

Theme/Concept	(KS2)	Year 7	Year 8	Year 9	Year 10	Year 11	(Post-16)
Biology: The cellular basis of life		Cells and Microscopes Eukaryotic cell structure Cell shape & size Cell membrane & basic diffusion Microscopy Specialisation & differentiation Introduction to stem cells Organisation	Respiration Energy Aerobic and anaerobic respiration Word equations Breathing rate and heart rate	Cell Transport Osmosis Diffusion Active Transport Specialisation of exchange surfaces in humans & plants	Biotechnology Prokaryotes & eukaryotes Biological molecules & enzymes Culturing microorganisms Stem cells Monoclonal antibodies Genetic engineering Cloning Food production	<i>(Application)</i>	<i>Biological molecules Cells Organisms exchange substances with their environment</i>
Biology: DNA as the molecule of inheritance	<i>Living things and their habitats</i>	<i>(Cells)</i>	Reproduction Growth Life cycles Mitosis Hormones in reproduction Sexual & asexual reproduction Advantages & disadvantages of each Contraception	Genetics & Variation Meiosis Chromosomes DNA & the genome Discovery of DNA DNA structure Gene banks	Inheritance Genetic inheritance Genotype & phenotype Inherited disorders Sex determination Variation Understanding of genetics Antibiotic resistance	Evolution Selective breeding Evolution Natural selection Speciation Evidence for evolution Fossils Classification	<i>Genetic information, variation Genetics The control of gene expression</i>
Biology: Human Biology	<i>Animals including humans Evolution & Inheritance</i>	Health Teeth Biomechanics - skeleton, muscles & exercise Basic digestion & nutrition Nervous system Simple endocrine systems Substance misuse Mental health	Breathing & Circulation The Lungs Diffusion Asthma & smoking The Heart Blood and blood vessels Heart disease Lung disease Exercise Smoking	Digestion Human digestive system Importance of bacteria Digestive enzymes Control of blood glucose Deficiency Obesity Malnutrition	Defense & Immunity Pathogens & microbes Health & disease Health issues Cancer Communicable diseases (Plant disease) Human defense systems Discovery and development of drugs Reducing the spread of infection Vaccination Antibiotics & painkillers	Homeostasis Human nervous system Control of body temperature Human endocrine system Maintaining water & nitrogen balance Cellular respiration & ATP The Brain The Eye	<i>Organisms exchange substances with their environment Energy transfers Organism response to environment</i>
Biology: Ecosystems	<i>Living things and their habitats</i>	Ecology Communities Differences between & within species Continuous & discontinuous variation Biotic and abiotic factors Organisation of an ecosystem Adaptation & variation inc. basic fossil evidence	Plant Biology Plant nutrition Leaf structure Photosynthesis Plant organ systems Carbon cycle Transpiration & translocation	Food Chains Food webs Trophic levels Interdependence Pyramids of biomass Transfer of biomass Sampling Basic food security & effect of pollution Ecosystem components & dynamics Kingdoms & domains	<i>(Inheritance)</i>	Human effects on ecosystems Photosynthesis & limiting factors Plant hormones Intro to plant disease Extinction Biodiversity Measuring & maintaining biodiversity Nutrient cycles Food security Environmental science	<i>Relationships between organisms Energy transfers Populations, evolution and ecosystems</i>
Chemistry: Structure, Properties, Bonding & Analysis		<i>(Substances & Properties)</i>	Atoms Particulate nature of matter Elements, compounds Symbols & formulae Mixtures History of the atom Subatomic particles Charge Size & mass Basic polymer properties	<i>(Rates)</i>	Bonding Chemical bonds Ionic bonding Covalent bonding Properties of small molecules Giant covalent structures Structure and bonding of carbon Comparison to ionic bonding	Electrolysis Ionic bonding Ionic compounds Properties of ionic compounds Electrolysis of molten compounds & solutions Balanced equations Electroplating	<i>Atomic structure, amount of substance, bonding</i>
	<i>Rocks</i>	<i>(Substances & Properties)</i>	Periodic Table Elements Metals & non-metals Atomic structure & periodic patterns History of the Periodic Table Group 0 Group 1 Group 7 Properties of transition metals	Identification Purity Formulations Chromatography Filtering & evaporation Identification of common gases Simple distillation	Chemical Analysis Identification of ions by chemical and spectroscopic means	Crude Oil Hydrocarbon molecules Cracking Fractional distillation Polymers	<i>Energetics, kinetics, thermodynamics, rate equations, acids & bases, periodicity</i>
Chemistry: Chemical Reactions	<i>Properties and changes of materials</i>	Substances & properties Particulate nature of matter Composites, ceramics and polymers Physical & chemical inc. separation Diffusion Pure & impure substances Acids & alkalis Concentration & dilution Reactions of acids pH scales and neutralisations Salts	Chemical Reactions Reactants & products Conservation of mass Word equations Symbol equations Representing reactions inc. balanced chemical equations Conservation of mass Combustion, thermal decomposition, oxidation, reduction, neutralisation and displacement Endothermic & exothermic reactions	Rates Rate of reaction Collision frequency Reversible reactions Catalysis Intro to Haber process	Quantitative Chemistry Relative atomic and relative formula mass Balancing equations Moles Moles in gases & moles in solution Amounts of substances in equations Using moles to balance equations Limiting reactions Strong and weak acids Concentration of solutions & pH Titration Stoichiometry	Industrial Chemistry Redox Chemical measurements Exothermic & endothermic reactions Yield & atom economy Chemical cells & fuel cells Synthetic & naturally occurring Polymers Bulk & surface properties of matter The Haber process & NPK fertilisers Dynamic equilibrium	<i>Redox, chemical equilibria</i>

Chemistry: Earth & Resources		Earth & Recycling Rocks & the Earth Atmosphere, air quality & pollution inc. acid rain Recycling	<i>(Atoms & Periodic Table)</i>	Atmosphere & Resources Chemical & physical weathering Carbon & water cycle Recycling Using materials Composition and evolution of the Earth's atmosphere Making rocks Making fossil fuels Using resources and potable water	Metals Alkali metals Metallic bonding Contrast with ionic & covalent bonding Alloys Conductors Reactivity Metal acid reactions Extraction	<i>(Application)</i>	<i>Organic chemistry</i>
Physics: Energy	<i>Light</i> <i>Straight lines</i> <i>Reflection to see objects</i> <i>Shadows</i>	Energy Stores Energy stores & systems Energy values Changes in energy Conservation and dissipation of energy	Waves Transverse & longitudinal Properties of waves Superposition Sound & hearing Light & vision Seismic waves Using waves Electromagnetic waves	Thermal Energy Transfers Heating & cooling Energy changes in systems Internal energy & thermal equilibrium Power Efficiency Black body radiation	Nuclear Radiation Atoms & isotopes Radioactive decay Nuclear radiation Half-life Hazards & uses of radioactive emissions and background radiation Nuclear fission & fusion	<i>(Application)</i>	<i>Waves</i> <i>Thermal</i> <i>Radioactivity</i>
	<i>Electricity</i> <i>Brightness & voltage</i> <i>Components</i> <i>Symbols</i>	Resources Structure of the Earth Earthquakes National and global energy resources	Electricity & Magnetism Electrical charge and current Resistance and potential difference Series Circuits Electric fields Magnetic fields Earth's magnetism Static electricity Basic electromagnets	Domestic Electricity Parallel Circuits Resistance Sensing circuits Domestic uses and safety Energy transfers in everyday appliances & cost Electrical power ratings The National Grid Static electricity	Electromagnetic Spectrum Electromagnetic Spectrum Transmission of light Reflection of waves Refraction of waves The Eye Lenses	Electromagnetic Induction Solenoids & electromagnets Motor effect Induced potential Transformers & National Grid	
Physics: Forces	<i>Forces</i> <i>Gravity</i> <i>Types of force</i> <i>Transferring force</i>	Forces Contact and non-contact Resultant forces Forces & elasticity Speed Newton's First Law Gravity, mass & weight Friction	Motion Resultant forces Work done & energy transfer Scalar & vector quantities Graphs of motion Drag	Newtonian Mechanics Velocity & Acceleration More complex graphs of motion Power Newton's Laws Forces & braking Momentum	Moments Moments, levers & gears Hydraulics	<i>(Application)</i>	<i>Mechanics</i>
	<i>Earth & Space</i> <i>Solar System</i> <i>Moon</i> <i>Day & Night</i>	<i>(Forces)</i>	Space Solar system & the universe The Earth & seasons Gravitational fields Red shift Using waves	<i>(Newtonian Mechanics)</i>	Circular Motion & Orbits Circular Motion Orbits Satellites	The Universe Origins of the universe The Big Bang Theory Stellar evolution	
Physics: Matter	<i>Properties of Materials</i> <i>Classify</i> <i>Dissolving</i> <i>States of matter</i>	Particle Model Changes of state & the particle model Brownian motion & diffusion Conservation of mass Density Gas pressure	Pressure Particle model & pressure Pressure differences in fluids Convection Atmospheric pressure Hydraulics	Material extension & compression Hooke's Law Work done & elastic energy stores	<i>(Application)</i>	<i>(Application)</i>	<i>Particle Physics</i> <i>Materials</i>
Scientific Discipline: Scientific Method	<i>Making predictions</i>	<i>Stem cell research</i> <i>History of the atom</i> <i>Mendeleev Periodic Table</i> <i>Classifying materials</i> <i>Gravity, mass & weight</i> <i>The particle model of matter</i>	<i>Measuring breathing & heart rate</i> <i>The lungs & the heart</i> <i>Carbon cycle</i> <i>Rocks & the Earth</i> <i>Recycling and life cycle assessment</i> <i>Model of the solar system</i> <i>Waves for exploration</i>	<i>Discovery of DNA</i> <i>Food security & the effect of pollution</i> <i>Definition of kingdoms & domains</i> <i>Giant covalent structures and their use</i> <i>Collision theory</i> <i>Metallic bonding & conductors</i>	<i>Stem cell research</i> <i>Monoclonal antibodies</i> <i>Genetic engineering</i> <i>Cloning</i> <i>Vaccination</i> <i>Discovery & development of drugs</i> <i>Discovery of penicillin</i> <i>Electrolysis</i> <i>Nuclear radiation</i> <i>Use of fission & fusion</i> <i>Orbits & satellites</i>	<i>Selective breeding</i> <i>Theory of evolution</i> <i>Classification</i> <i>Food security</i> <i>The Haber Process</i> <i>National Grid</i>	<i>Accuracy, precision, repeatability, reporducibility</i> <i>Scientific methods and development of theories</i> <i>Evaluating risk</i>
Scientific Discipline: Apparatus & Techniques	<i>Planning scientific enquiry</i> <i>Taking measurements</i>	<i>Using microscopes</i> <i>Making solutions</i> <i>Separating mixtures</i> <i>Acids, alkalis and pH scales</i> <i>Simple titrations</i> <i>Measuring energy changes</i> <i>Measuring elasticity</i> <i>Measuring volume</i>	<i>Leaf structure</i> <i>Physical & chemical changes and separation</i> <i>Endothermic and exothermic reactions</i> <i>Measuring forces</i> <i>Taking electrical measurements</i>	<i>Measuring osmosis</i> <i>Measuring purity</i> <i>Chromatography</i> <i>Identification of common gases</i> <i>Identification of ions & spectroscopy</i> <i>Measuring rate of reaction</i> <i>Electric circuits</i> <i>Sensing circuits</i> <i>Measuring motion</i> <i>Hooke's Law</i>	<i>Action of enzymes</i> <i>Sampling methods</i> <i>Electrolysis</i> <i>Cracking</i> <i>Fractional distillation</i> <i>Potable water</i> <i>Reflection & refraction of waves</i> <i>Lenses</i>	<i>Eye dissection</i> <i>Limiting factors of photosynthesis</i> <i>Making NPK fertiliser</i> <i>Making electric motors</i>	<i>Developing questions</i> <i>Making predictions</i> <i>Scientific enquiry</i> <i>Technique, apparatus & materials</i> <i>Making and recording observations</i> <i>Sampling techniques</i>
Scientific Discipline: Data Analysis	<i>Recording data</i> <i>Reporting</i>	<i>Identifying cell features</i> <i>Continuous & discontinuous variation</i> <i>Calculating neutralisation</i> <i>Calculating density</i> <i>Drawing graphs of force-extension</i> <i>Calculating density</i>	<i>Measuring diffusion</i> <i>Conservation of mass</i> <i>Balanced chemical equations</i> <i>Percentage yield</i> <i>Analysing graphs of motion</i>	<i>Control of blood glucose</i> <i>Food webs</i> <i>Pyramids of biomass</i> <i>Sampling techniques</i> <i>Rate of reaction</i> <i>Efficiency</i> <i>Measuring motion</i>	<i>Genetic inheritance statistics</i> <i>Variation</i> <i>Disease statistics</i> <i>Relative atomic & relative formula mass</i> <i>Balancing equations</i> <i>Composition of the atmosphere</i> <i>Calculating half-life</i>	<i>Measuring body temperature</i> <i>Quantitative chemistry</i> <i>Calculating step-up & step-down transformers</i>	<i>Interpreting observations & data</i> <i>Presenting reasoned explanations</i> <i>Evaluating data</i> <i>Identifying error</i>

<p>Scientific Discipline: Using Evidence</p>	<p>Identifying scientific evidence</p>	<p>Development of health ideas over time Fossil evidence for evolution Rutherford scattering Electronic structure Structure of the Earth Newton's First Law Brownian Motion</p>	<p>Life cycles Mitosis Properties of elements and ionic compounds Big Bang Theory - Red shift and CMBR</p>	<p>Specialisation of exchange surfaces Deficiency, obesity and malnutrition Catalysis Reactivity Black body radiation Static electricity Newton's Laws Hooke's Law</p>	<p>Genetic inheritance Antibiotic resistance Reducing the spread of infection Composition and evolution of the atmosphere Fossil fuels Hazards & uses of nuclear radiation Orbits in solar system</p>	<p>Evidence for evolution & fossils Extinction Biodiversity Environmental science Origins of the universe The Big Bang Theory Stellar evolution</p>	<p>Development of theories over time taking account of new evidence</p>
<p>Maths for Science</p>		<p>Sampling groups Chemical nomenclature for elements, compounds & mixtures Simple chemical formulae SI units for energy, force, speed & mass Application and manipulation of equations Drawing straight line graphs</p>	<p>Statistics and graphing breathing rate and heart rate Analysis stats related to smoking Calculating rate of photosynthesis Electronic configuration Conservation of mass calculations Balancing chemical equations Calculating percentage yield Calculating energy changes Graphing endothermic & exothermic reactions Statistics on composition of the atmosphere Wave calculations Electricity calculations (current, p.d., resistance) Motion calculations (distance, displacement, speed, velocity) Pressure calculations</p>	<p>Interpreting statistics Pyramids of biomass Calculations relating to bonding Formulations Calculating rate of reaction Calculating energy changes Calculating power & efficiency Electricity calculations (Power, energy, efficiency) Motion calculations (acceleration, power, momentum) Presenting Hooke's Law graphically Calculating elastic energy store Calculating work done</p>	<p>Statistics relating to food production Statistics relating to genetic inheritance Half equations Relative atomic & relative formula mass Balancing equations Yield & atom economy Composition of the atmosphere Nuclear decay equations Graphing half-life Calculating moments Vector nature of circular motion</p>	<p>Graphing body temperature Graphing limiting factors Moles Amounts of substances in equations Using moles to balance equations Concentration of solutions & pH Titration Stoichiometry Calculating p.d. in relation to transformers</p>	<p>Mathematical calculation Presenting data SI units Chemical nomenclature Equations Calculations Statistical techniques</p>

Time of Year	Year 7	Year 8	Year 9	Year 10	Year 11
Autumn 1	Cells & microscopes	Chemical Reactions	Genetics & Variation	Nuclear Radiation	Homeostasis
	Energy stores	Respiration	Covalent Bonding	Electrolysis	Industrial Chemistry
Autumn 2	Particle Model	Waves	Digestion	Defense & Immunity	Organic
	Atoms	Energy changes	Newtonian Mechanics	Electromagnetic Spectrum	Mock Exams
		Motion			Evolution
Spring 1	Health	Breathing & Circulation	Cell Transport	Inheritance	Electromagnetic Induction
	Periodic Table	Ionic Bonding	Rates	Moments	Human Effects on Ecosystem
Spring 2	Substances & properties	Reproduction	Metals	Crude Oil	HEoE continued
	Resources	Electricity & Magnetism	Domestic Electricity	Atmosphere & Resources	Mock Exams
Summer 1	Forces	Pressure	Thermal Energy Transfers	Biotechnology	Revision
		Earth & Recycling			
	Ecology	Space	Food Chains	Quantitative Chemistry	External Examination
Summer 2	Ecology cont.	Reproduction	Chemical Analysis	Circular Motion & Orbits	External Examination
	Summer Examination	Summer Examination	Summer Examination	Summer Examination	
	Application	Reproduction cont.	Chemical Analysis cont.	Application	---
	Application	Application			