

Term	Year 7			Year 8			Year 9		
	Topic	Knowledge	Skills/Assessment	Topic	Knowledge	Skills/Assessment	Topic	Knowledge	Skills/Assessment
Term 1	Induction topic	Basic lab skills, Gathering basic data, measuring using a stopwatch and thermometer. How to work safely.		Big idea 3 Objects can affect other objects at a distance.	All objects have an effect on other objects without being in contact with them. In some cases the effect travels from the source to the receiver in the form of radiation (e.g. visible light). In other cases, action at a distance is explained in terms of the existence of a field of influence between objects, such as a magnetic, electric or gravitational field. Gravity is a universal force of attraction between all objects, however large or small. It keeps the planets in orbit around the sun.	Describing patterns in graphs, Identifying how to make methods safe, Describing results from a table, Explain reasons for patterns, Identifying variables, Linking results to hypothesis. Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses. Assessment of Big ideas 1, 2 & 3 to report in whole school assessment window.	Big idea 6 All matter in the universe is made of very small particles	All matter is composed of tiny indivisible particles too small to see. These particles do not share the properties of the material they make up. There is nothing in the space between the particles that make up matter. The particles which make up matter are in constant motion in all physical states.	Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses. Assessment of Big ideas 1-6 & 8 to report in whole school assessment window.
	Big idea 1 Our solar system is a very small part of one of billions of galaxies in the universe.	The solar system comprises the sun, the eight planets, and other smaller objects orbiting it. Day and night and the seasons are explained by the orientation and rotation of the earth as it moves round the sun. The solar system is part of a galaxy of stars, gas and dust, one of many billions in the universe, enormous	Describing patterns in graphs, Drawing graphs, Writing conclusions, Writing hypothesis. Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses.						

		distances apart. Many stars appear to have planets.							
Term 2	Big idea 2 Organisms are organised on a cellular basis and have a finite life span.	All organisms comprise one or more cells. Multi-cellular organisms have cells that are differentiated according to their function. All the basic functions of life are the result of what happens inside the cells that make up an organism. Growth is the result of multiple cell divisions.	Creating risk assessments, Creating hypothesis, Linking results to hypothesis Explaining hypothesis, Calculating means Analysing data Evaluating validity, Evaluating reliability. Writing methods. Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses.	Big idea 4 Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms.	Food provides materials and energy for organisms to carry out the basic functions of life and to grow. Green plants and some bacteria are able to use energy from the sun to generate complex food molecules. Animals obtain energy by breaking down complex food molecules and ultimately depend on green plants as their source of energy source. In any ecosystem there	Identifying reproducibility, Identify ways to improve precision, Explaining scientific phenomenon, Using variables in experiments. Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses.	Big idea 7 Humans depend on the Earth for its resources.	Humans use natural resources for everything they do: for example, they use soil and water to grow food, wood to burn to provide heat or to build shelters, and materials such as iron or copper extracted from Earth to make cooking pans. They can obtain many materials including plastics from crude oil.	Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses.
							Big idea 8 Genetic information is passed down from one	Genetic information in a cell is held in the chemical DNA. Genes determine	Solve problems, make predictions and to develop

					is competition among species for the energy resources and materials they need to live and reproduce.		generation of organisms to another.	the development and structure of organisms. In asexual reproduction all the genes in the offspring come from one parent. In sexual reproduction half of the genes come from each parent.	scientific explanations Use scientific theories and explanations to develop hypotheses, Plan experiments to test hypotheses. Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses.
Term 3	<u>Big idea 2 continued....</u> Organisms are organised on a cellular basis and have a finite life span.	All organisms comprise one or more cells. Multi-cellular organisms have cells that are differentiated according to their function. All the basic functions of life are the result of	Creating risk assessments, Creating hypothesis, Linking results to hypothesis Explaining hypothesis, Calculating means Analysing data Evaluating validity, Evaluating reliability. Writing methods.	<u>Big idea 5</u> Changing the movement of an object requires a net force to be acting on it.	Force acting on an object is not seen directly but is detected by its effect on the object's motion or shape. If an object is not moving, the forces acting on it are equal in size and opposite in	Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses. Assessment of Big ideas 1-5 to report in whole school	<u>Big idea 8 continued</u> Genetic information is passed down from one generation of organisms to another.	Genetic information in a cell is held in the chemical DNA. Genes determine the development and structure of organisms. In asexual reproduction all the genes in the offspring come	Solve problems, make predictions and to develop scientific explanations Use scientific theories and explanations to develop hypotheses,

		<p>what happens inside the cells that make up an organism. Growth is the result of multiple cell divisions.</p>	<p>Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses.</p>		<p>direction, balancing each other. Since gravity affects all objects on earth there is always another force opposing gravity when an object is at rest. Unbalanced forces cause a change in movement in the direction of the net force. When opposing forces acting on an object are not in the same line they cause the object to turn or twist. This effect is used in some simple machines.</p>	<p>assessment window.</p> <p>Writing chemical formula, Drawing lines of best fit. Evaluate reliability, Writing methods. Using scientific terms like reproducible. Suggest ways to improve accuracy. Suggesting improvements to methods. Use various ways of representing data to suggest changes.</p>	<p><u>Big idea 9</u> The diversity of organisms, living and extinct, is the result of evolution.</p>	<p>from one parent. In sexual reproduction half of the genes come from each parent.</p> <p>All life is directly descended from a universal common ancestor that was a simple one-celled organism. Over countless generations changes resulting from natural diversity within a species led to the selection of individuals best suited to survive under certain conditions. Species not able to respond sufficiently to changes in their environment become extinct</p>	<p>Plan experiments to test hypotheses.</p> <p>Ongoing concept formative assessments. End of topic consolidation assessments. Weekly synoptic assessments and responses.</p> <p>Understand how scientific methods and theories develop over time,</p> <p>Use scientific theories and explanations to develop hypotheses.</p>
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Term	Year 10			Year 11		
	Topic	Knowledge	Skills/Assessment	Topic	Knowledge	Skills/Assessment
Term 1	C1- Atomic structure Link to Big idea 6	All matter is composed of tiny indivisible particles too small to see. These particles do not share the properties of the material they make up. There is nothing in the space between the particles that make up matter. The particles which make up matter are in constant motion in all physical states.	Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations, Use scientific theories and explanations to develop hypotheses, Understand how scientific methods and theories develop over time.	B2 – Homeostasis Link to Big idea 2	Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. In order to do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. In this section we will explore the structure and function of the nervous system.	Exam technique skills. Ongoing concept formative assessments. End of topic consolidation assessments Synoptic mock assessment (Cell biology ,organisation, infection and response, Atomic structure and the periodic table, Bonding, structure, and the properties of matter, Quantitative chemistry, Chemical changes, Particle model of matter, Atomic structure, Energy, Electricity, Homeostasis and response, Inheritance , variation and evolution Homeostasis, Energy changes, The rate and extent of chemical change, Organic chemistry, Chemistry of the atmosphere, Chemical analysis, Using resources Waves, Magnetism and electromagnetism)
	P1 – Radioactivity Link to Big idea 6	Ionising radiation is hazardous but can be very useful. Although radioactivity was discovered over a century ago, it took many nuclear physicists several decades to understand the structure of atoms, nuclear forces and stability. Today radioactive materials are widely used in medicine, industry, agriculture and electrical power generation	Ongoing concept formative assessments. End of topic consolidation assessments. Synoptic mock assessment (Cell biology/organisation/ infection and response, Atomic structure and the periodic table/ Bonding, structure, and the properties of matter, Quantitative chemistry/ Chemical changes, Particle model of matter/ Atomic structure, Energy/ Electricity)	B2 – Genetics Link to big idea 8	In this section we will discover how the number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Gene mutations occur continuously and on rare occasions can affect the functioning of the animal or plant. These mutations may be damaging and lead to a number of genetic disorders or death. Very	Mock exam B1, C1, P1, B2, C2, P2 Foundation B1, C1, P1, B2, C2, P2 Higher B1, C1, P1, B2, C2, P2 Triple
	B1- Cells & Microscopy Link to Big idea 2	All organisms comprise one or more cells. Multi-cellular organisms have cells that				

		are differentiated according to their function. All the basic functions of life are the result of what happens inside the cells that make up an organism. Growth is the result of multiple cell divisions. Stem cells and their uses. Transport in cells; diffusion, osmosis & active transport.			<p>rarely a new mutation can be beneficial and consequently, lead to increased fitness in the individual. Variation generated by mutations and sexual reproduction is the basis for natural selection; this is how species evolve. An understanding of these processes has allowed scientists to intervene through selective breeding to produce livestock with favoured characteristics. Once new varieties of plants or animals have been produced it is possible to clone individuals to produce larger numbers of identical individuals all carrying the favourable characteristic. Scientists have now discovered how to take genes from one species and introduce them in to the genome of another by a process called genetic engineering. In spite of the huge potential benefits that this technology can offer, genetic modification still remains highly controversial</p>	To report in whole school assessment window.
	P1- Particle model Link to Big idea 3	The particle model is widely used to predict the behaviour of solids, liquids and gases and this has many applications in everyday life. It helps us to explain a wide range of observations and engineers use these principles when designing vessels to withstand high pressures and temperatures, such as submarines and spacecraft.		B2- Ecology Link to Big idea 9	<p>The Sun is a source of energy that passes through ecosystems. Materials including carbon and water are continually recycled by the living world, being released through respiration of animals,</p>	

plants and decomposing microorganisms and taken up by plants in photosynthesis. All species live in ecosystems composed of complex communities of animals and plants dependent on each other and that are adapted to particular conditions, both abiotic and biotic. These ecosystems provide essential services that support human life and continued development. In order to continue to benefit from these services humans need to engage with the environment in a sustainable way. In this section we will explore how humans are threatening biodiversity as well as the natural systems that support it. We will also consider some actions we need to take to ensure our future health, prosperity and well-being.

B2- Natural cycles
 Link to Big idea 9

All materials in the living world are recycled to provide the building blocks for future organisms. The carbon cycle returns carbon from organisms to the atmosphere as carbon dioxide to be used by plants in photosynthesis. The water cycle provides fresh water for plants and animals on land before draining into the seas.

Term 2

					Water is continuously evaporated and precipitated.	
	B1 -Organisation Link to Big idea 2	In this section we will learn about the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. Damage to any of these systems can be debilitating if not fatal. Although there has been huge progress in surgical techniques, especially with regard to coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle.	Use scientific theories and explanations to develop hypotheses, Use scientific vocabulary, terminology and definitions, Use SI units. Present observations and other data using appropriate methods. Synoptic mock assessment (Cell biology/organisation/infection and response, Atomic structure and the periodic table, Bonding, structure, and the properties of matter, Quantitative chemistry, Chemical changes, Particle model of matter, Atomic structure, Energy, Electricity Waves, Electromagnetism, Space)	C2 Rates of Reaction Link to Big idea 6	Chemical reactions can occur at vastly different rates. Whilst the reactivity of chemicals is a significant factor in how fast chemical reactions proceed, there are many variables that can be manipulated in order to speed them up or slow them down. Chemical reactions may also be reversible and therefore the effect of different variables needs to be established in order to identify how to maximise the yield of desired product. Understanding energy changes that accompany chemical reactions is important for this process. In industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product. Whilst there may be compromises to be made, they carry out optimisation processes to ensure that enough product	Exam technique skills. Ongoing concept formative assessments. End of topic consolidation assessments Synoptic mock assessment (Cell biology ,organisation, infection and response, Atomic structure and the periodic table, Bonding, structure, and the properties of matter, Quantitative chemistry, Chemical changes, Particle model of matter, Atomic structure, Energy, Electricity, Homeostasis and response, Inheritance , variation and evolution Homeostasis, Energy changes, The rate and extent of chemical change, Organic chemistry, Chemistry of the atmosphere, Chemical analysis, Using resources Waves, Magnetism and electromagnetism, Ecology)
	C1 - Quantitative Chemistry Link to Big idea 6	Conservation of mass and balanced chemical equations. Relative formula mass. Mass changes. Chemical measurements and amounts. The titrations and higher level work will be	Ongoing concept formative assessments. End of topic consolidation assessments. Mock exam B1, C1, P1 Foundation B1, C1, P1 Higher			Mock exam

	<p>C1 – Metals & Acids Link to Big ideas 2 & 7</p>	<p>completed in year 11. This will be delivered by Chemistry specialists.</p> <p>Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organizing their results logically. Knowing about these different chemical changes meant that scientists could begin to predict exactly what new substances would be formed and use this knowledge to develop a wide range of different materials and processes.</p>	<p>B1, C1, P1 Triple To report in whole school assessment window.</p>	<p>C2 Organic Chemistry Link to Big idea 7</p>	<p>is produced within a sufficient time, and in an energy-efficient way.</p> <p>The chemistry of carbon compounds is so important that it forms a separate branch of chemistry. A great variety of carbon compounds is possible because carbon atoms can form chains and rings linked by C-C bonds. This branch of chemistry gets its name from the fact that the main sources of organic compounds are living, or once-living materials from plants and animals. These sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Chemists are able to take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes and detergents.</p>	<p>B1, C1, P1, B2, C2, P2 Foundation B1, C1, P1, B2, C2, P2 Higher B1, C1, P1, B2, C2, P2 Triple To report in whole school assessment window.</p>
	<p>P1 – Energy transfer Link to Big idea 4</p>	<p>Energy can be transferred usefully, stored or dissipated, but cannot be created or destroyed. Explain where there are energy transfers in a closed system, that there is no net change to the total energy. Describe how in all system changes energy is dissipated, so that it is stored in less useful ways. This energy is often described as being ‘wasted’.</p>		<p>C2 Earth’s Resources Link to Big idea 7</p>	<p>Industries use the Earth’s natural resources to manufacture useful products. In order to operate sustainably, chemists seek to minimise the use of limited</p>	
	<p>P1- Energy calculations Link to Big idea 4</p>	<p>The concept of energy emerged in the 19th century. The idea was used to explain the work output</p>				

of steam engines and then generalised to understand other heat engines. It also became a key tool for understanding chemical reactions and biological systems. Limits to the use of fossil fuels and global warming are critical problems for this century. Physicists and engineers are working hard to identify ways to reduce our energy usage.

resources, use of energy, waste and environmental impact in the manufacture of these products. Chemists also aim to develop ways of disposing of products at the end of their useful life in ways that ensure that materials and stored energy are utilised. Pollution, disposal of waste products and changing land use has a significant effect on the environment, and environmental chemists study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised.

C2 Analytical Chemistry

Link to Big idea 7

Analysts have developed a range of qualitative tests to detect specific chemicals. The tests are based on reactions that produce a gas with distinctive properties, or a colour change or an insoluble solid that appears as a precipitate. Instrumental methods provide fast, sensitive and accurate means of analysing chemicals, and are particularly useful when the amount of chemical being analysed is small. Forensic scientists and drug control

					<p>scientists rely on such instrumental methods in their work.</p>	
				<p>P2 Forces Link to Big idea 5</p>	<p>Engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. Anything mechanical can be analysed in this way. Recent developments in artificial limbs use the analysis of forces to make movement possible.</p>	
				<p>P2 Waves Link to Big idea 3</p>	<p>Wave behaviour is common in both natural and man-made systems. Waves carry energy from one place to another and can also carry information. Designing comfortable and safe structures such as bridges, houses and music performance halls requires an understanding of mechanical waves. Modern technologies such as imaging and communication systems show how we can make the most of electromagnetic waves.</p>	
				<p>P2 Space (Triple only) Link to Big idea 1</p>	<p>Questions about where we are, and where we came from, have been asked for thousands of years. In the past century, astronomers and astrophysicists have</p>	

	<p>antibiotics have been developed which have proved successful against a number of lethal diseases caused by bacteria. Unfortunately many groups of bacteria have now become resistant to these antibiotics. The race is now on to develop a new set of antibiotics.</p>				<p>opportunity to work on mathematical along with how science works elements of the GCSE. This will also be delivered through content concepts or a visual material. Repetition in this area will support students in accessing exam work such as data analysis graph plotting and writing methods. Higher ability groups will focus on some of the higher-level maths skills such as physics formula and tangents/rates from graphs.</p>	
<p>B1 – Health Link to Big idea 2</p>	<p>Health is the state of physical and mental well-being. Diseases, both communicable and non-communicable, are major causes of ill health. Other factors including diet, stress and life situations may have a profound effect on both physical and mental health.</p>			<p>Key concepts</p>	<p>Concepts will be identified using a combination of QLA along with past paper analysis. Each key concept is to be delivered in a striped down format with explicit communication of key points. The concept will then be accessed through exam questions and students are to be challenged through out of context questions/scenarios. Each set of key Concepts are designed to challenge the depth of students understanding to provide a stable platform to access potentially difficult material</p>	
<p>C1 - Energy changes in reactions Link to Big ideas 2,4 & 6</p>	<p>Chemical reactions can occur at vastly different rates. Whilst the reactivity of chemicals is a significant factor in how fast chemical reactions proceed, there are many variables that can be manipulated in order to speed them up or slow them down. Understanding energy changes that accompany chemical reactions is important for this process.</p>					
<p>P1 – Particles in action Link to Big idea 7</p>	<p>Electric charge is a fundamental property of</p>					

		<p>matter everywhere. Understanding the difference in the microstructure of conductors, semiconductors and insulators makes it possible to design components and build electric circuits. Many circuits are powered with mains electricity, but portable electrical devices must use batteries of some kind. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing and control.</p>			<p>on GCSE exams. It is the intention that delivery of key Concepts and in particular analysis and accessibility of questions, will skill students in detecting and avoiding unfamiliar context.</p>	
	<p>C1- Electrolysis Link to Big idea 6</p>	<p>When an ionic compound is melted or dissolved in water, the ions are free to move about within the liquid or solution. These liquids and solutions are able to conduct electricity and are called electrolytes. Passing an electric current through electrolytes causes the ions to move to the electrodes. Positively charged ions move to the negative electrode (the cathode), and negatively charged ions move to the positive electrode (the anode). Ions are discharged at the electrodes producing elements. This process is called electrolysis.</p>		<p><u>Key Themes</u></p>	<p>This aspect aims to build on the Key concepts and improve students ability to map across the specification and topics. In contrast to the key concept delivery (explicit) this aims to look at a theme or ideas surrounding science. The theme will run through several areas of the curriculum and aim to pull them together under an umbrella idea.</p>	

Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. In order to do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. In this section we will explore the structure and function of the nervous system.

B1 – Plant Biology
 Link to Big idea 4

Linking the structures of plant tissues and organs to their functions. These include photosynthesis, translocation and transpiration.

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