



Curriculum Overview - Science

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 3.1	Summer Term 3.2
<b>Year 7</b>	<p>Introduction to science: lab safety, variables, accuracy, precision.</p> <p>Energy: fuels, resources, stores and transfers</p>	<p>Forces: representing forces, tension &amp; compression, slip &amp; grip, upthrust, moments.</p> <p>Particle Model: properties of solids, liquids gases, changes of state,</p>	<p>Separating techniques: mixtures, filtration, evaporation &amp; crystallisation, chromatography, distillation</p> <p>Cells: microscopes, structure of animal and plant cells, introduction to biological systems.</p>	<p>Electricity: charge, current, potential difference, conductors and insulators.</p> <p>Fluids: pressure, density, drag forces.</p> <p>Elements: elements &amp; compounds, simple reactions of elements, element symbols and simple formulae.</p>	<p>Acids and alkalis: reactions of acids and alkalis, managing risks, pH scale.</p> <p>Reproduction: male and female reproductive systems, fertilisation, implantation, plant reproduction, distribution of seeds.</p>	<p>Waves: light, reflection, refraction, colour, sound, pitch &amp; volume, ultrasound.</p> <p>Ecosystems: food chains, food webs, predator-prey relationships, interdependence, importance of biodiversity.</p>
<b>Year 8</b>	<p>Periodic table: trends in groups and periods, metals and non-metals.</p> <p>Chemical reactions: combustion, thermal decomposition, reduction, oxidation, displacement.</p>	<p>Health and diet: healthy diet, unbalanced diet, digestive system, enzymes, adaptations of the digestive system.</p> <p>Gas exchange systems: the respiratory system, circulatory system, gas exchange in plants, the role of stomata.</p>	<p>Energy transfers: conduction, convection, radiation, evaporation, power, efficiency.</p> <p>Circuits &amp; magnetics: parallel circuits, magnetism, electromagnetism.</p>	<p>Earth and atmosphere: igneous, sedimentary, and metamorphic rocks, the atmosphere, global warming, climate change, pollution.</p> <p>Metals and their uses: reactions of metals with water, oxygen, acid, ceramics, composites, and polymers.</p>	<p>Skeletal and muscular systems: the skeleton, muscles, joints.</p> <p>Genetics: structure of DNA, variation, continuous and discontinuous data, competition, natural selection, extinction.</p>	<p>Earth and space: day and night, the solar system, the milky way, measuring using light years, the moon, eclipses (lunar and solar).</p>
<b>Year 9</b>	<p>Cells &amp; transport: observing and recording cells, diffusion, osmosis, active transport, mitosis, stem cells, cancer.</p> <p>Atomic structure: structure of Chadwick's atom, how the atomic model evolved, isotopes, relative atomic mass.</p> <p>Forces: resultant forces, resolving forces, scalars &amp; vectors.</p>		<p>Organisation: enzyme-controlled reactions (carbohydrase, proteases, lipases), structure of blood vessels, the blood, structure of the heart, treating the heart, non-communicable diseases &amp; their risk factors.</p> <p>Structure bonding &amp; properties: forming ions, properties of giant ionic compounds, forming covalent bonding, properties of giant covalent structures (diamond, graphite, graphene), covalently bonded molecules, metallic structure &amp; their properties.</p> <p>Energy stores and transfers: kinetic energy, gravitational potential, work done by a force, efficiency, dissipation</p>		<p>Communicable diseases: bacterial, fungal, protist, viral diseases, how pathogens spread, immune response, role of vaccines, testing and discovering new drugs.</p> <p>Chemical reactions: acids and alkalis, acids and carbonates, acids and metals, redox chemistry, electrolysis.</p> <p>Particles: internal energy, specific heat capacity, latent heat, energy transfers in gases.</p>	
<b>Year 10 Combined Science</b>	<p>Bioenergetics: aerobic respiration, anaerobic respiration, effect of exercise, photosynthesis, changing the rate of photosynthesis.</p> <p>Energy changes in reactions: exothermic and endothermic reactions, measuring temperature changes, energy profiles.</p> <p>Electricity: properties of LDRs, thermistors, diodes, measuring resistance in series and parallel circuits, power of electrical devices, alternating current..</p>		<p>Coordination and control: nervous system, reflexes, endocrine system, menstrual cycle, negative feedback.</p> <p>Rates of reaction: effect of temperature, surface area, concentration, pressure, and catalyst on the rate of reaction, dynamic equilibrium, changing equilibrium.</p> <p>Radioactivity: unstable nuclei, alpha, beta, and gamma decay, detecting radiation, half life.</p>		<p>Ecology: adaptations, competition, ecosystems, predator-prey relationships, importance of biodiversity, how humans have impacted biodiversity, carbon cycle, water cycle.</p> <p>Crude Oil: hydrocarbons, properties of hydrocarbon molecules, combustion reactions, cracking.</p> <p>Waves: longitudinal and transverse waves, measuring wave speed, reflection and refraction of waves, electromagnetic spectrum, uses of each part of the EM spectrum.</p>	



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<b>Year 10 Triple Science</b>	Bioenergetics: aerobic respiration, anaerobic respiration, effect of exercise, photosynthesis, changing the rate of photosynthesis.		Coordination and control: nervous system, reflexes, endocrine system, menstrual cycle, negative feedback, the brain, eyes, thermoregulatory control, plant hormones		Ecology: adaptations, competition, ecosystems, predator-prey relationships, importance of biodiversity, how humans have impacted biodiversity, carbon cycle, water cycle, trophic levels in ecosystems, use of biotechnology, decay, food security, transfer of biomass, sustainable farming.	
	Energy changes in reactions: exothermic and endothermic reactions, measuring temperature changes, energy profiles, cells and batteries.		Rates of reaction: effect of temperature, surface area, concentration, pressure, and catalyst on the rate of reaction, dynamic equilibrium, changing equilibrium.		Crude Oil: hydrocarbons, properties of hydrocarbon molecules, combustion reactions, cracking, alkenes, alkanes, alcohols, carboxylic acids, esters	
	Electricity: properties of LDRs, thermistors, diodes, measuring resistance in series and parallel circuits, power of electrical devices, alternating current.		Radioactivity: unstable nuclei, alpha, beta, and gamma decay, detecting radiation, half-life, background radiation, nuclear fission, nuclear fusion.		Waves: longitudinal and transverse waves, measuring wave speed, reflection and refraction of waves, electromagnetic spectrum, uses of each part of the EM spectrum, uses of sound, ultrasound, black body radiation, lenses.	
<b>Year 11 Combined Science</b>	Inheritance: sexual and asexual reproduction, DNA and the genome, Punnet squares, genetic screening, inherited disorders, variation, evolution by natural selection, selective breeding, genetic engineering, fossils and extinction, classification.		Resources: finite resources, potable water, treating waste water, extracting metals, life cycle assessments.  Revision and exam preparation.		Examinations	
	Analysis: chromatography, formulations, testing for gases.					
	Atmosphere: evolution of the atmosphere, global warming, climate change, sources of pollution and their effects.  Electromagnetism: permanent and induced magnets, magnetic fields, electromagnets, motor effect, electric motor.					
<b>Year 11 Triple Science</b>	Inheritance: sexual and asexual reproduction, DNA and the genome, Punnet squares, genetic screening, inherited disorders, variation, evolution by natural selection, selective breeding, genetic engineering,		Inheritance: cloning, Mendel discoveries, theories of evolution, Darwin's theory of evolution, speciation, fossils and extinction, classification.		Examinations	
	Analysis: chromatography, formulations, testing for gases, testing for positive ions, and negative ions.		Resources: finite resources, potable water, treating waste water, extracting metals, life cycle assessments, rusting, alloys, polymers, glass, ceramics, and composites, fertilisers, Haber Process		Examinations	
	Atmosphere: evolution of the atmosphere, global warming, climate change, sources of pollution and their effects.		Revision and exam preparation.			
	Electromagnetism: permanent and induced magnets, magnetic fields, electromagnets, motor effect, electric motor, generator effect, microphones, loudspeakers, alternators, dynamo, transformers.		Space: formation of solar system, life cycle of stars, solar system, dark matter and energy, red shift & doppler effect.			



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<b>Year 12 Biology</b>	<p>Biological Molecules: carbohydrates, lipids, proteins, nucleic acids, ATP, water, inorganic ions.</p> <p>Cells: cell structure, cells arise from other cells, transport across cell membranes, cell recognition and immune systems.</p>		<p>Genetic information, variation and relationships between organisms: DNA, genes and chromosomes, protein synthesis, genetic diversity mutation, species taxonomy, biodiversity.</p> <p>Exchange of substances: surface area to volume ratio, gas exchange, digestion and absorption, mass transport.</p>	<p>Energy Transfers: photosynthesis</p> <p>Genetics &amp; populations: inheritance</p>		
<b>Year 13 Biology</b>	<p>Energy Transfers: respiration, energy and ecosystems, nutrient cycles.</p> <p>Organisms responding to changes in the environment: stimuli detection and response, nervous co-ordination.</p> <p>Genetics, populations: populations, evolution and speciation.</p>		<p>Organisms responding to changes in the environment: skeletal muscles as effectors, homeostasis.</p> <p>Control of gene expression: alteration of bases in DNA, gene expression control, using genome projects, gene technologies.</p>	<p>Revision, exam preparations.</p> <p>Examinations.</p>		



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<b>Year 12 Chemistry</b>	Atomic structure, amounts of substance.  Formulae and equations, electron structure, bonding and structure.	Acids, redox.  Organic chemistry introduction.	Periodicity, group 2, group 7, qualitative analysis.  Alkanes, alkenes.	Enthalpy changes, reaction rates.  Alcohols, haloalkanes.	Reaction rates  Organic synthesis	Chemical equilibrium  Analytical techniques
<b>Year 13 Chemistry</b>	Kinetics, equilibrium constants.  Aromatic compounds.	Acids, bases and buffers, lattice enthalpy.  Carbonyl compounds, carboxylic acids and esters, amines.	Enthalpy and entropy, redox and electrode potentials.  Amino acids, amides, and chirality, polyesters, polyamides, carbon-carbon bond formation.	Organic synthesis, chromatography and qualitative analysis.	Revision and consolidation.	Examinations



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<b>Year 12 Physics</b>	Measurements & quantities. Particles	Newtons laws, momentum Waves	Work Optics, circular motion.	Materials Simple harmonic motion	Electricity, gravitational fields	Electric fields Thermal physics
<b>Year 13 Physics</b>	Capacitors Gas laws	Magnetic fields Nuclear physics	Electromagnetism Option topic	Revision & consolidation	Revision & consolidation	Examinations