

Why do we teach Science?	How do we teach Science? (Key concepts and skills)
Science has been a fundamental part of human existence since	In Science we teach the students
the beginning of time and teaching science enables us to	1. How to design and conduct experiments safely.
understand and make sense of the world around us.	 Analyse and evaluate data and studies. To dovelop their subject knowledge through teaching the "ten big.
understanding for the world around them by thinking	ideas" in science. These ideas are the main concepts that are
analytically and to gain a better knowledge of how and why	covered across all three subject areas (Biology, Chemistry and
things function. It is more than just a set of facts and equations	Physics).
because we are constantly making discoveries that can lead to	4. To build on their scientific vocabulary to support with oral and
new and better products, methods and technologies that will	written communication.
allow us to Improve our lives.	5. To identify and address misconceptions in science.
What do we toach in Science?	How is Science personalised for our learners?
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YEAR 7	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	How are organisms adapted to function? Justify whether a substance is a solid, liquid or gas. Identify unknown substances using separation techniques.	Describe how energy is transferred in a range of real-life situations. How can variation help organisms adapt to their environment?	How do metals react? How can neutralisation reactions be used in a range of situations?	Predict how forces will change the motion of an object. How do organisms depend on each other? How do plants reproduce?	What is the Universe made of? Explain how circuits work. What is the relationship between voltage and current?	How does light behave in different mediums? Reviewing all topics covered. How science works (skills and practical based).
Key concepts & skills	 Organisms (cells and transport) Safety in the lab Matter (particles and separation techniques) 	 Energy (transfers and costs) Calculations Genes (Reproduction) 	Reactions (metals and acids)	 Forces (speed and gravity) Ecosystems (interdependence) 	 Earth (Earth structure and Universe) Electricity (circuits) 	 Waves (Light) Scientific enquiry project Revision
Summative Assessment	End of unit test for organism and Matter.	End of unit test for Energy and Genes.	End of unit test for Reactions	End of unit test for Forces and Ecosystems	End of unit test for Earth and Electricity	End of topic test for Waves End of year exam.
Builds on	Cell organisation Model of matter	Uses of energy. Linking adaptation to survival.	Making predictions and testing hypothesis.	Ideas on forces. Relationship between all living organisms.	Particles and how rocks were formed. Analogy of how circuits work.	Linking energy to light waves. Exam technique on all units covered. Practical skills. Writing explanations.
Builds towards	How organ systems work. Elements and Periodic table.	Work being done and energy transfer in heating and cooling Inheritance and variation.	Different types of reactions.	Contact and non- contact forces. Chemical processes including respiration and photosynthesis.	Climate change and resources. Magnets and electromagnets.	Sound. End of KS3 exam.



YEAR 8	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	What is the role of organ systems in order to live? Recap of Year 7 Science	How are elements organised in the Periodic table? How could you get machines to do more work? How can you prevent heat loss? What makes us different?	What are the different types of chemical reactions? What factors can affect the speed or movement of an object?	What chemical processes allow us to live? What's your carbon footprint?	What are electromagnets used for? How can we change the volume and pitch of a sound?	Revision
Key concepts & skills	 Organisms (Breathing and digestion) Retrieval of Year 7 concepts 	 Matter (Elements and Periodic table) Energy (Work done/heating and cooling) Genes (inheritance and Variation) 	 Reactions (Types of reactions) Forces (contact and non-contact) 	 Ecosystems (Photosynthesis and respiration) Earth (Climate and resources) 	 Electricity (Magnetism) Waves (Sound) 	 Revisit Year 7 topics Revision all Year 7 and 8 topics Scientific enquiry
Summative Assessment	End of topic test on organism Year 7 and 8 Assessment Point test	End of topic test on Matter, Energy and Genes.	End of topic test on reactions and Forces	End of topic test on Ecosystems and Earth.	End of topic test on Electricity and Waves.	End of year exam. (includes Year 7 and 8 topics).
Builds on	Transport in cells. Year 7 Science	Particles involved reactions- why some are more reactive than others. Energy transfers. Reproduction.	Naming compounds and reactions with metals. Naming and identifying forces. Investigate factors/forces affecting speed.	Cell structure and function. Natural resources and their uses.	Simple circuits Energy transfer	Securing knowledge of big ideas across 7-8. Practical skills.
Builds towards	Compare transport mechanisms across cells.	How structure of atom links to reactivity. Using equations to calculate changes of energy. Structure of DNA and genetic diseases	Structure of atoms and how compounds are formed. Use equations to calculate forces.	Understand the difference between eukaryote and prokaryote Human impact on the environment.	Link between resistance, current and voltage Electromagnetic waves	KS4 exams.



YEAR 9	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Describe the cell structure of eukaryotes and prokaryotes. Explain cell division by looking at mitosis and the cell cycle. Use the periodic table to identify the mass number and atomic number of elements. Describe the electron structure for the first 20 elements.	Describe and Explain the transfer of Energy (GPE and KE). Calculate Specific Heat Capacity Describe transport in cells – diffusion, osmosis and active transport	Draw dot and cross diagrams for ionic compounds formed by metals in Group 1 and Group 2 with non – metals in Group 6 and 7.	Use particle theory to explain physical concepts such as density and pressure. Describe the structure and functioning of the human heart and lungs Describe the effect of lifestyle on some non- communicable diseases.	Explain the development of the periodic table Use the periodic table to identify the position of metals and non- metals Explain the trends in Group 1, Group 7 and Group 0. Identify the circuit symbols	Explain the atomic structure and radioactive decay.
Key concepts & skills	 Biology (cell structure) Biology (cell division) Chemistry atomic structure 	 Physics (Energy stores and changes) Biology (transport in cells) 	Chemistry (Chemical bonds, ionic, covalent and metallic)	 Physics (particle model of matter) Biology (Health – heart, blood and health issues) Biology (non-communicable diseases) 	 Chemistry (periodic table - Group 1,7 & 0) Electrical charge and current, Current, resistance and potential difference 	Physics (atomic structure, radioactive decay)
Summative Assessment	End of unit test for cells and Atomic Structure	End of unit test for energy stores and Transport	End of unit test for Chemical bonds	End of unit test for particle model of matter and Health	End of unit test for the periodic table and Electricity	End of year exams: All Biology, Chemistry and Physics topics.
Builds on	KS3 cells and atomic structure.	KS3 energy stores and cell transport	KS3 Periodic table (metals and non – metals)	KS3 Organ systems KS3 States of Matter	KS3 elements and the periodic table KS3 electricity (circuits, electrical charge and resistance)	KS3 HSW skills, maths skills and choosing suitable axes
Builds towards	Cell Biology – Structure and functions and reproduction Chemistry - Bonding	Cell transport in Animals and Plants Dissipation of energy	Properties of covalent structures.	Linking temperature, kinetic energy and pressure to explain and use ideal gas laws	Writing balanced chemical equations. Predicting the products of more complex chemical reactions Use graphs to determine whether circuit components are linear or non – linear.	Designing experiments with clearly defined variables. Evaluating data independently to draw valid conclusions.



YEAR 10 Combined Science	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Describe and explain how an organisms adaptations are related to their function. Use particle theory to explain physical concepts such as density and pressure. Describe how energy is transferred within and between systems. Calculate the changes in energy within a system.	Explain how the organ systems in our body work together to carry out their function. Describe the changes which occur in our bodies in response to a pathogen. Describe the features and characteristics of pathogens which cause disease in plants. Explain how electrical circuits work and use calculations and equipment to measure quantities such as current, resistance and potential difference.	Describe the processes of respiration and photosynthesis and explain their importance to living organisms. Use the principles of atomic structure to explain the process of nuclear radiation and evaluate its uses.	Describe the structure of the atom and explain how the electron arrangement is related to its physical properties. Use the principles of atomic structure to explain the characteristics of various compounds and their methods of bonding.	Use the principles of chemical bonding to predict the results of various chemical reactions. Use the periodic table to calculate relative formula masses and the amount of product formed in chemical reactions. Calculate the energy in bonds and determine whether certain reactions are exothermic or endothermic.	Reviewing all topics covered. How science works (skills and practical based). Required practicals Interpreting graphs and tables Drawing valid conclusions.
Key concepts & skills	 Biology (cell structure and organisation) Physics (energy transfers and calculations) Physics (particle model of matter) 	 Biology (organisation) Biology (infection and response) Physics (electricity) 	 Biology (bioenergetics) Physics (nuclear radiation) 	 Chemistry (atomic structure) Chemistry (bonding and structure) 	 Chemistry (chemical changes and quantitative chemistry) Chemistry (energy changes) 	 Required practicals Revision Study skills Data analysis and scientific enquiry
Summative Assessment	End of unit test for cells, energy and particles.	End of unit test for organisation, infection and response and electricity.	End of unit test for bioenergetics and nuclear radiation.	End of unit test for atomic structure and bonding.	End of unit test for chemical changes and energy changes.	End of year exams: Biology 1 Chemistry 1 Physics 1
Builds on	KS3 cells, solids, liquids and gases. Work being done and energy transfer in heating and cooling	KS3 how organ systems work, microbes and simple electrical circuits	KS3 chemical processes, including respiration and photosynthesis, elements and the periodic table	KS3 naming and drawing simple molecules	KS3 different types of reactions - physical and chemical changes. Elements and Periodic table.	KS3 HSW skills, maths skills and choosing suitable axes Making predictions and testing hypotheses.
Builds towards	Linking temperature, kinetic energy and pressure to explain and use ideal gas laws	Creating more complex electrical circuits to investigate different components such as diodes and thermistors	Writing balanced chemical reactions to represent processes within cells and calculating energy released during radioactive decay	Predicting the products of more complex chemical reactions and relating their properties to its structure	Calculating the percentage yield and using moles to write balanced chemical reactions	Designing experiments with clearly defined variables. Evaluating data independently to draw valid conclusions.



YEAR 11 Combined Science	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Key content	Use particle and collision theory to describe and explain how different factors affect the rate of reactions. Describe how Earth's atmosphere has changed over time and explain how human activity has impacted climate change.	Explain how different organs work together to maintain optimum conditions inside the body. Apply Newton's laws of motion to a variety of situations. Identify different types of waves and describe their uses.	How is variation achieved during sexual reproduction? Describe the features of organisms which make that suited to their habitat. Describe the properties of magnetic materials and how electromagnetic devices work.	Reviewing all topics covered. How science works (skills and practical based). Required practicals Interpreting graphs and tables Drawing valid conclusions.	Reviewing all topics covered. Identify which assessment objective is being assessed by reading and understanding what the questions is asking. Practice completing exam questions under timed conditions.
Key concepts & skills	 Chemistry (review Yr10 topics) Chemistry (rates of reaction) Chemistry (organic chemistry) Chemistry (early atmosphere) Chemistry (using resources) 	 Biology (homeostasis) Physics (forces) Physics (waves) 	 Biology (inheritance, variation and evolution) Biology (ecology) Physics (magnetism and electromagnetism) 	 Revision Exam practice Required practicals Data analysis and scientific enquiry 	 Revision Exam practice
Summative Assessment	Chemistry 1 assessment End of unit test for rates of reaction	End of unit test for homeostasis and forces	End of unit test for inheritance, variation & evolution and waves	End of unit test for ecology, magnetism and electromagnetism	External GCSE exams
Builds on	Year 10 chemical changes, particle model and data analysis. Climate change and resources.	Year 10 organ systems and KS3 contact and non- contact forces. Linking energy to light and sound waves.	KS3 Inheritance and variation. Magnets and electromagnets. Relationship between all living organisms.	Making predictions and testing hypothesis. Evaluating data independently to draw valid conclusions.	Identifying and understanding command words in exam questions.
Builds towards	Using information about the Earth's atmosphere to explain black body radiation	Linking forces and magnetism to explain the concept of electromagnetism.	Linking adaptation to evolution and survival.	Exam technique on all units covered. Developing practical skills.	Differentiating between assessment objectives.



YEAR 10 Biology	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Describe and explain how an organisms adaptations are related to their function. Investigate the effect of antibiotics on bacterial growth using agar plates.	Explain how the organ systems in our body work together to carry out their function. Identify risk factors for non-communicable diseases such as Type 2 diabetes.	Describe the changes which occur in our bodies in response to a pathogen. Evaluate the advantages and disadvantages of monoclonal antibodies.	Describe the features and characteristics of pathogens which cause disease in plants.	Describe the processes of respiration and photosynthesis and explain their importance to living organisms. Investigate the effect of light intensity on the rate of photosynthesis.	Reviewing all topics covered. How science works (skills and practical based). Required practicals Interpreting graphs and tables Drawing valid conclusions.
Key concepts & skills	Biology (cell structure)	➢ Biology (organisation)	Biology (infection and response)	Biology (infection and response)	➢ Biology (bioenergetics)	 Required practicals Revision Study skills Data analysis and scientific enquiry
Summative Assessment	End of unit test for cell structure	End of unit test for organisation	Mid-topic test for infection and response	End of unit test for infection and response	End of unit test for bioenergetics	End of year exam: Biology 1
Builds on	KS3 cells and specialised cells	KS3 how organ systems work.	KS3 health and disease	KS3 plant structure	KS3 photosynthesis and respiration.	KS3 HSW skills, maths skills and choosing suitable axes Making predictions and testing hypotheses.
Builds towards	Eukaryotes and Prokaryotes. Structure of biological molecules essential to life	Enzyme structure and function Adaptations of transport systems.	Explaining how the immune system works.	Plant pathogens and diseases.	Photosynthesis Role of liver and Respiration	Designing experiments with clearly defined variables. Evaluating data independently to draw valid conclusions.



YEAR 11 Biology	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
	Explain how different organs work together to maintain optimum conditions inside the body.	How is variation achieved during sexual reproduction?	Describe the features of organisms which make that suited to their habitat.	Reviewing all topics covered. How science works	Reviewing all topics covered. Identify which assessment
Key content	Describe how kidney dialysis works	Describe the structure of DNA. Explain the processes	Evaluate the impact of environmental changes on the distribution of species in an ecosystem.	(skills and practical based). Required practicals Interpreting graphs and	objective is being assessed by reading and understanding what the questions is asking.
	Investigate the effect of light or gravity on the growth of newly germinated seedlings.	involved in cloning. Describe the theory of evolution	Evaluate the efficiency of farming techniques.	tables Drawing valid conclusions.	Practice completing exam questions under timed conditions.
Key concepts & skills	Biology (homeostasis)	Biology (inheritance, variation and evolution)	➢ Biology (ecology)	 Revision Exam practice Required practicals Data analysis and scientific enquiry 	 Revision Exam practice
Summative Assessment	End of unit test for Homeostasis	December Centre Assessments (Biology 1)	End of unit test for inheritance, variation	March Centre Assessments (Biology 2)	External GCSE exams
Builds on	Year 10 organ systems and enzymes	Year 10 organisation and cell biology	KS3 Inheritance and variation and the relationship between all living organisms.	Making predictions and testing hypothesis. Evaluating data independently to draw valid conclusions.	Identifying and understanding command words in exam questions.
Builds towards	Nervous and hormonal homeostatic control.	Structure of DNA. Transport across cells. Stages involved in cell division.	Linking adaptation to evolution and survival.	Exam technique on all units covered. Developing practical skills.	Differentiating between assessment objectives.



YEAR 10 Chemistry	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Describe the structure of the atom and explain how the electron arrangement is related to its physical properties. Compare the differences between Group 1 elements and the	Use the principles of atomic structure to explain the characteristics of various compounds and their methods of bonding. Evaluate the use of	Use the principles of chemical bonding to predict the results of various chemical reactions. Investigate the reacting volumes of a strong acid and a strong alkali	Use the periodic table to calculate relative formula masses and the amount of product formed in chemical reactions. Calculate the number of moles in a given	Calculate the energy in bonds and determine whether certain reactions are exothermic or endothermic. Evaluate the use of hydrogen fuel cells in comparison with	Reviewing all topics covered. How science works (skills and practical based). Required practicals Interpreting graphs and tables
	transition metals.	nanoparticles.	by titration.	formula mass.	rechargeable cells and batteries.	Drawing valid conclusions.
Key concepts & skills	Chemistry (atomic structure)	Chemistry (bonding and structure)	Chemistry (chemical changes)	Chemistry (chemical changes and quantitative chemistry)	Chemistry (energy changes)	 Required practicals Revision Study skills Data analysis and scientific enquiry
Summative Assessment	End of unit test for atomic structure.	End of unit test for bonding and structure	End of unit test for chemical changes	End of unit test for quantitative chemistry	End of unit test for energy changes.	End of year exam: Chemistry 1
Builds on	KS3 atoms, elements and the periodic table	KS3 naming and drawing simple molecules	KS3 chemical reactions and chemical changes	KS3 conservation of mass theory	KS3 different types of reactions - physical and chemical changes.	KS3 HSW skills, maths skills and choosing suitable axes Making predictions and testing hypotheses.
Builds towards	Periodic table –trends Structure of the periodic table	Drawing a range of compounds and relating their properties to the structures	Writing balanced chemical equations to represent different reactions	Predicting the products of more complex chemical reactions	Calculating the energy changes in different reactions	Designing experiments with clearly defined variables. Evaluating data independently to draw valid conclusions.



YEAR 11 Chemistry	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Key content	Use particle and collision theory to describe and explain how different factors affect the rate of reactions. Explain the effect of changing conditions on equilibrium.	Describe the structure of hydrocarbons and evaluate their uses. Describe the differences between synthetic and naturally occurring polymers. Use chemical tests to identify ions in an unknown compound.	Describe how Earth's atmosphere has changed over time and explain how human activity has impacted climate change. Describe the Haber process and evaluate the use of NPK fertilisers.	Reviewing all topics covered. How science works (skills and practical based). Required practicals Interpreting graphs and tables Drawing valid conclusions.	Reviewing all topics covered. Identify which assessment objective is being assessed by reading and understanding what the questions is asking. Practice completing exam questions under timed conditions.
Key concepts & skills	 Chemistry (rates of reaction) 	Chemistry (organic chemistry)	 Chemistry (early atmosphere) Chemistry (using resources) 	 Revision Exam practice Required practicals Data analysis and scientific enquiry 	 Revision Exam practice
Summative Assessment	End of unit test for rates of reaction	December Centre Assessments (Chemistry 1)	End of unit test for organic chemistry and early Earth's atmosphere)	March Centre Assessments (Chemistry 2)	External GCSE exams
Builds on	Year 10 chemical changes, and data analysis.	Year 10 bonding and structure.	Year 10 climate change and resources.	Making predictions and testing hypothesis. Evaluating data independently to draw valid conclusions.	Identifying and understanding command words in exam questions.
Builds towards	Rates of reaction Role of a catalyst	Redox reactions Organic functional groups	Amines Polyesters and Polyamides	Exam technique on all units covered. Developing practical skills.	Differentiating between assessment objectives.



YEAR 10 Physics	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Use particle theory to explain physical concepts such as density and pressure. Explain how doing work on a gas leads to an increase in the temperature of the gas.	Describe how energy is transferred within and between systems. Calculate the changes in energy within a system. Investigate the effectiveness of different materials as thermal insulators.	Explain how electrical circuits work and carry out experiments to find the resistance of different components. Describe the production of static electricity, and sparking, by rubbing surfaces.	Use the principles of atomic structure to explain the process of nuclear radiation and evaluate its uses. Describe the processes of nuclear fusion and nuclear fission.	Describe the life cycle of a star. Explain how red shift provides evidence for the Big Bang Theory.	Reviewing all topics covered. How science works (skills and practical based). Required practicals Interpreting graphs and tables Drawing valid conclusions.
Key concepts & skills	Physics (particle model of matter)	Physics (energy)	Physics (electricity)	Physics (atomic structure and nuclear radiation)	Physics (Space physics)	 Required practicals Revision Study skills Data analysis and scientific enquiry
Summative Assessment	End of unit test for particles.	End of unit test for energy.	End of unit test for electricity.	End of unit test for atomic structure and nuclear radiation.	End of unit test for space physics.	End of year exams: Physics 1
Builds on	KS3 solids, liquids and gases.	KS3 work being done and energy transfer in heating and cooling.	KS3 simple electrical circuits.	KS3 structure of the atom and energy resources.	KS3 the Solar System and space	KS3 HSW skills, maths skills and choosing suitable axes Making predictions and testing hypotheses.
Builds towards	Linking temperature, kinetic energy and pressure to explain and use ideal gas laws.	Linking work done, energy and power to model physics situations.	Creating more complex electrical circuits to investigate different components such as diodes and thermistors.	Calculating energy released during radioactive decay.	Evaluate the evidence for the Big Bang theory and identify possible causes of dark energy.	Designing experiments with clearly defined variables. Evaluating data independently to draw valid conclusions.



YEAR 11 Physics	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
	Apply Newton's laws of motion to a variety of situations.	Identify different types of waves and describe their uses.	Describe the properties of magnetic materials and how electromagnetic	Reviewing all topics covered.	Reviewing all topics covered.
Key content	Calculate resultant forces acting on an object.	Describe how reflection, refraction and diffraction occur.	devices work.	How science works (skills and practical based). Required practicals	Identify which assessment objective is being assessed by reading and understanding what the
	Describe the motion of objects using key words such as speed and acceleration.			Interpreting graphs and tables Drawing valid conclusions.	questions is asking. Practice completing exam questions under timed conditions.
Key concepts & skills	Physics (forces)	Physics (waves)	 Physics (magnetism and electromagnetism) 	 Revision Exam practice Required practicals Data analysis and scientific enquiry 	 Revision Exam practice
Summative Assessment	End of unit test for forces	December Centre Assessments (Physics 1)	End of unit test for waves	March Centre Assessments (Physics 2)	External GCSE exams
Builds on	KS3 forces and their effects and Year 10 work done and energy transfer	KS3 light and sound and Year 10 heat energy transfer	KS3 Inheritance and variation. Magnets and electromagnets. Relationship between all living organisms.	Making predictions and testing hypothesis. Evaluating data independently to draw valid conclusions.	Identifying and understanding command words in exam questions.
Builds towards	Resolving forces and vectors to find the resultant force of an object.	Linking energy to light and sound waves.	Linking forces and magnetism to explain the concept of electromagnetism.	Exam technique on all units covered. Developing practical skills.	Differentiating between assessment objectives.



Year 12 Biology	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Transition to KS5-Have I got the foundation skills from GCSE? How can microscopes support evidence for roles of cells and organelles? What are the macromolecules that are essential to life?	How are nucleic acids essential to heredity in living organisms? How can we develop mechanisms for the administration of drugs? How can stem cells be modified?	How can we increase our use of enzymes in industry? How are substances transported in plants and animals?	How can medical intervention support our natural defences? Why do we need specialised exchange surfaces?	How have plants and animals evolved defences to deal with disease? How have classification systems changed our knowledge of organisms?	Revision Practical work
Key concepts & skills	 Development of practical skills Foundations in biology: Cell structure Biological molecules 	 Module 2 Foundations in biology: Nucleotides and nucleic acid Biological membranes Cell division 	 Module 2 Foundations in biology: Enzymes Module 3 Exchange and transport Transport in plants/animals 	 Module 4 Biodiversity, evolution and disease: Communicable diseases Exchange surfaces 	 Module 4 Biodiversity, evolution and disease: Biodiversity Classification and Evolution 	 Revision Exam skills
Summative Assessment	Transition test (biological molecules and cell structure)	AP1 assessment Foundations in biology	AP2 assessment Foundations in biology Enzymes and Exchange	AP3 assessment Foundations in biology Exchange and Disease	AP4 assessment Biodiversity and Evolution	End of year exam
Builds on	Eukaryotes and Prokaryotes. Structure of biological molecules essential to life.	Structure of DNA. Transport across cells. Stages involved in cell division.	Enzyme structure and function Adaptations of transport systems.	Pathogens and diseases. Adaptations of exchange surfaces.	Habitats and diverse community. Evolution.	
Builds towards	Functions of living organisms. Application of knowledge and understanding.	Understand roles of genetic info and metabolism. Cell communication. Stem cell uses.	Industrial uses of enzymes and induced fit model. Mechanisms of transport.	How the immune system works. Significance of SA:V ratio in exchange surfaces.	Maintaining biodiversity. Classification systems and impact of evolution.	



Year 13 Biology	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Key content	How does the nervous and endocrine system respond to stimuli? What biochemical pathways are involved in photosynthesis?	How do we remove toxic waste from our bodies? Where do we get our energy from?	How do we respond to environmental changes? How go genes regulate and control cell function and development?	What is biotechnology? Is artificial cloning necessary? How can we contribute to a climax community?	Exam period
Key concepts & skills	 Module 5 Communication, homeostasis and energy Homeostasis Neuronal and hormonal communication Photosynthesis 	 Module 5 Communication, homeostasis and energy: Excretion Respiration 	 Module 5 Communication, homeostasis and energy: Plant and animal responses Module 6 Genetics, evolution and ecosystems Cellular control and inheritance 	 Module 6 Genetics, evolution and ecosystems Ecosystems Populations and sustainability Cloning and biotechnology 	 Revision Final practical work (PAG non-exam assessment)
Summative Assessment	Transition from Year 12 Photosynthesis Homeostasis and communication.	Year 12 topics Photosynthesis and respiration.	Year 12 topics Module 5	Year 12 topics Module 6	Paper 1 Biological processes Paper 2 Biological diversity Paper 3 Unified biology
Builds on	Homeostasis Photosynthesis	Role of liver and kidneys Respiration	Responding to stimuli Genetic inheritance	Ecosystems and food webs. Microorganisms.	
Builds towards	Nervous and hormonal homeostatic control. Biochemical pathways to form ATP and glucose in photosynthesis.	Chemical pathways involved in removing waste. Biochemical pathways to form ATP in respiration.	Evidence of responses. Metabolic reactions linked with genes. Uses of DNA in medicine.	Efficiency of biomass. Uses of microbes in industry.	



Year 12 Chemistry	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Transition to KS5. Have I got the foundation skills from GCSE? How do I develop basic chemical skills in writing chemical formulae, constructing equations and calculating chemical quantities?	What are atomic orbitals and how are electron configurations linked to the periodic table?	How do I improve my knowledge and understanding of the important chemical ideas that underpin the study of inorganic and physical chemistry?	How do I explain the effect of the simple collision theory, catalysts and Boltmann distribution on reaction rates? How do I identify the functional groups of alkanes and alkenes?	How do I identify the functional groups in Organic chemistry? How do I use mass spectrometry to determine molecular mass?	Revision Practical work
Key concepts & skills	 Module 1 ▷ Development of practical skills Module 2 ▷ Foundations in Chemistry Atoms, ions and compounds. ▷ Amount of substance. ▷ Acids and redox 	 Module 2 ➢ Foundations in Chemistry ➢ Electrons and bonding ➢ Shapes of molecules. Module 3 ➢ Periodic table and energy ➢ Periodicity 	Module 3 ➤ Periodic table and energy ➤ Reactivity trends ➤ Enthalpy	 Module 3 ➢ Periodic table and energy ➢ Reaction rates and equilibrium Module 4 ➢ Core Organic chemistry ➢ Basic concepts of organic chemistry. 	 Module 4 Core Organic chemistry Alcohols, halo alkanes and analysis. Organic synthesis Analytical techniques 	 Revision Exam skills
Summative Assessment	Transition test (atoms, ions and compounds, amount of substance and acids and redox)	AP1 assessment Foundations in chemistry	AP 2 assessment Foundations in chemistry Reactivity trends Enthalpy	AP 3 assessment Foundations in chemistry Reaction rates and equilibrium	AP4 assessment Foundations in chemistry Alkanes, Alkenes Alcohols Organic synthesis Analytical techniques	End of year exam.
Builds on	Periodic Table Formulae and equations Mole calculations Mole and concentration Titration	Electron configuration Mendeleev Physical trends (melting points/boiling points)	Periodic table –trends Structure of the periodic table Combustion	Rates of reaction Role of a catalyst Hydrocarbons	Organic chemistry – functional groups Alcohols	
Builds towards	Reactivity trends Organic Chemistry Buffers and neutralisation.	Enthalpy Reactivity	Enthalpy cycles Boltzman distribution	How fast – rate equations and rate constants	Mass spectrometry Aromatic compounds	



Year 13 Chemistry	Autumn 1	Autumn 2	Spring 1 Spring 2		Summer 1
Key content	How do I determine reaction rates and p H by developing practical quantitative techniques?	How do I construct a Born – Haber cycle? How do I measure p H with a p H meter?	How do I identify the oxidising agent and reducing agent from redox equations? How do I identify the functional groups in Organic chemistry?	How do I consider multi-stage synthetic routes towards and organic product?	Exam period
Key concepts & skills	 Module 5 ➢ Physical chemistry and transition elements. ➢ Rates ➢ Acids, bases and buffers 	 Module 5 Physical chemistry and transition elements. Lattice Enthalpy Enthalpy and Entropy Acids, bases and buffers 	 Module 5 Physical chemistry and transition elements. Redox and electrode potentials Transition elements Module 6 Organic chemistry and analysis Aromatic compounds 	 Module 6 Organic chemistry and analysis Nitrogen compounds, polymers and synthesis Analysis 	 Revision Final practical work (PAG non-exam assessment)
Summative Assessment	Transition from Year 12 Rates Acids, bases and buffers	Year 12 topics Enthalpy Acids, bases and buffers	Year 12 topics Module 5	Year 12 topics Module 6	Paper 1 Periodic table, elements and physical chemistry Paper 2 Synthesis and analytical techniques Paper 3 Unified chemistry
Builds on	Reaction rates Neutralisation	Bronsted – Lowry acids and bases Hess cycle	Redox reactions Organic functional groups	Amines Polyesters and Polyamides Chromatography	
Builds towards	Redox chemistry	Quantitative practical work Use of logarithms and exponents.	Characteristic tests for carbonyl compounds.	MMR Spectroscopy	



YEAR 12 Physics	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Transition to KS5 Physics: Develop understanding of physical quantities, S.I. units, scalars and vectors. Can you model the motion of objects using maths and describe the effect forces have on objects?	Can you apply Newton's laws of motion to moving objects and explain how forces can cause deformation? Explain and understand the link between work done and energy transfer?	What are electrons and how do they behave in electrical circuits? Discuss the link between environmental damage from power stations and the impetus to use energy saving devices in the home.	Can you design and build electrical circuits to investigate the characteristics of different electrical components? Describe and explain the wave-particle duality of electromagnetic waves.	What is quantum physics? How can key concepts of quantum physics be used to explain physical phenomena such as wave interference? Revision	Revision of practical skills How is temperature measured? What is the difference between heat and temperature?
Key concepts & skills	 Math for physicists Motion Forces in action 	 Work, energy and power Materials Newton's laws 	 Charge and current Energy, power and resistance 	 Electrical circuits Waves 	 Quantum physics Revision of all topics Exam practice AO3 practice: Data analysis and scientific enquiry 	 PAG catch up Thermal physics
Summative Assessment	End of unit test for maths for physicists and forces	End of unit test for work, energy & power, materials and Newton's laws	End of unit test for charge & current and energy, power & resistance	End of unit test for electrical circuits and waves	Breadth in physics exam Depth in physics exam	End of unit test for thermal physics
Builds on	Rearranging maths equations. Resolving forces and vectors to find the resultant force of an object.	Linking force and acceleration. Describing the properties of different types of materials.	Applying electrical circuit equations to show how current, potential difference and resistance are linked.	Creating more complex electrical circuits to investigate different components such as diodes and thermistors	Using electron configuration to explain why electrons emit photons of radiation when they move to a lower energy level.	Designing experiments with clearly defined variables. Linking temperature, kinetic energy and pressure to explain and use ideal gas laws
Builds towards	Describe and analyse the motion of objects in both one-dimension and in two- dimensions.	Explain how pressure differences give rise to upthrust on an object in a fluid	Categorising all materials in terms of their ability to conduct.	Discuss how the double-slit experiment demonstrated the wave-like behaviour of light	Use the concept of photons to explain the photoelectric effect, de Broglie waves and wave–particle duality.	



YEAR 13 Physics	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key content	Can you use maths to model objects in circular motion? Explain what is meant by simple harmonic motion and resonance. Can you apply Newton's law of gravitation to objects in planetary motion?	Can you apply Kepler's laws of planetary motion to orbiting objects within our Solar System? Explain how Wein's displacement law, Stefan's law and Hubble's law provide evidence for the Big Bang theory.	Explain how capacitors can be used as a source of electrical energy in circuits. What is the difference between electric potential and electric energy? Use Faraday's law to describe how generators work.	Evaluate the benefits and risks to society of building nuclear power stations. Outline the defining characteristics of fundamental particles. Discuss the use of non-invasive techniques used in bosnitals	Revision Exam skills	Revision Exam skills
Key concepts & skills	 Circular motion Oscillations Gravitational fields 	 Astrophysics Cosmology 	 Capacitors Electric fields Electromagnetism 	 Nuclear and particle physics Medical imaging 	 Revision Exam practice MCQ practice AO3 practice: Data analysis and scientific enquiry 	
Summative Assessment	End of unit test for circular motion, oscillations and gravitational fields	Year 13 Mock 1: Depth in Physics exam paper	End of unit test for capacitors, electric fields and electromagnetism	Year 13 Mock 2: Modelling Physics exam paper	Year 13 Mock 3: Exploring Physics exam paper	External exams: Modelling Physics Exploring Physics Unified Physics
Builds on	Using oscilloscopes to analyse waves. Gravitational potential equation for uniform fields.	KS4 life cycle of a star. Use of forces to explain the main sequence phase of a star.	KS4 electromagnetism – explaining how devices work	KS4 nuclear radiation; hazards and uses.		
Builds towards	Discuss the limitations and benefits of using circular motion to model objects in our Solar System.	Evaluate the evidence for the Big Bang theory and identify possible causes of dark energy.	Linking all three fields; gravitational, electric and electromagnetic – using similar equations	Evaluating the use of radioactive tracers and crystals in medical imagery.		