

	<u>Topic</u>	<u>Key concept – what do I want the students to learn from this unit?</u>	<u>What knowledge will they acquire?</u>
YEAR 9 OVERVIEW			
Y9 - half term 1	<p>Energy- Work, Heating and Cooling,</p> <p>Reactions-Chemical Energy, Types of Reaction</p>	<p>Work is done and energy transferred when a force moves an object. The bigger the force or distance, the greater the work. Machines make work easier by reducing the force needed. Levers and pulleys do this by increasing the distance moved, and wheels reduce friction.</p> <p>The thermal energy of an object depends upon its mass, temperature and what it's made of. When there is a temperature difference, energy transfers from the hotter to the cooler object. Thermal energy is transferred through different pathways, by particles in conduction and convection, and by radiation.</p> <p>During a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic. Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light.</p> <p>Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating. 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.</p>	<p>Work done and machines.</p> <p>Temperature and heat energy.</p> <p>The particle model linked to energy transfer in solids and fluids.</p> <p>Radiation and thermal insulation.</p> <p>Reactants and products. Combustion.</p> <p>Thermal decomposition. Conservation of mass. Exothermic and endothermic reactions. Energy level diagrams. Bond energies.</p>

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	Genes- Evolution and Inheritance	<p>Natural selection is a theory which explains how species evolve and why extinction occurs. Biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans.</p> <p>Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction. Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.</p>	<p>Natural selection. Charles Darwin. Extinction. Biodiversity.</p> <p>Inheritance. DNA, genetics and genetic modification.</p>
Y9 – half term 2	<p>The Cosmos series.</p> <p>Standing up in the milky way</p> <p>Some of the things that molecules do</p> <p>When knowledge conquered fear</p> <p>A sky full of ghosts</p> <p>Hiding in the light</p> <p>Deeper, deeper, deeper still</p> <p>The clean room</p> <p>Sisters of the Sun</p>	<p>Solar system, Planetary distances Cosmic Calendar DNA Evolution Constellations Hooke's Law Scientific method Light, Visible spectrum, Spectroscopy Extremophiles, Tardigrades Carbon Cycle The age of the Earth Lead, Classifying stars. The energy from the sun to Earth Wegner, Continental drift, Plate tectonics, Evolution Motors Generators Power stations</p>	<p>This is a skills based part of the curriculum.</p>

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	<p>The lost worlds of planet Earth</p> <p>The Electric Boy</p> <p>The Immortals</p> <p>The world set free</p> <p>Unafraid of the dark</p>	<p>Origins of Life</p> <p>The Environment and man's affect</p> <p>Dark matter and dark energy</p>	
Y9 – half term 3	Cells	Plant, Animal, Differentiation, Prokaryotic, Microscopes	<p>Eukaryotes and Prokaryotes</p> <p>Animal and Plant cells</p> <p>Cell specialisation</p> <p>Cell Differentiation</p> <p>Microscopy</p>
	Atomic structure and the periodic table	<p>Model of the atom, symbols, relative atomic mass, electronic charge and isotopes</p> <p>The periodic table</p> <p>Properties of Transition metals.</p>	<p>Atoms, elements and compounds</p> <p>Mixtures</p> <p>The 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</p> <p>Development of the periodic table</p> <p>Metals and non-metals</p> <p>Group 0</p> <p>Group 1</p> <p>Group 7</p>
	Energy	<p>Energy changes in a system and the ways energy is stored before and after such changes.</p> <p>Conservation and dissipation of energy</p>	<p>Energy stores and systems</p> <p>Changes in energy</p> <p>Energy changes in systems</p> <p>Power</p> <p>Energy transfers in a system</p> <p>Efficiency</p>

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			National and global energy resources
Y9 – half term 4	Cell division	Use of stem cells, Mitosis, Meiosis, Cell Cycle	Chromosomes Mitosis and the cell cycle Stem cells Diffusion Osmosis Active Transport
	Bonding structure, and the properties of matter	Chemical bonds, Ionic, covalent and metallic How bonding and structure are related to the properties of substances.	Chemical bonds Ionic bonding Ionic compounds Covalent bonding Metallic bonding The three states of matter State symbols Properties of ionic compounds Properties of small molecules Polymers Giant covalent structures Properties of metals and alloys Metals as conductors
	Electricity	Current, potential difference and resistance Series and parallel circuits	Standard circuit diagram symbols Electrical charge and current Current resistance and potential difference Resistors Series and parallel circuits
Y9 – half term 5	Organisms	Movement of Molecules, Digestion, Enzymes, Circulatory, Blood, Heart Disease	Principles of organisation The human digestive system The heart and blood vessels Blood Coronary heart disease: a non-communicable disease Health issues The effect of lifestyle on non-communicable diseases Cancer

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	Bonding structure, and the properties of matter	Structure and bonding of carbon Bulk and surface properties of matter including nanoparticles	Diamond Graphite Graphene and fullerenes
	Electricity	Domestic uses and safety Energy Transfers	Direct and alternating potential difference Power Energy transfer and everyday appliances The National grid
Y9 – half term 6	Plant tissues, organs and systems	Transpiration, Leaf Structure, stomata, microscope work, non-communicable diseases	Plant tissues Plant organ systems
	Quantitative Chemistry	Chemical measurements, conservation of mass and the quantitative interpretation of chemical equations Use of amount of substance in relation to masses of pure substance Yield and atom economy of chemical reactions	Conservation of mass and balanced chemical equations Relative formula mass Mass changes when a reactant or product is a gas Chemical measurements Moles (HT only) Amounts of substances in equations (HT only) Using moles to balance equations (HT only) Limiting reactants (HT only) Concentration of solutions
	Particle model of matter	Changes of state and particle model Internal energy and energy transfers Particle model and pressure	Density of materials Changes of state Internal energy Temperature changes in a system and specific heat capacity Changes of heat and specific latent heat Particle model and pressure
FORMAL ASSESSMENT			