

## Progression Map - Biology

Key Concepts	Year 7	Year 8	Year 9	Year 10	Year 11
Cell biology	<b>7I A new baby</b> Cells, Microscopes,	<b>8C Cells to organisms</b> Cells, Specialised cells, Blood,		<b>B1 Cells and Microscopy</b> Cell structure, adaption, Microscope calculations, Cell replication, Transport	
Organ systems	<b>7C How we Move</b> Muscular Skeletal System <b>7I A new baby</b> Reproductive organs	<b>8C cells to organisms</b> Circulatory system Flowers <b>8F Gas Exchange</b> Lungs, Breathing, plants <b>8I The Digestive system</b>	<b>9B1 Bioenergetics</b> Leaf structure	<b>B2 Organisation</b> Circulatory, digestive and respiratory system, Food test and enzymes, Risk and disease. Plant organisation and transport	
Health and disease	<b>7I A new baby</b> Effect of diet, drugs and exercise on foetus. <b>7F Feeding the planet</b> Nutrients, healthy diet	<b>8F Gas Exchange</b> Effect of exercise, Smoking, Asthma <b>8I The Digestive system</b> Unbalanced diet		<b>B3 Infection and response</b> Disease vectors, vaccines, Drug development	
Biochemistry	<b>7F Feeding the planet</b> Producers		<b>9B1 Bioenergetics</b> Photosynthesis; aerobic & anaerobic respiration <b>9BP Photosynthesis</b> Practical	<b>B4 Bioenergetics</b> Photosynthesis and uses of glucose; aerobic and anaerobic respiration; metabolism	
Hormones and the nervous system	<b>7I A new Baby</b> Menstrual Cycle				<b>B5 Homeostasis and Response</b> Nervous system; Reaction time; Glandular system; Hormones; Blood sugar; Diabetes
Genetics and reproduction	<b>7I A new baby</b> Sexual reproduction Plant reproduction		<b>9BT Inheritance and Evolution</b> Variation, DNA Chromosomes genes; Natural selection; gene bank		<b>B6 Variation, Inheritance and evolution</b> Inheritance, alleles, evolution; classification.
Interactions with the environment	<b>7D Feeding the planet</b> Food Chains, Webs, Ecosystems, bioaccumulation		<b>9BT Inheritance and Evolution</b> Maintaining biodiversity		<b>B7 Ecology</b> abiotic & biotic factors Ecosystem; Sampling; Carbon water cycle;

## Progression Map - Chemistry

Key concepts	Yr7	Yr8	Yr9	Yr10	Yr11
Properties of materials	<b>7AA Materials and their properties</b> Identifying properties of materials The concept of a pure substance Mixtures and dissolving, separating techniques <b>7D The water of Life</b> Particle model, States, diffusion	<b>8H The periodic table</b> Periodic table groups, basic properties <b>8B Planet Earth</b> Structure of Planet Earth Rocks	<b>9C1 Metals and their Reactions</b> Metals & non metals acids and alkalis catalysts  <b>Trans Practicals 9CP making salts</b>	<b>C2 - Bonding and structure</b> Types of bonding Properties of Covalent and ionic structures Polymers	<b>C8 - Chemical analysis</b> Use of properties (eg solubility / chromatography) in analysis
The Periodic Table	<b>7H Atoms, Elements and compounds</b> Atoms, elements, compounds & mixtures Chemical symbols and formulae	<b>8E The periodic table</b> Intro and history of Periodic table; Structure of the atom ;	<b>9CT Intro to bonding</b> Groups and periods Electronic shell structure	<b>C1 - Atomic structure and the periodic table</b> Structure of the atom History & Trends in the periodic table	
Breaking & Making Bonds	<b>7H Atoms, Elements and Compounds</b> Joining atoms	<b>8H Chemical reactions</b> Thermal decomposition & combustion	<b>9CT Intro to Bonding</b> Bonds exist between atoms; Covalent, Ionic Diamond and graphite	<b>C2 Bonding and structure</b> Metallic, ionic, covalent bonds Sand, & small covalent molecules (C2) <b>C5 - Energy changes</b> Exo and endothermic reactions; Reaction profiles	
Chemical Reactions.	<b>7AA 2 Materials and their properties</b> Chemical change and reversible reactions <b>7E Chemistry skills</b> acids and alkalis, metals and acids, The pH scale <b>7H Atoms, elements and compounds</b> joining atoms & chemical reactions	<b>8H Chemical reaction</b> Metals and acids; Thermal decomposition; Word equations + some use of symbols; gas tests ; exo / endothermic	<b>9C1 Metals and their reactions</b> Reactions of metals, metal oxides, and acids. Reactivity series; Combustion; Catalysts  <b>Trans Practicals 9CP making salts</b>	<b>C4 - Chemical changes</b> Reactivity of metals Reactions of acids The pH scale	<b>C8- Chemical analysis</b> Gas tests and ion tests <b>C6 - Rate and extent of chemical change</b> Factors affecting rates of reaction; Reversible reactions <b>C10 - Using resources</b> Haber process
Chemical Calculations	<b>7H Atoms, Elements and compounds</b> conservation of mass	<b>8H Chemical reactions</b> Bond energies		<b>C3 - Quantitative chemistry</b> Calculations relating to atoms and reactions	<b>C6 - Rate and extent of chemical change</b> Calculating rates of reaction <b>C10 - Using resources</b> Calculation of percentage yield
Environmental Chemistry	<b>7D Water of Liife</b> environment is made of chemicals (food, clothes etc)	<b>8B Planet Earth</b> Structure of the earth The rock cycle; the atmosphere; Carbon Cycle; ecycling	<b>9C1 Metals and their reactions</b> Combustion; metal extraction; catalysis		<b>C7 - Organic chemistry</b> Hydrocarbons; fractional distillation and cracking <b>C10 - Using resources</b> Making water safe; Life cycle assessments <b>C9 - Chemistry of the atmosphere</b> Changes in the earth's atmosphere over time Global warming and climate change Carbon footprint

## Progression Map - Physics

Key Concepts	Year 7	Year 8	Year 9	Year 10	Year 11
Forces and motion	<b>7C How we Move</b> Force diagrams, Pressure, Speed, time distance, Friction <b>7G Force and Pressure</b> Atmospheric pressure, liquids, pressure equation; non contact forces; relative motion, electrostatic attractions. Movement		<b>9P1 Machines</b> Leavers, gears, moments, forces, <b>9PP Hooke's law</b>		<b>P5a &amp; 5b Forces and their interactions</b> Resultant forces; weight; Hooke's law; moments; Levers & gears; Pressure Velocity, acceleration; Newton's laws; terminal velocity; momentum
Energy	<b>7B Keeping the lights on</b> fuels and energy resources; conservation of energy - energy' fuel bills; energy transfers; energy in food	<b>8A Heating and cooling</b> energy stores and transfers; thermal energy and internal energy Thermal equilibrium Intro to internal energy <b>8D Light</b> Light transferring energy from source to absorber	<b>9P1 Machines</b> power ratings compare energy usage domestic fuel bills and usage	<b>P1 Energy</b> energy stores: numerical; energy transfers and conservation of energy : numerical; efficiency, power calculation, SHC, energy resources and their uses	
Waves	<b>7AA KS2-3 Transition 3</b> electricity and light Shadows and reflections	<b>8D Light</b> light properties, reflection refraction; lenses; spectrum <b>8G Sound</b> SoundAuditory ranges of humans and animals			<b>P6 Waves</b> wave properties and investigations; refraction; EMS uses and dangers
Matter	<b>7D The water of Life</b> states of matter and changes of state; anomaly of water; motion in gases	<b>8A Heating and Cooling</b> Particle model changes in motion and spacing of particles with temperature		<b>P3 Particle model of matter</b> density; pressure and temperature in gases; internal energy and changes of state; SLH; SLH and SHC complex calculations	<b>P4 Atomic structure</b> the model of the atom; nuclear radiation and its properties;
Electricity and Magnetism	<b>7AA KS2-3 transition 3.</b> Electricity and light Circuit  <b>7B Keeping the lights on</b> Making electricity	<b>8B Planet earth</b> Magnetism; magnetic fields,	<b>9PT Electricity and Space</b> electrical current and potential difference; series and parallel resistance as $V/I$ electrostatics; magnetic field of a current	<b>P2 Electricity</b> different components; characteristics; circuit components; resistance ; 3 pin plug and the National Grid; power of electrical appliances; solving numerical problems involving electrical circuits	<b>P7 Magnetism and Electromagnetism</b> induced magnetism; electromagnets and their uses; motor
Space	<b>7AA KS2/3 Transition</b> Earth moon day and night	<b>8B Planet Earth</b> Earth's magnetism	<b>9PT Electricity and Space</b> gravity, $W=mg$ gravitational field strength different planets of the Solar System; gravity between astronomical objects day and night, seasons, years		

**Long-term plan:** organises the knowledge from the progression map into units to give an overview of what is taught when in the curriculum.

**Year 7- Science**

Autumn Term		Spring Term		Summer Term	
<b>Unit Title:</b>  <b>Getting ready for secondary science</b>  <b>Keeping the lights on (energy resources)</b>  <b>We like to move it, move it (Skeleton and movement inc. forces)</b>	<b>Unit length:</b>  18 lessons  10 lessons  8 lessons	<b>Unit Title:</b>  <b>7D the Water of Life (Particle model)</b>  <b>7E Chemistry Skills</b>  <b>7F Feeding the planet</b>	<b>Unit length:</b>  8 lessons  9 lessons  10 lessons	<i>Unit Title:</i>  <b>7G Force and pressure</b>  <b>7H Atoms, elements and compounds</b>  <b>7I A new baby (plant and animal reproduction)</b>	<b>Unit length:</b> 7 lessons  11 lessons  11 lessons
<b>Domains of Knowledge:</b> <b>Getting ready for science:</b> life cycles ; classification; Adaptations; Reproduction; Fossils; Circulatory system; Basic circuits ; Light and shadows ; Reflection ; The earth, sun and moon ; Day and night ; Dissolving; comparing substances; Separating substances ; Reversible changes ; Chemical changes;  <b>Keeping the lights on (energy resources)</b> Uses of electricity; Generating electricity; Solar power; wind power; Fossil fuels; Electricity from water; Measuring energy; More about energy; future energy.  <b>We like to move it move it</b> The body as a machine (skeleton); Muscles (measuring forces); Antagonistic pairs (how muscles work); How we walk (balanced forces); What else do muscles do (forces); How fast can you go (speed); Drawing your movement (graphs)		<b>Domains of Knowledge:</b> <b>7D the water of life</b> What is water; why states are different; ice; changing states; pure water; diffusion; brownian motion;  <b>7E Chemistry skills</b> Safety, Hazards and precautions; How to use a bunsen; how to measure with equipment; Drawing graphs- How to draw a bar chart; Using indicators; reacting metals with acids; Measuring temperature; Extracting salts.  <b>7F feeding the planet</b> Macronutrients; micronutrients; Energy requirements; Energy transfers from food; food chains; Producers & photosynthesis; Why are producers important?; Pollinators;		<b>Domains of Knowledge:</b>  <b>7G Force and pressure</b> Atmospheric pressure ; Pressure in liquids ; Pressure equation ; Non contact forces ; Electrostatic attraction ; Relative motion ; Forces and movement ; Changes caused by forces ;  <b>7H Atoms, elements and compounds</b> The atomic model ; Atoms, elements and compounds ; Chemical symbols and formulae ; Conservation of mass in chemical reactions; Rearrangement of atoms in chemical reactions ; The concept of a pure substance ;  <b>7I A new baby (plant and animal reproduction)</b> Cells as a building block of life ; Naming sub cellular structures in plant and animal cells ; Observing cells ; Reproduction in humans inc. egg + sperm as specialised animal cells ; Reproduction in plants	
<b>Relevant Key Concepts:</b> Energy, forces and motion, organ systems		<b>Key Concepts:</b> Matter, Chemical reactions, health and disease, biochemistry, interactions with the environment		<b>Key Concepts:</b> Forces, The periodic table, chemical reactions, properties of materials, cell biology	
<b>Gateway knowledge:</b> Living things, including humans have offspring ; Life cycle of a plant ; Common appliances use electricity ; Simple circuits and names of components ; Darkness is the absence of light ; Light can be blocked by opaque substances ; The earth is part of a solar system ; The earth rotates ; Know that some substances dissolve; Basic SI units (seconds, metres); Electricity is a useful energy source; Energy is present when things happen; Basic skeleton structure; Forces as push or pull forces ; Basics of levers ;		<b>Gateway knowledge:</b>  Materials have different properties; Materials are either solid, liquid , or gas; Changes of state; Chemicals can react; Reactions can change the properties of material ; Food is a source of energy; Impact of diet on bodily function ; Plants need the sun to grow; Basic lab Safety		Gateway knowledge:  Calculating area ; Forces as pushes and pull; Forces as contact and non contact ; Neutralisation reactions and reactions with acids and metals ; Dissolving ; Reproduction as essential life process; Plants grow from seeds	
<b>Assessment end-points:</b> Know how to: Explain why different animals have different life cycles; classify animals; Explain the adaptations of animals. Differentiate between asexual and sexual reproduction; Explain the functions of the circulatory system; <i>Use differences in mass to investigate the solubilities of sugar and salt; Identify materials as metal and non metal from their physical and chemical properties; Use correct equipment and separating techniques to separate salt, sand and iron.</i> Draw and label particle diagrams of solid, liquids and gases. <i>Observe reactions</i> to determine whether they are chemical reactions or physical changes; Use circuit symbols in simple circuit diagrams; <i>Build circuits and predict results using sketch graphs.</i> Explain how shadows are created and eclipses. Model and explain the motions of the sun, earth and moon. Explain why night and day occurs. Represent energy changes in flow charts; Describe the pros and cons of various energy resources; Describe how electricity is generated from fossil fuels. <i>Investigate how light intensity affects voltage from a PV cell and use a graph to describe the change; Investigate how wind turbine blades affects voltage and use means to compare.</i> Summarise how energy is generated; <i>Compare the energy used by different devices;</i> Identify the variety of energy stores; Explain how energy is conserved. Label the structures and functions of a skeleton; <i>Use discretion to Identify antagonistic pairs of muscles in a chicken wing; measure forces acting on muscles using a force meter</i> ; Describe forces acting against a body; Apply force arrows & directions to determine outcomes; Calculate the speed of human motion; <i>Draw graphs to describe speed, distance and time.</i>		<b>Assessment end-points:</b> Know how to: Draw and label particle diagrams of particles changing states; Explain why ice is less dense than water why solids are generally more dense than their liquid forms. Explain what a melting and boiling point is and how it can be used to identify substances. <i>Investigate how temperature of water changes during boiling and use a graph to analyse the results. Investigate how a coloured crystal diffuses in a liquid and perfumes travel across a room. Model the brownian movement of particles using simple diagrams</i> ; Identify and signpost hazards to reduce risks with precautions; Light and use a bunsen burner safely; <i>Use thermometers and measuring cylinders to take measurements; Identification of acids &amp; alkalis using universal indicator; Investigate the reaction of metals with acids and test the test for hydrogen. Investigate how temperature of water changes during boiling and use a graph to analyse the results Extract pure salt from rocksalt</i> Identify the constituent parts of a healthy diet and the role of each component for the body ; Match vitamins with the deficiency disease. <i>Investigate the amount of energy provided by different foods and use them to make different diets.</i> Draw Sankey diagrams to show how energy is used by the body. Draw and explain food chains; Explain how producers grow using photosynthesis. Predict the outcome of a producer dying to the food chain using interdependence. Label a flower and describe the role of insects in plant reproduction;		<b>Assessment end-points:</b> Know how to: <i>Use a collapsing can demonstration to explain the concept of air pressure and how it varies in gases; Use a spouting cylinder experiment to explain water pressure;</i> explain how upthrust is created; <i>Calculate the pressure of a human standing on one foot; Use a force meter to demonstrate the effect of force on speed.</i> Describe relative speed Identify direction of motion, change in direction, acceleration, deceleration and constant speed in basic force diagrams; Describe how static charge is created; Identify when charges will attract or repel; <i>Use plotting compases to show force fields;</i> categorise forces as contact and non contact. Draw/label a simple diagram of an atom ; Define the terms atom, element and compound and identify them from diagrams ; Complete simple word equations and identify the chemical formulae of common compounds ; <i>measuring boiling points of substances to identify if they are pure or not.</i> Draw/label a simple cell diagram ; Categorise sexual and asexual reproduction; Describe key milestones in the development of a foetus ; Describe the process of reproduction in plants	

# Year 8- Science

Autumn Term		Spring Term		Summer Term	
<b>Unit Title:</b> <b>8A Heating &amp; Cooling</b>	<b>Unit length:</b> <b>12 lessons</b>	<b>Unit Title:</b> <b>8D Light</b>	<b>Unit length:</b> <b>10 lessons</b>	<b>Unit Title:</b> <b>8G Sound</b>	<b>Unit length:</b> <b>12 lessons</b>
<b>8B Planet Earth</b>	<b>12 lessons</b>	<b>8E The Periodic Table</b>	<b>10 lessons</b>	<b>8H Chemical Reactions</b>	<b>12 lessons</b>
<b>8C Cells to Organisms</b>	<b>12 lessons</b>	<b>8F Gas Exchange</b>	<b>10 lessons</b>	<b>8I The Digestive System</b>	<b>12 lessons</b>
Domains of Knowledge: Energy, environmental chemistry, cell biology, organ systems		Domains of Knowledge: Waves, energy, The periodic table, organ systems		Domains of Knowledge: Waves, Chemical reactions, organ systems, health and disease	
Relevant Key Concepts: <b>8A Heating &amp; Cooling</b> Energy stores and transfers; thermal energy and internal energy; Thermal equilibrium ; Intro to internal energy ;  <b>8B Planet Earth</b> Structure of the earth ; The rock cycle ; The composition of the earth’s atmosphere ; The link between CO <sub>2</sub> production and climate change ; CO <sub>2</sub> produced when we burn fuels, Acid rain and particulates.; Attraction and repulsion; plotting magnetic field lines using compass; Earth’s magnetism ;  <b>8C Cells to Organisms</b> Functions of subcellular structures; Comparing plant and animal cells ; Unicellular organisms; The role of diffusion; Organisation of multicellular organism ;		Key Concepts: <b>8D Light</b> Light waves and their properties; Using models to show the visible light spectrum; Light transferring energy from source to absorber ;  <b>8E The Periodic Table</b> Periodic table origins Structure of the atom; Intro to history of the periodic table ; Identifying the number of protons, neutrons and electrons in different elements  <b>8F Gas Exchange</b> Structure and function of gas exchange system in humans ; mechanism of breathing ; Gas exchange in leaves ; Impact of exercise on breathing ; Impact of smoking on breathing and exercise ; Impact of asthma on breathing and exercise		Key Concepts: <b>8G Sound</b> Sound waves and their properties ; Auditory ranges of humans and animals ;  <b>8H Chemical Reactions</b> Reactions with the alkali metals; Word equations + some use of symbols; Test for different gases ; Some reactions are exo / endothermic;  <b>8I The Digestive System</b> Digestive system, structure and function ; Function of enzymes ; Consequences of an unbalanced diet ;	
Gateway knowledge;; fuels and energy resources;; basics of conservation of energy - energy as a quantity that can be quantified ( no calculation yet); energy transfers in electrical circuits; other examples of energy transfers related with motion; Your environment is made of chemicals; The earth as a planet ; Cells as the building blocks of life ; observing cells ; Naming sub cellular structures		Gateway knowledge;; Light is reflected from surfaces; Light is required for humans to see ; The atomic model; Atoms, elements, compounds & mixtures; Chemical symbols and formulae; Organisation of multicellular organism <i>How to use and set up a light microscope for viewing cells.</i>		Gateway knowledge;; Speed calculations; Sounds are made using vibrations ; Sound travels through a medium to the ear ; Periodic table symbols; Conservation of mass in chemical reactions; Rearrangement of atoms in chemical reactions; Organisation of multicellular organism ; Components of healthy diets ;	
Assessment end-points: <i>Know how to</i> Description of energy stores and changes (extend to numerical problems); Describe the process of conduction and radiation <i>Measure the temperature of different substances using digital and liquid thermometers. Investigate the changes in size of metals when heated, collect and display data on objects as they cool.</i> Descriptions of stages of the rock cycle; Analysis of rocks ; Prediction of whether magnets will attract or repel ; Problems with magnets and Poles; <i>Investigate the material that interact with magnets and the strength of magnets</i> Explain the function of subcellular structures; Identify differences in plant and animal cells ; Identification of specialised cells & tissues; Explain the functions of common specialised cells and tissues ; <i>use microscopes to view plant cells, construction and development of methods. Make observations on diffusion using agar jelly, indicators and acids.</i>		Assessment end-points: <i>Know how to</i> Completion of simple ray diagrams; Explanation of colour; <i>use scientific equipment to measure angles of reflection and angles of refraction. create conclusions based upon data collected.</i> Explain the effects of a lens, state the structure and function of the human eye, compare this to a basic camera State the definitions for the terms; elements, compounds and mixtures. Be able to use diagrams to identify elements, compounds and mixtures. <i>Observe and provide evidence for a chemical reaction taking place.</i> Description of periods and groups in the PT; Prediction of properties based on group and period; <i>Make predictions based upon trends seen in given data.</i> Recall structure & mechanisms of gas exchange including the structure of the mammalian lungs. Describe the process of breathing; Describe diffusion in the alveoli; Explain the effect of smoking on lung health and the effect asthma can have.; Explain how gases are exchanges in leaves <i>Use microscopes and scientific techniques to count the number stomata on a leaf.</i>		Assessment end-points: <i>Know how to</i> Describe the structure of different sound waves ; Identify mediums that sound waves travel through ; Carry out calculations of sound speed; Describe problems of hearing range in humans and animals.; <i>Identify the speed of sound using echoes, distance and time. Interpret data from diagrams such as oscilloscopes to make conclusions about waves and sound.</i> State how we can tell a chemical reaction has taken place. Use formulae in equations of reactions; Describe different types of reactions; such as thermal decomposition, endo and exothermic reactions. <i>Make a number of different observations and record data such as temperature change and using basic gas tests such as lime water for carbon dioxide.</i> Identify organs in the digestive system and explain their functions ; Describe the role of enzymes in digestion ; Describe the symptoms and treatments of different deficiency diseases <i>Carry out qualitative tests to identify different food groups from a sample of food stuffs</i>	



Year 9- Science

Autumn Term		Spring Term		Summer Term	
Unit Title:  9P1 Machines  9C1 Metals and their reactions  9B1 Intro to bioenergetics	Unit length: 10 lessons 12 lessons 10 lessons	Unit Title: 9P2 Space and space travel  9C2 Bonding  9B2 Inheritance and evolution	Unit length: 12 lessons 10 lessons 12 lessons	Unit Title:  9WS - Investigations in Science  End of Key stage 3 Test	Unit length: 32 lessons
Domains of Knowledge:  9P1 Machines simple machines: levers and gears; moments; forces measured in Newton power ratings; compare energy usage; domestic fuel bills and usage 9C1 Metals and their reactions Metals and non metals ; Combustion ; Reactions with metals ; The reactivity series ; Extraction of metals ; Catalysts 9B1 Intro to Bioenergetics Aerobic and anaerobic respiration ; The process of photosynthesis ; How leaves are adapted to maximise the rate of photosynthesis ;		Domains of Knowledge:  9P2 Space and space travel electrical current and potential difference; series and parallel; circuit components (numerical) ; the magnetic effect of a current; gravity, W=mg; gravitational field strength on different planets of the Solar System; gravity between astronomical objects; day and night, seasons, years 9C2 Bonding The periodic table ; Identifying the number of protons, neutrons and electrons; Intro to electronic structure ; Bonds exist between atoms ; How some bonds are formed; Structure of diamond and graphite 9B2 Inheritance and evolution How genes are inherited ; DNA, chromosomes and genes ; Variation within a species ; Variation between different species ; Natural selection ; The use of gene banks to preserve biodiversity		Domains of Knowledge:  9WS - Investigations in Science <i>Independent, dependent and control variables ; Hypotheses ; Producing a scientific method ; Following a method to collect valid data ; Presenting data in tables and as graphs ; Drawing conclusions from data</i>  End of Key stage 3 Test	
Relevant Key Concepts: Forces and motion and energy; Chemical reactions and environmental chemistry; Biochemistry and organ systems ;		Key Concepts Space; Electricity; The periodic table, breaking and making bonds ; Genetics and reproduction		Key Concepts;; All, across all sciences	
Gateway knowledge: forces and simple force diagrams in the context of biomechanics; forces and pressure; speed and speed-time graphs; basics of conservation of energy - energy as as a quantity that <b>can</b> be quantified ( no calculation yet); domestic fuel bills and costs; Reactions with the alkali metals; Word equations + some use of symbols; The rock cycle Gas exchange in leaves ; Word equations + some use of symbols; Introduction to photosynthesis		Gateway knowledge;; Earth’s magnetism; plotting magnetic field lines using compass; The solar system ; Compounds as atoms joined by bonds; The atomic model; Atoms, elements, compounds & mixtures; Chemical symbols and formulae; Differences between species ; Plant reproduction ; Human reproduction		Gateway knowledge: <i>Listing variables from simple practicals ; Following methods to collect data from practicals ; Plot graphs with given data ; Describe relationships between variables, handling and analysis of data, mean calculations, uncertainties, use of terms accuracy and precision, repeatability, reproducibility</i>	
Assessment end-points: Recall the three types of lever ; recall that the lever is a force multiplier if the distance of the effort from the pivot is larger than the distance of the load from the pivot;; recognise that if the lever is not a force multiplier, it will amplify displacement;; define moment and use the correct formula to calculate different quantities involving balanced levers;; define work done and apply the principle of conservation of energy to <i>measure different quantities when energy is being transferred</i> ;; use the correct formula to calculate power;; compare the power ratings of different machines and processes;; use given data to calculate domestic fuel bills; <i>measure forces using a Newton meter</i> ; Identify elements as metals and non metals ; <i>Describe observations of metals reacting with acids ; Predict how some metals will react with acids and water</i> ; Produce word equations for complete and incomplete combustion ; Produce word equations for neutralisation reactions ; <i>Use universal indicator to identify the pH of an acid or alkali and realise when neutralisation has taken place. Plan and manage risks during practicals.</i> Describe how metals are extracted from ores; Describe how catalysts speed up the rate of reactions ; Recall the word equation for photosynthesis, aerobic respiration and anaerobic respiration ; Define fermentation and recall its use in industry ; Describe the role of different tissues in a leaf ; Explain how some tissues in the leaf are adapted to maximise photosynthesis ;		Assessment end-points: define potential difference, current and resistance; <i>construct simple circuits using diagrams and symbols</i> ; recognise and state the properties of series and parallel circuits; <i>use ammeters and voltmeters to take readings</i> ; use facts about series and parallel circuits to find different quantities and solve problems;; describe the magnetic effect of a current passing through a wire;; define electromagnets; <i>use scientific equipment o buld electromagnets, investigate factors that effect the strength of an electromagnet selecting appropriate variables</i> ; describe some uses of electromagnets;; describe the electric motor - principles only;; define gravity as a force;; apply the formula for weight to find different quantities, involving one’s weight on different planets;; explain day, night, years;; describe the gravity between astronomical objects;; Identify the number of protons, neutrons and electrons of elements using the periodic table ; Draw simple electronic structure of atoms ; Describe how atoms are covalently and ionically bonded ; Explain the properties of diamond and graphite <i>investigate the properties of metals through observations</i> ; Recognise simple models of chromosomes, genes and DNA ; Describe how genetic information is transmitted ; <i>Categorise characteristics as continuous or discontinuous and represent these on graphs</i> ; Describe how variation is the driver of natural selection and therefore evolution ; Explain how sudden changes in an ecosystem can impact biodiversity		Assessment end-points;; Identify a range of variables ; Write a hypothesis ; Write a scientific method ; Conduct a series of practicals safely ; Collect and present data obtained from practicals ; Draw conclusions from the data collected; Evaluate the validity of data collected  Online Mutliple choice questions test split into the three stands of Biology, Chemistry and Physics from the National Curriculum <a href="https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study">https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study</a> Written paper looking into the disciplinary skills based around investigations and data handling associated with Science	

# Year 10- Biology

Autumn Term		Spring Term		Summer Term	
Unit Title: <b>B1 Cell biology</b>  <b>B2a Organisation</b>	Unit length: <ul style="list-style-type: none"><li>13 lessons</li><li>10 lessons</li></ul>	Unit Title: <b>B2b Organisation</b>  <b>B3 - Infection and response</b>	Unit length: <ul style="list-style-type: none"><li>10 lessons</li><li>12 lessons</li></ul>	Unit Title: <b>B4 Bioenergetics</b>  <b>Mock paper 1</b>	Unit length: <ul style="list-style-type: none"><li>8 lessons</li></ul>
Domains of Knowledge:  <b>B1 - Cell Biology</b> Eukaryotes and prokaryotes, Animal and plant cells, function of organelles, microscopy required practical activity 1, cell specialisation, cell differentiation, cell division, chromosomes, mitosis and the cell cycle, stem cells, Transport in cells, diffusion, SA:V, osmosis, Required practical activity 2, Active transport  <b>B2a - Organisation</b> Principles of organisation Animal Tissue, organ and organ systems; The human digestive system, role of enzymes food tests Required Practical Activity 3 and 4, The heart and blood vessels, mammalian heart structure and function, arteries, veins and capillaries, blood,		Domains of Knowledge:  <b>B2b - Organisation</b> Coronary Heart disease, non-communicable disease, Heath issues, the effect of lifestyle on some non-communicable diseases, Cancer, Plant Tissues, organs and organ systems, plant tissues, the leaf, plant organ systems, transpiration and translocation  <b>B3 - Infection and Response</b> Communicable diseases, pathogens, Viral diseases (measles, HIV & TMV), Bacterial diseases (salmonella & gonorrhoea) Fungal diseases (Rose black spot) protist diseases (malaria), Human defence systems non-specific immune system, WBC, Vaccination, Antibiotics and painkillers, Discovery and development of drugs		Domains of Knowledge:  <b>B4 - Bioenergetics</b> Photosynthesis reaction, factors that affect the rate of photosynthesis, Required Practical Activity 5, use of glucose from photosynthesis, Respiration, aerobic and anaerobic respiration in animals and plants and yeast cells, response to exercise, metabolism  <b>Mock paper 1</b> Biology topics 1–4: Cell Biology; Organisation; Infection and response; and Bioenergetics.	
Relevant Key Concepts: Cell biology ; Organ systems ;		Key Concepts: Organ systems, Health and disease		Key Concepts: Biochemistry	
Gateway knowledge; What are cells? ; observing cells; Functions of subcellular structures; Comparing plant and animal cells ; Unicellular organism ; The role of diffusion; Structure and function of the skeleton ; Muscles ; Organisation of multicellular organism ; Structure and function of gas exchange system in humans ; mechanism of breathing ; Digestive system and enzymes ;		Gateway knowledge: The function of the heart and blood ; Consequences of an unbalanced diet ; The effect of lifestyle on the development of the foetus; The effect of recreational drugs on health and behaviour ; Unicellular organisms ; infections		Gateway knowledge: Photosynthesis and respiration equations Gas exchange in leaves; Introduction to photosynthesis ; Aerobic and anaerobic respiration Impact of exercise on breathing	
Assessment end-points: Know How to; Draw and label the cell structure and give functions and adaptations. ; Fully label a microscope <i>use equipment to view an onion cell</i> and complete a microscopy calculation; Describe the process of cell replication; Describe methods of transport across membranes and predict movement of substances in cells <i>investigate the effect of concentration on changing mass of a plant tissues</i> Label and describe the function of the organs in the circulatory, digestive and respiratory systems ; Explain how organs from these systems are adapted for their function ; <i>Describe the procedure of food tests and the enzymes practical. Draw conclusions from and analyse data</i>		Assessment end-points: Know How to; Analyse data from text and graphs about the relationship between risk factors and disease ; Compare two kinds of tumours ; Describe and explain how each tissue in a leaf is adapted to its function ; Describe the processes of transpiration and translocation ; Explain the factors that affect the rate of transpiration ; <i>use specific equipment (potometer) to measure and calculate rate of transpiration</i> Identify the types of pathogens which cause certain diseases ; Describe and explain the symptoms, transmission and treatment of certain diseases; Describe how a vaccine makes people immune to a pathogen ; Describe how new drugs are tested for safe use in the general public <i>Use aseptic technique to grow bacterial culture safety</i>		Assessment end-points;; Know How to Recall the word and symbol equation for photosynthesis, aerobic and anaerobic respiration ; Describe and explain the factors that affect the rate of photosynthesis ; <i>Investigate the rate of photosynthesis using aquatic organisms Draw conclusions from and analyse data</i> ; Explain the relationship between exercise and the rate of respiration ; <i>Investigate the effect of exercise on the body collating data from a group</i> Describe metabolism and the factors that affect it  Mock Paper 1 How it's assessed Written exam: 1 hour 15 minutes combined Foundation and Higher Tier70 marks 16.7% of GCSE	

# Year 10 - Chemistry

Autumn Term		Spring Term		Summer Term	
Unit Title:	Unit length:	Unit Title:	Unit length:	Unit Title:	Unit length:
C1 - Atomic Structure & The Periodic Table	14 Lessons	C3 - Quantitative Chemistry	10 lessons	C5 - Energy Changes	6 Lessons
C2 - Bonding and Structure	14 Lessons	C4 - Chemical Changes	19 Lessons	Mock Paper 1	
<b>Domains of Knowledge:</b> <b>C1 - Atomic structure and the periodic table:</b> Atoms, elements and compounds; Mixtures; Development of the model of the atom; Relative electrical charge of subatomic particles; Size and mass of atoms; Relative atomic mass; Electronic structure; The Periodic table; Development of the periodic table; Metals and non-metals; Group 0; Group 1; group 7; Properties of transition metals  <b>C2 - Bonding and structure and the properties of matter:</b> Chemical bonds, ionic bonding; ionic compounds; covalent bonding; Metallic bonding; Three states of matter; state symbols properties of ionic compounds; properties of ionic compounds, properties of small molecules; Polymers; giant covalent structures; Properties of metals and alloys; metals as conductors; Diamond; graphite; Graphene and fullerenes; Nanoparticles: sizes of particles and their properties; uses of Nanoparticles		<b>Domains of Knowledge:</b> <b>C3 - Quantitative chemistry:</b> Conservation of mass and balanced chemical equations; Relative formula mass; Mass changes when a reactant or product is a gas; Chemical measurements; Moles (HT); Amounts of substances in equations (HT); Using moles to balance equations (HT); Limiting reactants (HT); Concentration of solutions; Percentage yield (Chem) ; Atom economy (Chem); Using Concentrations of solutions (Chem HT); Use of amount of substance in relation to volumes of gases (Chem HT);  <b>C4 - Chemical changes ;</b> Metal oxides; The reactivity series; Extraction of metals and reduction; Oxidation and reduction in terms of electrons (HT); Reactions of acids with metals; Neutralisation of acids and salt production; Soluble salts; The pH scale and neutralisation; Titrations (Chem); Strong and weak acids (HT); Process of Electrolysis; Electrolysis of molten ionic compounds; Using electrolysis to extract metals; Electrolysis of aqueous solutions; Representation of reactions at electrodes as half equations (HT);		<b>Domains of Knowledge:</b> <b>C5 - Energy changes:</b> Energy transfer during exothermic and endothermic reactions; Reaction profiles; Energy change of reactions (HT); cells and batteries (Chem); fuel cells (Chem)  <b>Mock Paper 1</b> Chemistry topics 8–12: Atomic structure and the periodic table; Bonding, structure, and the properties of matter; Quantitative chemistry; Chemical changes; and Energy changes.	
<b>Relevant Key Concepts:</b> The Periodic Table; Properties of Materials; Breaking and Making Bonds;		<b>Key Concepts:</b> Chemical Calculations ; Chemical Reactions		<b>Key Concepts:</b> Breaking and Making Bonds	
<b>Gateway knowledge:</b> Define: Atoms, elements, compounds & mixtures; Identify the chemical properties of materials; Understand particle model; Basic structure of the atom: Protons, Neutrons, Electrons; The Periodic table; Periodic table groups, basic properties; Structure of Planet Earth; <i>Identify Metals &amp; non metals through simple tests;</i>		<b>Gateway knowledge:</b> <i>Carry out and observe experiments in a series of simple reactions;</i> Identify when a chemical reaction has taken place. <i>Know and carry out tests for: hydrogen, carbon dioxide and Acids &amp; alkalis;</i> Write word equations for chemical reactions seen; Periodic table - alkali metals; Know some use formulae for simple molecules; <i>Carry out reactions of metals, metal oxides, and carbonates with acids.</i>		<b>Gateway knowledge:</b> <i>Use thermometers to identify whether simple chemical reactions are exo or endothermic reactions;</i> Compounds as atoms joined by bonds; <i>Make Observation of thermal decomposition &amp; combustion;</i>	
<b>Assessment end-points:</b> Know how to: Draw and label the subatomic structure of the first 20 elements; Describe the developments made to the model of the atom by Dalton, Thompson, Rutherford and Bohr; Calculate RAMs using isotopic masses and % abundance. Describe the development of the periodic table. Describe trends and properties of The Noble gases, Group 1 metals , the halogens and transition metals; <i>Record observations from demonstration</i>  Describe what a chemical bond is; Draw dot and cross diagrams to show the bonding in simple ionic, covalent compounds and metals; Identify common substances from simple chemical formulae, diagrams and models; <i>Identify ionic, covalent compounds and metals from their chemical &amp; physical properties;</i> Describe and understand the properties of polymers, allotropes of carbon and nanoparticles.		<b>Assessment end-points:</b> <b>Know how to:</b> Use the conservation of mass and to balance chemical equations; Calculate RFMs from RAMs; Calculate the percentage by mass of an element in a compound; <i>Accurately measure the change in mass when Mg reacts completely in O2. Analyse results of observed changes in mass in non-enclosed systems.</i> Calculate theoretical yields, percentage yields and atom economy from experimental data.  Explain oxidation and reduction in terms of the gain and loss of oxygen; recall and describe the reactions, of metals with water and dilute acids; <i>Determine an order of reactivity of metals based on experimental results; Determine the products from electrolysis of solutions;</i> Describe electrolysis with half equations. <i>Use titration to determine reacting volumes</i> and calculate the concentration of acids and alkalis in neutralisation reactions using mole calculations.		<b>Assessment end-points:</b> <i>Carry out experiments to accurately measure temperature changes</i> in chemical reactions and determine whether they are endothermic and exothermic; Draw reaction profile diagrams for endothermic and exothermic reactions; Calculate the energy transferred in chemical reactions using bond energies. <i>Set up and interpret data from simple electrochemical cells.</i> Evaluate the use of hydrogen fuel cells with rechargeable cells and batteries. Write half equations for the reactions at the electrodes in the hydrogen fuel cells.  Mock Paper 1 How it's assessed Written exam: 1 hour 15 minutes combined Foundation and Higher Tier70 marks 16.7% of GCSE	



Year 10 - Physics

Autumn Term					
Autumn Term		Spring Term		Summer Term	
Unit Title:	Unit length:	Unit Title:	Unit length:	Unit Title:	Unit length:
P1 -Energy	14 lessons	P2b Electrical circuits;	10 lessons	P4 - Atomic structure and radioactivity	8 lessons;
P2a - Electricity;	10 lessons	P3 - The particle model of matter	12 lessons	Mock Paper 1	
Domains of knowledge:		Domains of Knowledge:		Domains of Knowledge:	
<p><b>P1 -Energy</b> Energy changes in a system, and the ways energy is stored before and after such change, energy stores and systems, changes in energy, calculations using specific energy equations, energy changes in systems, Required practical activity 14 SHC, power, conservation and dissipation of energy, energy transfers in a system, efficiency, national and global energy resources</p> <p><b>P2a - Electricity;</b> `Current, potential difference and resistance, circuit symbols, electrical change and current, current, resistance and potential difference, required practical activity 15 Resistance in a wire, resistors, required practical activity 16 I-V characteristics,</p>		<p><b>P2b Electrical circuits;</b> series and parallel circuits, domestic uses and safety, direct and alternating potential difference, mains electricity, energy transfers, power, energy transfers in everyday appliances, the national grid,</p> <p><b>P3 - The particle model of matter</b> Changes of state and the particle model, density of materials, Required practical activity 17 determine the density of regular and irregular objects and liquids, changes of state, internal energy and energy transfers, internal energy, temperature changes in a system and specific heat capacity, changes if state and latent heat, particle model and pressure, particle motion in gases</p>		<p><b>P4 - Atomic structure and radioactivity</b> Atoms and isotopes, the structure of an atom, mass number, atomic number and isotopes, the development of the model of the atom, Rutherfords’ gold foil experiment, atoms and nuclear radiation, radioactive decay and nuclear radiation, nuclear equations, half-lives and the random nature of radioactive decay, radioactive contamination,</p> <p><b>Mock Paper 1</b> Physics topics 18–21: Energy; Electricity; Particle model of matter; and Atomic structure.</p>	
<b>Relevant Key Concepts:</b> Energy and transfers, Electrical components and quantities;		<b>Key Concepts:</b> The particle model of matter		<b>Key Concepts:</b> The three types of radiation and their uses.	
Gateway knowledge: Fuels and energy resources, basics of conservation of energy - energy as as a quantity that <b>can</b> be quantified ( no calculation yet); domestic fuel bills and costs; energy transfers in electrical circuits; other examples of energy transfers related with motion, energy in food; energy stores and transfers; thermal energy and internal energy;		Gateway knowledge: electrical current and potential difference; circuit components (numerical) ; resistance; ; atoms and molecules as particles; states of matter and changes of state; anomaly of water; motion in gases; changes in motion and spacing of particles with temperature;		Gateway knowledge: Atoms and molecules as particles; Periodic Structure of the atom. Protons, Neutrons, Electron numbers of the elements	
Assessment end-points: Identify and recognise energy stores and transfers; recall the correct formulae to calculate the energy stored in the kinetic ,gravitational potential store and elastic potential store; recall and correctly apply the principle of conservation of energy to solve problems; recall and correctly use the formula to calculate efficiency of different energy transfers; define specific heat capacity; <i>Investigate the concept of SHC to compare materials in terms of their heat conductivity using specific equipment.</i> correctly describe how electricity is generated through different methods and evaluate these in terms of sustainability and impact on the Earth. define potential difference, current and resistance; recall and correctly use the formulae to calculate potential difference, current and resistance; recall the names and the circuit symbols and name the function of the circuit components ; <i>use Ohm’s law effectively and investigate the resistance of a wire under different circumstances design appropriate investigations to test the I-V relationships for a fixed resistor, filament light bulb and a diode</i> ; recall the shape of the I-V graphs for a fixed resistor, filament light bulb and a diode;		Assessment end-points: Recognise and state the properties of series and parallel circuits; use facts about series and parallel circuits to find different quantities and solve problems; describe the correct wiring of a UK plug; use the correct formula to calculate power; describe the National Grid and how electricity is transferred efficiently through the grid Define density; recall and correctly use the formula to calculate the density of a substance; <i>design an investigation to find the density of an object, depending on its state and shape: regularly shaped solid, irregularly shaped solid, liquid</i> ; describe the arrangement of particles in solids, liquids and gases and what changes take place during a change of state; name the changes of state: melting, freezing, boiling, condensation, sublimation; <i>Using material take measurements to construct a cooling/heating curve</i> , where a change of state takes place in a substance; define internal energy of a system as the total kinetic and potential energy of all its particles; define Specific Latent Heat and use this concept to calculate the energy transferred during a change of state; identify when to use the concept of specific heat capacity or specific latent heat;		Assessment end-points: Describe how the model of the atom has changed through research and how different models of the atom are appropriate for explaining different concept; describe the experiment that lead to the discovery of the nucleus, explaining how different observations lead to certain conclusions; describe the different properties of alpha, beta and gamma radiation; <i>make suitable observations about the properties of radioactive sources using a variety of material and a geiger-muller tube</i> recall the radioactive decay is a random process <i>use effective models to illustrate a scientific concept</i> ; write equations to show the radioactive decay by alpha and beta radiation; define half life; be able to interpret a decay curve and to find the half life of a substance using it; be able to use the concept of half life to determine the activity/ count rate after a certain amount of time; the uses of radioactivity in smoke alarms, factories and hospitals - generic, not specific.  Mock Paper 1 How it's assessed Written exam: 1 hour 15 minutes combined Foundation and Higher Tier70 marks 16.7% of GCSE	

Year 11 - Biology

Autumn Term		Spring Term		Summer Term	
Unit Title: B7 Ecology	Unit length: 15 lessons	Unit Title: B6 Inheritance, variation and evolution	Unit length: 14 lessons	Unit Title:	Unit length:
B5 homeostasis and response	11 lessons			Exam Runway	Until the summer exams begin
Domains of Knowledge:  B7 Ecology Adaptations, interdependence and competition, communities, abiotic factors, biotic factors, organisation of an ecosystem, levels of organisation, Required practical activity 7, How materials are cycled, Biodiversity and the effect of human interaction, waste management, land use, deforestation, global warming, maintaining biodiversity,  B5 homeostasis and response Homeostasis, The human nervous system, Required Practical Activity 6, Hormonal coordination in humans, human endocrine system, control of blood glucose concentration, hormones in human reproduction, contraception, the use of hormones to treat infertility (HT only), feedback systems (HT only)		Domains of Knowledge:;  B6 Inheritance, variation and evolution Reproduction,sexual and asexual reproduction, meiosis, DNA and the genome, genetic inheritance, Inherited disorders, polydactyly and CF, Sex determination, variation and evolution, selective breeding, genetic engineering, the development of the understanding of genetics and evolution, evidence for evolution, fossils, extinction, resistant bacteria, classification of living organisms, Linnaeus and Woese		Domains of Knowledge:  All domains from B1-7 (see above) Focus on Examination rubric and knowledge recall and application. Disciplinary knowledge of Science linked to all 7 Required Practical Activities	
Relevant Key Concepts: Interactions with the environment ; Hormones and the nervous system ;		Key Concepts: Genetics and reproduction		Key Concepts: All biology key concepts	
Gateway knowledge: Food chains and webs ; The sun as the origin of all energy in an ecosystem; How organisms interact with their environment including the build up of toxic material; Maintaining biodiversity ; The menstrual cycle		Gateway knowledge: How genes are inherited ; DNA, chromosomes and genes ; Variation within a species ; Variation between different species ; Natural selection ; The use of gene banks to preserve biodiversity ; Differences between species ; Plant reproduction ; Human reproduction		Gateway knowledge:	
Assessment end-points: Know How to Describe how energy is transferred through food chains and webs ; Describe consequences to disruption in a food chain or web ; Demonstrate procedural knowledge of the carbon and water cycles; <i>Demonstrate procedural knowledge of using quadrats to investigate distribution of organisms and analyse data</i> ; Describe and explain the impact of humans on ecosystems including the impact of global warming ; Explain how “information” is transferred in both the nervous and endocrine systems ; Explain how hormones maintain homeostasis in humans ; <i>Demonstrate procedural knowledge of investigating reaction times and analyse data</i> ; Explain the causes and describe the treatments of type 1 and 2 diabetes ;		Assessment end-points: Know How to Categorise reproduction as sexual or asexual ; Describe the process of meiosis ; Use punnett squares to determine the probability of sex chromosome inheritance and the inheritance of dominant and recessive alleles ; Describe the process of evolution by natural selection ; Explain how selective breeding, the fossil record and antibiotic resistance are evidence of evolution ; Apply knowledge of binomial nomenclature and the classification hierarchy to name species		Assessment end-points: Paper 1 Biology topics 1–4: Cell Biology; Organisation; Infection and response; and Bioenergetics. Paper 2 Biology topics 5–7: Homeostasis and response; Inheritance, variation and evolution; and Ecology. Written exam: 1 hour 15 minutes x 2 Foundation and Higher Tier 70 marks x 2 33.3% of GCSE Questions Multiple choice, structured, closed short answer, and open response.	

Year 11 - Chemistry

Autumn Term		Spring Term		Summer Term	
Unit Title;;	Unit length;;	Unit Title:	Unit length:	Unit Title	Unit length:
C6 - Rate and Extent of Chemical Change	C6 - 12 Lessons;	C8 - Chemical Analysis	C8 - 6 Lessons	C10 - Using Resources	C10 - 7 Lessons;
C7 - Organic Chemistry	C7 - 8 Lessons	C9 - Chemistry of The Atmosphere	C9 - 13 Lessons	Exam Runway	Until the summer exams begin
Domains of Knowledge:  C6 - Rate and extent of chemical change Calculating rates of reaction; Factors affecting rates of reaction, required practical activity 11 rate of reaction, collision theory and activation energy, catalysts, reversible reactions and dynamic equilibrium, reversible reactions, energy changes and reversible reactions, equilibrium, the effect of change conditions on equilibrium (HT only), the effect of change concentration (HT only), the effect of temperature changes on equilibrium (HT only), the effect of pressure changes on equilibrium  C7 - Organic chemistry Carbon Compounds as fuels and feedstock, Crude oil, hydrocarbons and alkanes, fractional distillation and petrochemicals, properties of hydrocarbons, cracking and alkenes,		Domains of Knowledge:  C8- Chemical analysis Purity, formulations and chromatography, pure substances, formulations, chromatography, required practical activity 12, identification of common gases, test for hydrogen, test for oxygen, test of carbon dioxide, test for chlorine,  C9 - Chemistry of the atmosphere The composition and evolution of the Earth’s atmosphere, the proportions of different gages in the atmosphere, the Earth’s early atmosphere, how oxygen was increased, how carbon dioxide was decreased, carbon dioxide and methane as greenhouse gases, greenhouse gases, human activities which contribute to an increase in greenhouse gases in the atmosphere, global climate change, the carbon footprint and its reduction, common atmospheric pollutants and their sources, atmospheric pollutants from fuels, properties and effects of atmospheric pollutants,		Domains of Knowledge:  C10 - Using resources Using the Earth’s resources and obtaining potable water, using the Earth’s resources and sustainable development, potable water, required practical activity 13 mass of dissolved substances, waste water treatment, alternative method of extracting metals (HT only), life cycle assessment and recycling, life cycle assessment, ways of reducing the use of resources,  Domains of Knowledge;; All domains from C1-7 Focus on Examination rubric and knowledge recall and application. Disciplinary knowledge of Science linked to all 7 Required Practical Activities	
Relevant Key Concepts: Chemical calculations; Environmental Chemistry ;		Key Concepts: Properties of Materials; Chemical reactions; Environmental Chemistry		Key Concepts: Chemical Reactions ; Chemical Calculations; Environmental Chemistry ; All Chemistry key concepts	
Gateway knowledge: Simple experiments where mass of reactants is involved; Thermal decomposition of Copper carbonate; Simple effects of temperature on reactions; C3 - Quantitative chemistry ; Calculations relating to atoms and reactions; Your environment is made of chemicals , (food, clothes etc); CO2 produced when we burn fuels. Acid rain. Particulates.; (biology link, pesticides);		Gateway knowledge: KS2/3 transition module Identifying properties of materials; Periodic table groups, basic properties; Structure of Planet Earth; Metals & non metals; C2 - Bonding and structure; Types of bonding ; Properties of Covalent and ionic structures ; Polymers ; Observe series of simple reactions;		Gateway knowledge: Simple experiments where mass of reactants is involved; Thermal decomposition of Copper carbonate; Simple effects of temperature on reactions; C3 - Quantitative chemistry ; Calculations relating to atoms and reactions; Your environment is made of chemicals , (food, clothes etc); CO2 produced when we burn fuels. Acid rain. Particulates.;	
Assessment end-points;; Be able to calculate the rate of reaction from given data, Be able to deduce the rate of reaction from graphs. predict and explain using collision theory the effects of changing factors, Explain how factors can affect the rate of reaction. <i>Carry out investigations to obtain rate of reaction through production of a solid precipitate and the collect of gas.</i> Students should be able to identify catalysts in reactions from their effect on the rate of reaction. Students should be able to explain catalytic action in terms of activation energy.; Describe what a reversible reaction is. ; HT Students should be able to make qualitative predictions about the effect of changes on systems at equilibrium when given appropriate information. Describe what a hydrocarbon is; Explain the process of fractional distillation.; Explain the process of cracking and the conditions required, <i>Investigate the properties of hydrocarbons such as viscosity.</i>		Assessment end-points: Be able to describe how to <i>carry out the tests for hydrogen, oxygen, carbon dioxide and chlorine</i> ; explain how paper chromatography separates mixtures; Suggest how chromatographic methods can be used for distinguishing pure substances from impure substances; <i>Interpret chromatograms and determine Rf values from chromatograms ; Students should be able to use melting point and boiling point data to distinguish pure from impure substances.</i> ; Students should be able to, given appropriate information, interpret evidence and evaluate different theories about the Earth’s early atmosphere; Describe the main changes in the atmosphere over time and some of the likely causes of these changes; Students should be able to describe the greenhouse effect in terms of the interaction of short and long wavelength radiation with matter.; Describe how human activities have affected the atmosphere. ; Explain some of the consequences of global warming and the greenhouse effect. ; Be able to describe the effect of carbon on the atmosphere and how our carbon footprint can be reduced		Assessment end-points: State what potable water is and how it can be obtained in the UK and other countries. <i>Investigatthe mass of a dissolved substance in a given sample of water.</i> Describe the differences in treatment of ground water and salty water; Give reasons for the steps used to produce potable water, state examples of natural products that are supplemented or replaced by agricultural and synthetic products; Distinguish between finite and renewable resources given appropriate information. Use a life cycle assessment to evaluate the decision to use a specific material or product. GCSE Paper 1 Chemistry topics 8–12: Atomic structure and the periodic table; Bonding, structure, and the properties of matter; Quantitative chemistry; Chemical changes; and Energy changes. Paper 2 Chemistry topics 13–17: The rate and extent of chemical change; Organic chemistry; Chemical analysis; Chemistry of the atmosphere; and Using resources.	

# Year 11 - Physics

Autumn Term		Spring Term		Summer Term	
Unit Title:	Unit length:	Unit Title:	Unit length:	Unit Title:	Unit length:
P5 - Forces	20 lessons	P6 - Waves  P7 - Electromagnetism	8 lessons  5 lessons	Exam Runway	Until the summer exams begin
Domains of Knowledge:  P5 - Forces Forces and their interactions, scalar and vector quantities, contact and non-contact forces, gravity, resultant forces, work done and energy transfer, forces and elasticity, required practical activity 18 Hooke’s Law, forces and motion, describing motion along a line, distance and displacement, speed, velocity, the distance-time relationship, acceleration, forces, acceleration and Newton’s Law of motion, required practical activity 19 F=Ma, stopping distance, reaction time, factors affecting braking distance 1, factors affecting braking distance 2, Momentum (HT only), Conservation of momentum (HT only)		Domains of Knowledge:  P6 - Waves Waves in air, fluids and solids, transverse and longitudinal waves, properties of waves, required practical activity 20 ripple tank and waves on a string, Electromagnetic waves, types of electromagnetic waves, properties of electromagnetic waves, required practical activity 21 leslie cube, uses and application of electromagnetic waves  P7 - Electromagnetism Permanent and induced magnetism, magnetic forces and fields, poles of a magnet, magnetic fields, electromagnetisms, Fleming’s left hand rule (HT only)), Electric Motors (HT only)		Domains of Knowledge:  All domains from p1-7 (see above) Focus on Examination rubric and knowledge recall and application. Disciplinary knowledge of Science linked to all 7 Required Practical Activities	
Relevant Key Concepts: Forces		Key Concepts: waves; magnetism		Key Concepts: All Physics key concepts	
Gateway knowledge;; forces and simple force diagrams in the context of biomechanics; forces and pressure; speed and speed-time graphs; simple machines: levers and gears; moments; forces measured in Newtons; Hooke’s law and work done during deformation		Gateway knowledge: sound and light waves and their properties; plotting magnetic field lines using compass; electrical current and potential difference; the National Grid		Gateway knowledge:	
Assessment end-points: Correctly name and represent forces using scale vector drawings; find resultant forces in different situations; <i>design an investigation to test the effect of changing the force on the extension of a spring</i> ; state Hooke’s law;; recall the formula for Hooke’s law and correctly use it in calculations to find different quantities; State Newton’s three laws of motion;;Use Newton’s laws of motion to find different quantities; recall and correctly use the formula for Newton’s second law of motion; <i>Use correct apparatus to investigate the relationship between force, mass and acceleration</i> , recall and correctly use the formulae for speed and acceleration; draw and interpret distance time and speed time graphs; describe and explain what happens during a parachute jump in terms of forces; describe car stopping distances; explain how different factors can affect the stopping distance; define momentum (HT only); explain how conservation of momentum can be used to predict motion after a collision (HT only)		Assessment end-points: State the differences between transverse and longitudinal waves in terms of direction of oscillation and direction of energy transfer; define amplitude, displacement, wavelength and frequency; select the correct formula to calculate frequency in terms of period; use displacement time graphs to find amplitude and frequency; recall and correctly use the wave speed formula to calculate different quantities; <i>describe a method for investigating the speed of sound in air, design an investigation to accurately measure the speed of a wave in a ripple tank and using a signal generator and string; design an investigation to identify the path of a ray of light through a perspex/glass block;; define and explain refraction(HT only)</i> ; name all the parts of the electromagnetic spectrum; electromagnetic waves as transverse waves;recall uses and dangers associated with each of the parts of the electromagnetic spectrum; <i>Investigate the absorption and reflection of infra-red radiation using a Leslie’s cube.</i> Identify magnetic materials; recognise when an object is a permanent or an induced magnet; represent the magnetic field around a bar magnet, a current carrying wire and a solenoid; explain how an electromagnet works; describe and explain how the electric motor works (HT only)		Assessment end-points: GCSE exams as per specification  GCSE Paper 1 Physics topics 18–21: Energy; Electricity; Particle model of matter; and Atomic structure. GCSE Paper 2 Physics topics 22–24: Forces; Waves; and Magnetism and electromagnetism  How it's assessed Written exam: 1 hour 15 minutes x 2 Foundation and Higher Tier 70 marks x 2 33.3% of GCSE	