

# Science Department: Curriculum Overview 2024-25

## Curriculum Intent:

*We aim that our curriculum allows every science student to develop a passion for learning and engagement in science lessons through practical based learning and problem-solving approaches. The curriculum will build from the skills and knowledge that students develop in key stage 2, having carefully considered students starting point to enable a smooth transition to secondary science. Then through their 5-to-7-year journey, it allows students to gradually build both skills and knowledge through the spiral curriculum that revisits key content and skills on a cyclic basis so that all students continue to progress and master concepts. The aim will be to tailor each student's journey to allow every student to access the curriculum and all pupils to truly excel in their future science qualifications.*

*The curriculum will aim to equip students to use the scientific method and understand 21<sup>st</sup> century science to apply their knowledge to the wider world and everyday life as well as allowing them to fully evaluate real world scientific claims relevant to their own lives. To do this we will try to ensure the curriculum;*

- Bases of science knowledge in the wider world and everyday life
- All lessons focus on the development of practical skills and problem-solving approaches.
- Equips students to use the scientific method in the real world to collect and interpret data for bettering their own lives, making decisions and evaluating scientific claims.
- Allows students to develop an understanding and awareness of the importance of following the health and safety regulations in everyday life and within a lab.
- Helps to develop students' language.

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Year 7	Term 1				Term 2			Term 3			End Points
	Intro	Term 1 Topic 1 Bio	Term 1 Topic 1 Phys	Term 1 Topic 1 Chem	Term 2 Topic 2 Bio	Term 2 Topic 1 Phys	Term 2 Topic 2 Chem	Term 3 Topic 3 Bio	Term 3 Topic Phys	Term 3 Topic 3 Chem	
<b>Topic</b>	<b>Safety, Measurements and using a Bunsen Burner</b>	<b>Cells</b>	<b>Forces</b>	<b>Matter</b>	<b>Ecosystems</b>	<b>Electricity</b>	<b>Earth and Space</b>	<b>Reproduction</b>	<b>Energy</b>	<b>Simple chemical reactions</b>	
<b>Skill</b>	<p>Identify risks in the Science lab and how to minimise them.</p> <p>Use a Bunsen burner safely.</p> <p>Chooses appropriate pieces of equipment and take accurate measurements.</p> <p>Draw scientific equipment using scientific conventions.</p> <p>Recording and presenting data</p>	<p>Biological drawings</p> <p>Preparing a temporary microscope slide</p> <p>Using a microscope</p>	<p>Planning a practical</p> <p>Identifying variables</p> <p>Writing a method</p> <p>Drawing graphs</p>	<p>Identifying risk and working safely in the lab</p> <p>Application of knowledge</p>	<p>Construct and interpret food chains/ webs</p>	<p>Constructing circuits safely and competently</p> <p>Drawing electrical circuits using scientific convention</p> <p>Recording data from a variety of meters</p>	<p>Evaluating models of the rock cycle, its processes and the solar system</p> <p>Application of knowledge</p> <p>Working safely in a lab</p> <p>Recording observations</p>	<p>Interpreting diagrams</p> <p>Recording results in an appropriate form</p> <p>Analysing given data</p>	<p>Using formula to carry out calculations</p>	<p>Writing balanced chemical equations</p> <p>Identifying risk and working safely in the lab</p>	
<b>Content</b>	<p>Safety in the science lab</p> <p>Correct and safe use of Bunsen burners</p> <p>Becoming acquainted with the equipment in the science lab.</p> <p>Learning to draw scientific equipment and becoming accustomed to using it to take measurements.</p>	<p>Animal and Plant Cells</p> <p>Bacteria &amp; Specialised Cell</p> <p>Microscopes</p> <p>Biological Drawing</p> <p>Organs and Organ Systems</p> <p>Skeleton/Muscle/Joint</p>	<p>Contact/Non Contact Forces</p> <p>Understanding speed, distance and time</p> <p>Understanding &amp; Comparing Journeys</p> <p>Mass and Weight</p> <p>Gravity</p> <p>Simple machines</p>	<p>Particle Model</p> <p>Solids Liquids and Gases</p> <p>Changes in state</p> <p>Diffusion</p> <p>Separating techniques</p> <p>Chromatography</p>	<p>Food chains and webs</p> <p>Toxins in the Environment</p> <p>Importance of Insects</p> <p>Interdependence and Competition</p> <p>Plant Reproduction</p> <p>Seed dispersal</p> <p>Invertebrate Classification</p>	<p>Electric circuits and energy in circuits</p> <p>Current, Voltage and Measuring</p> <p>Circuits</p> <p>Resistance</p> <p>Series Circuits</p> <p>Parallel Circuits</p> <p>Static Charge</p> <p>Safety and Control</p>	<p>Igneous Rocks</p> <p>Sedimentary Rocks</p> <p>Metamorphic rock</p> <p>The Rock Cycle</p> <p>Fossils</p> <p>The Earth &amp; Moon</p> <p>Solar System</p> <p>Seasons</p> <p>Day and Night</p> <p>Cycle of the Moon</p>	<p>Types of reproduction</p> <p>Reproductive systems</p> <p>Gametes and fertilisation</p> <p>Puberty and Menstrual cycle</p> <p>Pregnancy and birth</p> <p>Variation causes and importance</p> <p>Contraception</p>	<p>Energy transfers and fuel</p> <p>Energy Transfers</p> <p>Potential, elastic kinetic energy</p> <p>Rates of energy-Power and cost</p> <p>Rates of energy-Power and cost</p> <p>Energy and temperature</p> <p>Work</p> <p>Renewable and non renewable</p>	<p>Metals and Non Metals</p> <p>Displacement Reaction</p> <p>Oxidation</p> <p>Metals and Acids</p> <p>Acids and Alkalis</p> <p>Indicators</p> <p>Neutralisation</p>	

<b>Prior Knowledge Required</b>	At key stage 2 students should discuss identify risks and how to minimise them and selecting appropriate equipment to make measurements accurately.	Students will have studied plant and animal organs at key stage 3.  Specifically learning about the functions of tissues such as muscles, the skeleton and organs of the digestive and circulatory systems.	Students <u>should</u> have studied the effects of gravity acting between the earth and the falling object. They should have identified the effects of air resistance, water resistance and friction that act between moving surfaces.	Students should have look to group materials based on their properties, discussed the different states of matter and how to change between them.	Students will should have studied that we can group organisms based on their characteristics.	Students <u>should</u> be able to recall symbols for representing a simple circuit in a diagram. They should have constructed a simple series circuit identifying and naming the basic parts including cells, wires, bulbs, switches and buzzers.	Students should have studied the different types of rocks and their simple properties. Students should have some knowledge from KS2 regarding seasons, day and night.	Students should have studied life cycles, and understand that living things have to produce offspring.	Students should have studied light and sound, though this is not focused on these as types of energy there may have been discussion about this. They have also studied food and digestion and how food provides us with energy.	Students should have learnt about basic properties of materials including metals. As well simple observations of chemical reactions e.g. bubbling, fizzing, colour change.
<b>Feedback Points</b>	There is no written feedback for this section. Students will receive feedback in class.	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions
<b>Key Questions</b>	<p>What are the parts to a Bunsen burner?</p> <p>Can you identify the stages in lighting a Bunsen burner safely?</p> <p>Can you find a (named piece of glassware) in the lab and draw it following scientific convention?</p> <p>Can you recall the standard safety rules we must always follow in the lab.</p>	<p>What is the fundamental unit of living organisms?</p> <p>How can we observe, interpret and record cell structure using a light microscope</p> <p>What are the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts</p> <p>Identify the similarities and differences between plant and animal cells</p> <p>Explain the structure and functions of the human skeleton, to include support, protection, movement and making blood cells</p> <p>What is the interaction between skeleton and muscles,</p>	<p>What is speed?</p> <p>Describe the quantitative relationship between average speed, distance and time</p> <p>Show how a journey can be represented on a distance-time graph</p> <p>What is relative motion.</p> <p>What type of forces are exerted between objects- using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces</p>	<p>Explain the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure</p> <p>Describe changes of state in terms of the particle model.</p> <p>Identify the concept of a pure substance mixtures, including dissolving</p> <p>Explain diffusion in terms of the particle model</p> <p>Describe simple techniques for separating mixtures: filtration,</p>	<p>Highlight the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</p> <p>Explain the importance of plant reproduction through insect pollination in human food security</p> <p>Show how organisms affect, and are affected by, their environment, including the accumulation of toxic materials.</p>	<p>How is electric current measured</p> <p>Describe and draw series and parallel circuits</p> <p>What is potential difference,</p> <p>What is resistance and how can it be measure</p> <p>Explain the idea of static charge</p>	<p>Identify the composition and structure of the Earth</p> <p>Explain the rock cycle and formation of igneous, sedimentary and metamorphic rocks</p> <p>Explain the seasons, day and night, the Earth's tilt at different times of year, in different hemispheres</p> <p>Understand and create fossils</p>	<p>Explain reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems</p> <p>Describe the menstrual cycle, gametes, fertilisation, gestation and birth</p> <p>Identify the effect of maternal lifestyle on the foetus through the placenta</p> <p>Explain reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed</p>	<p>What is energy</p> <p>Compare energy values and power ratings of appliances in watts (W, kW)</p> <p>Compare amounts of energy transferred (J, kJ, kW hour)</p> <p>How can energy be quantified and calculated</p> <p>What are different types of fuels and energy resources.</p>	<p>How can we represent chemical reactions using formulae and using equations</p> <p>Explain oxidation and displacement reactions</p> <p>Define acids and alkalis in terms of neutralisation reactions</p> <p>What is the pH scale and why do we use it</p> <p>Explain indicators and its use in neutralisation</p> <p>What do reactions of acids with metals produce</p> <p>Explain how reactions of acids with alkalis</p>

		including the measurement of force exerted by different muscles  Describe the function of muscles and examples of antagonistic muscles.	What are contact and non-contact forces.  What forces are acting at a distance on Earth and in space,  State the forces between magnets  What is static electricity?	evaporation, distillation and chromatography the identification of pure substances				and fruit formation and dispersal		produce a salt plus water  Identify and explain displacement reactions	
<b>Direct Vocab Instruction</b>	Variable Hazard Apparatus	Organelles Cells Specialised cells Sub-cellular Microscope Magnification Specimen Organ Resolution	Motion Gravity Attraction Repulsion Contact	Diffuse Dense Evaporate Sublime Dissolve Filter	Competition Invertebrate Classification Accumulation Interdependent Ecosystem	Current Voltage Series Parallel Resistance	Igneous Metamorphic Sedimentary Hemisphere Sedimentation Compaction Planetology Erosion	Contraception Fertilisation Variation Gamete Foetus Fuse	Joules Resources Transfer Potential Kinetic	Oxidation Displacement Neutralisation Indicator Scale	
<b>Standardised Homework</b>	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question  Modelling concepts through diagrams	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question	Multiple choice quizzes  Exam style question  Research task	

Year 8				Term 2			Term 3			End Points
	Term 1 Topic 1 Bio	Term 1 Topic 1 Phys	Term 1 Topic 1 Chem	Term 2 Topic 2 Bio	Term 2 Topic 1 Phys	Term 2 Topic 2 Chem	Term 3 Topic 3 Bio	Term 3 Topic 3 Phys	Term 3 Topic 3 Chem	
<b>Topic</b>	<b>Human Body</b>	<b>Forces 2</b>	<b>Periodic Table</b>	<b>Bioenergetics</b>	<b>Magnetism</b>	<b>Advanced Chemical Reactions</b>	<b>Genetics</b>	<b>Waves</b>	<b>Earth and Atmosphere</b>	
<b>Skill</b>	Applying Biology to real life settings  Completing GCSE style questions	Carrying out scientific calculations	Using the Periodic Table  Explaining reactions in terms of electron structure	Recording results in an appropriate form  Analysing given data	Completing practical safely  Plotting magnetic fields	Using the Periodic Table  Writing balanced chemical equations	Producing punnet squares  Interpreting pedigree diagrams	Completing GCSE style questions	Justifying an opinion using Science- debate	
<b>Content</b>	Breathing (Lungs and measuring breathing)  Gas exchange and the effects of disease on gas exchange  Healthy lifestyle and the effects of drugs  Healthy Eating  Digestive system and organs  Enzymes	Equilibrium Drag Stretch and compression Pressure in solids and calculations Pressure in liquids Sinking and Floating Drag forces in parachutes	Atomic model  Electronic configuration  Exploring metals  Exploring non-metals  Elements and combining elements  Compounds and mixtures  Polymers  Ceramics and composites	Aerobic and Anaerobic respiration  Anaerobic respiration in sport and fermentation  Photosynthesis- testing photosynthesis  Parts of a leaf- iodine test  Gas exchange in plants  Movement and importance of minerals	Forces  Fields  Gravity and orbits  Magnetism  Uses of Electromagnets  Investigating the strength of electromagnets	Exothermic reactions  Endothermic reactions  Investigation  Catalysts  Combustion  Thermal decomposition  Law of conservation	Genetic material and chromosomes  Variation  Modelling variation  Human genome and genetic disorders  Natural selection  Biodiversity  Extinction	Transverse and longitudinal waves.  Properties of waves  Exploring sound  Detecting sound  Exploring light  Detecting light and colour  Reflection and refraction	Understanding the atmosphere  Carbon Cycle  Water Cycle  Global warming  Extracting metals  Human impact  Recycling and sustainability	
<b>Prior Knowledge Required</b>	In year 7 student learn about cells and microscopes. Then study tissues such as (the skeleton, Muscles), Joints and organs.  In key stage 2 students should have studies the digestive and circulatory systems.	In year 7 students study forces, speed, Distance and Times graphs, and Contact and Non-contact Forces. In key stage 2 students <u>should</u> have studied the effects of gravity acting between the earth and the falling object. They should have identified the	In year 7 students study particle model the changes of states and separating mixtures.	In year 7 students study energy in ecosystems and food chains. This will link to how energy is transferred in terms of the reactions taking place.	In key stage 2 students should have noticed that some forces need contact between two objects but that magnetic forces can act at a distance. They should have observed how magnets attract or repel each other and attract some materials but not others.	In year 7 students study types of energy. They also study chemical reactions.	In year 7 students study fertilisations and reproduction and touch on the  Basic principles of characteristics being passed on from one generation to the next.  In key stage 2 students study variation, how	In year 7 students study types of energy.  In key stage 2 students study both light and sound.	Students learn from KS2 through to year 7 about importance of recycling.  In year 7 pupils learn how the Earth has many natural resources.	

		effects of air resistance, water resistance and friction that act between moving surfaces					animals are suited to their environment that organisms change over time.			
<b>Feedback Points</b>	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions	Students will receive individual feedback based on short and long exam style questions  Research task
<b>Key Questions</b>	<p>What are the contents of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, Why each is needed?</p> <p>What are the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</p> <p>Identify and describe the tissues and organs of the human digestive system, including adaptations to function</p> <p>Explain how the digestive system digests food (enzymes simply as biological catalysts)</p>	<p>Explain the forces associated with deforming objects</p> <p>How is force measure</p> <p>Explain Hooke's Law</p> <p>Describe work done and energy changes on deformation</p> <p>What is the relationship between atmospheric pressure with height and weight</p> <p>Explain pressure in liquids and how it is measured</p> <p>Explain how drag forces change with increases in speed</p>	<p>State the varying physical and chemical properties of different elements</p> <p>Describe the principles underpinning the Mendeleev Periodic Table</p> <p>Summarise the Periodic Table: periods and groups; metals and non-metals</p> <p>Explain how patterns in reactions can be predicted with reference to the Periodic Table</p> <p>Describe the properties of metals and non-metals</p> <p>Explain the chemical properties of metal and non-metal oxides with respect to acidity.</p> <p>State the order of metals and</p>	<p>Explain aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life</p> <p>Write a word summary for aerobic respiration</p> <p>Explain the process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration</p> <p>Identify the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.</p>	<p>What are magnetic poles, attraction and repulsion</p> <p>Identify magnetic fields by plotting with compass, representation by field lines</p> <p>Describe the Earth's magnetism, compass and navigation</p> <p>Explain the magnetic effect of a current, electromagnets, D.C. motors (principles only).</p>	<p>Identify and explain exothermic and endothermic chemical reactions (qualitative).</p> <p>What is combustion and thermal decomposition</p> <p>Explain the idea of conservation of mass</p> <p>What catalysts do</p>	<p>What is the process by which genetic information is transmitted from one generation to the next</p> <p>What is the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model</p> <p>Explain differences between species</p> <p>Describe the variation between individuals within a species being continuous or discontinuous-include measurement and graphical representation of variation</p> <p>What is competition</p> <p>Explain how changes in the environment may leave individuals within a species, and some entire</p>	<p>What are waves</p> <p>Describe the properties of waves</p> <p>What are longitudinal and transverse waves</p> <p>Explain the similarities and differences between light waves and waves in matter</p> <p>Describe the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface</p> <p>Model the use of ray boxes to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing</p>	<p>Are resources on Earth limited?</p> <p>Explain the carbon and water cycle</p> <p>What is the composition of the atmosphere</p> <p>How do humans impact the climate</p> <p>What can we do to help save the planet</p>	

	<p>State the importance of bacteria in the human digestive system</p> <p>Identify the structure and functions of the gas exchange system in humans, including adaptations to function</p> <p>What is the mechanism of breathing- including simple measurements of lung volume</p> <p>Explain the impact of exercise, asthma and smoking on the human gas exchange system</p>		<p>carbon in the reactivity series</p> <p>Identify the use of carbon in obtaining metals from metal oxides</p> <p>Explain the properties of ceramics, polymers and composites (qualitative).</p>	<p>Explain the idea of plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.</p> <p>Identify and explain the role of leaf stomata in gas exchange in plants.</p> <p>Write the word summary for photosynthesis</p> <p>Explain the adaptations of leaves for photosynthesis.</p>			<p>species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction</p> <p>State the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.</p>			
<b>Direct Vocab Instruction</b>	<p>Obesity</p> <p>Exchange</p> <p>Enzymes</p> <p>Adaptation</p>	<p>Estimate</p> <p>Extension</p> <p>Equilibrium</p> <p>Upthrust</p>	<p>Atoms</p> <p>Elements</p> <p>Compounds</p> <p>Mixtures</p> <p>Polymer</p> <p>Monomer</p>	<p>Aerobic</p> <p>Anaerobic</p> <p>Photosynthesis</p> <p>Reactants</p> <p>Products</p>	<p>Field</p> <p>Attraction</p> <p>Repulsion</p>	<p>Thermal</p> <p>Combustion</p> <p>Decomposition</p> <p>Exothermic</p> <p>Endothermic</p>	<p>Variation</p> <p>Genetic</p> <p>Chromosomes</p> <p>Extinction</p> <p>Generation</p>	<p>Transverse</p> <p>Longitudinal</p> <p>Transmission</p> <p>Absorption</p> <p>Reflect</p> <p>Refract</p>	<p>Climate</p> <p>Extraction</p> <p>Sustainable</p> <p>Impact</p> <p>Atmosphere</p>	
<b>Standardised Homework</b>	<p>Multiple choice quizzes</p> <p>Exam style question</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p> <p>Research task</p> <p>Modelling through diagrams</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p>	<p>Multiple choice quizzes</p> <p>Exam style question</p> <p>Research task</p> <p>Modelling through diagrams</p>	

Year 9	Term 1		Term 2		Term 3			End Points
	Term 1 [Physics lessons]	Term 1 [Chemistry lessons]	Term 2 [Physics lessons]	Term 2 [Biology lessons]	Term 3 [Biology lessons]	Term 3 [Chemistry lessons]	Term 3 [Chemistry lessons]	
<b>Topic</b>	<b>Energy &amp; Matter</b>	<b>Atomic Structure and Periodic Table</b>	<b>Electricity</b>	<b>Cells</b>	<b>Bioenergetics</b>	<b>Structure &amp; Bonding</b>	<b>Energy Changes</b>	
<b>Skill</b>	<ul style="list-style-type: none"> <li>- Rearranging equations</li> <li>- Applying equations</li> <li>- Conduct core practical safely and competently.</li> </ul>	<ul style="list-style-type: none"> <li>- Using the Periodic Table</li> <li>- Writing balanced chemical equations</li> <li>- Explaining reactions in terms of electron structure</li> </ul>	<ul style="list-style-type: none"> <li>Re-arrange equations</li> <li>Apply equations to different contexts</li> <li>Using standard form</li> <li>Construct circuits safely and competently</li> </ul>	<ul style="list-style-type: none"> <li>Using microscopes</li> <li>Creating microscope slides</li> <li>Microscope calculations</li> <li>Identifying variables</li> </ul>	<ul style="list-style-type: none"> <li>Calculation of rate of reaction</li> <li>Identifying limiting factors</li> <li>Identifying variables</li> </ul>	<ul style="list-style-type: none"> <li>- Working out structure of ions and practice drawing these</li> <li>- Practical skills</li> <li>- Planning and writing a step-by-step method for a preparing a pure, dry sample of a salt</li> <li>- Recording results in an appropriate form</li> <li>- Analysing given data</li> </ul>	<ul style="list-style-type: none"> <li>-Rearranging equations</li> <li>-Applying equations</li> <li>-Conduct core practical safely and competently</li> <li>-Modelling of bond breaking and making</li> <li>-Taking accurate temperature readings</li> <li>-Measuring volumes of solutions using the meniscus.</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>- Potential and kinetic energy</li> <li>- Work done and power</li> <li>- Efficiency and dissipation</li> <li>- Density and changes of state</li> <li>- Internal energy</li> <li>- Specific heat capacity &amp; Latent heat</li> </ul>	<ul style="list-style-type: none"> <li>- Atomic structure &amp; history of the atom</li> <li>- Relative atomic mass, atomic number, isotopes &amp; electron configuration</li> <li>- Periodic table structure &amp; development of the periodic table</li> <li>- Group 1 alkali metals</li> <li>- Group 7 halogens &amp; their reactions</li> <li>- Group 0 and summary of reactions link to periodic table</li> <li>- Balancing equations and states of matter</li> <li>- Separating techniques</li> </ul>	<ul style="list-style-type: none"> <li>Charge, current and voltage</li> <li>Series and Parallel circuits</li> <li>Resistance</li> <li>Static electricity (fields, forces, charging objects)</li> <li>Resistance with thermistors and LDRs (graph-based task)</li> <li>RP16 IV characteristics</li> <li>Domestic uses and safety</li> <li>AC/DC</li> <li>National grid</li> <li>Plugs</li> <li>Electrical power and efficiency</li> <li>Revision</li> </ul>	<ul style="list-style-type: none"> <li>- Cell Types/ Cell Ultrastructure</li> <li>-DNA/ Chromosomes /Mitosis /Cell Division</li> <li>- Stem Cells</li> <li>- Cell Differentiation/ Cell Specialisation</li> <li>- Microscopes Intro/ Bio-viewers/ Calculations</li> <li>-Cellular Transport (Diffusion/ Osmosis/ Active Transport)</li> <li>- RP: Osmosis</li> </ul>	<ul style="list-style-type: none"> <li>- Recap of Prior Knowledge/ Equation/ Starch Testing Practical</li> <li>- Rate of reaction/ RP 5 – Light Intensity/ Demo &amp; Carry out</li> <li>- Experimental review/ Limiting factors</li> <li>-Feedback Task: replanning rate Exp for different factors</li> <li>- Uses of glucose</li> <li>-Aerobic and anaerobic respiration</li> <li>-Planning Anaerobic practical with Yeast – link to feedback task in 4.4</li> <li>- Response to exercise and metabolism</li> </ul>	<ul style="list-style-type: none"> <li>- Introduction to types of bonding – what happens in terms of electrons and why?</li> <li>- Ionic bonding &amp; properties of ionic compounds</li> <li>- Covalent bonding in simple molecules &amp; giant structures and their properties</li> <li>- Allotropes of carbon, graphene &amp; fullerene</li> <li>- Metallic bonding including alloys</li> <li>- Smart materials to include nanoparticles and polymers</li> </ul>	<ul style="list-style-type: none"> <li>- Endothermic and exothermic reactions.</li> <li>- Measuring temperature change core practical.</li> <li>- Calculating bond enthalpy to determine endothermic and exothermic reactions.</li> <li>- Fuel cells.</li> </ul>	<p>In Chemistry students will be able to:</p> <ul style="list-style-type: none"> <li>•use the names and symbols of elements in the periodic table to name compounds from given formulae.</li> <li>•write balanced chemical equations for given reactions</li> <li>•identify and calculate numbers of subatomic particles from mass and atomic numbers</li> <li>•explain how properties of elements depends on their electron structure</li> </ul>
<b>Prior Knowledge Required</b>	<ul style="list-style-type: none"> <li>- Solids liquids and gasses</li> </ul>	<ul style="list-style-type: none"> <li>- All matter is made up of atoms</li> <li>- Metals &amp; non-metals in the periodic table</li> </ul>	<p>Students should already know about circuits with cells, bulbs, switches, conductors and insulators, series and parallel circuits, current as a flow of charge, and simple models of static electricity.</p>	<ul style="list-style-type: none"> <li>- What are organelles within a cell structure?</li> </ul>	<ul style="list-style-type: none"> <li>- What is photosynthesis?</li> <li>- What is respiration?</li> <li>- Gas exchange</li> </ul>	<ul style="list-style-type: none"> <li>- Atoms, elements, compounds, mixtures</li> </ul>	<ul style="list-style-type: none"> <li>- How to measure temperature changes using a thermometer.</li> <li>- Energy can be transferred.</li> <li>- All molecules contain bonds.</li> </ul>	<ul style="list-style-type: none"> <li>• explain chemical bonding in terms of electrostatic forces and the transfer or sharing of electrons</li> </ul>

<b>Feedback Points</b>	Writing a method for determining the density of an object	Long answer exam questions	Using equations to determine current, voltage and resistance in series and parallel circuits	Long answer exam questions	Long answer exam questions	Long answer exam questions	Long answer and short answer exam questions.	<ul style="list-style-type: none"> <li>•draw dot and cross diagrams for ionic and covalent compounds</li> <li>•describe the properties of diamond and graphite in terms of their structure &amp; bonding</li> <li>•Distinguish between exothermic and endothermic reactions in terms of temperature changes. Explain what is meant by activation energy. Calculating bond enthalpy and describe how fuel cells work.</li> </ul>
<b>Key Questions</b>	<ul style="list-style-type: none"> <li>- What is the conservation of energy/matter?</li> <li>- How do I calculate the efficiency of an appliance?</li> <li>- How can I make my home more insulated?</li> <li>- How do I calculate work done/power?</li> <li>- What is energy? What is an energy transfer?</li> <li>- What is/how to calculate density?</li> <li>- How can we describe changes of state?</li> <li>- What is internal energy?</li> <li>- What is specific heat capacity/latent heat and how can we calculate it?</li> <li>- How can we explain gas pressure using the particle model?</li> </ul>	<ul style="list-style-type: none"> <li>- What is the conservation of mass?</li> <li>- What are the properties of alkali metals?</li> <li>-What are the properties of the halogens?</li> <li>- What are the properties of the noble gases</li> <li>- How are the properties of groups in the periodic table explained by electronic structure?</li> </ul>	<ul style="list-style-type: none"> <li>What is charge, current and voltage?</li> <li>How does current and voltage change in series and parallel circuits?</li> <li>Which equations would we use to calculate current and voltage in a circuit?</li> <li>What is resistance?</li> <li>How do we calculate resistance?</li> <li>How can objects become charged by friction?</li> <li>What happens in an electric field between charged objects?</li> <li>How does resistance change in a thermistor or an LDR?</li> <li>What do the I–V graphs of a resistor, filament lamp, and diode look like?</li> <li>What is the difference between AC and DC?</li> <li>How does the National Grid transmit electricity efficiently?</li> <li>What safety features are built into plugs and household circuits?</li> <li>How do we calculate electrical power and efficiency?</li> </ul>	<ul style="list-style-type: none"> <li>Compare and contrast the sub-cellular structure of an animal and a plant cell.</li> <li>Explain the difference between a prokaryotic and eukaryotic cell.</li> <li>Explain how the structure of different types of cell relate to their function.</li> <li>Calculate the magnification of a specimen viewed under the microscope.</li> <li>State the three stages of the cell cycle.</li> <li>Explain the importance of mitosis in growth and development.</li> <li>Discuss the social and ethical issues in the use of stems cells.</li> <li>Describe how substances are transported into and out of cells by diffusion, osmosis, and active transport.</li> </ul>	<ul style="list-style-type: none"> <li>Describe the process of photosynthesis.</li> <li>State the importance of the chloroplast, stomata and guard cells.</li> <li>Explain the effects of limiting factors on photosynthesis.</li> <li>Explain the uses of glucose from photosynthesis.</li> <li>Describe the process of respiration and where it takes place.</li> <li>Contrast and compare aerobic and anaerobic respiration.</li> <li>Explain the effects of exercise on the body, referring to oxygen debt.</li> <li>Explain the importance of nutrients and how they are broken down into simpler molecules.</li> <li>Define metabolism and state an example.</li> </ul>	<ul style="list-style-type: none"> <li>-Why do atoms transfer or share electrons?</li> <li>- How does bonding effect properties?</li> <li>- What are allotropes?</li> </ul>	<ul style="list-style-type: none"> <li>-How do bond break and how are new bonds made?</li> <li>- What type of reactions are endothermic and exothermic?</li> <li>- How do batteries work?</li> <li>- How does a hydrogen fuel cell generate electricity?</li> </ul>	
<b>Direct Vocab Instruction</b>	<ul style="list-style-type: none"> <li>- System</li> <li>- Transfer</li> <li>- Unit</li> <li>- Compare</li> <li>- Dissipate</li> </ul>	<ul style="list-style-type: none"> <li>-Proton</li> <li>-Neutron</li> <li>-Electron</li> <li>-Isotopes</li> <li>-Elements</li> <li>-Compounds</li> <li>-Mixtures</li> </ul>	<ul style="list-style-type: none"> <li>- Charge</li> <li>- Current</li> <li>- Voltage</li> <li>- Describe</li> <li>- Explain</li> <li>- Calculate</li> </ul>	<ul style="list-style-type: none"> <li>- Organelles</li> <li>- Cells</li> <li>- Specialised cells</li> <li>- Stem cells</li> <li>- Sub-cellular</li> <li>- Microscope</li> <li>- Magnification</li> </ul>	<ul style="list-style-type: none"> <li>-Photosynthesis</li> <li>-Anaerobic</li> <li>-Aerobic</li> <li>-Limiting factor</li> <li>-Indicator</li> </ul>	<ul style="list-style-type: none"> <li>- Ionic, covalent, metallic bonding</li> <li>- Intermolecular forces</li> <li>- Allotropes</li> <li>- Alloys</li> <li>- Delocalised electrons</li> <li>- Ions</li> </ul>	<ul style="list-style-type: none"> <li>-Endothermic</li> <li>-Exothermic</li> <li>-Combustion</li> <li>-Enthalpy</li> <li>-Cell</li> </ul>	

		<ul style="list-style-type: none"> <li>-Periodic Table</li> <li>-Alkaline metals</li> <li>-Halogens</li> <li>-Nobel gases</li> <li>-Displacement</li> <li>-Reactivity</li> <li>- Solid, liquid and gas</li> </ul>	<ul style="list-style-type: none"> <li>- Ohm's Law</li> <li>- Thermistor and LDR</li> <li>- I-V characteristics</li> <li>- AC/DC</li> <li>- National Grid</li> <li>- Fuse</li> <li>- Efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- Specimen</li> <li>- Mitosis</li> <li>- Diffusion</li> <li>- Osmosis</li> <li>- Active transport</li> </ul>		<ul style="list-style-type: none"> <li>- Polymers</li> <li>- Polymerisation</li> <li>- Nanoparticles</li> </ul>		
<b>Standardised Homework</b>	<ul style="list-style-type: none"> <li>- multiple choice quiz on Show My Homework</li> <li>- explain a concept to a family member/friend</li> <li>- take away a question and complete</li> </ul>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> <li>- Research task</li> </ul>	<p>Homework may include short questions and exam-style questions. Sometimes, there will be short research projects where students write a paragraph on a relevant topic that may not be examinable but broadens scientific knowledge.</p>	<p>SAM Learning Exam Questions Quizzes through MS Forms Complete a worksheet Practical Writeups Draw a graph</p>	<p>SAM Learning Exam Questions Quizzes through MS Forms Complete a worksheet Practical Writeups Draw a graph</p>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> </ul>	<ul style="list-style-type: none"> <li>-Exam Questions</li> <li>- Calculations involving temperature changes</li> <li>-Writing up core practical</li> <li>-Drawing and interpreting temperature change graphs.</li> </ul>	



Year 10 Chemistry	Term 1		Term 2		Term 3		End Points
	Half Term 1 [7 lessons]	Half Term 2 [8 lessons]	Half Term 3 [4 lessons]	Half Term 4 [7 lessons]	Half Term 5 [6 lessons]	Half Term 6 [3 lessons]	
Topic	Topic 6 Rates of reaction	Topic 4 Chemical Changes	Topic 7 Organics (part 1)	Topic 3 Quantitative chemistry (part 1)	Topic 3 Quantitative chemistry (part 1 continued)	Topic 9 Atmosphere	
Skill	<ul style="list-style-type: none"> <li>- Graph interpretation – using the slope of a tangent as a measure of rate of change</li> <li>- Maths skills – recognise and use expressions in decimal form</li> <li>- Practical skills</li> </ul>	<ul style="list-style-type: none"> <li>- Writing balanced chemical equations</li> <li>- Practical skills</li> <li>- Planning and writing a step-by-step method for a preparing a pure, dry sample of a salt</li> <li>- Recording results in an appropriate form</li> <li>- Analysing given data</li> <li>- Writing balanced chemical equations</li> <li>- Practical skills – planning, recording and analysing given data</li> </ul>	<ul style="list-style-type: none"> <li>- Practical skills</li> <li>- Use Molymods to make 3D models of organic compounds</li> <li>- Modelling fractional distillation and cracking through practical demos</li> </ul>	<ul style="list-style-type: none"> <li>- Balancing equations</li> <li>- Maths skills to include: Manipulation of equations to calculate an unknown entity. Conversion from decimals to standard form</li> <li>- Practical skills, carrying out an accurate measurements using meniscus for volumes and creating varying concentration of solutions</li> </ul>	<ul style="list-style-type: none"> <li>- Balancing equations</li> <li>- Maths skills to include: Manipulation of equations to calculate an unknown entity. Conversion from decimals to standard form</li> <li>- Practical skills, carrying out an accurate measurements using meniscus for volumes and creating varying concentration of solutions</li> </ul>	<ul style="list-style-type: none"> <li>- Maths skills – using ratios, fractions and percentages</li> <li>- Analysing given data</li> </ul>	<p><b>In chemistry students will be able to:</b></p> <p>Identify oxidation and reduction in terms of loss and gain of oxygen.</p> <p>Select an appropriate acid and describe a method to make a given salt.</p> <p>Predict the products of electrolysis of molten ionic compounds and solutions.</p> <p>Draw, and interpret, graphs showing the quantity of product formed or quantity of reactant used up against time. They should be able to draw a tangent to a curve on the graph and use the slope of the tangent as a measure of the rate of reaction.</p> <p>Predict and explain using collision theory the effects of changing conditions of concentration, pressure and temperature and a catalyst on the rate of a reaction.</p> <p>Calculate the mass of solute in a volume of solution of known concentration in terms of mass per given volume of solution. Relate the mass of a solute and the volume of a solution is to the concentration of the solution.</p> <p>Explain how equilibrium can be affected by changes in temperature, concentration and pressure.</p> <p>Explain how crude oil is separated via fractional distillation and the differences between alkanes and alkenes. They should be able to explain how alkenes polymerise and are used in the plastics industry.</p> <p>Describe the main changes in the atmosphere over time and some of the likely causes of these changes. They also need to describe potential effects of global</p>

							climate change and the environmental implications.
<b>Content</b>	<ul style="list-style-type: none"> <li>- Factors affecting rates &amp; collision theory and calculating rate</li> <li>- Effect of concentration practical &amp; rate calculation</li> <li>- Effect of temperature practical &amp; rate calculation</li> <li>- Effect of surface area practical &amp; rate calculation</li> <li>- Catalysts and activation energy</li> <li>- Equilibria and Le Chatelier's Principle</li> </ul>	<ul style="list-style-type: none"> <li>- Metals &amp; metal oxides and redox,</li> <li>- Reactivity series and extraction of metals</li> <li>- Acids, alkalis, neutral solutions, pH scale and indicators</li> <li>- Metals &amp; acids, neutralisation of acids, strong and weak acids</li> <li>- Making a salt core practical</li> <li>Review of ions, ionic bonding, and ionic compounds</li> <li>- Review balancing equations</li> <li>- Electrolysis of molten compounds &amp; solutions</li> <li>- Extraction of metals from their ores e.g., aluminium from bauxite, half equations</li> <li>- Electrolysis core practical</li> </ul>	<ul style="list-style-type: none"> <li>- Crude oil &amp; alkanes</li> <li>- Fractional distillation &amp; properties of hydrocarbons</li> <li>- Combustion</li> <li>- Cracking &amp; alkenes</li> </ul>	<ul style="list-style-type: none"> <li>- Conservation of mass</li> <li>- Relative atomic mass and formula mass</li> <li>- Balancing equations</li> <li>- Chemical Measurements</li> </ul>	<ul style="list-style-type: none"> <li>- Moles</li> <li>- Calculating amounts of substances</li> <li>- Using moles to balance equations</li> <li>- Concentrations of solutions</li> </ul>	<ul style="list-style-type: none"> <li>- Evolution of the atmosphere from early to current</li> <li>- Greenhouse gases &amp; human activities</li> <li>- Carbon footprint and it's reduction</li> <li>- Atmospheric pollutants from fuels and their properties and effects</li> </ul>	
<b>Prior Knowledge Required</b>	<ul style="list-style-type: none"> <li>- Exothermic and endothermic reactions</li> <li>- Catalysts</li> </ul>	<ul style="list-style-type: none"> <li>- Acids, alkalis &amp; neutralisation</li> <li>- pH scale</li> <li>- Metals &amp; acids</li> <li>- Displacement reactions and reactivity of metals</li> <li>- Writing word equations to explain a chemical reaction</li> <li>- How are ions formed?</li> </ul>		<ul style="list-style-type: none"> <li>Mass number of an element</li> <li>Atomic number of elements</li> <li>How to measure volumes using meniscus when conducting practical's</li> </ul>	<ul style="list-style-type: none"> <li>- Covalent bonding</li> <li>- Elements from periodic table</li> <li>- Polymers from Year 9 structure and bonding unit</li> <li>-Melting points and boiling points</li> </ul>	<ul style="list-style-type: none"> <li>-Early and current atmosphere</li> <li>- Combustion of fuels, covered in year 8 topic</li> <li>- Human activities and their effects</li> </ul>	
<b>Feedback Points</b>	Examination questions	Examination questions	Examination questions	Examination questions	Examination questions	Examination questions	
<b>Key Questions</b>	<ul style="list-style-type: none"> <li>- What happens to energy during a reaction?</li> <li>- How can I tell whether a reaction is exothermic or endothermic?</li> <li>- What does rate of reaction mean?</li> <li>- What factors affect the rate of a chemical reaction?</li> <li>- What is collision theory?</li> <li>- What do we mean by equilibrium?</li> <li>- What is Le Chatelier's Principle and can I use it to predict the effect on position</li> </ul>	<ul style="list-style-type: none"> <li>- Can I work out the position of the metals in the reactivity series given the results of a series of reactions?</li> <li>- Why are there different methods of extracting metals from metal ores?</li> <li>- What is a redox reaction in terms of loss or gain of oxygen?</li> <li>- Can I work out the name of the salt formed in a reaction from the named acid?</li> <li>- What is an indicator?</li> </ul>	<ul style="list-style-type: none"> <li>- How is crude oil formed?</li> <li>- What is meant by the term homologous series in organic chemistry?</li> <li>- What is an alkane?</li> <li>- What is fractional distillation and the products from crude oil?</li> <li>- What are the products of combustion of fuels?</li> <li>- Can I explain the difference between a double and single bond in terms of covalent bonding</li> </ul>	<ul style="list-style-type: none"> <li>- What is meant by the conservation of mass in a chemical reaction?</li> <li>- How can I work out the relative formula mass of a compound?</li> <li>- Can I explain concentration in terms of particles?</li> </ul>	<ul style="list-style-type: none"> <li>- What is a mole?</li> <li>- Can I use reacting ratios to write a balanced equation?</li> <li>- Calculating concentrations of solutions using the formula triangle</li> </ul>	<ul style="list-style-type: none"> <li>- How did the current atmosphere evolve from the early atmosphere?</li> <li>- What is the greenhouse effect?</li> <li>- How have human activities affected the atmosphere?</li> <li>- How do greenhouse gases trap the radiation from the sun and how does this</li> </ul>	

	of equilibrium with different conditions.	<ul style="list-style-type: none"> <li>- What does the pH scale measure?</li> <li>- How are strong and weak acids different?</li> <li>- What happens to ions at the anode and cathode when an ionic compound is electrolysed?</li> <li>- Can I write a balanced half equation?</li> <li>- What does preferential discharge mean and how is it related to the reactivity series?</li> </ul>	<ul style="list-style-type: none"> <li>- How can I use bromine water to work out whether my hydrocarbon is an alkane or alkene?</li> <li>- How has cracking helped meet the supply and demand issue for fuels?</li> </ul>			<ul style="list-style-type: none"> <li>affect the global climate?</li> <li>- What is meant by the carbon footprint and how can we reduce this?</li> <li>- How do atmospheric pollutants from fuels affect the atmosphere?</li> </ul>	
<b>Direct Vocab Instruction</b>	<ul style="list-style-type: none"> <li>- Exothermic</li> <li>- Endothermic</li> <li>- Rate of reaction</li> <li>- Collision theory</li> <li>- Concentration</li> <li>- Temperature</li> <li>- Surface area</li> <li>- Catalyst</li> <li>- Equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>- Reactivity</li> <li>- Metal oxide</li> <li>- Reduction</li> <li>- Oxidation</li> <li>- Strong and weak acid</li> <li>- Hydrogen ion concentration</li> <li>- Indicators</li> <li>- Neutralisation</li> <li>- Electrolysis</li> <li>- Cathode</li> <li>- Anode</li> <li>- Cation</li> <li>- Anion</li> <li>- Electrolyte</li> <li>- Molten</li> <li>- Solution</li> <li>- Half equations</li> </ul>	<ul style="list-style-type: none"> <li>- Homologous</li> <li>- Alkane</li> <li>- Alkene</li> <li>- Fractional distillation</li> <li>- Cracking</li> <li>- Viscosity</li> <li>- Combustion</li> <li>- Fermentation</li> <li>- Polymerisation</li> <li>- Monomer</li> <li>- Polymer</li> </ul>	<ul style="list-style-type: none"> <li>- Conservation</li> <li>- Relative molecular mass</li> <li>- Concentration</li> <li>- Meniscus</li> </ul>	<ul style="list-style-type: none"> <li>- Mole</li> <li>- Stoichiometry</li> </ul>	<ul style="list-style-type: none"> <li>- Atmosphere</li> <li>- Radiation</li> <li>- Ultraviolet</li> <li>- Infrared</li> <li>- Greenhouse gas</li> <li>- Pollutant</li> <li>- Global warming</li> </ul>	
<b>Standardised Homework</b>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> </ul>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> </ul>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> <li>- Research task</li> </ul>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> </ul>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> <li>- Calculation sheets</li> </ul>	<ul style="list-style-type: none"> <li>- Exam question</li> <li>- Multiple choice quiz</li> </ul>	

Year 10 Biology	Term 1		Term 2		Term 3		End Points
	Half Term 1 [7 lessons]	Half Term 2 [8 lessons]	Half Term 3 [6 lessons]	Half Term 4 [6 lessons]	Half Term 5 [6 lessons]	Half Term 6 [7 lessons]	
<b>Topic</b>	<b>Organisation</b>	<b>Organisation</b>	<b>Unit 3: Infection and Response (8)</b>	<b>Unit 3: Infection and Response cont. (8)</b>	<b>Unit 7: Ecology (13)</b>	<b>Unit 7: Ecology cont. (13)</b>	
<b>Skill</b>	Dissection Microscopy Biochemical Testing	Dissection Graphical Interpretation	Graph Interpretation Aseptic Technique	Aseptic Technique	Graphical Interpretation Experimental Planning Data Analysis	Graphical Interpretation Experimental Planning Data Analysis	
<b>Content</b>	Cellular Function Enzymes Digestion Organ Systems Breathing and The Lungs	Heart Function Blood and Blood Vessels CHD/Lifestyle/Cancer/COPD Plant Tissues Mass Transport in Plants	What is communicable disease How are diseases transmitted Types of Pathogen Examples of disease Malaria Life Cycle & Prevention Primary Defence Systems	Secondary Defence Systems Drug Development Vaccines Monoclonal Antibodies* Plant Disease/Responses* RP: Culturing Microorganisms*	Food chains and webs Interdependence Pyramids of Numbers and Biomass* Cycles (Water and Carbon) Decay and Decomposition* Biodiversity	Environmental Factors Adaptations Sampling the environment Land Use Global Warming Food Security and Farming*	
<b>Prior Knowledge Required</b>	Organ systems in the human body Cell structure	Organ Systems Plant Structure	Students learn about different types of cell in year 7 and look at organ systems in year 8.	Students learn about different cell types in year 7.	Food Chain and Webs Global Warming		
<b>Feedback Points</b>	Examination questions based on course content	Examination questions based on course content	Examination questions based on course content	Examination questions based on course content	Examination questions based on course content	Examination questions based on course content	
<b>Key Questions</b>	How do we digest food? How do we breathe? How is the body organised into systems? How do enzymes work?	How does the heart work? How do you dissect a heart? What choices can we make about our lifestyle to make us healthier? How do plant move substances?	How do we get sick What makes us sick? What diseases can we catch? What is Malaria? How does our body protect us and make us better?	How we develop new treatments? How does a vaccine work? How do plants respond to disease? What is a monoclonal antibody and how can it be used?	How do animals and plants interact with their environment? What factors affect organisms? Hoe does energy move through an ecosystem? How are organisms adapted to their environment?	What is global warming? How is land used?	
<b>Direct Vocab Instruction</b>	Tissue Organ Organism Lung Bronchi Alveoli Vein Heart Ventricle Atrium Artery Capillary	Stomach Pancreas Small intestine Large Intestine Liver Enzyme Blood Cancer COPD	Communicable Transmission Pathogen Bacteria Fungi Virus Protist	Phagocyte Vaccine Antibody Antigen Immunity Antibiotic	Adaptation Extremophile Producer Consumer Decomposer Biotic Abiotic	Biodiversity Conservation Endangered Extinct Deforestation	
<b>Standardised Homework</b>	Quizzes on forms SAM Learning/Seneca Exam questions	Quizzes on forms SAM Learning/Seneca Exam questions	Quizzes on forms SAM Learning/Seneca Exam questions	Quizzes on forms SAM Learning/Seneca Exam questions	Quizzes on forms Practical write ups on OneNote SAM Learning/Seneca	Quizzes on forms Practical write ups on OneNote SAM Learning/Seneca Examination questions	

Year 11 Physics	Term 1		Term 2		Term 3		End Points
	Half Term 1 [6 lessons]	Half Term 2 [6 lessons]	Half Term 3 [6 lessons]	Half Term 4 [6 lessons]	Half Term 5 [6 lessons]	Half Term 6 [6 lessons]	
<b>Topic</b>	<b>Forces</b>	<b>Electromagnetism</b>	<b>Astrophysics</b>	<b>Unifying Concepts 1</b>	<b>Unifying concepts 2</b>	<b>Exams</b>	
<b>Skill</b>	Interpret data from a practical investigation Apply Newton's laws	Draw magnetic fields Apply equations	Use observations to arrive at theories	Apply different parts of the specification to solve contextual problems.	Apply different parts of the specification to solve contextual problems		
<b>Content</b>	Forces on Springs Stopping Distances Newton's Third Law Momentum Conservation of Momentum Collisions	Permanent and induced magnetism, forces and fields The Motor Effect Loudspeakers and microphones Generators and transformers	The Solar System Life Cycles of Stars Orbits of Planets, Moons and Satellites Red-Shift	Energy with Electricity Electricity with Electromagnetism Nuclear with Waves	Matter with Energy Forces with Electricity Matter with Electricity		<p>In Physics students should be able to:</p> <ul style="list-style-type: none"> <li>• apply their knowledge of forces and momentum to improve car safety on the roads</li> <li>• use ideas about electricity and magnetism to explain how motors and/or generators work</li> <li>• draw on all parts of the specification to solve contextual problems</li> </ul>
<b>Prior Knowledge Required</b>	Contact and non-contact forces Speed, distance, time Acceleration	Poles of a magnet Magnetic materials	The Earth rotates on its own axis and orbits the Sun.	Energy, electricity, matter, atomic structure, forces, waves and magnetism	Energy, electricity, matter, atomic structure, forces, waves and magnetism		
<b>Feedback Points</b>	Long answer exam questions	Long answer exam questions	Long answer exam questions	Long answer exam questions	Long answer exam questions		
<b>Key Questions</b>	Describe the difference between a linear and non-linear relationship between force and extension Explain a method for determining human reaction time Explain the dangers caused by large decelerations Describe factors affecting stopping distances ----- Explain the concept of conservation of momentum	Describe how the magnetic effect of a current can be demonstrated Draw the magnetic field pattern for a straight wire carrying a current and for a solenoid Use Fleming's left-hand rule to recall the factors that affect the size and direction of the force on a conductor. ----- Explain how a moving-coil loudspeaker and headphones work	Describe the similarities and distinctions between the planets, their moons, and artificial satellites. Explain the phenomenon that is red shift Explain how red shift provides evidence for the Big Bang model Describe the observations used by scientists to produce the Big Bang theory	Explain how the power of an immersion heater can be used to determine the specific heat capacity of a solid Explain the link between current in a wire and the motor effect. Compare the similarities and differences between different types of radiation with reference to charge.	Evaluate the advantages and disadvantages of different types of energy resources Describe the benefits and risks of using X-rays and Gamma rays to diagnose and treat cancers Use Newton's laws to explain why a boat propeller causes a boat to accelerate Explain how Fleming's left-hand rule is used to determine the direction of motion of a wire		
<b>Direct Vocab Instruction</b>	Elastic Explain Exponentially	Describe Determine Calculate	Observation Evidence Theory	State Identify Explain	Interpret Describe Evaluate		
<b>Standardised Homework</b>	- Exam question - Multiple choice quiz	- Exam question - Multiple choice quiz	- Exam question - Multiple choice quiz	- Exam question - Multiple choice quiz	- Exam question - Multiple choice quiz		

Year 11 Chemistry	Term 1		Term 2		Term 3		End Points
	Half Term 1 [5 lessons for separate science, 3 lessons combined science]	Half Term 2 [ 5 lessons for combined science and separate science]	Half Term 3 [6 lesson for separate science. All remaining lessons up until exam for combined science ]	Half Term 4 [7 lessons Separate Science. All remaining lessons up until exam for combined Science]	Half Term 5 All remaining lessons up until exam]	Half Term 6	
<b>Topic</b>	<b>Topic 3: Calculations part 2 (Separate science only)</b> <b>Topic 8 Chemical Analysis (combined science only)</b>	<b>Topic 7 Organics (part 2 for separate science)</b> <b>Topic 10 Using resources for combined science</b>	<b>Combined Science: Recap key year 9 &amp; 10 content – topics 1, 2 &amp; 3</b> <b>Topic 8 Chemical Analysis (Separate science only)</b>	<b>Combined Science: Recap key year 10 content – topics 4, 5 &amp; 6</b> <b>Topic 10: Using resources (Separate Science)</b>	<b>Recap key year 10 content – topics 7 &amp; 9</b>	<b>Exams</b>	
<b>Skill</b>	Maths skills- using and rearranging equations - Plan and carry out methods to investigate unknown concentrations or substances -Data interpretation	Interpret data from a graph - Maths skills – translate information between graphical and numerical form - Practical skills -	Recall key concepts and apply different parts of the specification to exam questions Interpret data from a graph - Maths skills – translate information between graphical and numerical form - Practical skills	Recall key concepts and apply different parts of the specification to exam questions Interpret data from a graph - Maths skills – translate information between graphical and numerical form - Practical skills	Recall key concepts and apply different parts of the specification to exam questions Interpret data from a graph - Maths skills – translate information between graphical and numerical form - Practical skills	<b>Exams</b>	
<b>Content</b>	<b>Topic 8 Chemical Analysis (combined science only)</b> - Purity & separation - Chromatography - Gas tests -Formulations  <b>Topic 3: Calculations part 2 (Separate science only)</b>  <b>Separate content</b> - Percentage yield & Atom economy - Using moles, volumes and concentration of solutions in a calculation - Titrations - Volumes of gases	<b>Topic 10 Using resources for combined science</b> - Sustainable development - Potable water - Waste water treatment - Alternative methods of metal extraction - Life cycle assessments and recycling  <b>Topic 7 Organics (part 2 for separate science)</b> <b>Separate content</b> - Alkenes - Alcohols - Carboxylic acids - Polymerisation - Amino acids & DNA	<b>Topic 1</b> - Structure of the Atom - Electron structure - Development of the periodic table  <b>Topic 2</b> - Types of bonding and their properties  <b>Topic 3</b> - Relative formula mass - Moles - Calculating amounts of substances - Using moles to balance equations - Concentrations of solutions  <b>Topic 8: Separate content</b> - Flame tests - Metal hydroxide tests - Test for anions - Use of chemical tests to identify ions in an unknown compound - Instrumental methods and spectroscopy	<b>Topic 4</b> - Electrolysis - Extraction of metals from their ores e.g., aluminium from bauxite - Half Equations  <b>Topic 5</b> -Endothermic and exothermic reactions -Bond Enthalpy  <b>Topic 6</b> - Factors affecting rates & collision theory - Investigating rates - Equilibria and Le Chatelier's Principle  <b>Topic 10: Using resources (Separate Science)</b>  - Corrosion - Alloys as useful materials - Ceramics, polymers and composites - Haber process - Production and use of NPK fertilisers	<b>Topic 7</b> - Crude oil & alkanes - Fractional distillation & properties of hydrocarbons - Combustion - Cracking & alkenes  <b>Topic 9</b> - Evolution of the atmosphere from early to current - Greenhouse gases & human activities - Atmospheric pollutants from fuels and their properties and effects	<b>Exams</b>	<b>In chemistry students will be able to:</b>  Describe a test for common gases. Separate science students should also be able to identify anions and cations and hence the identity of an unknown compound using practical techniques.  Describe actions to reduce emissions of carbon dioxide and methane and hence reduce our carbon footprint.  Distinguish between potable water and pure water. They need to describe the differences in treatment of ground water and salty water. They need to give
<b>Prior Knowledge Required</b>	<b>Topic 8 Chemical Analysis (combined science only)</b> Practical techniques that can be used to separate mixtures	<b>Topic 10 Using resources for combined science</b> -Sustainability and recycling of resources	- All matter is made up of atoms - Metals & non-metals in the periodic table	- Acids, alkalis & neutralisation - pH scale - Metals & acids	-Covalent bonding -Early and current atmosphere - Combustion of fuels	<b>Exams</b>	

	<p><b>Topic 3: Calculations part 2 (Separate science only)</b></p> <p><b>Separate content</b></p> <ul style="list-style-type: none"> <li>- Acid and base reactions to make salts</li> <li>- Relative molecular and formula mass</li> <li>- Moles</li> <li>- Balancing equations</li> <li>- Molar ratios</li> </ul>	<p>- Bonding in metals</p> <p><b>Topic 7 Organics (part 2 for separate science)</b></p> <ul style="list-style-type: none"> <li>- Crude oil and alkanes</li> <li>- Fractional distillation &amp; properties of hydrocarbons</li> <li>- Combustion</li> <li>- Cracking &amp; alkenes</li> </ul>	<p><b>Topic 8: Separate content</b></p> <ul style="list-style-type: none"> <li>- Cations</li> <li>- Anions</li> <li>- Transition metals</li> <li>- Separation techniques</li> </ul>	<ul style="list-style-type: none"> <li>- Displacement reactions and reactivity of metals</li> <li>- Writing word equations to explain a chemical reaction</li> <li>- How are ions formed?</li> </ul> <p><b>Topic 10: Using resources (Separate Science)</b></p> <ul style="list-style-type: none"> <li>- Sustainability and recycling of resources</li> <li>- Bonding in metals</li> <li>- Metal reactivity</li> <li>- Alloys</li> <li>- Making Salts</li> <li>- Le Chatelier's principal</li> </ul>	<ul style="list-style-type: none"> <li>- Human activities and their effects</li> </ul>		<p>reasons for the steps used to produce potable water.</p>
<b>Feedback Points</b>	Long and short answer exam questions	Long and short answer exam questions Long and short answer exam questions	Long and short answer exam questions	Long and short answer exam questions	Long and short answer exam questions	<b>Exams</b>	
<b>Key Questions</b>	<p><b>Topic 8 Chemical Analysis (combined science only)</b></p> <ul style="list-style-type: none"> <li>- What is a pure substance?</li> <li>- How can we use different techniques to analyse unknown substances?</li> </ul> <p><b>Topic 3: Calculations part 2 (Separate science only)</b></p> <p><b>Separate content</b></p> <ul style="list-style-type: none"> <li>- Why are percentage yield and atom economy important in an industrial process?</li> <li>- Can I calculate the unknown concentration of a solution using a titration?</li> <li>- Can I use the gas equation to calculate moles and volumes of gases?</li> </ul>	<p><b>Topic 10 Using resources for combined science</b></p> <ul style="list-style-type: none"> <li>- What do we mean by sustainable resource?</li> <li>- What is a finite resource?</li> <li>- What is the difference between potable and pure water?</li> <li>- How can we treat waste water?</li> <li>- What alternative methods can we use to extract metals from low grade ores?</li> </ul> <p><b>Topic 7 Organics (part 2 for separate science)</b></p> <ul style="list-style-type: none"> <li>- Do I know the equation for the fermentation of sugar to make ethanol?</li> <li>- Can I predict what salt is going to form from the reaction of a given carboxylic acid?</li> <li>- Can I write equations to show the formation of a polymer from a given monomer</li> <li>- Can I recognise the monomer used to form a given polymer?</li> <li>- How is condensation similar yet different to addition polymerisation?</li> <li>- Be able to explain how amino acids react to form proteins</li> <li>- Recognise the fact that naturally occurring polymers are essential for life – for example DNA</li> </ul>	<ul style="list-style-type: none"> <li>- What is the conservation of mass?</li> <li>- What are the properties of alkali metals?</li> <li>- What are the properties of the halogens?</li> <li>- What are the properties of the noble gases</li> <li>- How are the properties of groups in the periodic table explained by electronic structure?</li> <li>- Why do atoms transfer or share electrons?</li> <li>- How does bonding effect properties?</li> <li>- What are allotropes?</li> </ul> <p><b>Topic 8 Chemical Analysis (Separate science only)</b></p> <ul style="list-style-type: none"> <li>- What is a pure substance?</li> <li>- How can we use different techniques to analyse unknown substances?</li> <li>- Why do we see distinctive flame colours for certain cations?</li> </ul>	<ul style="list-style-type: none"> <li>- What is Le Chatelier's Principle and can I use it to predict the effect on position of equilibrium with different conditions.</li> <li>- Can I work out the position of the metals in the reactivity series given the results of a series of reactions?</li> <li>- Why are there different methods of extracting metals from metal ores?</li> <li>- What is a redox reaction in terms of loss or gain of oxygen?</li> <li>- Can I work out the name of the salt formed in a reaction from the named acid?</li> <li>- What is an indicator?</li> <li>- What does the pH scale measure?</li> <li>- How are strong and weak acids different?</li> <li>- What happens to energy during a reaction?</li> <li>- How can I tell whether a reaction is exothermic or endothermic?</li> <li>- What does rate of reaction mean?</li> <li>- What factors affect the rate of a chemical reaction?</li> <li>- What is collision theory?</li> <li>- What do we mean by equilibrium?</li> </ul>	<ul style="list-style-type: none"> <li>- Homologous</li> <li>- Alkane</li> <li>- Alkene</li> <li>- Fractional distillation</li> <li>- Cracking</li> <li>- Viscosity</li> <li>- Combustion</li> <li>- Fermentation</li> <li>- Polymerisation</li> <li>- Monomer</li> <li>- Polymer</li> <li>- Addition polymerisation</li> <li>- Condensation polymerisation</li> <li>- Amino acid</li> <li>- Polypeptide</li> <li>- Protein</li> <li>- Atmosphere</li> <li>- Radiation</li> <li>- Ultraviolet</li> <li>- Infrared</li> <li>- Greenhouse gas</li> <li>- Pollutant</li> <li>- Global warming</li> </ul>	<b>Exams</b>	

			-What chemical tests can we conduct to identify unknown compounds?	<b>Topic 10: Separate content</b> - What factors affect corrosion of metals and why is this an issue? - Why is the Haber process essential for agriculture? - Why led to the choice of certain conditions for the manufacture of ammonia? Why do fertilisers contain different amounts of nutrients?			
<b>Direct Vocab Instruction</b>	<b>Topic 8 Chemical Analysis (combined science only)</b> - Formulation - Chromatography - Spectroscopy - Chromatography  <b>Topic 3: Calculations part 2 (Separate science only)</b>  - Relative molecular mass - Concentration - Meniscus -Titration -Stoichiometry	<b>Topic 10 Using resources for combined science</b> - Sustainable - Finite - Potable - Phytomining - Bioleaching - Corrosion - Equilibrium  <b>Topic 7 Organics (part 2 for separate science)</b>  - Addition polymerisation - Condensation polymerisation - Amino acid - Polypeptide - Protein	Describe Determine Interpret Calculate  <b>Topic 8 Chemical Analysis (Separate science only)</b> - Formulation - Chromatography - Spectroscopy - Chromatography - Mass spectrometer - Flame emission spectroscopy -Cation -Anion	State Identify Describe Explain  <b>Topic 10: Separate content</b> -Phytomining -Bioleaching -Alloy -Corrosion -Fertiliser -Superphosphates	State Interpret Describe Evaluate	<b>Exams</b>	
<b>Standardised Homework</b>	- Long and short answer exam question - Multiple choice quiz -Research task - Core practical write up	- Exam question - Multiple choice quiz -Research task - Core practical write up - Exam question - Multiple choice quiz	- Exam question - Multiple choice quiz -Research task - Core practical write up	-- Exam question - Multiple choice quiz -Research task - Core practical write up	- Exam question - Multiple choice quiz	<b>Exams</b>	

Year 11 Biology	Term 1		Term 2		Term 3		End Points
	Half Term 1 [10 lessons]	Half Term 2 [? lessons]	Half Term 3 [13 lessons]	Half Term 4 [? lessons]	Half Term 5 [? lessons]	Half Term 6 [? lessons]	
<b>Topic</b>	Homeostasis	Homeostasis	Inheritance and Evolution	Inheritance and Evolution cont.	Revision in preparation for final GCSE exams		
<b>Skill</b>	Graphical Interpretation Data Analysis	Graphical Interpretation Data Analysis	Interpretation of genetic diagrams Data Analysis Graphical Interpretation	Interpretation of genetic diagrams Data Analysis Graphical Interpretation	Exam skills Long answer examination skills Practical examination skills Maths based exam skills		
<b>Content</b>	What is homeostasis Nervous System <ul style="list-style-type: none"> <li>• Structure</li> <li>• Synapses</li> <li>• Sensitivity</li> <li>• Reflexes</li> </ul> The Brain* The Eye* Endocrine System Blood Glucose/Diabetes	Puberty & Menstrual Cycle Contraception/IVF Kidney & Water Balance* Thyroxine and Adrenaline Plant Hormones & Germination*	Reproduction Sex determination Meiosis DNA & Human Genome Protein Synthesis* Variation Inherited Disorders	Charles Darwin and Natural Selection Speciation and Lamarck* Classification Fossils and Extinction Selective Breeding Cloning/Genetic Engineering			
<b>Prior Knowledge Required</b>	Organ Structure	Organ Structure	Mitosis studied in year 9 cells topic 1. DNA, genes and chromosomes studied in year 7 and year 9.	Classification studied in year 8.			
<b>Feedback Points</b>	Examination questions	Examination questions	Examination questions	Examination questions			
<b>Key Questions</b>	What is homeostasis? How does a nerve work? What is a reflex? How do we control internal conditions?	What is puberty and how is it controlled? How is the menstrual cycle controlled? How does the kidney work? How do plants control their growth?	How do organisms reproduce? What does DNA do? How are sex cells made? What happens when DNA goes wrong?	Why do we have so many different species? How do we know what came before? Why do species die out? How do we use genes to our advantage?			
<b>Direct Vocab Instruction</b>	Stimulus Response Receptor Relay Neuron Motor neuron Central Nervous System Pituitary Gland Adrenal Gland Testis	Pancreas Insulin Glucagon Luteinising Hormone Progesterone Thyroxine Adrenaline	DNA Genome Genes Chromosomes Heterozygous and homozygous Dominant and recessive Alleles Genotype and phenotype	Evolution Adaptations Competition Extinction			
<b>Standardised Homework</b>	Quizzes on forms Practical write ups on OneNote SAM Learning/Seneca Exam Questions	Quizzes on forms Practical write ups on OneNote SAM Learning/Seneca Exam Questions	Quizzes on forms Practical write ups on OneNote SAM Learning/Seneca Exam Questions	Quizzes on forms Practical write ups on OneNote SAM Learning/Seneca Exam Questions	Exam practice questions		





Year 12 Chemistry	Term 1		Term 2		Term 3		End Points
	Half Term 1 [6 lessons atomic structure, 7 lessons Bonding and structure]	Half Term 2 [7 lessons: Calculations Inorganic chemistry: 9 lessons]	Half Term 3 [5 lessons: Inorganic chemistry 8 lessons: organic chemistry]	Half Term 4 [3 lessons: Redox 1 Kinetics 1: 3 lessons Equilibria 1: 3 lessons ]	Half Term 5 [3 lessons: Modern Analytical Techniques 5 Lessons: Energetics 1]	Half Term 6 [3 lessons: Equilibrium II 4 Lessons: Acid-base equilibria ]	
Topic	Topic 1 Atomic Structure Topic 2 Bonding and structure	Topic 5 Formulae, equations & amounts Topic 4 Inorganic chemistry and the periodic table	Topic 4 Inorganic chemistry and the periodic table (continued)  Topic 6 Organic chemistry	Topic 3 Redox reactions Topic 9 Kinetics I Topic 10 Equilibrium I	Topic 7 Modern Analytical Techniques I Topic 8 Energetics 1	Topic 11 Equilibrium II Topic 12 Acid-base equilibria	
Skill	<ul style="list-style-type: none"> <li>- Numeracy</li> <li>- Practical skills</li> <li>- Writing balanced chemical equations</li> <li>- Reasoning</li> <li>- Analytical</li> </ul>	<ul style="list-style-type: none"> <li>- Numeracy</li> <li>- Practical skills</li> <li>- Writing balanced chemical equations</li> <li>- Reasoning</li> <li>- Analytical</li> </ul>	<ul style="list-style-type: none"> <li>- Numeracy</li> <li>- Practical skills</li> <li>- Writing balanced chemical equations</li> <li>- Reasoning</li> <li>- Analytical</li> </ul>	<ul style="list-style-type: none"> <li>- Numeracy</li> <li>- Practical skills</li> <li>- Writing balanced chemical equations</li> <li>- Reasoning</li> <li>- Analytical</li> </ul>	<ul style="list-style-type: none"> <li>- Numeracy</li> <li>- Practical skills</li> <li>- Writing balanced chemical equations</li> <li>- Reasoning</li> <li>- Analytical</li> </ul>	<ul style="list-style-type: none"> <li>- Numeracy</li> <li>- Practical skills</li> <li>- Writing balanced chemical equations</li> <li>- Reasoning</li> <li>- Analytical</li> </ul>	<p><b>Students will be able to:</b></p> <p>Analyse and interpret data from mass spectrometry to calculate relative atomic mass from relative abundance of isotopes.</p> <p>Explain how ionisation energies are influenced by the number of protons, the electron shielding and the electron sub-shell from which the electron is removed.</p> <p>Explain the fact that the first ionisation energy of successive elements provides evidence for electron sub-shells, state the shapes and the number of electrons in each sub-shell. Use the Aufbau principle and Hund's Rule to explain how electrons occupy the sub-shell.</p> <p>Predict the shapes of, and bond angles in, simple molecules and ions using electron-pair repulsion theory.</p> <p>Understand the nature of intermolecular forces</p>

							<p>resulting from these interactions:</p> <p>i London forces (instantaneous dipole – induced dipole)</p> <p>ii permanent dipoles</p> <p>iii hydrogen bonds</p> <p>They will also need to be able to explain the interactions in molecules, such as H<sub>2</sub>O, liquid NH<sub>3</sub> and liquid HF, which give rise to hydrogen bonding.</p> <p>Understand and explain the terms redox, oxidation number, disproportionation, half equations.</p>
<b>Content</b>	<p>Subatomic particles &amp; the Periodic table</p> <p>Mass spectrometry</p> <p>Relative atomic mass and isotopes</p> <p>Electron configuration &amp; orbital theory</p> <p>Ionisation energies</p> <p>Periodicity</p> <p>Ionic bonding</p> <p>Ionic structure</p> <p>Covalent bonding</p> <p>covalent structures</p> <p>Allotropes of carbon</p> <p>Metallic bonding &amp; structure</p> <p>Intermolecular forces</p> <p>Shapes of molecules</p> <p>Polarity</p> <p>Solubility</p>	<p><b>Topic 4 Inorganic chemistry and the periodic table</b></p> <p>Group 2 properties &amp; patterns</p> <p>Group 2 reactions</p> <p>Group 7 properties &amp; patterns</p> <p>Group 7 reactions</p> <p>Ion tests</p> <p><b>Topic 5 Formulae, equations &amp; amounts</b></p> <p>Amounts of substances</p> <p>Empirical and molecular formulae</p> <p>Ionic equations</p> <p>Reacting masses</p> <p><math>pV=nRT</math></p> <p>Titration calculations</p> <p>Experimental Techniques</p> <p>Percentage yield</p> <p>Atom Economy</p>	<p>Homologous series &amp; functional groups</p> <p>Nomenclature</p> <p>Isomerism</p> <p>Fuels &amp; combustion</p> <p>Reactions of Alkanes</p> <p>Reactions of Alkenes</p> <p>Addition Polymerisation</p> <p>Halogenoalkanes</p> <p>Alcohols</p>	<p><b>Redox 1:</b></p> <p>Oxidation numbers</p> <p>Half equations</p> <p>Redox equations</p> <p><b>Kinetics 1:</b></p> <p>Collision theory</p> <p>Calculating rate</p> <p>Maxwell Boltzmann</p> <p>Catalysts &amp; reaction profiles</p> <p><b>Equilibria 1:</b></p> <p>Dynamic Equilibrium</p> <p>Le Chatelier's Principle</p>	<p><b>Energetics 1:</b></p> <p>Enthalpy changes &amp; reaction profiles</p> <p>Standard enthalpies of combustion, neutralisation &amp; formation</p> <p><math>Q=MCT</math></p> <p>Hess's Law and Hess cycles</p> <p>Bond enthalpies</p> <p><b>Modern Analytical Techniques 1:</b></p> <p>Mass Spectrometry</p> <p>Infrared spectroscopy</p> <p>Combustion analysis</p>	<p><b>Equilibrium II:</b></p> <p>Equilibrium constants <math>K_c</math> &amp; <math>K_p</math></p> <p>Factors affecting equilibria</p> <p><b>Acid-base equilibria:</b></p> <p>Acid Base theory</p> <p>pH definition</p> <p><math>K_w</math></p> <p><math>K_a</math></p> <p>Titrations &amp; indicators</p> <p>Buffers</p>	<p>Recall the reactions of group 2 and 7 elements and explain the trends in reactivity of these.</p> <p>Explain the importance of using standard conditions to compare enthalpy changes. They should be able to use Hess's Law to calculate enthalpy changes.</p> <p>Use IUPAC nomenclature to name organic molecules. Students should also be able to classify reactions as addition, elimination, substitution, oxidation, reduction, hydrolysis or polymerisation.</p>
<b>Prior Knowledge Required</b>	GCSE atomic structure and bonding	GCSE groups of the periodic table GCSE quantitative chemistry	GCSE organic chemistry	GCSE redox and half equations GCSE rates and equilibrium	GCSE enthalpies	Year 12 Equilibria I	
<b>Feedback Points</b>	Long and short answer exam questions	Long and short answer exam questions	Long and short answer exam questions	Long and short answer exam questions	Long and short answer exam questions	Long and short answer exam questions	Understand the term 'structural isomerism' and determine the possible

<b>Key Questions</b>	<ul style="list-style-type: none"> <li>- Who discovered the subatomic particles?</li> <li>- What are the key structures/properties of the subatomic particles?</li> <li>- Why do isotopes have identical chemical properties?</li> <li>- Can I analyse and interpret data from a mass spectrum and calculate relative atomic mass from the relative abundance of isotopes and vice versa?</li> <li>- Can I draw and describe the shapes of s and p orbital?</li> <li>- Predict the electron configuration of an atom using both spdf AND 'electrons in boxes' notation?</li> <li>- What is ionisation energy?</li> <li>- Can I explain how ionisation energies are influenced by number of protons, electron shielding and the orbital from which the electron is removed?</li> <li>- Can I explain the trend in ionisation energy across a period AND down a group?</li> <li>- I know how to illustrate periodicity using data.</li> </ul> <ul style="list-style-type: none"> <li>- Use metallic bonding to explain the physical properties of metals?</li> <li>- How do the physical properties of ionic compounds depend on the structure of ionic bonding?</li> <li>- Which orbitals overlap in the formation of sigma and pi bonds?</li> <li>- How does the bond length in a covalent bond affect its strength?</li> <li>- What is electronegativity?</li> <li>- What is the octet rule?</li> <li>- How is a dative covalent bond formed and how is it different to a simple covalent bond?</li> <li>- What is the electron pair repulsion theory and how does this govern the shape of a molecule?</li> <li>- What is the difference between a polar and non-polar molecule?</li> </ul>	<p><b>Topic 4 Inorganic chemistry and the periodic table</b></p> <ul style="list-style-type: none"> <li>- Can I explain the trend in ionisation energy down group 2?</li> <li>- What are the reactions of the group 2 elements with oxygen, chlorine and water?</li> <li>- What are the trends in solubility of the hydroxides and sulfates of group 2 elements?</li> <li>- What factors affect the thermal stability of group 2 compounds?</li> <li>- How do I test for cations and anions?</li> <li>- Can I explain the trend in reactivity of group 7 elements?</li> <li>- What reactions of the halides can I use to illustrate the trend in reducing ability of the halide ions?</li> </ul> <p><b>Topic 5 Formulae, equations &amp; amounts</b></p> <ul style="list-style-type: none"> <li>- Can I use moles to calculate masses, volumes, concentrations and formulae?</li> <li>- Have my practical skills developed successfully so that I carry out a titration to give accurate and precise results whilst considering errors and uncertainties?</li> </ul>	<ul style="list-style-type: none"> <li>- What is meant by homologous series?</li> <li>- What are the nomenclature rules for naming organic compounds?</li> <li>- What is isomerism and why does it arise?</li> <li>- How are we meeting the increasing demand for fuels?</li> <li>- What are the pollution problems arising from the combustion of fuels?</li> <li>- How does a catalytic converter solve some of the problems caused by pollutants?</li> <li>- What are the key steps in a free radical substitution reaction mechanism?</li> <li>- Why do addition reactions occur?</li> <li>- What is meant by halogenation?</li> <li>- What are the key steps in an addition reaction mechanism?</li> <li>- How are we dealing with polymer waste?</li> <li>- What are the key steps in a nucleophilic substitution reaction?</li> <li>- How can alcohols be oxidised and what are the products that can be formed by this process?</li> </ul>	<p><b>Redox 1:</b></p> <ul style="list-style-type: none"> <li>- What does oxidation number mean?</li> <li>- What is disproportionation</li> <li>- How do I use oxidation numbers in nomenclature?</li> <li>- Can I construct a full ionic equation using two half equations?</li> </ul> <p><b>Kinetics 1:</b></p> <ul style="list-style-type: none"> <li>- What is reaction rate?</li> <li>- Can I explain the effects of changing conditions on reaction rates using collision theory?</li> <li>- What is activation energy?</li> <li>- What is the role of a catalyst in increasing the rate of a reaction?</li> <li>- Can I use the Maxwell-Boltzmann distribution curve to explain effect of temperature and catalysts?</li> </ul> <p><b>Equilibria 1:</b></p> <ul style="list-style-type: none"> <li>- What is a reversible and irreversible reaction?</li> <li>- How is dynamic equilibrium established within a given reaction?</li> <li>- How is Le Chatelier's Principle used to explain the effect of concentration, pressure and temperature on equilibrium composition?</li> <li>- Can I deduce an expression for Kc for heterogeneous and homogeneous systems?</li> </ul>	<p><b>Energetics 1:</b></p> <ul style="list-style-type: none"> <li>- Why is it important to use standard conditions when comparing enthalpy changes?</li> <li>- What are the key definitions for enthalpy changes of formation, combustion and neutralisation?</li> <li>- Do I know how to calculate enthalpy changes given experimental data?</li> <li>- How is Hess's Law used to determine enthalpy changes of reactions that can be determined directly?</li> <li>- Do I know how to use bond enthalpies to calculate enthalpy changes of reaction, and mean bond enthalpies from enthalpy changes of reaction?</li> </ul> <p><b>Modern Analytical Techniques 1:</b></p> <ul style="list-style-type: none"> <li>- How does fragmentation occur inside the mass spectrometer?</li> <li>- How to use mass spectra to identify the structures of organic compounds?</li> <li>- What happens when molecules absorb infrared radiation?</li> <li>- How to use infrared spectra to identify the structures of organic compounds?</li> </ul>	<p><b>Equilibrium II:</b></p> <ul style="list-style-type: none"> <li>- Can I deduce an expression for Kc and for Kp for heterogeneous and homogeneous systems?</li> <li>- What is the effect of temperature, concentration, pressure and catalysts on equilibrium constants?</li> </ul> <p><b>Acid-base equilibria:</b></p> <ul style="list-style-type: none"> <li>- What is meant by a Bronsted-Lowry acid and base?</li> <li>- What is a conjugate acid-base pair in terms of proton transfer?</li> <li>- Can I identify conjugate acid-base pairs in any given reaction?</li> <li>- What is the relationship between hydrogen ion concentration and pH?</li> <li>- What is the method used to calculate the pH of aqueous solutions?</li> <li>- What is the difference between a strong and weak acid?</li> <li>- How do I calculate Ka and Kw?</li> <li>- How do I draw and interpret titration curves?</li> <li>- How do we select a suitable indicator for an acid-base titration?</li> <li>- What is a buffer?</li> </ul>	<p>structural, displayed and skeletal formulae of an organic molecule, given its molecular formula</p> <p>Understand the term 'stereoisomerism', as illustrated by E/Z isomerism (including cis-trans isomerism where two of the substituent groups are the same).</p> <p>Distinguish between an electrophile and a nucleophile, draw the mechanisms for these reactions using curly arrow notation.</p> <p>Analyse substances using mass and infra-red spectra.</p> <p>Interpret a Maxwell-Boltzmann distribution curve.</p> <p>Know that many reactions are readily reversible and that they can reach a state of dynamic equilibrium in which:</p> <p>i the rate of the forward reaction is equal to the rate of the backward reaction</p> <p>ii the concentrations of reactants and products remain constant</p> <p>2. be able to predict and justify the qualitative effect of a change in temperature, concentration or pressure on a homogeneous system in equilibrium</p>
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Year 12 Biology	Term 1		Term 2		Term 3		End Points
	Biological Molecules [? lessons]	Cells [? lessons]	Exchange and Transport [? lessons]	DNA, Variation and Interdependence [? lessons]	Half Term 5 [? lessons]	Half Term 6 [? lessons]	
<b>Topic</b>							
<b>Skill</b>	Experimental Planning Graphical Interpretation Maths	Experimental Planning Graphical Interpretation Maths Microscopy	Experimental Planning Graphical Interpretation Maths Dissection	Experimental Planning Graphical Interpretation Maths	Experimental Planning Graphical Interpretation Maths	Practical planning Practical observation Practical write up skills	
<b>Content</b>	Introduction to biological molecules Carbohydrates - monosaccharides Carbohydrates - disaccharides and polysaccharides Starch, glycogen and cellulose Lipids Proteins Enzymes Rate of enzyme controlled reactions Enzyme inhibition Structure of genetic material DNA replication ATP and energy Water and its functions CP: Food Test CP: Enzyme Factors	Eukaryotic cell structure Cell specialisation and organisation Prokaryotic cells and viruses Light microscopes Electron microscopes Microscope calculations Mitosis and the Cell cycle Structure of cell membranes Diffusion, osmosis and active transport Co-transport (absorption in the ileum) Defence mechanisms Phagocytes Cell mediated response Humoral response Antibodies Vaccination HIV CP: Microscopy CP: Membrane Permeability CP: Water Potential	Calculations of surface area and volume Gas exchange in single celled organisms Gas exchange in insects and fish Gas exchange in plants Limiting water loss in plants and insects Structure of human gas exchange system Mechanisms of breathing and gas exchange The digestive system and enzymes Absorption of digested materials Haemoglobin Transport by haemoglobin Circulatory systems in mammals Heart structure and cardiac cycle Blood vessels Transport systems in plants CP: Heart Dissection CP Potometer	DNA and chromosomes Genes and the triplet code Structure of RNA Protein synthesis Mutations Meiosis and genetic variation Genetic diversity and adaptation Types of selection	Taxonomy Diversity in communities Human impact on diversity Investigating diversity CP: Species Sampling	Introduction to year 13 content looking at responses of organisms to the environment. This focuses on the knowledge and skills required to carry out core practical 10 and 12 which are both better suited to study in the summer term.	
<b>Prior Knowledge Required (GCSE)</b>	Food Types and food testing completed in year 9 topic 2. Enzyme Action completed in year 9 topic 2. DNA studied in year 11 topic 6.	Cellular Structure studied in year 7 term 1 and year 9 topic 1. Microscopes studied in year 7 term 1 and year 9 topic 1. Immune System studied in year 10 topic 3. Cellular Transport studied in year 9 topic 1.	Digestion – studied in year 7 term 1 and year 9 topic 2. Circulation - studied in year 7 term 1 and year 9 topic 2. Surface Area Mass Transport studied in year 7 term 1 and year 9 topic 2.	DNA studied in year 11 topic 6. Meiosis studied in year 11 topic 6. Classification studied in year 11 topic 7. Biodiversity studied in year 11 topic 7. Adaptations studied in year 11 topic 6 and 7.	Biodiversity studied in year 11 topic 7. Adaptations studied in year 11 topic 6 and 7.	Sampling is studied in year 11 topic 7.	
<b>Feedback Points</b>	Long answer exam questions Core-practical write up	Long answer exam questions Core-practical write up	Long answer exam questions Core-practical write up	Long answer exam questions Core-practical write up	Long answer exam questions Core-practical write up	Core practical write up	
<b>Key Questions</b>	What are the different Biological Molecules? How are structure and function related with the different molecules? How does an enzyme work?	What are the different cell types? What is in a cell? How does a microscope work? What is mitosis and why is it significant?	How do organisms exchange substances with their environment? How are substances transported around an organism?	What is genetic material? What impacts do mutations have? How does genetic variation lead to selection?	What is biodiversity and what impact do humans have? How do we measure biodiversity?	What is taxes and kinesis? How can we take samples of organisms?	

	What factors affect how an enzyme works? How does DNA replicate? Why is water such an important molecule?	How do cells move substances? How does our body defend itself? How does vaccination work?					
<b>Direct Vocab Instruction</b>	See lists on Science Hub	See lists on Science Hub	See lists on Science Hub	See lists on Science Hub	See lists on Science Hub	See lists on Science Hub	
<b>Standardised Homework</b>	10 Mark Recap Qs Core Practical Write Ups Exam Questions Wider Reading	10 Mark Recap Qs Core Practical Write Ups Exam Questions Wider Reading	10 Mark Recap Qs Core Practical Write Ups Exam Questions Wider Reading	10 Mark Recap Qs Core Practical Write Ups Exam Questions Wider Reading	10 Mark Recap Qs Core Practical Write Ups Exam Questions Wider Reading	Core practical write up	

Year 13 Physics	Term 1		Term 2		Term 3		End Points
	Half Term 1 [24 lessons]	Half Term 2 [21 lessons]	Half Term 3 [18 lessons]	Half Term 4 [18 lessons]	Half Term 5 [10 lessons]	Half Term 6 [ 0 lessons]	
<b>Topic</b>	<b>Wave-Particle duality and Thermodynamics</b>		<b>Oscillations</b>	<b>Gravitational fields and Cosmology</b>	<b>Synoptic Review</b>	<b>Exams</b>	
<b>Skill</b>	CP6: Determine the speed of sound in air CP7: Investigate the effects of length, tension and mass per unit length on the frequency of a vibrating string or wire. CP8: Determine the wavelength of light from a laser or other light source using a diffraction grating.	CP12: Calibrate a thermistor in a potential divider circuit as a thermostat. CP13: Determine the specific latent heat of a phase change. CP14: Investigate the relationship between pressure and volume of a gas at fixed temperature.	CP16: Determine the value of an unknown mass using the resonant frequencies of the oscillation of known masses . Mathematical skills such as sketching relationships that might be modelled by $y = \sin x$ and $y = \cos x$	Sketch and interpret scientific diagrams Apply different methods for determining the distances to stars Research, analyse and present real-time data using the Sloan Digital Sky Survey.	Apply different parts of the specification to solve contextual problems		
<b>Content</b>	Superposition, Standing Waves Diffraction, Refraction, Reflection, Polarization Lenses and Image formation Photoelectric effect Atomic spectra	Heat and Temperature Internal Energy Heat Transfer Ideal Gas Behaviour Kinetic Theory Equations Derivation of Kinetic Equations	Simple Harmonic Motion (SHM) Free and Forces Oscillations SHM Energy SHM Maths Resonance, Damping	Gravitational Fields and forces Stellar Classifications Measuring Astronomical Distances The Age of the Universe The Fate of the Universe	Circular motion with Gravitational fields Waves with SHM Thermodynamics with Electricity Mechanics with Thermodynamics		<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Draw on all parts of the Specification to explain the world around them</li> <li>• Solve complex problems using sound physics principles</li> <li>• Apply mathematical reasoning to interpret data and make predictions of future trends</li> </ul>
<b>Prior Knowledge Required</b>	Types of Waves Refraction, reflection and EM spectrum	Gas volume and pressure laws Particle model of matter	Equations for motion in a circle	Astrophysics Red shift Life cycle of a star	All topics represented in the Physics equation sheet		
<b>Feedback Points</b>	Long answer exam questions	Long answer exam questions	Long answer exam questions	Long answer exam questions	Long answer exam questions		
<b>Key Questions</b>	Describe longitudinal waves in terms of pressure variation and the displacement of molecules Explain what is meant by a standing/stationary wave and how such a wave is formed.	Explain the concepts of internal energy and absolute zero Explain what is meant by a black body radiator	Explain the conditions for simple harmonic motion Identify situations in which simple harmonic motion will occur Explain resonance	Explain how astronomical distances can be determined using trigonometric parallax Explain the Doppler effect	Compare electric fields with gravitational fields Explain how you can apply Newton's laws of motion and universal gravitation to orbital motion.		
<b>Direct Vocab Instruction</b>	Investigate Interpret Deduce	Interpret Derive	Interpret Analyse Conclude	Describe Interpret Deduce	Compare Apply		
<b>Standardised Homework</b>	- Pre-reading and note taking (flip learning)- Exam questions - Planning a practical - Writing up a core practical	- Pre-reading and note taking (flip learning) - Exam questions - Planning a practical - Writing up a core practical	- Pre-reading and note taking (flip learning) - Exam questions - Planning a practical - Writing up a core practical	- Pre-reading and note taking (flip learning) - Exam questions - Planning a practical - Writing up a core practical	- Pre-reading and note taking (flip learning) - Exam questions - Planning a practical - Writing up a core practical		

Year 13 Chemistry	Term 1		Term 2		Term 3		End Points
	Half Term 1 [10 lessons: Redox II Energetics II: 8 lessons ]	Half Term 2 [7 lessons: Transition metals Organics 2: 5 Lessons]	Half Term 3 [9 lessons: Organics III]	Half Term 4 [8 lessons: Kinetics 2 6 lessons: Modern Analytical Techniques II]	Half Term 5 [? lessons]	Half Term 6 [? lessons]	
<b>Topic</b>	Topic 13 Energetics II Topic 14 Redox II	Topic 15 Transition metals Topic 17 Organic chemistry II	Topic 18 Organic chemistry III	Topic 16 Kinetics II Topic 19 Modern analytical techniques II	Revision	Revision & exams	
<b>Skill</b>	- Numeracy - Practical skills - Writing balanced chemical equations - Reasoning - Analytical	- Numeracy - Practical skills - Writing balanced chemical equations - Reasoning - Analytical	- Practical skills - Writing balanced chemical equations - Reasoning - Analytical	- Numeracy - Practical skills - Writing balanced chemical equations - Reasoning - Analytical	Revision	Revision & exams	
<b>Content</b>	<b>Energetics II:</b> Lattice enthalpy Born Haber cycles Polarisation Solubility Entropy Gibbs Free energy Feasibility and relationships (G/S/K)  <b>Redox II:</b> Standard Electrode potentials Electrochemical cells E cell calculations Storage and fuel cells Redox titrations	<b>Transition metals:</b> Chemical Properties Complex ions Colour Chromium Water and deprotonation Reactions Catalytic activity  <b>Organics Chemistry II:</b> Chirality Carbonyl compounds Reactions of Carbonyls Carboxylic acids Reactions of Carboxylic acids Acyl chlorides Esters Condensation polymerisation and polyesters	<b>Organics Chemistry III:</b> Benzene Reactions of Benzene Friedel Crafts Phenol Amines Amides Polyamides Amino acids & TLC Functional group tests Organic synthesis Grignards Experimental Techniques	<b>Kinetics 2:</b> Experimental techniques conc/time graphs Rate/conc graphs Order & rate reactions Order & mechanisms Arrhenius equation  <b>Modern analytical techniques: II</b>  Mass spectrometry C NMR H NMR Chromatography	Revision	Revision & exams	<b>Students should be able to:</b>  Use energy cycles and energy level diagrams to carry out calculations involving enthalpy change of solution, enthalpy change of hydration and lattice energy. Explain the effect of ionic charge and ionic radius on the values of:  i lattice energy  ii enthalpy change of hydration  Explain that entropy is a measure of the disorder of a system. Use given data to calculate the entropy of system and surroundings and hence the enthalpy change in order to predict the feasibility of a reaction.  Know the features of the standard hydrogen
<b>Prior Knowledge Required</b>	Year 12 chemical energetics I Year 12 redox I	Year 12 redox I Year 12 organics I	Year 13 organics II	Year 12 kinetics I	Revision	Revision & exams	
<b>Feedback Points</b>	Long answer exam questions	Long answer exam questions	Long answer exam questions	Long answer exam questions	Revision	Revision & exams	
<b>Key Questions</b>	<b>Energetics II:</b> - Can I use the Born Haber Cycle to calculate lattice enthalpy? - What are enthalpy changes of atomisation, solution and hydration? - How does a cation polarise an anion?	<b>Transition metals:</b> - What is a ligand? - How does carbon monoxide prevent the transport of oxygen through the bloodstream?	- How are aromatic compounds different from aliphatic compounds in terms of their physical and chemical properties? - Why is it easier to brominate phenol compared to benzene?	<b>Kinetics 2:</b> - What are the different methods used to measure the rate of a reaction? - What relationship is shown by the rate equation? - What do we mean by the order of a reaction?	Revision	Revision & exams	

	<ul style="list-style-type: none"> <li>- Why do entropy changes occur during changes of state?</li> <li>- What is a spontaneous process?</li> <li>- How does the Second Law of Thermodynamics allow us to predict whether a process will occur?</li> <li>- Can I calculate total entropy if I am given entropies of system and surroundings?</li> <li>- How is entropy related to enthalpy and temperature?</li> <li>- What is the relationship between entropy, Gibbs energy and equilibrium constants?</li> </ul> <p><b>Redox II:</b></p> <ul style="list-style-type: none"> <li>- How do I construct and electrochemical cell and use it to calculate cell potential (emf)?</li> <li>- How are standard electrode (redox) potentials determined?</li> <li>- How to use redox potentials to predict feasibility of a chemical reaction?</li> <li>- How does a storage cell work?</li> <li>- What is a fuel cell?</li> </ul>	<ul style="list-style-type: none"> <li>- How can transition metals act as catalysts?</li> </ul> <p><b>Organics Chemistry II:</b></p> <ul style="list-style-type: none"> <li>- What is a chiral molecule?</li> <li>- What is optical activity?</li> <li>- What is an enantiomer?</li> <li>- What is a racemic mixture?</li> <li>- What are the different types of reaction mechanism?</li> </ul>	<ul style="list-style-type: none"> <li>- What are the similarities between manufacturing polyamides and the formation of proteins from amino acids?</li> <li>- How can I increase the length of a carbon chain in a molecule using a Grignard reagent?</li> <li>- What experimental techniques can be used to prepare and purify organic compounds?</li> </ul>	<ul style="list-style-type: none"> <li>- How can I use the initial-rate method and the continuous monitoring method to investigate reaction rates?</li> <li>- How can I deduce the rate-determining step from a rate equation?</li> <li>- What is an SN1 and SN2 reaction mechanism?</li> <li>- Can I use the Arrhenius equation to explain the effect of temperature on the rate constant of a reaction?</li> </ul> <p><b>Modern analytical techniques II:</b></p> <ul style="list-style-type: none"> <li>- How to use nuclear magnetic resonance spectra to identify the structures of organic compounds?</li> <li>- What is chemical shift?</li> <li>- What is a chemical environment?</li> <li>- What is the difference between high resolution and low-resolution NMR spectroscopy?</li> <li>- How does the movement of the mobile phase in HPLC differ from gas chromatography?</li> </ul>			<p>electrode and understand why a reference electrode is necessary. To write cell diagrams using the conventional representation of half-cells. Predict the thermodynamic feasibility of a reaction using standard electrode potentials values.</p> <p>Understand that the colour of aqueous ions, and other complex ions, results from the splitting of the energy levels of the d-orbitals by ligands. They should be able to explain why there is a lack of colour in some aqueous ions and other complex ion</p>
<b>Direct Vocab Instruction</b>	<p><b>Energetics II:-</b></p> <ul style="list-style-type: none"> <li>- Atomisation</li> <li>- Entropy</li> <li>- Spontaneous</li> <li>- Enthalpy</li> </ul> <p><b>Redox II:</b></p> <ul style="list-style-type: none"> <li>- Electrochemical</li> <li>- Electrode potential</li> <li>- Feasibility</li> </ul>	<p><b>Transition metals:</b></p> <ul style="list-style-type: none"> <li>- Ligand</li> <li>- Monodentate</li> <li>- Bidentate</li> <li>- Multidentate</li> <li>- Chiral</li> <li>- Chirality</li> <li>- Enantiomer</li> <li>- Racemic mixture</li> <li>- Polarised</li> </ul> <p><b>Organics Chemistry II:</b></p> <ul style="list-style-type: none"> <li>- Reagent</li> <li>- Reflux</li> <li>- Arene</li> <li>- Polarised</li> <li>- Racemic</li> </ul>	<ul style="list-style-type: none"> <li>- Aliphatic</li> <li>- Aromatic</li> <li>- Delocalised</li> <li>- Solvent extraction</li> <li>- Recrystallisation</li> <li>- Solvent extraction</li> </ul>	<p><b>Modern analytical techniques II:</b></p> <ul style="list-style-type: none"> <li>- High performance liquid chromatography</li> <li>- Chemical shift</li> <li>- Chemical environments</li> <li>- Singlet</li> <li>- Doublet</li> <li>- Triplet</li> <li>- Quartet</li> </ul> <p><b>Kinetics 2:</b></p> <ul style="list-style-type: none"> <li>- Rate-determining</li> <li>- Half-life</li> <li>- Rate-constant</li> <li>- Homogenous</li> <li>- Heterogenous</li> <li>- Order</li> </ul>	<b>Revision</b>	<b>Revision &amp; exams</b>	<p>Understand that colour changes in transition metal ions may arise as a result of changes in:</p> <ul style="list-style-type: none"> <li>i oxidation number</li> <li>ii ligand</li> <li>iii coordination number</li> </ul> <p>Understand how a catalytic converter decreases carbon monoxide and nitrogen monoxide emissions from internal combustion engines by:</p>
<b>Standardised Homework</b>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>	<b>Revision</b>	<b>Revision &amp; exams</b>	

						<p>i adsorption of CO and NO molecules onto the surface of the catalyst</p> <p>ii weakening of bonds and chemical reaction</p> <p>iii desorption of CO<sub>2</sub> and N<sub>2</sub> product molecules from the surface of the catalyst</p> <p>Calculate the rate of reaction and the half-life of a first-order reaction using data from a concentration-time or a volume-time graph. They should be able to deduce the order (0, 1 or 2) with respect to a substance in a rate equation using data from:</p> <p>i a concentration-time graph</p> <p>ii a rate-concentration graph.</p> <p>Understand that optical isomerism results from chiral centre(s) in a molecule with asymmetric carbon atom(s) and that optical isomers are object and non-superimposable mirror images.</p> <p>Identify functional groups such as carbonyls, carboxylic acids, and amines. Plan reaction schemes, of up to four steps, to form</p>
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							<p>both familiar and unfamiliar compounds</p> <p>Use a variety of analytical techniques such as NMR spectroscopy to identify unknown organic compounds.</p>
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Year 13	Term 1		Term 2		Term 3		End Points
	Half Term 1 [? lessons]	Half Term 2 [? lessons]	Half Term 3 [? lessons]	Half Term 4 [? lessons]	Half Term 5 [? lessons]	Half Term 6 [? lessons]	
<b>Topic</b>	Energy Transfer	Responses to Change	Genetics, Populations and Ecosystems	Gene Expression	Revision and preparation for final A level examinations		
<b>Skill</b>	Experimental Planning Graphical Interpretation Maths	Experimental Planning Graphical Interpretation Maths	Experimental Planning Graphical Interpretation Maths	Experimental Planning Graphical Interpretation Maths			
<b>Content</b>	Overview of photosynthesis Light-dependent reaction Light-independent reaction Glycolysis Link reaction and krebs cycle Oxidative phosphorylation Anaerobic respiration Energy transfers in ecosystems Nutrient cycles Uses of fertilisers and environmental impacts	Receptors Control of heart rate Neurones and the nervous system Resting membrane potential Action potentials Passage of an action potential Speed of conductance Synapses (structure and transmission) Skeletal muscles Contraction of muscles Homeostasis Feedback mechanisms Regulation of glucose Diabetes and control Regulation of water (osmoregulation) Nephrons Role of hormones in osmoregulation	Monohybrid inheritance Dihybrid inheritance Probability and genetic crosses Codominance and multiple alleles Sex-linkage and autosomal-linkage Epistasis Population genetics and variation in phenotypes Natural selection Different forms of selection Isolation and speciation Population in ecosystems Competition Predation Investigating populations Succession Conservation	Gene mutations Stem cells Regulation of transcription and translation Epigenetic control Gene expression and cancer Genome projects Recombinant DNA technology Creating DNA fragments In-vivo gene cloning In-vitro gene cloning Locating genes, genetic screening and counselling Genetic fingerprinting			
<b>Prior Knowledge Required</b>	Photosynthesis is studied in 9 in topic 4. Respiration is studied in year 9 topic 4. ATP and macromolecules are studied in year 12 topic 1. Flow of energy through ecosystems is studied in year 11 topic 7.	The nervous system and endocrine system are studied in year 10 or 11 topic 5. Movement across the membrane is studied in year 12 topic 2.	Inheritance is studied in year 11 topic 6. Natural selection is studied in year 11 topic 6 and year 12 topic 3. Interdependence is studied in year 11 topic 7 and year 12 topic 3.	GM is studied in year 11 topic 6. DNA structure is studied in year 11 topic 6 and year 12 topic 1. Genetics is studied in year 13 topic 7.			
<b>Feedback Points</b>	Long answer exam questions	Long answer exam questions	Long answer exam questions	Long answer exam questions			
<b>Key Questions</b>	How does photosynthesis work? What factors affect photosynthesis? How does respiration take place? How does energy move between organisms? What are nutrient cycles and what are their significance?	How does the body communicate with itself? What conditions are needed for the body to function properly? How are these conditions controlled? How is movement controlled?	How are characteristics inherited? What is natural selection? How do new species form? How do different species interact with each other? How can we investigate populations? How do new habitats develop?	How are genes switched off and on? How does the environment alter gene expression? How does gene expression link to cancer? What was the human genome project? How can we artificially copy DNA? How do we genetically modify organisms? What is genetic fingerprinting?			

				Why is genetic counselling necessary?			
<b>Direct Vocab Instruction</b>	See lists on Science Hub	See lists on Science Hub	See lists on Science Hub	See lists on Science Hub			
<b>Standardised Homework</b>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-reading and note taking (flip learning)</li> <li>- Exam questions</li> <li>- Planning a practical</li> <li>- Writing up a core practical</li> </ul>			