



Science Curriculum Map



KEVI HWGA Curriculum Map

Curriculum Purpose:

Context	Beyond KEVI HWGA:	<p>Science can lead to further education through either degree level studies or apprenticeships in a wide variety of areas linked to the three specialisms or Biology, Chemistry and Physics.</p> <p>Science can lead to a wide range of career options linked to each of the science areas.</p> <p>Biological Careers: Aerobiologist - Agricultural Scientist – Bioinformatician – Biomechanics Engineer – Biomedical engineer or researcher – Biophysicist – Biostatistician – Cell Biologist – Conservationist – Cryobiologist – Cytologist – Ecologist – Ecotoxicology – Embryologist – Endocrinologist – Entomologist – Forensic Psychologist – Forensic Scientist – Geneticist – Genomics – Immunologist – Marine Biologist – Molecular Biologist – Pharmacologist – Teaching - Toxicologist – Veterinarian – Virologist – Zoologist</p> <p>Chemistry Careers: Analytical Chemist – Biochemist – Chemical Engineer – Cheminformatics – Cosmetic Chemist – Crystallographer – Food Technologist – Forensic Scientist – Geochemist – Immunologist – Laboratory Analyst – Manufacturing Chemist – Materials Engineer – Organic or Inorganic Chemist – Pharmacist – Process Chemist – Product Developer – Researcher – Toxicologist – Quantum Chemist – Water Chemist</p> <p>Physics Careers: Aerospace Engineer – Acoustician – Applied Mathematician -Astronomer Atomic Physicist – Architect – Astrophysicist – Biophysicist – Chemical Physicist – Civil Engineer – Computer Physicist – Cosmologist – Cry physicist – Data analyst – Electrical Engineer – Electromagnetic Physicist – Fluid dynamics/mechanics physicist – Geophysicist – High Energy Physicist – Laser Physicist – Mechanical Physicist – Meteorologist – Molecular Physicist – Nanotechnologist – Nuclear Technician – Nuclear physicist – Optical Physicist – Particle Physicist - Patent analyst – Plasma Physicist – Quantum Physicists – Roboticist – X-ray Analysis</p> <p>And more careers!</p>
	KS5	<p>KS5 Biologists will be taken on a journey that inspires and nurtures a passion for the subject through an in-depth study of Biological Molecules, Cells, Organisms, Genetics, Energy Transfers, and links with the environment which is taught through theory, research, independent study, and practical work.</p> <p>KS5 Chemists will be taken on a journey that inspires and nurtures a passion for the subject through an in-depth study of physical chemistry, Inorganic Chemistry and Organic Chemistry through theory, research, independent study, and practical work.</p> <p>BTEC Applied Science students will be taken on a journey of applied learning that brings together a wide knowledge and understanding of all three sciences with practical and technical skills. This is achieved through students performing vocational tasks</p>

	that encourage the development of appropriate vocational behaviours and transferrable skills such as communication, teamwork and research and analysis. Students will study a range of mandatory units such as Principles and Application of Science, Science Investigation skills and Contemporary issues in Science and then will undertake optional units.
KS4	When studying the combined science trilogy course, you will develop a knowledge and understanding of all major biological, chemical and physical concepts and will enhance your ability to apply this knowledge to a wide range of concepts within the scientific world. You will also enhance and refine the practical skills you developed in KS3 which will lead to a deeper understanding of how to work and think scientifically thus developing your analytical and evaluation skills. Through a study of science, we will foster a love of the subject and ensure you learn to see and understand the world through the eyes of a scientist.
KS3	At KS3 you will learn to develop an enquiring mind where you can; analyse patterns, draw conclusions, present data, communicate ideas, critique claims, justify opinions, collect data, plan variables, test hypothesis, estimate risk, review theories, and interrogate sources. You will do this through learning about 10 key concepts: Forces, Electromagnets, Energy, Waves, Matter, Reactions, Earth. Organisms, Ecosystems and Genes. These foundations of knowledge, practical and analytical skills will prepare you for a more in-depth study of science at KS4 and above
KS1/2 links	Students at KS1/2 are encouraged to experience and observe scientific phenomena and look closely at the natural and constructed world around them. They are encouraged to be curious and develop scientific enquiry skills by investigating their own questions. They will develop a basic scientific vocabulary. Students will be encouraged to look at interactions, relationships and functions and will develop their scientific skills further by observing changes over time, noticing patterns, grouping, and classifying and carrying out simple comparative tests using basic scientific equipment and writing basic conclusions. Students will study plants and be able to identify functions of each part, investigate water transport and pollination. They will study animals and learn that they gain nutrition from the food they eat and their basic life cycles and will understand the purpose of muscles and the skeleton. They will be able to state the basic functions of organs in the digestive system and be able to construct food chains as well as describing the human life cycle and basic variation. They will be able to group and classify rocks and simple describe how fossils form as well as being able to group materials according to their state of matter. They will know how to separate mixtures and know that dissolving and mixing are reversible They will understand they need light to see things and that it is reflected of surfaces, they will know how shadows form and that sound is created by vibrations that can travel through different medium. They will understand how magnets repel and attract and the basics of electrical circuits and the solar system and earth's rotation as well as the basics of forces and the interactions with other objects.



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Big Qs Linked to NC	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11	<p><i>How do engineers analyse forces and use this knowledge to design a great variety of machines and instruments? (P5 Forces)</i></p> <p>Students will learn about a wide variety of forces and their effects on a number of factors and how these can be used and applied to everyday activities and the world around us.</p> <p><i>Why is there a great variety in carbon compounds and how are they used in everyday life? (C7 Organic Chemistry)</i></p> <p>Students will learn that organic chemistry is so important it is its own branch of chemistry and that carbon compounds are so varied due to how carbon atoms can form chains and rings. Students will learn that organic molecules can be modified to make new and useful materials.</p> <p><i>How is genetic information passed from your parents to you and why are we so varied? What is the theory of evolution and what is the evidence that supports it (B6 Inheritance, Variation & Evolution)</i></p> <p>Students will learn how genetic information is halved in meiosis and how these</p>	<p><i>How do waves carry energy and how is our knowledge of waves used to design comfortable and safe structures? (P6 Waves)</i></p> <p>Students will learn about different types of waves, their properties, applications and uses are everyday life.</p> <p><i>What tests are used to detect chemicals and what are the positive results for these tests? (C8 Chemical Analysis)</i></p> <p>Students will learn the wide range of tests for detect specific chemicals and will put many of these tests into action so they can determine a positive result. Students will learn how precision is essential to these tests in industries such as forensic science and drug control.</p> <p><i>What powers our ecosystem and how are material cycled through it? How do organisms interact with each other and their environment and how are humans trying to manage ecosystems in a sustainable way (B7 Ecology)</i></p> <p>Students will learn about how animals are adapted to their environment and how they interact with other organisms, they will be able to analyse and determine energy losses through</p>	<p><i>How are electromagnetic effects used in a wide variety of devices? (P7 Magnetism & Electromagnetism)</i></p> <p>Students will learn how engineers make the use of the fact that a magnet moving in a coil can produce electric current and that when a current flows around a magnet it can produce movement.</p> <p><i>(C9 Chemistry of the atmosphere)</i></p> <p><i>Why is the Earth's atmosphere dynamic and forever changing? (C9 Chemistry of the atmosphere)</i></p> <p>Students will learn that the atmosphere has changes over time because of natural cycles and man-made influences. They will look at how scientists study these changes and the many variables that influence them as well as studying how human impact has affected the atmosphere.</p> <p><i>How do industries use the Earth's natural resources and how have chemists dispose of products? (C10 Using resources)</i></p> <p>Students will learn how industries use natural resources, chemists minimise the use of limited resources, energy, waste and environmental impact in the manufacture of products.</p>	<p><i>How do we use the analysis of Mock Papers to devise a revision programme?</i></p> <p>Students will be taught individually, in groups and as whole sets, areas of need based on the analysis of Mock Papers</p> <p><i>How do we revise and study independently?</i></p> <p>Students will be taught and practice a variety of revision techniques and apply these to their areas of need.</p> <p><i>What knowledge and understanding are required to successfully answer Required Practical Questions?</i></p> <p>Students will undertake or observe required practical and answer examination style questions based upon these.</p>		

	<p>combined with the genes from a sexual partner to form a new individual. They will learn how mutations can cause genetic disorders and how they can lead to variation that can then be a driver of evolution.</p>	<p>a system and explain and interpret how materials are cycled through an ecosystem as well as discussing methods for maintaining and measuring biodiversity in a habitat or ecosystem.</p> <p>How do we use the analysis of Mock Paper 1s to devise a revision programme?</p> <p>Students will be taught individually, in groups and as whole sets, areas of need based on the analysis of Mock Papers</p> <p>How do we revise and study independently?</p> <p>Students will be taught and practice a variety of revision techniques and apply these to their areas of need.</p> <p>What knowledge and understanding are required to successfully answer Required Practical Questions in Paper 1?</p> <p>Students will undertake or observe required practical and answer examination style questions based upon these.</p>	<p>How do we use the analysis of Mock Paper 2s to devise a revision programme?</p> <p>Students will be taught individually, in groups and as whole sets, areas of need based on the analysis of Mock Papers</p> <p>How do we revise and study independently?</p> <p>Students will be taught and practice a variety of revision techniques and apply these to their areas of need.</p> <p>What knowledge and understanding are required to successfully answer Required Practical Questions in Paper 2?</p> <p>Students will undertake or observe required practical and answer examination style questions based upon these.</p>			
Key Knowledge, Concepts, and skills	<p>Forces Organic chemistry Inheritance, variation & evolution. Application of knowledge, analysis of data, practical skills, evaluation, and analysis.</p>	<p>Waves Chemical analysis Ecology Analysis of strengths and areas of development, Revision Skills, knowledge and understanding of required practical.</p>	<p>Magnetism & Electromagnetism Chemistry of the atmosphere Using resources Analysis of strengths and areas of development, Revision Skills, knowledge and understanding of required practical.</p>	<p>Analysis of strengths and areas of development, Revision Skills, knowledge and understanding of required practical.</p>		
Feedback & Assessment	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities</p>	<p>AO1 Knowledge & Understanding of areas of need, revision techniques & paper 1 required practical AO2 Application of revision skills and Required Practical skills</p>	<p>AO1 Knowledge & Understanding of areas of need, revision techniques & paper 1 required practical AO2 Application of revision skills and Required Practical skills</p>	<p>AO1 Knowledge & Understanding of areas of need, revision techniques & paper 1 required practical AO2 Application of revision skills and Required Practical skills</p>		

	Assessment – P5, C7 & B6 EWT – Genetics & Evolution EWT- Motion Graphs	Assessment P6, C8 & B7 EWT- Wave comparison Paper 1 Biology Mock Paper 1 Chemistry Mock Paper 1 Physics Mock	Assessment P7, C9 & C10 EWT – Biology EWT – Chemistry EWT –Electromagnets & Physics (Based on teacher knowledge of class with a focus on Required Practical's)	Paper 2 Biology Mock Paper 2 Chemistry Mock Paper 2 Physics Mock		
Big Qs <i>Linked to NC</i>	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10	<p>How is the idea of energy used to explain the work output of devices and machinery and how physicists using their knowledge of energy to identify ways of reducing energy usage? (P1 Energy)</p> <p>Students will learn how energy is stored and changed and how we can calculate energy and efficiency of devices. Students will be able to analyse the pros and cons of a variety of methods for generating electricity as well as being able to explain trends in energy usage.</p> <p>How do chemists use the theories of structure and bonding to explain physical and chemical properties of materials? (C2 Bonding, Structure, and properties of matter)</p> <p>Students will learn about all the ways that elements can be bonded together, how these bonds determine the properties and will be able to discuss a number of specific examples.</p> <p>How do the digestive, respiratory and circulatory systems complete their bodily functions and how</p>	<p>Continue with P1 Energy</p> <p>Continue with B2 Principles of organisation.</p> <p>What is electricity and how do we measure it, what do we use it for and how? What kind of PowerStation's should we build for a sustainable future (P2 Electricity)</p> <p>Students will learn all about circuits and how to make them, they will be able to predict potential difference and currents across components in different circuits and will be able to calculate resistance and charge. They will be able to identify components by the way they behave and the IV graph they produce. They will understand power and different methods of electricity generation.</p> <p>How do we use quantitative analysis to determine the formulae of compounds and the equations for reactions? (C3 Quantitative Chemistry)</p> <p>Students will learn how to calculate relative formula mass and apply this to reactions and be able to look for patterns and make predictions about the behaviour of chemicals</p>	<p>Continue with P2 Electricity</p> <p>How does our knowledge of chemical change allow us to predict exactly what new substance will be formed? (C4 Chemical Changes)</p> <p>Students will learn about the reactivity of metals and will be able to predict how and whether metals will react. Students will investigate how metals can be extracted in a number of different ways and how salts are formed from acid and alkali reactions.</p> <p>What pathogens make us ill and how are they transmitted and how do they make us ill? How does the body defend against these pathogens? (B3 Infection & Response)</p> <p>Students will learn about the 4 main pathogens and will learn about specific infections and diseases. They will learn how they are transmitted, how they affect the body and how the body defends itself.</p>	<p>How can we use the particle model to predict behaviour of solids, liquids and gases and how do scientists use this knowledge to design submarines and spacecraft? (P3 Particle Model of Matter)</p> <p>Students will be able to explain changes in state using their knowledge of states of matter and internal energy and will investigate density and pressure and be able to explain its effects on objects and materials</p> <p>Why are energy changes important in chemical reactions and what is the energy used for? (C5 Energy Changes)</p> <p>Students will learn about exothermic and endothermic reactions and how the energy is used to break and form bonds and how the process of electrolysis occurs and is used.</p> <p>How do plants harness the Sun's energy and how is the oxygen used to transfer the energy organism need to perform their functions? (B4 Bioenergetics)</p> <p>Students will learn about the process of photosynthesis and how it is limited as well as the</p>	<p>What are the uses and dangers of ionising radiation and how have nuclear physicists learnt about the structure, forces, and stability of atoms? (P4 Atomic Structure)</p> <p>Students will learn about the development of the atomic model, radioactive decay and its dangers and the uses of radiation in medicine, industry agriculture and electrical power generation.</p> <p>What factors affect the rate of reactions and how do chemical engineers use this knowledge? (C6 Rate & extent of chemical change)</p> <p>Students will investigate what factors affect the rate of reaction and how to apply this knowledge to a variety of reactions and to the concept of maximising yield.</p> <p>How does the body effectively maintain and regulate internal conditions? (B5 Homeostasis & Response)</p> <p>Students will learn and investigate how the human body controls blood glucose, temperature and water levels and these automatic control systems may involve nervous</p>	<p>How do we revise and study independently?</p> <p>Students will be taught and practice a variety of revision techniques and apply these to their areas of need.</p> <p>What knowledge and understanding are required to successfully answer Required Practical Questions in Paper 1?</p> <p>Students will undertake or observe required practical and answer examination style questions based upon these.</p> <p>How do we use the analysis of Mock Papers to devise a revision/study programme for the summer holidays?</p> <p>Students will be taught individually, in groups and as whole sets, areas of need based on the analysis of Mock Papers and will be provided a question level analysis that highlights their strengths and areas for development.</p>

	<p><i>can damage to these systems be debilitating if not fatal?</i> (B2 Principles of Organisation)</p> <p>Students will learn the structure and function of the major organ systems of the body and will analyse what will happen to these systems if they are treated poorly and become damaged by human excesses</p>			processes of Anaerobic and Aerobic Respiration.	responses or chemical responses.	
Key Knowledge, Concepts and skills	Bonding, Structure, and properties of matter. Energy Principles of Organisation Application of knowledge, analysis of data, practical skills, evaluation, and analysis	Electricity Quantitative Chemistry Required Practical skills and understanding. Application of knowledge, analysis of data, practical skills, evaluation, and analysis	Electricity Chemical changes Infection & Response Application of knowledge, analysis of data, practical skills, evaluation, and analysis.	Particle model of matter Energy changes Bioenergetics Application of knowledge, analysis of data, practical skills, evaluation, and analysis.	Atomic structure Rate and extent of chemical change Homeostasis and response Application of knowledge, analysis of data, practical skills, evaluation, and analysis.	Required practical Revision Techniques Application of knowledge, analysis of data, practical skills, evaluation, and analysis. Plan
Feedback & Assessment	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities</p> <p>Assessment- C2 EWT – Ionic and covalent bonds EWT – Specific Heat Capacity Required Practical EWT – Enzymes Required Practical of Food test Required Practical</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities</p> <p>Assessment – P1, B2, C3</p> <p>EWT – Calculating resistance EWT – Metal Reactivity or Extraction</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities</p> <p>Assessment – P2, B3, C4</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities</p> <p>Assessment – P3, B4 & C5 EWT –</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities</p> <p>Assessment – P4, B5, C6</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities</p> <p>Mock Examination Biology Mock Examination Chemistry Mock Examination Physics</p>

Big Qs <i>Linked to NC</i>	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 9	<p>Chemistry – Mastery Level Matter</p> <p>Students will learn about atoms in more detail looking at the sub-atomic particles and the arrangement of electrons. They will learn what happens to atoms in chemical reactions and how chemical reactions transfer energy and why chemical reactions are important.</p> <p>Biology - Mastery Level Organisms</p> <p>Students will learn in more detail about unicellular and multicellular organisms. They will look in detail at the structure and function of organ systems such as the heart, respiratory and digestive system. They will investigate how substance move</p> <p>Physics Mastery Level Energy 2</p> <p>Students will learn how energy is stored and changed and the different transfers of energy in more detail. Students will be able to determine and explain energy changes for a variety of equipment. Students will be able to calculate work done and explain it.</p>	<p>Maths skills in science</p> <p>Students build upon the skills and core knowledge gained in year 7 and 8 in the areas of Number and algebra.</p> <p>Chemistry – Mastery level Reactions 2</p> <p>Students will learn about how chemical reactions can be useful and how they can make new substances such as medicines, fabrics and building materials. They will learn about chemical reactions in metals and acids. They will find out how to use patterns in properties to predict products and how salts are made.</p> <p>Biology mastery level - Ecosystems 2</p> <p>Students will learn about how we get energy from food. They will learn about how they body transfers energy from food so it can be used for movement, growth and repair by the process of respiration. Students will investigate how plants produce food by the process photosynthesis and look in detail the structure of the leaf.</p> <p>Physics mastery level- Forces 2</p> <p>Students will learn about forces in more detail. What resultant forces are and how to calculate resultant forces. They will learn how they arise and how they change the motion of an object.</p>	<p>Physics mastery level- Electricity 2</p> <p>Students will learn about what is happening inside a wire. They will learn about what is happening in a circuit and how you can model it. They will learn about what batteries do and how to use circuit components to do different jobs.</p> <p>Chemistry mastery level- States of matter</p> <p>Students will investigate in more detail about the particle model and look at heating and cooling curves. They will look at diffusion and gas pressure in more detail.</p> <p>Biology Mastery level- Genes</p> <p>Students will learn about the different living things around the world. They will find out the organisms that exist today have evolved, and how scientists are trying to prevent further species from becoming extinct and preserve biodiversity. They will learn about inherited characteristics from parents through genetic material, and how genetic material in some organisms is being modified.</p>	<p>What is the purpose of the periodic table and how was it developed using knowledge of atomic structure? (C1 Atomic structure and the periodic table)</p> <p>Students will learn that the periodic table provides chemists with a structured organisation of the known chemical elements so they can make sense of physical and chemical properties. Students will investigate the properties of elements and their placement in the periodic table and will learn how the development of scientific knowledge has led to the production of the current periodic table.</p>	<p>How do structural differences in cells allow them to perform their function and what feature of cells has allowed scientists to develop stem cell technology? (B1 Cell Biology)</p> <p>Students will learn the differences between cell types and will be able to analyse structures and determine their functions. They will learn how cells divide and produce new identical cells and will investigate how stem cell research is being used to repair cells, organs and grow new tissue.</p> <p>How can we use the particle model to predict behaviour of solids, liquids and gases and how do scientists use this knowledge to design submarines and spacecraft? (P3 Particle Model of Matter)</p> <p>Students will be able to explain changes in state using their knowledge of states of matter and internal energy and will investigate density and pressure and be able to explain its effects on objects and materials</p>	<p>What are the uses and dangers of ionising radiation and how have nuclear physicists learnt about the structure, forces and stability of atoms? (P4 Atomic Structure)</p> <p>Students will learn about the development of the atomic model, radioactive decay and its dangers and the uses of radiation in medicine, industry agriculture and electrical power generation.</p> <p>How do we use the analysis of End of Year examinations to devise a revision programme?</p> <p>Students will be taught individually, in groups and as whole sets, areas of need based on the analysis of Mock Papers</p> <p>How do we revise and study independently?</p> <p>Students will be taught a Nd practice a variety of revision techniques and apply these to their areas of need.</p>
Key Knowledge, Concepts and skills	Energy, organisms and matter Application of knowledge, analysis of data, practical skills, evaluation, and analysis	Reactions, Ecosystems, Forces Application of knowledge, analysis of data, practical skills, evaluation, and analysis	Electricity, genes, and states of matter. Application of knowledge, analysis of data, practical skills, evaluation, and analysis	Application of knowledge, analysis of data, practical skills, evaluation, and analysis	Atomic Structure and the periodic table Particle model of matter	Ecology Revision Techniques Required Practical skills and understanding.

					Application of knowledge, analysis of data, practical skills, evaluation and analysis	Application of knowledge, analysis of data, practical skills, evaluation and analysis
Feedback & Assessment	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities Assessment 1 – organisms, energy 2 and matter	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities Assessment 2 – Reactions 2, forces 2 and Ecosystems 2	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities Assessment 3 – electricity 2, Genes and states of matter	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities Assessment 1 – Atomic Structure and the periodic table	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities Assessment 1 – Cell Biology, Particle model of matter. EWT –STEM cells or cell division EWT – Density Required Practical	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via required practical and practical activities End of Year Assessment – All units covered
Big Qs <i>Linked to NC</i>	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 8	What is photosynthesis and why it is important? How can we test for the products of photosynthesis? How is a leaf adapted for photosynthesis? What and why is respiration important? How is aerobic respiration different from Anaerobic? What is fermentation? (Ecosystems) Students will investigate the importance and photosynthesis and carry out investigations to test for the products. They will learn about the structure of the leaf and how the leaf is adapted for photosynthesis. Students will be able to compare aerobic and anaerobic respiration. They will learn how living organisms break down organic molecules to enable all other chemical processes	Which light bulb is the most cost effective to run a filament bulb or a fluorescent? What are the energy transfers in a car or computer? What is work done and how do we measure it? How can we prevent heat loss? (Energy) Students will be able to compare the running costs of a variety of equipment and be able to calculate the running costs. Students will learn about different ways of generating electricity. Students will be able to determine and explain energy changes for a variety of equipment. Students will be able to calculate work done and explain it. Students will learn how to reduce energy loss by radiation, convection, and conduction. How are elements arranged in the periodic table? (The periodic table)	How do we revise and revisit learning? (Health Interleaving) Students will learn some revision techniques and apply them to the health unit How do you know when a chemical reaction has occurred and how can we determine reactivity? (Chemical Reactions) Students will investigate and learn about different reactions, what is formed when they react and be able to write word and formula equations. Students will undertake a variety of chemical reactions learning how to identify when a reaction has occurred and how to rank according to reactivity. How and why do humans vary from each other? How have these changes occurred over millions of years? (Adaptations and inheritance) Students will be explained how variation may have led to the	How do we revise and revisit learning? (Chemical Reactions Interleaving) Students will learn revision techniques and apply them to the Chemical Reactions unit What is the structure of the earth, what resources can we obtain from it? How has the atmosphere evolved and what factors continue to change its composition? (Earth) Students will be able to describe the structure of the earth and state how different forms of rocks and fossils are formed. Students will be able to determine what factors have changed the composition of the atmosphere and will be able to interpret graphs based on these changes. Students will look at what resources we can obtain from the earth and determine how we can use these in a sustainable manner	How do we revise and revisit learning? (Waves Interleaving) Students will learn revision techniques and apply them to the Chemical Reactions unit How do we revise and study independently, so we are successful in our End of Year Assessment? Students will be taught a Nd practice a variety of revision techniques and apply these to their areas of need.	What would be expected of me when completing a Required Practical? (Full Practical Write-ups) Students will embed their practical write-up knowledge. Students will be able to identify variables in a practical, collect valid data and identify errors. They will be able to graph their results and draw a valid conclusion What question can I investigate or what topic of interest can I improve my knowledge and understanding of? (Projects) Students will work in groups on a project of their choice and develop a wider knowledge and understanding of their

	<p>What are the differences in Current, Voltage and resistance in series and parallel circuits? How can we vary the strength of an electromagnet? What does the field pattern look like around the earth and how does this compare to a magnet? (Electromagnets)</p> <p>Students will be able to set up and draw series and parallel circuits and will be able to draw and identify components. Students will investigate the differences between series and parallel circuits in terms of current and voltage. Students will investigate how to increase an electromagnet's strength and what magnetic fields look like.</p>	<p>Students will be able to relate features of the particle model to the properties of materials in different states, sort elements using chemical data and relate this to the position in the periodic table. They will also compare the properties of elements with the properties of a compound formed from them</p>	<p>survival of one species and the extinction of another. Students will identify characteristics as inherited and environmental and be able to explain why they have grouped them as such. Students will be able to explain how genetic material is stored in a cell and how it passes from generation to generation</p> <p>How is speed calculated, what are motion graphs? how and why does pressure vary? (Motion and pressure)</p> <p>Students will investigate the variables that affect the speed of a toy car on a ramp. They will interpret motion graphs and will investigate why objects sink and float and what pressures are being applied.</p> <p>(This unit will carry on in Spring 2)</p>	<p>What are the key features of the digestive system and what are their functions? How do we maintain a healthy body and what factors can affect our organ systems? (Health and lifestyle)</p> <p>Students will undertake a journey through the digestive system and be able to explain the function of each part. Students will be able to determine diets for specific needs and will complete food tests for all the major food groups. Students will investigate how to maintain a healthy body and determine how the body fights infection. Students will also learn the structure and function of the main organ systems in the body.</p> <p>How do you know when a chemical reaction has occurred and how can we determine reactivity? What are polymers and their uses? (Metals and acids)</p> <p>Students will investigate how metals react with acids, oxygen and water, what they form when they react and be able to write word and formula equations. Students will undertake a variety of chemical reactions learning how to identify when a reaction has occurred and how to rank according to reactivity.</p>		<p>chosen area. Groups will present back to the class.</p>
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				(This unit will carry on in Summer 1)		
Key Knowledge, Concepts and skills	Ecosystems and electromagnets. Graph skills and understanding. Data analysis skills Application of knowledge, practical skills, evaluation and analysis	Energy Costs, Energy Transfer, Work Done and Heating and Cooling. Application of physical formulae. Graph skills for cooling curves. Evaluation of energy generation types.	Genes, inheritance, and evolution. Analysis of data. Hypothesis and predictions. Determining Variables. Measuring continuous and categorical data.	Earth structure, atmosphere, composition. Analysis of data atmospheric changes. Hypothesis and predictions of changes to the atmosphere and resources. Group work and discussion skills.	Revision Techniques Graph skills and understanding. Data analysis skills Application of knowledge, practical skills, evaluation and analysis	Practical skills; predictions, variables, data collection, error identification, graph skills and conclusions. Projects: Group work, self-motivation, research, organisation, presentation skills, confidence
Feedback & Assessment	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities. Unit 1 assessment – Ecosystems and electromagnetism.	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities Unit 2 assessment – Th periodic table and Energy	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities Unit 3 assessment – Adaptation and inheritance, Reactions, Motion, and pressure	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities Unit Assessment 4 – Metals and acids, Health and lifestyle, The earth End of Year Assessment – All units covered EWT – Graph Skills	AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities Yellow Sheets for Practical write up Yellow sheet for project work
Big Qs <i>Linked to NC</i>	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	<i>How do you conduct a science investigation safely and so you can obtain reliable and valid data?</i> <i>(Introduction to practical science)</i> Students will learn how to be safe in a laboratory and will conduct a practical determining variables and safety precautions as well as gathering valid data and writing a detailed conclusion. <i>What are the main features of an onion and cheek cell and how can we observe them?</i>	<i>What are multicellular organisms and how are they organised? Why do we breathe? What is the role of the skeleton? Why are joints and muscles important?</i> <i>(Body systems)</i> Students will learn the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. The structure and functions of the gas exchange system in humans, including adaptations to function. The structure and functions of the human skeleton, to include support, protection,	<i>What advice would you give a pregnant woman to ensure the embryo develops well and safely?</i> <i>(Human Reproduction)</i> Students will be able to label and describe the functions of the male and female reproductive systems. Students will learn about how genetic information is passed from parents and how to look after the development of a baby. Students will analyse data on gestation periods. <i>How do we revise and revisit learning?</i> <i>(Organisms Interleaving)</i>	<i>How can you separate a mixture of salt, sand, plastic beads, and iron filings?</i> <i>(Separating Mixtures)</i> Students will learn about pure substances and mixtures. They will complete investigations to separate a variety of mixtures and be able to explain what it is happening in each technique as well as being able to name the technique <i>How do we revise and revisit learning?</i> <i>(Particles Interleaving)</i> Students will learn revision techniques and apply them to the health unit	<i>How do you know when a chemical reaction has occurred and how can we determine reactivity?</i> <i>(Acids and alkalis)</i> Students will investigate how acid and alkalis react, what they form when they react and be able to write word and formula equations. Students will be able to explain the pH scale for measuring acidity/alkalinity and indicators. <i>What is our solar system made up of? How do we get different seasons and day lengths?</i>	<i>How do we revise and revisit learning?</i> <i>(Forces Interleaving)</i> Students will learn revision techniques and apply them to the health unit <i>How do we revise and study independently, so we are successful in our End of Year Assessment?</i> Students will be taught and practice a variety of revision techniques and apply these to their areas of need.

	<p><i>What are specialised cells and what are their functions?</i> <i>(Cells)</i></p> <p>Students will make microscope slides for a cheek and onion cell and will then be able to explain the structural differences and the organelle functions. Students will be able to explain the structural adaptations of some unicellular organisms. Students will explore the role of diffusion.</p> <p><i>What effect does gravity have on objects on different planets, what factors affect frictional forces and how and why does pressure vary?</i> <i>(Forces)</i></p> <p>Students will be able to explain what forces are and be able to use force arrows in diagrams, balanced and unbalanced forces. Students will investigate how to measure forces. Students will be able to explain how an astronaut's weight varies on their journey to the moon. Students will investigate a range of factors that affect friction. They will investigate why objects sink and float and what pressures are being applied</p> <p><i>What is the particle model and how to scientists use it to explain changes of state?</i> <i>(Particle model)</i></p> <p>Students will be able to relate features of the particle model</p>	<p>movement, and making blood cells.</p> <p><i>How does sound travel and how to scientists represent this in diagrammatic form?</i> <i>What are the key features of waves?</i> <i>(Waves- Sound)</i></p> <p>Students will investigate why sound cannot travel in a vacuum. Students will learn about the structure of the ear and hearing ranges for different animals.</p> <p><i>What are elements, atoms, and compounds? Where can all the elements be found? Why are formulas important?</i> <i>(Elements, Atoms, and compounds)</i></p> <p>Students will be able to explain the differences between atoms, elements, and compounds. Students will be able to write the chemical symbols and formulae for elements and compounds. They will be able to present observations and data using appropriate methods, including tables and graphs.</p>	<p>Students will learn revision techniques and apply them to the health unit</p> <p><i>How does light travel and how to scientists represent this in diagrammatic form?</i> <i>What are the key features of waves?</i> <i>(Waves- light)</i></p> <p>Students will investigate how light travels through different medium Students will learn the models used to represent waves and will be able to calculate reflection and refraction angles.</p>		<p><i>What are the different phases of the moon?</i> <i>(Space)</i></p> <p>Students will be able to understand that our Sun as a star, other stars in our galaxy, other galaxies. The light year as a unit of astronomical distance. They will be able to explain the seasons and the Earth's tilt, day lengths at different times of year, in different hemispheres.</p> <p><i>What is the interdependence of organisms in an ecosystem? How are organisms affected by their environment?</i> <i>(Interdependence)</i></p> <p>Students will be able to explain the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops. They will investigate how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.</p>	
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	to the properties of materials in different states. Students will investigate change of state and energy changes including diffusion in terms of the particle model.					
Key Knowledge, Concepts and skills	<p>Practical Skills Cell structure, Particles, and forces. Predictions, Variables, errors, conclusions, graph skills. Interpretation of graphs and data. Evaluation of practical and results. Use of a microscope. Biological diagrams.</p>	<p>Body systems, sound and elements, atoms, and compounds. Analysis of data. Hypothesis and predictions Variables</p>	<p>Human reproduction. Analysis of gestation periods. Separating Techniques Practical Skills Data analysis Interpretation of light diagrams. Measuring angles and analysing reflection and refraction patterns. Analysis of data.</p>	<p>Revision skills and revision techniques Independent study.</p>	<p>Revision Techniques Graph skills and understanding. Data analysis skills Application of knowledge, practical skills, evaluation, and analysis</p>	<p>Practical skills; predictions, variables, data collection, error identification, graph skills and conclusions. Projects: Group work, self-motivation, research, organisation, presentation skills, confidence</p>
Feedback & Assessment	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities</p> <p>Unit 1 assessment – practical skills, cells, particles, forces.</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities</p> <p>Unit 2 assessment- sound, body systems and elements, atoms and compounds.</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities</p> <p>Unit 3 assessment – separation techniques, light and reproduction.</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities</p> <p>Unit Assessment 4 – Acids and alkalis, space and interdependence End of Year Assessment – All units covered</p>	<p>AO1 Knowledge & Understanding of Units AO2 Application of knowledge via a variety of taught examples AO3 Analysis & Evaluation via practical activities</p> <p>Yellow Sheets for Practical write up Yellow sheet for project work</p>