, employment, and life. The curriculum is underpinned by our values of developing knowledgeable, innovative, and ethical scientists.

The units are planned to ensure progression of scientific knowledge from Key Stage 3 (KS3) in Year 7 through to A Level Science at Key Stage 5 (KS5). Subject specific vocabulary and skills is mapped out, and every unit has a practical aspect where pupils learn the scientific skills of making predictions, ensuring validity, analysing and evaluating results and drawing conclusions.

Our Key Stage 3 curriculum builds on primary science and will enable learners to understand themselves, others, and the World in which they live. Their three-year course is designed by subject specialists to ensure precision of subject specific vocabulary and contextual knowledge and will prepare students for their Key Stage 4 (KS4) Science choices. KS4 and KS5 is the period when students build on their earlier learning and prepare for adult life, higher education, and employment.

What are your aims for this subject?

Year	Term	Unit	Description of what is being taught including end learning goals Clearly outline substantive knowledge required (not just skills)	Links to National Curriculum	Subject Specific Terminology and Key Words	Prior knowledge (including previous key stage/retrieval required)	Assessment and Homework (How is the learning being checked- how do you know it is being remembered?)
Year 7	1	Space	<p>Details of the properties in our solar system including appearance and position relative to Earth.</p> <p>Explain what a light year is and why scientists use them.</p> <p>Explain why the Earth has day, night, seasons, and years.</p>	<p>our Sun as a star, other stars in our galaxy, other galaxies</p> <p>the seasons and the Earth’s tilt, day length at different times of year, in</p>	<p>Light year</p> <p>Galaxy</p> <p>Solar system</p> <p>Waxing</p> <p>Waning</p> <p>Gibbous</p> <p>Crescent</p> <p>Season</p> <p>Solar eclipse</p>	<p>Plants in the solar system.</p> <p>The Earth rotates on its axis and orbits the sun.</p> <p>The moon orbits the Earth.</p> <p>The Sun is a star at the centre of our solar system.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at</p>

			<p>Explain why places on the Earth experience different daylight hours and amounts of sunlight during the year.</p> <p>Describe the movement and phases of the moon and why they occur.</p> <p>Describe the position of the moon, the Earth and the Sun in solar and lunar eclipses using diagrams.</p> <p>Describe how space exploration and observations of stars are affected by the scale of the universe</p>	<p>different hemispheres</p> <p>the light year as a unit of astronomical distance</p>	Lunar eclipse	Students should know what we mean by daytime, night time and the different seasons.	the start of the lesson and teacher questioning throughout the lesson.
1	Interdependence	<p>Use a key to identify organisms and describe the differences between organisms</p> <p>Explain how adaptations enable organisms to survive.</p> <p>Use ideas of consumers and producers to explain the order of organisms in a food chain and explain what the arrow represents.</p> <p>Use a food web diagram to predict and explain effects that a change in the size of a population could have on other populations in the same community.</p> <p>Explain what pyramids of biomass and number represent.</p> <p>Explain the effect of bioaccumulation on organisms.</p>	<p>the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</p> <p>how organisms affect, and are affected by, their environment, including the accumulation of toxic materials</p>	<p>Producer</p> <p>Consumer</p> <p>Carnivore</p> <p>Herbivore</p> <p>Omnivore</p> <p>Predator</p> <p>Prey</p> <p>Bioaccumulation</p> <p>Habitat</p> <p>Species</p> <p>Organism</p>	<p>Plants create their own food and Animals must consume food.</p> <p>Knowledge of common animals and their diets and habitats.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p> <p>Homework tasks based on food webs and classification.</p>	

			Select and use suitable sampling methods to collect data from a habitat				
1	Particles	<p>Use the particle model to describe the properties of solids, liquids, and gases, including differences in melting points.</p> <p>Describe how the arrangement and movement of particles alters when a substance changes state.</p> <p>Describe the difference in energy between a solid, liquid and gas.</p> <p>Explain what diffusion is using the term concentration. Explain the factors that effect the rate of diffusion.</p> <p>Explain what causes gas pressure and what factors can effect it.</p> <p>Explain what density is using the particle model and use volume calculations to calculate the density of a regular object.</p>	<p>the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure</p> <p>changes of state in terms of the particle model.</p> <p>the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure</p> <p>Matter</p> <p>changes of state in terms of the particle model.</p> <p>similarities and differences, including density differences, between solids, liquids and gases</p>	<p>Solid Liquid Gas Particle Intermolecular Energy Diffusion Pressure Collision Density Expand Contract Concentration</p>	<p>Solid, liquid, and gas are the three states of matter.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p> <p>States of matter compare and contrast homework task.</p>	
1	Forces	<p>One effect of a force is to change an object's form, causing it to be stretched or compressed.</p>	<p>Forces as pushes or pulls, arising from the interaction</p>	<p>Push Pull Compress</p>	<p>Forces effect the speed or shape of an object.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p>	

			<p>An unbalanced force acting on an object is called the resultant force.</p> <p>When the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line.</p> <p>Skill Sketch the forces acting on an object and label their size and direction.</p> <p>Describe what happens to the length of a spring when the force on it changes.</p> <p>Mass is a property of the object; weight depends upon mass but also on gravitational field strength.</p> <p>Skill: Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).</p> <p>Compare your weight on Earth with your weight on different planets using the formula.</p>	<p>between two objects.</p> <p>Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.</p> <p>Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water</p> <p>Forces measured in newtons, measurements of stretch or compression as force is changed</p> <p>Force-extension linear relation; Hooke’s Law as a special case non-contact forces: gravity forces acting at a distance on Earth and in space.</p>	<p>Stretch Deform Friction Upthrust Gravity Air resistance</p>	<p>Gravity is force that we experience on Earth.</p> <p>Friction and its effects e.g. heating up or slowing down objects.</p>	<p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>
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				Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)			
Year 7	2	Cells	<p>Characteristic processes of living organisms (MRS GREN).</p> <p>The hierarchical organisation of multicellular organisms.</p> <p>How to use microscopes and calculate magnification.</p> <p>Know the structure and function of organelles in general and specialised plant and animal cells.</p> <p>Describe what a unicellular organism is and give examples of how they are adapted to carry out their functions.</p> <p>Know what stem cells are, what they do, and why they are important. Understand and discuss the social and ethical issues of stem cell research.</p>	<p>Cells and organisation cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope</p> <p>the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts</p> <p>the similarities and differences between plant and animal cells</p> <p>the role of diffusion in the movement of materials in and between cells</p> <p>the structural adaptations of some</p>	<p>Cell</p> <p>Organism</p> <p>Tissue</p> <p>Organ</p> <p>Mitochondria</p> <p>Cytoplasm</p> <p>Cell wall</p> <p>Cell membrane</p> <p>Nucleus</p> <p>Vacuole</p> <p>Amoeba</p> <p>Fungi</p> <p>Euglena</p> <p>Bacteria</p> <p>Algae</p>	<p>Living things are made up of small units called cells.</p> <p>Plants and animals have characteristic life processes.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p> <p>Homework task to learn keywords and microscope parts.</p>

				<p>unicellular organisms</p> <p>the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</p>			
	2	Separating mixtures	<p>Mixtures may be separated due to differences in their physical properties.</p> <p>Explain how substances dissolve using the particle model and the observed disappearance of a solute in terms of breaking into parts that are too small to see.</p> <p>How temperature affects solubility in liquids and gases</p> <p>Suggest a combination of methods to separate a complex mixture and justify the choices.</p> <p>Describe how to separate immiscible liquids.</p> <p>Describe the process and carry out chromatography of ink pens</p> <p>Describe what happens to the particles in distillation and predict the distillate of a simple distillation process.</p>	<p>The concept of a pure substance</p> <p>Mixtures, including dissolving</p> <p>Diffusion in terms of the particle model</p> <p>Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography</p> <p>The identification of pure substances</p>	<p>Solute</p> <p>Soluble</p> <p>Solution</p> <p>Dissolve</p> <p>Insoluble</p> <p>Chromatography</p> <p>Distillation</p> <p>Miscible</p> <p>Immiscible</p> <p>Filtration</p>	<p>Salt dissolves when added to water and seems to disappear but is still present.</p> <p>Oil and water do not mix</p> <p>Ideas of evaporation and condensation from the particles topic.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p> <p>Homework to assess key words and spellings.</p>

2	Reproduction	<p>Distinguish between 'getting bigger' (an increase in size) and growth (an increase in the number of cells) in multicellular organisms.</p> <p>Describe the life cycles of different plants and animals (e.g. a flowering plant, a human and a butterfly).</p> <p>Differentiate between internal and external fertilisation</p> <p>Evaluate the advantages and disadvantages of fertilisation strategies and relate this to body structure and behaviour</p> <p>Label and state function of male and female reproductive system</p> <p>Describe the adaptations of gametes Describe the process of ovulation and fertilisation</p> <p>Describe the gestation period and the development of the embryo</p> <p>Discuss the effect of maternal lifestyle on the foetus through the placenta</p> <p>Describe the process of labour and birth</p> <p>Describe the changes that occur in both boys and girls during puberty.</p> <p>To understand that changes in bodies are caused by hormones</p>	<p>Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta</p> <p>Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.</p>	<p>Style Stigma Petal Sepal Filament Ovule Pollination Pollen Anther Reproduction Fertilisation Internal External Sperm Egg Ovary Cervix Vagina Vulva Testes Penis Urethra Hormone Gestation Amniotic Embryo Foetus</p>	<p>Sexual and asexual reproduction in plants and animals</p> <p>Knowledge of the human reproductive system, gestation, fertilisation and maternal lifestyle.</p> <p>Flower structure, wind and insect pollination, seed dispersal.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>
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			<p>Describe how various forms of contraception reduces fertilisation and pregnancy</p> <p>Identify and recall the main structures of a flower.</p> <p>Explain how structures promote insect pollination</p> <p>Describe differences between wind and insect pollinated flowers.</p> <p>Explain how structures promote wind pollination</p> <p>Evaluate insect and wind pollination strategies</p> <p>Describe the process of fertilisation in plants</p> <p>Describe variety of plants seeds and dispersal methods</p>				
Year 7	3	Heating and cooling	<p>Explain the difference between heat and temperature.</p> <p>The thermal energy of an object depends upon its mass and temperature. When there is a temperature difference, energy transfers from the hotter to the cooler object.</p> <p>Describe how energy is transferred by conduction.</p>	<p>heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to</p>	<p>Conduction Convection Radiation Energy Transfer Thermal Vacuum</p>	<p>temperature difference between 2 objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher</p>

			<p>Use kinetic theory / particle model to explain conduction.</p> <p>Explain expansion, density change and convection.</p> <p>Describe which materials radiate the most heat using the idea that heat energy is transferred through a vacuum.</p> <p>Use particle ideas to describe changes of state and plot a heating/cooling curve.</p> <p>Explain how insulation works in terms of conduction, convection, and radiation.</p>	<p>reduce the temperature difference: use of insulators</p>		<p>difference; use of insulators</p>	<p>questioning throughout the lesson.</p>
3	Geology	<p>Describe the three rock layers inside Earth; the crust, the mantle and the core.</p> <p>Explain why a rock has a particular property based on how it was formed.</p> <p>Predict planetary conditions from descriptions of rocks on other planets.</p> <p>Describe the process for the formation of sedimentary rock</p> <p>Explain the properties and uses of sedimentary rock based on its formation e.g. clay for ceramics and limestone</p> <p>Describe the process for the formation of metamorphic rock</p> <p>Explain the properties and uses of metamorphic rock based on its formation</p>	<p>The composition of the Earth</p> <p>The structure of the Earth</p> <p>The rock cycle and the formation of igneous, sedimentary and metamorphic rocks</p>	<p>Sedimentary Metamorphic Igneous Volcano Lava Crystal Porous Weathering Erosion</p>	<p>Structure of the earth</p> <p>Different rocks have different physical properties.</p> <p>How fossils are formed in rocks</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>	

			<p>The process of physical and chemical weathering</p> <p>Sedimentary, igneous and metamorphic rocks can be interconverted over millions of years through weathering and erosion, heat and pressure, and melting and cooling.</p> <p>Construct a labelled diagram to identify the processes of the rock cycle.</p> <p>Describe similarities and differences between the rock cycle and everyday physical and chemical processes.</p>				
Year 8	1	Skeletal system	<p>The parts of the human skeleton work as a system for support, protection, movement and the production of new blood cells.</p> <p>Explain how a physical property of part of the skeleton relates to its function. Identify simple joints on the skeleton.</p> <p>Antagonistic pairs of muscles create movement when one contracts and the other relaxes</p> <p>Explain why some organs contain muscle tissue. Explain how antagonistic muscles produce movement around a joint.</p>	<p>The structure and functions of the human skeleton, to include support, protection, movement and making blood cells</p> <p>biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles</p> <p>the function of muscles and examples of antagonistic muscles</p>	<p>Skeleton Skeletal Tendons Ligaments Muscle Teeth Bones Joints Vertebra Skull Relax Contract Tissue</p>	<p>identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>Use a diagram to predict the result of a muscle contraction or relaxation.</p> <p>Suggest factors that affect the force exerted by different muscles.</p> <p>Predict the consequences of damage to a joint, bone or muscle.</p> <p>Consider the benefits and risks of a technology for improving human movement.</p> <p>Give reasons why oral hygiene is so important.</p>				
1	Waves light and sound	<p>Describe sound as vibrations which travel as longitudinal waves. Explain how particles move in a longitudinal wave</p> <p>Explain why sound does not travel through a vacuum.</p> <p>Define frequency, amplitude and wavelength. Describe how changing frequency and amplitude effect sounds. Suggest a relationship between frequency and wavelength</p> <p>Identify which state of matter sound travels fastest through</p> <p>Label the parts of the ear and explain how we hear sounds</p> <p>Identify causes of hearing loss and compare the hearing range of different animals.</p>	<p>frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound</p> <p>sound needs a medium to travel, the speed of sound in air, in water, in solids</p> <p>sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound</p>	<p>Frequency Amplitude Longitudinal Transverse Reflection Refraction Wavelength Prism Vacuum Pitch Transmit Absorb Electromagnetic Lens Convex Concave</p>	<p>From KS2: identify how sounds are made, associating some of them with something vibrating</p> <p>recognise that vibrations from sounds travel through a medium to the ear</p> <p>find patterns between the pitch of a sound and features of the object that produced it</p> <p>find patterns between the volume of a sound and the strength of the vibrations that produced it</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>	

		<p>Give the hearing range of humans.</p> <p>Explain that sound is reflected, transmitted or absorbed by different media</p> <p>Define an echo and explain how echoes can be used</p> <p>To name the different types of radiation in the EM spectrum, give the dangers and uses of the different types of radiation</p> <p>Calculate wave speed</p> <p>Define transparent, translucent and opaque, explain these in terms of transmission and absorption</p> <p>Draw ray diagrams, define the 'normal line'</p> <p>Describe the relationship between the angle of incidence and the angle of reflection</p> <p>Describe the relationship between the angle of incidence and the angle of refraction for more and less dense mediums. Explain why light bends</p> <p>Describe the refraction of light through a prism</p> <p>Explain how objects appear different colours</p>	<p>waves are longitudinal</p> <p>auditory range of humans and animals.</p> <p>the similarities and differences between light waves and waves in matter</p> <p>light waves travelling through a vacuum; speed of light</p> <p>the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface Science</p> <p>use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye</p> <p>light transferring energy from source to absorber leading</p>		<p>recognise that sounds get fainter as the distance from the sound source increases.</p>	
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			<p>Explain how images are formed from a pinhole camera</p> <p>Explain how lenses work, investigate how lens thickness affects focal length Suggest how the lens in our eyes change for near and far objects</p> <p>Label the parts of an eye and explain how the eye forms images</p>	<p>to chemical and electrical effects; photo-sensitive material in the retina and in cameras</p> <p>colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.</p>			
	1	Earth's atmosphere	<p>Draw the carbon cycle. Give equations for photosynthesis and respiration.</p> <p>Explain the processes of photosynthesis, respiration, and combustion</p> <p>Describe how human activities affect the carbon cycle.</p> <p>Explain why the concentration of carbon dioxide in the atmosphere is rising, and why this is an issue.</p> <p>Describe the composition of gases in the Earth's atmosphere. Name the greenhouse gases. Define global warming and climate change.</p> <p>Describe how global warming can impact on climate and local weather patterns.</p>	<p>the composition of the Earth</p> <p>the structure of the Earth</p> <p>the carbon cycle</p> <p>the composition of the atmosphere</p> <p>the production of carbon dioxide by human activity and the impact on climate.</p>	<p>Atmosphere</p> <p>Carbon dioxide</p> <p>Photosynthesis</p> <p>Respiration</p> <p>Combustion</p> <p>Decomposition</p> <p>Climate</p> <p>Greenhouse gas</p> <p>Global warming</p>	<p>The air is made up of gases</p> <p>Some human activities have a negative impact on the earth</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>Explain how human activity may impact the levels of these gases.</p> <p>Describe how human activities have contributed to global warming and the impact on the Earth.</p> <p>Describe how plankton can be used to reduce carbon emissions.</p> <p>Explain the role of iron fertilisation on reducing carbon emissions.</p>				
Year 8	2	Respiration	<p>Describe the role of each part of the respiratory system including adaptations.</p> <p>Process of breathing to take in oxygen and remove carbon dioxide, this involves muscle action in the ribs and diaphragm.</p> <p>Explain how changes in volume and pressure inside the chest move gases in and out of the lungs.</p> <p>Explain observations about changes to breathing rate and volume</p> <p>In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. The amount of oxygen required by body cells determines the rate of breathing.</p> <p>Predict how a change in the gas exchange system could affect other processes in the body.</p> <p>Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new</p>	<p>Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life</p> <p>A word summary for aerobic respiration</p> <p>The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration</p> <p>The differences between aerobic and anaerobic</p>	<p>Respiration</p> <p>Aerobic</p> <p>Anaerobic</p> <p>Organism</p> <p>Breathing</p> <p>Lungs</p> <p>Diaphragm</p> <p>Volume</p> <p>Exchange</p> <p>Cells</p> <p>Oxygen</p> <p>Carbon dioxide</p> <p>Glucose</p> <p>Fermentation</p>	<p>Breathing is necessary for life and involves the lungs.</p> <p>When we breathe in we take in air into our lungs, when we breathe out we expel air from our lungs.</p> <p>Respiration is a process that takes place in cells in our body.</p> <p>We breathe in oxygen and breathe out carbon dioxide.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>molecules. Use word equations to describe aerobic respiration.</p> <p>Compare aerobic respiration and its distinction from breathing.</p> <p>The effect of exercise intensity on heart rate.</p> <p>Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.</p> <p>Yeast fermentation is used in brewing and breadmaking. Suggest how organisms living in different conditions use respiration to get their energy.</p>	<p>respiration in terms of the reactants, the products formed and the implications for the organism</p>			
	2	Atoms, elements, and compounds	<p>Draw and explain the structure of the atom. Recall the charges and masses of protons, neutrons and electrons.</p> <p>Use the periodic table to find the numbers of protons, neutrons, and electrons in an atom</p> <p>Draw and write the electronic structure for atoms. Identify patterns in the periodic table</p> <p>Describe the difference between atoms, elements and compounds. Describe the properties of elements and how they</p>	<p>a simple (Dalton) atomic model</p> <p>differences between atoms, elements and compounds</p> <p>chemical symbols and formulae for elements and compounds</p> <p>conservation of mass changes of state and chemical reactions</p>	<p>Atom Element Compound Proton Neutron Electron Nucleus Conservation Period Group</p>	<p>Substances are made of particles.</p> <p>Knowledge of some compounds and formula e.g. water and carbon dioxide</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>compare to compounds containing the element.</p> <p>Describe how you can tell if a chemical reaction is happening. Construct word equations for chemical reactions.</p> <p>Name chemical compounds based on the elements in the compound</p> <p>Use chemical formula to write symbol equations.</p> <p>Balance symbol equations</p> <p>Describe the law of the conservation of mass.</p>	<p>chemical reactions as the rearrangement of atoms</p> <p>representing chemical reactions using formulae and using equations</p>			
2	Energy	<p>Describe energy and list energy stores</p> <p>Explain energy transfers and categorise these as useful and wasted</p> <p>Calculate useful and wasted energy from input and output data</p> <p>Explain how energy is dissipated and why processes cannot go on forever.</p> <p>Explain the advantages and disadvantages of different energy resources and how they work, including power stations and renewable sources.</p> <p>We pay for our domestic electricity usage based on the amount of energy transferred.</p>	<p>Comparing energy values of different foods (from labels) (kJ)</p> <p>Comparing power ratings of appliances in watts (W, kW)</p> <p>Comparing amounts of energy transferred (J, kJ, kW hour)</p> <p>Domestic fuel bills, fuel use and costs</p> <p>Fuels and energy resources.</p>	<p>Renewable</p> <p>Fossil fuel</p> <p>Dissipate</p> <p>Kinetic</p> <p>Thermal</p> <p>Gravitational</p> <p>Nuclear</p> <p>Chemical</p> <p>Electromagnetic</p> <p>Elastic</p> <p>Joules</p>	<p>Devices in the home use electricity to work.</p> <p>Ideas of energy relating to heating and cooling, thermal energy transfers.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>	

			<p>Calculate the cost of home energy usage, using the formula: $\text{cost} = \text{power (kW)} \times \text{time (hours)} \times \text{price (per kWh)}$.</p> <p>Compare the energy usage and cost of running different home devices.</p> <p>Food labels list the energy content of food in kilojoules (kJ). Compare the amounts of energy transferred by different foods and activities.</p>				
Year 8	3	Digestion	<p>To describe what makes up our food and to explain what is needed for a healthy diet. Discuss how an unbalanced diet can lead to health problems</p> <p>The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells.</p> <p>Describe possible health effects of unbalanced diets from data provided</p> <p>Calculate food requirements for a healthy diet, using information provided.</p> <p>To test a variety of foods for starch, protein, sugars and lipids To describe the tests you carried out and how you know if there is a reaction To describe the tests for lipids, starch, glucose and protein</p>	<p>content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed</p> <p>calculations of energy requirements in a healthy daily diet</p> <p>the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</p> <p>the tissues and organs of the human</p>	<p>Carbohydrate Lipid Protein Vitamin Mineral Fibre Cells Small intestine Large intestine Stomach Oesophagus Pancreas Enzyme Amylase Protease Temperature Obesity Deficiency</p>	<p>Pupils should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>To compare foods based on their nutritional content</p> <p>To describe how food moves through our digestive system and describe the processes our food undergoes</p> <p>Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes.</p> <p>Describe how organs and tissues involved in digestion are adapted for their role. Describe the events that take place in order to turn a meal into simple food molecules inside a cell.</p> <p>To describe what enzymes are and state the names of the 3 main groups of enzymes. Explain how enzymes digest our food and investigate the effect of temperature on enzymes. To apply knowledge to suggest how pH affects enzymes</p>	<p>digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)</p> <p>the importance of bacteria in the human digestive system</p>			
	3	Periodic table	<p>Use the periodic table to work out atomic structure, draw the electronic structure of atoms and recall the masses and charges of protons, neutrons and electrons</p> <p>Describe the physical and chemical properties of metals and non-metals</p>	<p>the varying physical and chemical properties of different elements</p> <p>the principles underpinning the Mendeleev Periodic Table</p>	<p>Mendeleev</p> <p>Groups</p> <p>Periods</p> <p>Trend</p> <p>Reactivity</p> <p>Electron</p> <p>Proton</p> <p>Neutron</p> <p>Non-metal</p> <p>Metal</p> <p>Transition metal</p>	<p>Knowledge of atomic structure and the periodic table from the atoms, elements, and compounds topic.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher</p>

			<p>Describe how the modern periodic table is arranged and how this compares to previous versions of the periodic table.</p> <p>Explain why Mendeleev's periodic table was readily accepted by scientists.</p> <p>Describe the trends in reactivity and properties of group 1 elements</p> <p>Describe the trends in reactivity and properties of group 7 elements.</p> <p>Describe the properties of group 0 and explain why they are unreactive.</p> <p>Describe the properties of transition metals and explain how they are different to the metals in group 1.</p>	<p>the Periodic Table: periods and groups; metals and non-metals</p> <p>how patterns in reactions can be predicted with reference to the Periodic Table</p> <p>the properties of metals and non-metals</p> <p>the chemical properties of metal and non-metal oxides with respect to acidity.</p>	<p>Octave</p> <p>Unreactive</p>		<p>questioning throughout the lesson.</p>
	3	Electricity	<p>Understand how charge can affect the behaviour of objects.</p> <p>What is an electric circuit. How to safely set up and use an electric circuit. How to draw circuits.</p> <p>Describe the rules for current in series circuits and parallel circuits and compare.</p> <p>Describe the rules for potential difference in series circuits and parallel circuits and compare.</p> <p>Understand how plugs and fuses work.</p>	<p>electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge</p> <p>potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current</p>	<p>Current</p> <p>Amps</p> <p>Potential difference</p> <p>Voltage</p> <p>Series</p> <p>Parallel</p> <p>Cell</p> <p>Battery</p> <p>Wire</p> <p>Bulb</p> <p>Ohms</p> <p>Resistance</p> <p>Fuse</p> <p>Plug</p> <p>Live</p> <p>Neutral</p>	<p>identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>identify whether or not a lamp will light in a simple series circuit, based on whether or</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>what is resistance and how can it be investigated. Use Ohms law to describe the relationship between resistance, current, and potential difference.</p>	<p>differences in resistance between conducting and insulating components (quantitative).</p> <p>separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects</p> <p>the idea of electric field, forces acting across the space between objects not in contact.</p>	<p>Earth Ammeter Voltmeter</p>	<p>not the lamp is part of a complete loop with a battery</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>recognise some common conductors and insulators, and associate metals with being good conductors.</p>	
<p>Year 9</p>	<p>1</p>	<p>Earths atmosphere</p>	<p>Draw the carbon cycle. Give equations for photosynthesis and respiration.</p> <p>Explain the processes of photosynthesis, respiration, and combustion</p> <p>Describe how human activities affect the carbon cycle.</p> <p>Explain why the concentration of carbon dioxide in the atmosphere is rising, and why this is an issue.</p> <p>Describe the composition of gases in the Earth's atmosphere.</p>	<p>the composition of the Earth</p> <p>the structure of the Earth</p> <p>the carbon cycle</p> <p>the composition of the atmosphere</p> <p>the production of carbon dioxide by human activity and the impact on climate.</p>	<p>Atmosphere Carbon dioxide Photosynthesis Respiration Combustion Decomposition Climate Greenhouse gas Global warming</p>	<p>The air is made up of gases</p> <p>Some human activities have a negative impact on the earth</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>Name the greenhouse gases. Define global warming and climate change.</p> <p>Describe how global warming can impact on climate and local weather patterns.</p> <p>Explain how human activity may impact the levels of these gases. Describe how human activities have contributed to global warming and the impact on the Earth.</p> <p>Describe how plankton can be used to reduce carbon emissions.</p> <p>Explain the role of iron fertilisation on reducing carbon emissions.</p>				
		Respiration	<p>Describe the role of each part of the respiratory system including adaptations.</p> <p>Process of breathing to take in oxygen and remove carbon dioxide, this involves muscle action in the ribs and diaphragm.</p> <p>Explain how changes in volume and pressure inside the chest move gases in and out of the lungs. Explain observations about changes to breathing rate and volume</p> <p>In gas exchange, oxygen and carbon dioxide move between alveoli and the blood. The amount of oxygen required by body cells determines the rate of breathing.</p>	<p>Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life</p> <p>A word summary for aerobic respiration</p> <p>The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for</p>	<p>Respiration Aerobic Anaerobic Organism Breathing Lungs Diaphragm Volume Exchange Cells Oxygen Carbon dioxide Glucose Fermentation</p>	<p>Breathing is necessary for life and involves the lungs.</p> <p>When we breathe in we take in air into our lungs, when we breathe out we expel air from our lungs.</p> <p>Respiration is a process that takes place in cells in our body. We breathe in oxygen and breathe out carbon dioxide.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

		<p>Predict how a change in the gas exchange system could affect other processes in the body.</p> <p>Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Use word equations to describe aerobic respiration.</p> <p>Compare aerobic respiration and its distinction from breathing.</p> <p>The effect of exercise intensity on heart rate.</p> <p>Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.</p> <p>Yeast fermentation is used in brewing and breadmaking. Suggest how organisms living in different conditions use respiration to get their energy.</p>	<p>anaerobic respiration</p> <p>The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism</p>			
	Periodic table	<p>Use the periodic table to work out atomic structure, draw the electronic structure of atoms and recall the masses and charges of protons, neutrons and electrons</p> <p>Describe the physical and chemical properties of metals and non-metals</p>	<p>the varying physical and chemical properties of different elements</p> <p>the principles underpinning the Mendeleev Periodic Table</p>	<p>Mendeleev</p> <p>Groups</p> <p>Periods</p> <p>Trend</p> <p>Reactivity</p> <p>Electron</p> <p>Proton</p> <p>Neutron</p> <p>Non-metal</p>	<p>Knowledge of atomic structure and the periodic table from the atoms, elements, and compounds topic.</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at</p>

		<p>Describe how the modern periodic table is arranged and how this compares to previous versions of the periodic table.</p> <p>Explain why Mendeleev's periodic table was readily accepted by scientists.</p> <p>Describe the trends in reactivity and properties of group 1 elements</p> <p>Describe the trends in reactivity and properties of group 7 elements.</p> <p>Describe the properties of group 0 and explain why they are unreactive.</p> <p>Describe the properties of transition metals and explain how they are different to the metals in group 1.</p>	<p>the Periodic Table: periods and groups; metals and non-metals</p> <p>how patterns in reactions can be predicted with reference to the Periodic Table</p> <p>the properties of metals and non-metals</p> <p>the chemical properties of metal and non-metal oxides with respect to acidity.</p>	<p>Metal</p> <p>Transition metal</p> <p>Octave</p> <p>Unreactive</p>		<p>the start of the lesson and teacher questioning throughout the lesson.</p>
	Electricity	<p>Understand how charge can effect the behaviour of objects.</p> <p>What is an electric circuit. How to safely set up and use an electric circuit. How to draw circuits.</p> <p>Describe the rules for current in series circuits and parallel circuits and compare.</p> <p>Describe the rules for potential difference in series circuits and parallel circuits and compare.</p> <p>Understand how plugs and fuses work.</p>	<p>electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge</p> <p>potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current</p>	<p>Current</p> <p>Amps</p> <p>Potential difference</p> <p>Voltage</p> <p>Series</p> <p>Parallel</p> <p>Cell</p> <p>Battery</p> <p>Wire</p> <p>Bulb</p> <p>Ohms</p> <p>Resistance</p> <p>Fuse</p> <p>Plug</p> <p>Live</p> <p>Neutral</p>	<p>identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>identify whether or not a lamp will light in a simple series circuit, based on whether or</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

			<p>what is resistance and how can it be investigated. Use Ohms law to describe the relationship between resistance, current, and potential difference.</p>	<p>differences in resistance between conducting and insulating components (quantitative).</p> <p>separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects</p> <p>the idea of electric field, forces acting across the space between objects not in contact.</p>	<p>Earth Ammeter Voltmeter</p>	<p>not the lamp is part of a complete loop with a battery</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>recognise some common conductors and insulators, and associate metals with being good conductors.</p>	
	2	Inheritance	<p>heredity as the process by which genetic information is transmitted from one generation to the next</p> <p>a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model</p> <p>the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material</p>	<p>heredity as the process by which genetic information is transmitted from one generation to the next</p> <p>a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model</p>	<p>DNA Gene Chromosome Inheritance Sperm Egg Hereditary Natural selection Darwin Species Extinction Evolution Variation Continuous Discontinuous Gene bank</p>	<p>recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

		<p>the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection</p> <p>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</p>	<p>differences between species</p> <p>the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation</p> <p>the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection</p> <p>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</p>	<p>Reproduction Genotype</p>	<p>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>	
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				the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.			
		Magnets and electromagnets	<p>Some materials are magnetic whilst others are not, magnets cause a force of attraction or repulsion.</p> <p>The stronger the magnet, and the smaller the distance from it, the greater the force a magnetic object in the field experiences.</p> <p>Two 'like' magnetic poles repel and two 'unlike' magnetic poles attract.</p> <p>Predict how an object made of a magnetic material will behave if placed in or rolled through a magnetic field.</p> <p>Magnetic materials, electromagnets and the Earth create magnetic fields which can be described by drawing field lines to show the strength and direction.</p> <p>Field lines flow from the north-seeking pole to the south-seeking pole.</p> <p>Predict the pattern of field lines and the force around two magnets placed near each other.</p> <p>Use the idea of field lines to show how the direction or strength of the field around a magnet varies.</p>	<p>magnetic poles, attraction and repulsion</p> <p>magnetic fields by plotting with compass, representation by field lines</p> <p>Earth's magnetism, compass and navigation</p> <p>the magnetic effect of a current, electromagnets, D.C. motors (principles only)</p>	<p>Magnet</p> <p>Electromagnet</p> <p>Pole</p> <p>Magnetic field</p> <p>Compass</p> <p>Current</p> <p>Attraction</p> <p>Repulsion</p>	<p>notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>observe how magnets attract or repel each other and attract some materials and not others</p> <p>compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>describe magnets as having two poles</p> <p>predict whether two magnets will attract or repel each other, depending on which poles are facing</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>

		<p>You can make an electromagnet by wrapping a wire around an iron bar.</p> <p>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.</p> <p>The magnetic field of an electromagnet decreases in strength with distance.</p> <p>Use a diagram to explain how an electromagnet can be made and how to change its strength.</p> <p>You can make an electromagnet by wrapping a wire around an iron bar.</p> <p>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.</p> <p>The magnetic field of an electromagnet decreases in strength with distance.</p> <p>Use a diagram to explain how an electromagnet can be made and how to change its strength.</p> <p>Explain the choice of electromagnets or permanent magnets for a device in terms of their properties.</p> <p>Suggest how bells, circuit breakers and loudspeakers work from diagrams</p>				
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		<p>Atoms, elements, and compounds</p>	<p>Draw and explain the structure of the atom. Recall the charges and masses of protons, neutrons and electrons.</p> <p>Use the periodic table to find the numbers of protons, neutrons, and electrons in an atom</p> <p>Draw and write the electronic structure for atoms. Identify patterns in the periodic table</p> <p>Describe the difference between atoms, elements and compounds. Describe the properties of elements and how they compare to compounds containing the element.</p> <p>Describe how you can tell if a chemical reaction is happening. Construct word equations for chemical reactions.</p> <p>Name chemical compounds based on the elements in the compound</p> <p>Use chemical formula to write symbol equations.</p> <p>Balance symbol equations</p> <p>Describe the law of the conservation of mass.</p>	<p>a simple (Dalton) atomic model</p> <p>differences between atoms, elements and compounds</p> <p>chemical symbols and formulae for elements and compounds</p> <p>conservation of mass changes of state and chemical reactions</p> <p>chemical reactions as the rearrangement of atoms</p> <p>representing chemical reactions using formulae and using equations</p>	<p>Atom</p> <p>Element</p> <p>Compound</p> <p>Proton</p> <p>Neutron</p> <p>Electron</p> <p>Nucleus</p> <p>Conservation</p> <p>Period</p> <p>Group</p>	<p>Substances are made of particles.</p> <p>Knowledge of some compounds and formula e.g. water and carbon dioxide</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>
		<p>Microbes</p>	<p>Different types of microbes and diseases that can be transmitted by microbes. How disease can be treated and prevented, how the body defends against microbes and disease.</p>	<p>the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</p>	<p>Yeast</p> <p>Fungi</p> <p>Bacteria</p> <p>Vitamin Deficiency</p> <p>Microbe</p>	<p>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Knowledge is assessed throughout the topic</p>

			<p>Describe how Vaccines work and how antibiotic resistance arises.</p> <p>Health related diseases, including the consequences of vitamin C deficiency.</p> <p>Describe how microbes e.g yeast can be useful in everyday life.</p>		<p>Vaccine</p> <p>White blood cell</p> <p>Antibody</p> <p>Antigen</p> <p>Immune system</p> <p>Immune Disease</p>		<p>through retrieval practise in lessons. 5 retrieval questions at the start of the lesson and teacher questioning throughout the lesson.</p>
Year 10	1	Organisation	<p>Principles of organisation in living organisms</p> <p>The human digestive system (including structure, importance of enzymes, food tests and factors affecting enzymes)</p> <p>The Heart and blood vessels (structure and function)</p> <p>Use of dissection equipment to dissect a heart</p> <p>Blood (structure and function)</p> <p>Coronary heart disease (what it is and how it can be treated)</p> <p>Other non-communicable health issues and their effects of lifestyle</p> <p>Cancer (types and treatment)</p> <p>Plant tissues, organs and systems (including leaf structure, xylem and phloem tissue, roots and the transport of water and sugars around the plant)</p>	<p>Cell Biology (Point 3,4 & 6)</p> <p>Transport systems (Points 1&2)</p> <p>Health, disease and development of medicines (point 3 & 8)</p>	<p>Haemoglobin</p> <p>Phagocytosis</p> <p>Gas exchange</p> <p>Diaphragm</p> <p>Trachea</p> <p>Stent</p> <p>Xylem</p> <p>Phloem</p> <p>Transpiration</p>	<p>KS3 recall of organs and organ systems from digestion, muscles and cells.</p> <p>Understanding of the organisation of organisms</p> <p>KS3 recall of non-communicable diseases from microbes topic</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

		Atomic Structure & PT	<p>Atoms, elements and compounds</p> <p>Mixtures</p> <p>Development of the model of the atom</p> <p>Relative electrical charges of subatomic particles</p> <p>Size and mass of atoms</p> <p>Relative atomic mass</p> <p>Electronic structure</p> <p>The Periodic table and its development</p> <p>Metals, Non-metals, Group 0,1&7</p> <p>Properties of transition metals (Separate chemistry)</p>	Atomic structure and the Periodic table (point 1,2,3,4,5,6 & 7)	Mendeleev Alkali Metals Noble Gases	<p>KS3 recall of periodic table formation, structure of atoms from atoms, elements and compounds topic</p> <p>Knowledge of parts of an atom</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>
		Bonding	<p>Chemical bonds</p> <p>Ionic bonding and compounds</p> <p>Covalent bonding</p> <p>Metallic bonding</p> <p>The three states of matter and state symbols</p> <p>Properties of ionic compounds</p> <p>Properties of small molecules and Polymers</p>	Structure, bonding and the properties of matter (point 1,2,3,4 & 5)	<p>Ionic</p> <p>Covalent</p> <p>Metallic</p> <p>Polymer</p> <p>Sublimation</p> <p>Deposition</p> <p>Graphene</p> <p>Fullerenes</p>	<p>KS3 recall of atomic structure</p> <p>Understanding of electrons and structure of the periodic table</p> <p>KS3 recall of the states of matter</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Giant covalent molecules</p> <p>Properties of metals and alloys – including conduction</p> <p>Structures and bonding of carbon (diamond, graphite, graphene and fullerenes)</p> <p>Sizes of particles and their properties (Separate chemistry)</p> <p>Uses of nanoparticles (Separate chemistry)</p>				
Year 10	2	Electricity	<p>Circuit symbol diagrams</p> <p>Electrical charge and current</p> <p>Current, resistance and potential difference</p> <p>Resistors</p> <p>Series and parallel circuits</p> <p>Direct and alternating potential difference</p> <p>Mains electricity</p> <p>Power</p> <p>Energy transfers in appliances</p> <p>National grid</p>	<p>Electricity (point 1,2,3,4,5 & 6)</p> <p>Energy (point 2)</p> <p>Magnetism and electromagnetism (point 3)</p>	<p>Series</p> <p>Parallel Resistor</p> <p>Variable Resistor</p> <p>Thermistor</p> <p>Ohmic resistor</p> <p>Transformer</p>	<p>KS3 recall of electricity topic</p> <p>Knowledge of circuit symbols, basic series and parallel circuits</p> <p>Understanding of voltage and current</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

		Atomic Structure	<p>The structure of an atom</p> <p>Mass number, atomic number and isotopes</p> <p>The development of the model of the atom</p> <p>Radioactive decay and nuclear radiation</p> <p>Nuclear equations</p> <p>Half-lives and the random nature of radioactive decay</p> <p>Radioactive contamination</p> <p>Nuclear fission (Separate physics)</p> <p>Nuclear fusion (Separate physics)</p> <p>Background radiation (Separate physics)</p> <p>Different half-lives of radioactive isotopes (Separate physics)</p> <p>Uses of nuclear radiation (Separate physics)</p>	Atomic structure (point 1,2,3,4,5,6 & 7)	<p>Gamma</p> <p>Beta</p> <p>Alpha</p> <p>Neutron</p> <p>Proton</p> <p>Electron</p> <p>Electromagnetic Wave</p> <p>Fission (Triple)</p> <p>Fusion (Triple)</p> <p>Half Life</p> <p>Decay</p>	<p>KS3 recall of atomic structure.</p> <p>KS4 recall of parts of an atom (neutrons, protons and electrons)</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>
		Infection & Response	<p>Communicable diseases</p> <p>Viral diseases</p> <p>Bacterial diseases</p> <p>Fungal diseases</p> <p>Protist diseases</p>	Health, diseases and the development of medicines (points 1,2,4,5,6 & 7)	<p>Protist</p> <p>Salmonella</p> <p>Gonorrhoea</p> <p>Malaria</p> <p>Vector</p> <p>Vaccination</p> <p>Monoclonal</p> <p>Antibodies</p> <p>Antigens</p>	<p>KS3 recall from microbes topic and cells</p> <p>Understanding of difference between animal cell and bacterial cell</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p>

			<p>Human defence systems</p> <p>Vaccination</p> <p>Antibiotics and painkillers</p> <p>Discovery and development of drugs</p> <p>Producing monoclonal antibodies (Separate biology)</p> <p>Uses of monoclonal antibodies (Separate biology)</p> <p>Detection and identification of plant diseases (Separate biology)</p> <p>Plant defence responses (Separate biology)</p>		<p>Antibiotics</p>	<p>Knowing the difference between bacteria, virus and fungus</p> <p>KS4 recall from Organisation to understand the difference between communicable and non-communicable disease</p> <p>Recall structure of blood and specifically function of WBC</p>	<p>6 mark question available per topic (minimum of one completed per half term)</p>
		Quantitative	<p>Conservation of mass and balanced chemical equations</p> <p>Relative formula mass</p> <p>Mass changes when a reactant or product is a gas</p> <p>Chemical measurements</p> <p>Moles</p> <p>Amounts of substances in equations</p> <p>Using moles to balance equations</p> <p>Limiting reactants</p>	<p>Chemical analysis (point 3 & 4)</p> <p>Chemical changes (point 1 & 2)</p>	<p>Moles</p> <p>Reactants</p> <p>Products</p> <p>Atomic number</p> <p>Concentration</p>	<p>KS3 recall of atomic structure and specifically atomic mass</p> <p>KS4 recall of periodic table and difference between atomic mass and atomic number</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Concentration of solutions</p> <p>Percentage yield (Separate chemistry)</p> <p>Atom economy (Separate chemistry)</p> <p>Using concentration of solutions in mol/dm³ (Separate chemistry)</p> <p>Uses of amount of substances in relation to volumes of gases (Separate chemistry)</p>				
		Bioenergetics	<p>Photosynthetic reaction</p> <p>Rate of photosynthesis</p> <p>Uses of glucose from photosynthesis</p> <p>Aerobic and anaerobic respiration</p> <p>Response to exercise</p> <p>Metabolism</p>	<p>Cell biology (point 1 & 5)</p> <p>Photosynthesis (point 1,2 & 3)</p>	<p>Photosynthesis</p> <p>Respiration</p> <p>Aerobic</p> <p>Anaerobic</p> <p>Metabolism</p>	<p>KS3 recall of respiration</p> <p>Knowledge of what animals need to for respiration. Also what products are made</p> <p>Ability to link this to photosynthesis</p> <p>Recall of plant and animal cell structure</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>
Year 10	3	Chemical changes	<p>Metal oxides</p> <p>The reactivity series</p> <p>Extraction of metals and reduction</p> <p>Oxidation and reduction in terms of electrons</p> <p>Reactions of acids with metals</p>	<p>Chemical changes (point 1,2,3,4,5,6 & 7)</p>	<p>Exothermic</p> <p>Endothermic</p> <p>Neutralisation</p> <p>Electrolysis</p> <p>Anode</p> <p>Cathode</p>	<p>KS3 recall of chemical reactions</p> <p>Knowledge that there are reactants and products</p> <p>Recall of difference between acid and alkali</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p>

			<p>Neutralisation of acids and salt production</p> <p>Soluble salts</p> <p>The pH scale and neutralisation</p> <p>Strong and weak acids</p> <p>The process of electrolysis</p> <p>Electrolysis of molten ionic compounds</p> <p>Using electrolysis to extract metals</p> <p>Electrolysis of aqueous solutions</p> <p>Representation of reactions at electrodes as half equations</p> <p>Transitions (Separate chemistry)</p>				<p>6 mark question available per topic (minimum of one completed per half term)</p>
		<p>Particle model of matter</p>	<p>Density of materials</p> <p>Changes of state</p> <p>Internal energy</p> <p>Temperature changes in a system and specific heat capacity</p> <p>Changes of state and specific latent heat</p> <p>Particle motion in gases</p> <p>Pressure in gases (Separate physics)</p>	<p>Structure, bonding and the properties of matter (point 1)</p>	<p>Capacity</p> <p>Vaporisation</p> <p>Condensation</p> <p>Pressure (triple)</p>	<p>KS3 recall of states of matter</p> <p>Difference between solid, liquid and gas</p> <p>Understanding of different particle arrangements</p> <p>Ability to link to KS4 energy topic</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			Increasing the pressure of a gas (Separate physics)				
		Energy changes	<p>Energy transfer during exothermic and endothermic reactions</p> <p>Reaction profiles</p> <p>The energy change of reactions</p> <p>Cells and batteries (Separate chemistry)</p> <p>Fuel cells (Separate chemistry)</p>	Energy changes in chemistry (point 1 & 2)	Exothermic Endothermic Activation energy	<p>KS3 recall to energy topic. An understanding of thermal energy and kinetic energy</p> <p>Recall states of matter and how they change</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>
Year 11	1	Homeostasis	<p>Homeostasis</p> <p>The human nervous system</p> <p>The humane endocrine system</p> <p>Control of blood glucose concentration</p> <p>Hormones in human reproduction</p> <p>Contraception</p> <p>The use of hormones to treat fertility</p> <p>Feedback systems</p> <p>The brain (Separate biology)</p> <p>The eye (Separate biology)</p>	<p>Transport systems (point 1)</p> <p>Coordination and control (point 1,2,3,4,5 & 6)</p>		<p>KS3 recall of cells, reproduction and digestive system</p> <p>Recall of specialised cells (nerve, sperm and egg)</p> <p>Recognition of the reproductive organs and the process of reproduction</p> <p>PSHE recall of contraception</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Control of body temperature (Separate biology)</p> <p>Maintaining water and nitrogen balance in the body (Separate biology)</p> <p>Plant hormone control and coordination (Separate biology)</p> <p>Use of plant hormones (Separate biology)</p>				
		Rates of reaction	<p>Calculating rates of reactions</p> <p>Factors which affect the rates of chemical reactions</p> <p>Collision theory and activation energy</p> <p>Catalysts</p> <p>Reversible reactions</p> <p>Energy changes and reversible reactions</p> <p>Equilibrium</p> <p>The effect of changing conditions on equilibrium</p> <p>The effect of changing concentration</p> <p>The effect of temperature changes on equilibrium</p> <p>The effect of pressure changes on equilibrium</p>	<p>Structure, bonding and the properties of matter (point 1)</p> <p>Rate and extent of chemical change (point 1 & 2)</p>		<p>KS3 recall of reactions, acids and alkalis</p> <p>KS4 recall of chemical changes, formulas and particle model</p> <p>Recall of kinetic energy in particles and what are products and reactants</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

		Electromagnets	<p>Poles of a magnet</p> <p>Magnetic fields</p> <p>Electromagnetism</p> <p>Flemings left hand rule</p> <p>Electric motors</p> <p>Loudspeakers (Separate physics)</p> <p>Induced potential (Separate physics)</p> <p>Uses of the generator effect (Separate physics)</p> <p>Microphones (Separate physics)</p> <p>Transformer (Separate physics)</p>	Magnetism and electromagnetism (point 1 & 2)		<p>KS3 recall of magnets and magnetism.</p> <p>Recall of magnetic poles, forces of attraction and their applications</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>
		Waves	<p>Transverse and longitudinal waves</p> <p>Properties of waves</p> <p>Types of electromagnetic waves</p> <p>Properties of electromagnetic waves</p> <p>Uses and application of electromagnetic waves</p> <p>Lenses (Separate physics)</p> <p>Visible light (Separate physics)</p> <p>Emission and absorption of infrared radiation (Separate physics)</p>	Wave motion (point 1,2,3,4,5 & 6)		<p>KS3 recall of waves and their different types</p> <p>Knowledge of light and how it reflects and refracts</p> <p>Different uses of waves</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Perfect black bodies and radiation (Separate physics)</p> <p>Reflection of waves (Separate physics)</p> <p>Sound waves (Separate physics)</p> <p>Waves for detection and exploration (Separate physics)</p>				
Year 11	2	Inheritance	<p>Sexual and Asexual reproduction</p> <p>Meiosis</p> <p>DNA and the genome</p> <p>Genetic inheritance</p> <p>Inherited disorders</p> <p>Sex determination</p> <p>Variation</p> <p>Evolution</p> <p>Selective breeding</p> <p>Genetic engineering</p> <p>Evidence for evolution</p> <p>Fossils</p> <p>Extinction</p> <p>Resistant bacteria</p>	<p>Evolution, inheritance and variation (point 1,2,3,4,5,6,7,8,9,10, 11 & 12)</p>		<p>KS3 recall of inheritance and reproduction</p> <p>Knowledge of genes and how they get inherited</p> <p>Understanding of some genetic diseases</p> <p>Recall of Darwin and the theory of evolution</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Classification of living organisms</p> <p>Advantages and disadvantages of sexual and asexual reproduction (Separate biology)</p> <p>DNA structure (Separate biology)</p> <p>Cloning (Separate biology)</p> <p>Theory of evolution (Separate biology)</p> <p>Speciation (Separate biology)</p> <p>The understanding of genetics (Separate biology)</p>				
		Organic Chemistry	<p>Crude oil, hydrocarbons and alkanes</p> <p>Fractional distillation and petrochemicals</p> <p>Properties of hydrocarbons</p> <p>Cracking and alkenes</p> <p>Structure and formulae of alkenes (Separate chemistry)</p> <p>Reactions of alkenes (Separate chemistry)</p> <p>Alcohols (Separate chemistry)</p> <p>Carboxylic acids (Separate chemistry)</p> <p>Addition polymerisation (Separate chemistry)</p>	<p>Chemical and allied industries (point 3 & 4)</p> <p>Earth and atmospheric science (point 4)</p>		<p>No clear KS3 recall.</p> <p>KS4 recall from atoms topic</p> <p>Understanding of chemical formulas and methods of separation</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Condensation polymerisation (Separate chemistry)</p> <p>Amino acids (Separate chemistry)</p> <p>DNA and other naturally occurring polymers (Separate chemistry)</p>				
		Forces	<p>Scalar and vector quantities</p> <p>Contact and non-contact forces</p> <p>Gravity</p> <p>Resultant forces</p> <p>Work done and energy transfer</p> <p>Forces and elasticity</p> <p>Describing motion along a line</p> <p>Distance and displacement</p> <p>Speed</p> <p>Velocity</p> <p>The distance-time relationship</p> <p>Acceleration</p> <p>Newton's first law</p> <p>Newton's second law</p> <p>Newton's third law</p>	<p>Forces (point 1,2,3 &4)</p> <p>Forces and motion (point 1,2,3,4 & 5)</p>		<p>KS3 recall of forces</p> <p>Knowledge of some simple forces and the ways they interact</p> <p>Understanding of speed, distance and time</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Stopping distance</p> <p>Reaction time</p> <p>Factors affecting braking distance</p> <p>Momentum is a property of moving objects</p> <p>Conservation of momentum</p> <p>Changes in momentum (Separate physics)</p> <p>Moments, levers and gears (Separate physics)</p> <p>Pressure in a fluid (Separate physics)</p> <p>Atmospheric pressure (Separate physics)</p>				
		Using resources	<p>Using the Earth's resources and sustainable development</p> <p>Potable water</p> <p>Waste water treatment</p> <p>Alternative methods of extracting metals</p> <p>Life cycle assessments</p> <p>Ways of reducing the use of resources</p> <p>Corrosion and its prevention (Separate chemistry)</p> <p>Alloys as useful materials (Separate chemistry)</p>	<p>Chemical and allied industries (point 1,2,3 & 5)</p> <p>Earth and atmospheric science (point 5)</p>		<p>KS3 recall is linked to Earth's atmosphere topic and geology.</p> <p>Recall of earth's structure and knowledge of the water cycle</p> <p>KS4 recall of particle model of matter and, organic chemistry and chemical formulas to help with understanding of different materials</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Ceramics, polymers and composites (Separate chemistry)</p> <p>The haber process (Separate chemistry)</p> <p>Production and uses of NPK fertilisers (Separate chemistry)</p>				
		Chemical analysis	<p>Pure substances</p> <p>Formulations</p> <p>Chromatography</p> <p>Test for hydrogen</p> <p>Test for oxygen</p> <p>Test of chlorine</p> <p>Test for carbon dioxide</p> <p>Flame tests (Separate chemistry)</p> <p>Metal hydroxides (Separate chemistry)</p> <p>Carbonates (Separate chemistry)</p> <p>Halides (Separate chemistry)</p> <p>Sulfates (Separate chemistry)</p> <p>Instrumental methods (Separate chemistry)</p> <p>Flame emission spectroscopy (Separate chemistry)</p>	Chemical analysis (point 1,2,3 & 4)		<p>KS3 recall from atoms, elements and compounds and also the periodic table.</p> <p>Ability to recall different elements and know which ones are the common gases</p> <p>KS4 recall of the periodic table and knowledge of difference between gas and solid. Understanding of chemical reactions and how elements react when exposed to heat</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

<p>Year 11</p>	<p>3</p>	<p>Ecology</p>	<p>Communities</p> <p>Abiotic factors</p> <p>Biotic factors</p> <p>Adaptations</p> <p>Levels of organisation</p> <p>How materials are cycled</p> <p>Biodiversity</p> <p>Waste management</p> <p>Land use</p> <p>Deforestation</p> <p>Global warming</p> <p>Maintaining biodiversity</p> <p>Decomposition (Separate biology)</p> <p>Impact of environmental change (Separate biology)</p> <p>Trophic levels (Separate biology)</p> <p>Pyramids of biomass (Separate biology)</p> <p>Transfer of biomass (Separate biology)</p>	<p>Ecosystems (point 1,2,3,4,5,6,7 & 8)</p>		<p>KS3 recall of independence topic and earths atmosphere.</p> <p>Build on previous learning of simple food chains and understanding of the difference between predator and prey</p> <p>Link to KS4 earths atmosphere topic to understand the importance of forests with regards to global warming</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>

			<p>Food production factors affecting food security (Separate biology)</p> <p>Farming techniques (Separate biology)</p> <p>Sustainable fisheries (Separate biology)</p> <p>Role of biotechnology (Separate biology)</p>				
		Earth's Atmosphere	<p>The proportion of different gases in the atmosphere</p> <p>The Earth's early atmosphere</p> <p>How oxygen increased</p> <p>How carbon dioxide decreased</p> <p>Greenhouse gases</p> <p>Human activities which contribute to an increase in greenhouse gases in the atmosphere</p> <p>Global climate change</p> <p>The carbon footprint and its reduction</p> <p>Atmospheric pollutants from fuels</p> <p>Properties and effects of atmospheric pollutants</p>	Earth and atmospheric science (point 1,2,3 & 4)		<p>KS3 recall is linked to Earth's atmosphere topic and geology.</p> <p>Recall of earth's structure</p> <p>KS4 recall of ecology topic to understand climate change and develop knowledge</p>	<p>Content knowledge is assessed in the end of unit assessment.</p> <p>Live marking throughout lessons with retrieval questions built into every lesson</p> <p>6 mark question available per topic (minimum of one completed per half term)</p>
		Space (Separate Physics)	<p>Our solar system</p> <p>The life cycle of a star</p> <p>Orbital motion, natural and artificial satellites</p>	Space Physics (point 1)		<p>KS3 recall of space topic</p> <p>Develop understanding of the solar system and</p>	

			Red shift			difference between stars and planets	
Year 12	1	<u>Biology</u> <u>Chemistry</u> <u>Physics</u>					
Year 12	2	<u>Biology</u> <u>Chemistry</u> <u>Physics</u>					
Year 12	3	<u>Biology</u> <u>Chemistry</u> <u>Physics</u>					
Year 13	1	<u>Biology</u> <u>Chemistry</u> <u>Physics</u>					
Year 13	2	<u>Biology</u> <u>Chemistry</u> <u>Physics</u>					
Year 13	3	<u>Biology</u> <u>Chemistry</u> <u>Physics</u>					

