

**Long-term planning (LTPs)** - Planning how the key concepts, knowledge, skills identified in the Progression map will be delivered termly per year group

Ensuring that end points & NC/spec are covered

Identifying what assessments are planned and when

Allowing for whole academy intent priorities to be planned for

Year 9 Triple				
	Autumn 1	Autumn 1	Autumn 1	Autumn 1
<b>Unit title:</b>	C1 Atom Structure	C2 The Periodic table	P1 Conserving and dissipating Energy	P2 Energy transfer by heating
<b>Unit length:</b>	8 lessons	6 lessons	9 lessons	5 lessons
<b>Key concepts:</b>	Understand and compare the properties of elements using their atomic structure and relative numbers of subatomic particles	The periodic table has been subject to change over time.  The periodic table is ordered based upon the numbers of protons and the properties of each element.	Energy cannot be created or destroyed, it can only be transferred from one energy store to another (or between stores)  Forces, waves and the application of "work" all transfer energy  Energy transfers are not 100% efficient and energy can dissipate into the environment	Energy can be transferred through conduction, convection and radiation  Energy transfers can be calculated  Energy is generated by transferring energy from one store into another, each having its own pros and cons
<b>Knowledge/ Skills:</b>  <b>Key Core Powerful</b>	Key The structure of an atom with a nucleus (protons + neutrons) orbited by electrons  Electrons have a -1 charge and a mass of 1/1840 Protons have a mass of 1 and a charge of +1 Neutrons have a mass of 1 and are neutrally charged  Core Our understanding of atom structure has changed since the ancient Greeks and the evidence we have used  Powerful Strong links to the Atoms and Particles units in Physics	Key The periodic table was originally in atomic weight order but is now in order of the number of protons  Structure of the atom dictates the position of an element on the periodic table  Within a group, atom structure gives rise to reactivity and property trends  Core The periodic table is an information resource which allows the properties and reactivity trends of elements to be predicted  Powerful Links to Physics, Quantitative chemistry and bonding (in particular) in chemistry	Key Energy is measured in joules  Insulators can be used to reduce energy loss  Some materials allow energy transfer more efficiently than others  Core The use of thermal conductors and insulators is key to the design of homes, vehicles and appliances  Powerful Links to Electricity topic, Rates of reaction and energy changes in chemistry as well as to aspects of Geography, Catering and DT	Key Other than solar, all electricity generation produces AC current and requires the movement of a turbine/generator  Some materials allow energy transfer more efficiently than others  Sources of energy can be renewable or non renewable  Core Data analysis and the use of equations is important in physics  Not all forms of electricity generation are always applicable under the given circumstances  Powerful Links to areas in physics including Forces Links to Geography and electrical generation

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<b>End points covered:</b>	The understanding that matter is organised into different categories based upon structure, how the different elements are arranged and that these give rise to distinctive properties.	Understanding that all particles carry an abstract quantity labelled as energy that can be stored in different stores, which can be transferred between stores or between systems but is always conserved. In some forms energy cannot be observed and has the potential to do work; in others it causes movement of particles or whole systems.
<b>NC/Spec coverage:</b>	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 2.2.2, 3.1.1, 3.1.3	1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6, 1.3.1, 1.3.2
<b>Cross-curricular links:</b>	Physics	Geography, Catering and DT
<b>Assessments:</b>	Formally Marked Work (FMW) tasks C1-2 exam	FMW tasks P1-2 exam
<i>Other academy intent priorities</i>		
<b>Curriculum Careers - Gatsby 4</b>	Industrial chemist Forensic Science Teaching Pharmacy/medicine	Industrial / research Physics Architect Builder/ buildings inspector Vehicle design
<b>Culturally rich – broadening horizons</b>	Opportunities to; <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- discuss role of scientists from different cultures and beliefs</li> </ul>	Opportunities to; <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- discuss role of scientists from different cultures and beliefs</li> <li>- discuss wider issues of providing energy and heating to less affluent parts of the world and linking natural resources to potential advantages in energy</li> </ul>

<b>Year 9</b>				
	<b>Autumn 2</b>	<b>Autumn 2</b>	<b>Autumn 2</b>	<b>Autumn 2</b>
<b>Unit title:</b>	C3 Bonding		B1 Cell structure and transport	
<b>Unit length:</b>	12 lessons		10 lessons	
<b>Key concepts:</b>	All atoms react in order to achieve full outer shells  Metals react by losing electrons (reduction) and non metals react by gaining electrons (reduction)		The use and differences between microscopes  The cells of plants, animals and of bacteria are different to each other  Different organelles and structures have different roles  Substances travel across membranes in different ways	

<b>Knowledge/ Skills:</b>  <b>Key Core Powerful</b>	<p>Key The magic number is 2:8:8:2</p> <p>Metals and non metals react ionically, producing ions</p> <p>Non metals reaction with non metals bond covalently (which produces molecules)</p> <p>Within metals the bonding is metallic</p> <p>Core The movement of charged particles allows a substance to be an electrical conductor</p> <p>Dot and cross diagrams can be used to represent the atoms in a compound as well as an atom</p> <p>The allotropes of carbon have structures which give rise to different properties</p> <p>Powerful The properties of materials link to DT and in some aspects to Physical geography</p>	<p>Key Magnifications can be calculated</p> <p>The organelles and structures of any cell have specific functions including for specialised cells</p> <p>Cells replicate by mitosis are diploid</p> <p>Gametes are made through meiosis and are haploid</p> <p>Core Cells are adapted to particular functions, including the absorption and removal of products</p> <p>Osmosis is the movement of water molecules from High to low concentration through a semi permeable membrane</p> <p>The role and characteristics of stem cells in animals and plants</p> <p>Powerful Links to other aspects of science, e.g later in Biology, Health and social care and child development</p>
<b>End points covered:</b>	<p>The understanding that matter is organised into different categories based upon structure, how the different elements are arranged and that these give rise to distinctive properties.</p>	<p>Understanding of core concepts of “the cell”</p>
<b>NC/Spec coverage:</b>	<p>2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.8, 2.3.1, 2.3.2, 2.3.3, 2.4.1, 2.4.2</p>	<p>1.1.1, 1.1.2, 1.1.3, 1.1.5, 1.3.1, 1.3.2, 1.3.3 2.3.2</p>
<b>Cross-curricular links:</b>	<p>Properties of materials links to Physical geography</p> <p>Links to DT</p>	<p>Links to Physical Geography</p> <p>Links to Sport Science</p>
<b>Assessments:</b>	<p>FMW tasks</p>	<p>FMW tasks</p>
<p><i>Other academy intent priorities</i></p>		
<b>Curriculum Careers -</b>	<p>Industrial chemist</p> <p>Forensic Science</p>	<p>Teacher</p> <p>Biologist</p>

Gatsby 4	Teaching Pharmacy/medicine Plastics engineer Automotive design Teacher	Microbiologist Medicine
<b>Culturally rich</b> – broadening horizons	Opportunities to; <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- develop understanding of the materials used in affluent countries and how these are often sourced from less affluent countries and the effects of this</li> <li>- discuss role of scientists from different cultures and beliefs</li> </ul>	Opportunities to; <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- discuss the effects of disparities in medical care across the globe</li> </ul>

Year 9				
	Spring 1	Spring 1	Spring 1	Spring 1
<b>Unit title:</b>	P3 Energy Resources	B2 Cell division	B3 Organisation and digestion	C5 Chemical changes
<b>Unit length:</b>	5 lessons	4 lessons	7 lessons	8 lessons + 2 practical time
<b>Key concepts:</b>	Energy is generated using energy transfers  Energy resources can be renewable or non-renewable	Cells divide for growth and repair – mitosis  Cells divide by meiosis to produce gametes	There is a hierarchy of complexity  Enzymes are biological catalysts and are involved in most reactions in the body	There are a range of types of chemical reactions which have predictable reactants and products  Electrolysis uses DC current to decompose ionic liquids and solutions
<b>Knowledge/ Skills:</b>  <b>Key Core Powerful</b>	Key Understand the different forms of energy and transfers Core Understand that other than solar, electricity production involves the transfer of kinetic energy to a turbine  Powerful Links to energy transfers on chemistry	Key Cells need to be replaced to grow or repair damage, this needs nutrition and energy  Core Stem cells are undifferentiated  The ethical implications of the use of embryos	Key The structure and action of enzymes linked to digestion Core The parts, adaptations and roles of the different parts of the digestive system The importance of temperature and pH  Powerful Links to homeostasis in biology Links to energy changes in chemistry	Key The link between acid strength and degree of ionisation in water Core Understand that a more reactive element from the same group can replace a less reactive one  Powerful Links to metal extraction and aspects of the resources topic in chemistry

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		Powerful Links to reproduction in biology		
<b>End points covered:</b>	Understanding that all particles carry an abstract quantity labelled as energy that can be stored in different stores, which can be transferred between stores or between systems but is always conserved. In some forms energy cannot be observed and has the potential to do work; in others it causes movement of particles or whole systems.	Understanding of core concepts of “the cell”	Appreciation of the function of multicellular organisms	The understanding that different elements interact in predictable ways to form compounds. Appreciating that, and their compounds do this in predictable ways, with predictable energy, “amounts” and rates of reaction.
<b>NC/Spec coverage:</b>	1.3	1.1.4, 1.2.1, 1.2.2, 1.2.3	2.1, 2.2.1, 4.2.3	4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.2.6
<b>Cross-curricular links:</b>	Physical Geography Links to aspects of chemistry Some links to numerical skills	Links to Child development and Biology - inheritance, variation and evolution	Links to Homeostasis and response	Links to aspects of Biology and physics, .c. electrical cells
<b>Assessments:</b>	FMW tasks	FMW tasks	FMW tasks	FMW tasks
<i>Other academy intent priorities</i>				
<b>Curriculum Careers - Gatsby 4</b>	Heating engineer Research physicist Building inspector Power station operative	IVF nurse Livestock farmer Teacher Nurseman	Biologist Doctor Teacher Physical trainer Dietician	Research chemist Teacher Automotive design/ R&D Telecoms R&D
<b>Culturally rich – broadening horizons</b>	Opportunities to: <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- discussion of the varying energy needs in different countries and how different countries are developing the energy resources available to them</li> </ul>	Opportunities to: <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- discussions of topics such as the production of gametes</li> </ul>	Opportunities to: <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- discuss diet and lifestyle amongst and between populations</li> </ul>	Opportunities to: <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- a chance to discuss mineral resources and occurrence in different countries linked to their cultural heritage</li> </ul>

Year 9				
	Spring 2	Spring 2	Spring 2	Spring 2
<b>Unit title:</b>	C5 continued	B4 Organising animals and plants	P4 Electric currents	
<b>Unit length:</b>	See Spring 1	9 lessons	6 lessons	lessons
<b>Key concepts:</b>	See Spring 1	The reactants and products of the fundamental chemical reactions need to be transported to and from cells	Current is the rate of flow of charge It requires an electrical conductor to flow	
<b>Knowledge/ Skills: + practical time Key Core Powerful</b>	See Spring 1	<p>Key Substances can be transported as liquids, solutions or gases via diffusion, osmosis or active transport</p> <p>Core Transpiration moves water through plants</p> <p>Translocation moves glucose around plants</p> <p>Multicellular animals need a cardiovascular system and know its parts</p> <p>Use word and symbol equations where appropriate</p> <p>Powerful Links to Health and social care and sports science</p>	<p>Key The structure of circuits and the rules for potential difference and resistance</p> <p>Understand the role of conductors and of charged particles in the flow of charge</p> <p>Core Component symbols</p> <p>The circuit rules for series and parallel circuits including for resistance</p> <p>How a range of electrical devices work (and transfer energy)</p> <p>Understand and can use all of the relevant formulae</p> <p>Powerful Links to safety in the home, electronics and DT</p>	
<b>End points covered:</b>	See Spring 1	Appreciation of the function of multicellular organisms	Understanding that the two fields of electricity and magnetism are fundamentally and invariably linked, and as a result, the flow of electrically charged objects results in the existence of corresponding magnetic fields.	
<b>NC/Spec coverage:</b>	See Spring 1	2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2	2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.2, 2.5.1, 2.5.2	

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<b>Cross-curricular links:</b>	See Spring 1	Links to cells and to ecology in Biology to particle movement in Physics and rates of reaction in chemistry	Atoms and bonding in chemistry Links to electrolysis in energy changes (chem)	
<b>Assessments:</b>	FMW tasks Exam	FMW tasks Exam	FMW tasks Exam	
<i>Other academy intent priorities</i>				
<b>Curriculum Careers - Gatsby 4</b>	Heating engineer Research physicist Building inspector Power station operative	Dietician Physical trainer Nurse/Medical Teacher	Electrician Electrical engineer Stereo engineer	
<b>Culturally rich – broadening horizons</b>	See Spring 1	Opportunities to: - discuss changing ideas over time and cooperation between scientists - discuss medical disorders and diet (can be linked culturally)	Opportunities to: - discuss changing ideas over time and cooperation between scientists	

<b>Year 9</b>				
	<b>Summer 1</b>	<b>Summer 1</b>	<b>Summer 1</b>	<b>Summer 1</b>
<b>Unit title:</b>	P5 Electricity in the home	C7 Energy changes	B8 Photosynthesis	B9 Respiration
<b>Unit length:</b>	5 lessons	6 lessons	Lessons 4	Lessons 4
<b>Key concepts:</b>	The rate of energy transfer = power Safety features of a plug	Chemical reactions require an activation energy Some reactions transfer thermal energy to the environment, in other reactions energy is transferred from the environment to the products' chemical energy store	Plant produce glucose for energy There are a number of variables in Photosynthesis Limiting factors	Living things convert chemical energy into forms that allow them to perform "life processes" There are a number of variables in both forms of respiration Limiting factors
<b>Knowledge/ Skills:</b>	Key The idea of electrical conduction and insulation Charge takes the path of least resistance	Key Energy cannot be created or destroyed, only transferred between stores Chemical energy is stored in the bonds of compounds	Key The equation for photosynthesis Cell adaptations/specialisations	Key The equations for aerobic and anaerobic respiration
<b>Key</b>			Core	

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<b>Core Powerful</b>	Electrical power is the rate of flow of charge  Core Calculating electrical power Recognise the wiring and safety functions of a plug  Powerful Links to DT	Core Use of reaction profiles Calculation of bond energies  Powerful Links to energy transfers in Physics and weather in geography	The uses for the energy produced Required practical and variables Leaf structure and adaptations Limiting factors and excess  Powerful Links to all aspects of Biology, to Energy changes in Chemistry	Breathing is to exchange the gases involved in respiration  Core The uses for the energy produced The effects of exertion on the body The role of lactic acid and oxygen debt  Powerful Links to H&SC and Sports Science and Energy changes in chemistry
<b>End points covered:</b>	Understanding that the two fields of electricity and magnetism are fundamentally and invariably linked, and as a result, the flow of electrically charged objects results in the existence of corresponding magnetic fields.	The understanding that different elements interact in predictable ways to form compounds. Appreciating that they do this in predictable ways, with predictable energy, "amounts" and rates of reaction	Understanding of core concepts of "the cell" Understanding of how organisms interact with each other and with their environment	Understanding of core concepts of "the cell" Understanding of how organisms interact with each other and with their environment
<b>NC/Spec coverage:</b>	2.3.1, 2.3.2, 2.4.1, 2.4.2	5.1.1, 5.1.2, 5.1.3, 5.2.2	4.1.1, 4.1.2, 4.1.3	4.2.1, 4.2.2, 4.2.3
<b>Cross-curricular links:</b>	Links to electromagnets in Physics DT	Links to Energy, electricity and energy transfers in Physics	Links with Ecology (Biology), Energy changes (chemistry) Renewable and non-renewable energy in physics and geography	Links with Ecology (Biology), Energy changes (chemistry) Links to health and social care and Sports Science
<b>Assessments:</b>	FMW tasks	FMW tasks	FMW tasks	FMW tasks
<i>Other academy intent priorities</i>				
<b>Curriculum Careers - Gatsby 4</b>	Electrician Electrical engineer Stereo engineer Domestic heating engineer Teacher	Chemist Fuel science Teacher	Farmer Ecologist Conservationist	Physical trainer Dietician Medicine
<b>Culturally rich – broadening horizons</b>	Opportunities to: - can discuss differences in energy use in different countries, how this is changing and what might be required - discuss changing ideas over time and cooperation between scientists	Opportunities to: - discuss changing ideas over time and cooperation between scientists	Opportunities to: - Link to farming conditions in other countries and cultures - discuss changing ideas over time and cooperation between scientists	Opportunities to: - link to and discuss the varying energy needs of different populations and groups within populations - discuss changing ideas over time and cooperation between scientists



Year 9				
	Summer 2	Summer 2	Summer 2	Summer 2
<b>Unit title:</b>	C9 Crude oil and fuels		C13 Earth's atmosphere	
<b>Unit length:</b>	4 lessons		Lessons 4	
<b>Key concepts:</b>	Carbon makes 4 single covalent bonds (Bonding topic) Origin and definition of biomass Renewable and non-renewable energy sources		The earth is constantly changing and evolving due to biotic and abiotic factors  Greenhouse gases and their formulae	
<b>Knowledge/ Skills: Key Core Powerful</b>	KEY  Understand bonding  Understand how to write displayed and molecular formulae  CORE  The different homologous series, their properties, displayed formulae and their reactions links to Organic chemistry  Powerful  Fossil fuel as a sedimentary product (Geography)		KEY  Understand Photosynthesis and respiration and be able to write word and symbol equations  Understand that human's combustion of fossil fuels has an environmental impact  CORE  The factors responsible for the changes in amounts of atmospheric gases  Powerful  The impact of humans on the environment (Geography)	
<b>End points covered:</b>	Understand that Carbon compounds give rise to homologous series which have specific properties and structures		Appreciate that the evolution of the Earth's atmosphere has been and remains an ongoing due to a number of processes.	
<b>NC/Spec coverage:</b>	7.1.1, 7.1.2, 7.1.3, 7.1.4		9.1.1, 9.1.2, 9.1.3, 9.1.4, 9.2.1, 9.2.2, 9.2.3, 9.2.4	

<b>Cross-curricular links:</b>	Links to Geography Links to Photosynthesis, nutrient cycling and Ecology in Biology	Links to Geography Links to Photosynthesis, nutrient cycling and Ecology in Biology
<b>Assessments:</b>	FMW tasks Exam	FMW tasks Exam
<b><i>Other academy intent priorities</i></b>		
<b>Curriculum Careers -</b> Gatsby 4	Electrician Electrical engineer Stereo engineer	Plant science Ecologist Farmer Geologist / palaeontologist Petroleum geologist
<b>Culturally rich –</b> broadening horizons	Opportunities to: <ul style="list-style-type: none"> <li>- discussion of natural resources in different countries and how they are exploited both within and without</li> <li>- discuss changing ideas over time and cooperation between scientists</li> </ul>	Opportunities to: <ul style="list-style-type: none"> <li>- discuss changing ideas over time and cooperation between scientists</li> <li>- discussion of global responsibility for maintaining the environment</li> </ul>