



Curriculum Overview - Science

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Year 7	Introduction to science: lab safety, variables, accuracy, precision. Particle Model & Energy: energy stores, energy transfers, properties of solids, liquids, gases, changes of state, melting and boiling points, conduction, convection, radiation, evaporation, gas pressure.	Elements & compounds: chemical symbols, molecules & formulae, chemical and physical changes, mixtures and pure substances, solutions, filtration, distillation.	Acids: acids, alkalis, & neutralisation, making salts, indicators Human body part 1: Circulation, respiration, breathing, gas exchange, the heart, blood & blood vessels, digestive system, skeletal and muscular systems.	Waves: longitudinal and transverse waves, light, reflection, refraction, colour, filters, the eye, sound, pitch & volume, ultrasound, echoes.	Reproduction: male and female reproductive systems, fertilisation, implantation, plant reproduction, distribution of seeds.	Human body part 2: disease and germ theory, communicable diseases, vaccines, non-communicable diseases
Year 8	Ecosystems: food chains, food webs, predator-prey relationships, interdependence, importance of biodiversity. Human body part 2: disease and germ theory, communicable diseases, vaccines, non-communicable diseases	Forces & space: The solar system, The Earth, astrophysics, gravitational forces, balanced and unbalanced forces, floating and sinking, drag forces, speed calculations, vertical motion, stopping distances.	Chemical reactions: Conservation of mass, gases as products and reactants, reactions of metals with water, oxygen, acid, displacement reactions, extracting metals, reduction of oxides.	Electricity & Magnetism: magnetic fields, electromagnets, charge, static electricity, conduction, current, potential difference, resistance, series and parallel circuits.:	Earth and climate: structure of the earth, igneous, sedimentary, and metamorphic rocks, rock cycle, fossil fuels, fractional distillation, atmospheric pollution, generating electricity, Earth's atmosphere, climate change.	Variation: survival, Mendel's peas, Punnett squares, adaptation of predators and prey, surface area to volume ratio, adaptations in hot & cold climates (plants and animals), selective breeding, theories of evolution, natural selection.
Year 9	Digestion: digestive system, enzymes, effect of pH and temperature on enzyme structure & action. Organisation: structure of blood vessels, the blood, structure of the heart, treating the heart, non-communicable diseases & their risk factors. Atomic structure: chemical formulae, structure of elements and compounds, balancing equations, filtration & crystallisation, structure of Chadwick's atom, how the atomic model evolved, isotopes, relative atomic mass. Forces: resultant forces, resolving forces, scalars & vectors.		Periodic table: trends in the groups on the period table, reactivity of group 1, 7, and 0 elements, history of the periodic table. Bonding: forming ions, properties of giant ionic compounds, forming covalent bonding, Structure & properties: properties of giant covalent structures (diamond, graphite, graphene), covalently bonded molecules, metallic structure & their properties. Motion: distance-time graphs, velocity-time graphs, calculating acceleration, measuring acceleration, Newton's second law of motion, momentum, terminal velocity.		Cell structure: structure of animals and plant cells, eukaryotes and prokaryotes, use of light microscopes, electron microscopes. Plant organisation: diffusion, osmosis, active transport, xylem, phloem, adaptations for photosynthesis, transpiration rates. Energy stores and transfers: kinetic energy, gravitational potential, work done by a force, efficiency, dissipation Energy resources: renewable and non-renewable energy resources, advantages and disadvantages of energy resources, responding to supply and demand.	



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Year 10 Combined Science	Plant organisation: diffusion, osmosis, active transport, xylem, phloem, adaptations for photosynthesis, transpiration rates.		Bioenergetics: aerobic respiration, anaerobic respiration, effect of exercise, photosynthesis, changing the rate of photosynthesis.		Ecology: adaptations, competition, ecosystems, predator-prey relationships, importance of biodiversity, how humans have impacted biodiversity, carbon cycle, water cycle. 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. Waves: longitudinal and transverse waves, measuring wave speed, reflection and refraction of waves, electromagnetic spectrum, uses of each part of the EM spectrum.	
	Communicable disease: germ theory of disease, work of Semmelweiss, fungal bacterial viral and protist diseases, non-specific defences, human immune system, vaccinations, drug development.		Coordination and control: nervous system, reflexes, endocrine system, menstrual cycle, negative feedback.			
	Quantitative Chemistry: relative atomic mass, formula mass, the mole, reacting masses, limiting reactants, reactions with gases as products or reactants, concentration, uncertainty in measurements.		Acids and alkalis: reactions of acids with bases and alkalis, making salts, reactions of carbonates, the pH scale.			
	Energy resources: renewable and non-renewable energy resources, advantages and disadvantages of energy resources, responding to supply and demand.		Redox chemistry: oxidation, reduction, reactions of metals and acids, extracting metals from ores, half equations, electrolysis of melts, electrolysis of solutions.			
	Electricity: properties of LDRs, thermistors, diodes, measuring resistance in series and parallel circuits, power of electrical devices, alternating current..		Energy changes in reactions: exothermic and endothermic reactions, measuring temperature changes, energy profiles.			
			Domestic electricity: alternating current & potential difference, wiring a 3-pin plug, mains electricity, electrical safety, power of electrical devices, efficiency of electrical devices, power of resistors, the national grid.			
			Radioactivity: unstable nuclei, alpha, beta, and gamma decay, detecting radiation, half life.			
Year 10 Triple Science	Plant organisation: diffusion, osmosis, active transport, xylem, phloem, adaptations for photosynthesis, transpiration rates.		Plant defences & Monoclonal antibodies.		Kidney & Plant Hormones.	
	Communicable disease: germ theory of disease, work of Semmelweiss, fungal bacterial viral and protist diseases, non-specific defences, human immune system, vaccinations, drug development.		Bioenergetics: aerobic respiration, anaerobic respiration, effect of exercise, photosynthesis, changing the rate of photosynthesis.		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. Crude Oil: hydrocarbons, properties of hydrocarbon molecules, combustion reactions, cracking, alkenes, alkanes, alcohols, carboxylic acids, esters	
	Quantitative Chemistry: relative atomic mass, formula mass, the mole, reacting masses, limiting reactants, reactions with gases as products or reactants, concentration, uncertainty in measurements,		Coordination and control: nervous system, reflexes, endocrine system, menstrual cycle, negative feedback, the brain, eyes, thermoregulatory control.			
	Further Quantitative: titrations, moles of gases, atom economy, percentage yield.		Energy changes in reactions: exothermic and endothermic reactions, measuring temperature changes, energy profiles, cells and batteries.			
	Acids and alkalis: reactions of acids with bases and alkalis, making salts, reactions of carbonates, the pH scale.		Rates of reaction: effect of temperature, surface area, concentration, pressure, and catalyst on the rate of reaction, dynamic equilibrium, changing equilibrium.			



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	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.	
Year 11 Combined Science	Coordination and control: nervous system, reflexes, endocrine system, menstrual cycle, negative feedback, the brain, eyes, thermoregulatory control. 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. 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 Motion: distance-time graphs, velocity-time graphs, calculating acceleration, measuring acceleration, Newton's second law of motion, momentum, terminal velocity.		Variation and evolution: natural selection, selective breeding, genetic engineering, classification, extinction, fossils. Ecology: adaptations, competition, ecosystems, predator-prey relationships, importance of biodiversity, how humans have impacted biodiversity, carbon cycle, water cycle, Analysis: chromatography, formulations, testing for gases. Atmosphere: evolution of the atmosphere, global warming, climate change, sources of pollution and their effects. Resources: finite resources, potable water, treating waste water, extracting metals, life cycle assessments. Waves: longitudinal and transverse waves, measuring wave speed, reflection and refraction of waves, electromagnetic spectrum, uses of each part of the EM spectrum. Electromagnetism: permanent and induced magnets, magnetic fields, electromagnets, motor effect, electric motor. Revision and exam preparation.		Revision & final examinations	
Year 11 Triple Science	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.		Revision & final 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		Revision & final 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.		Revision & final examinations	



Curriculum Overview - **Science**

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 3.1	Summer Term 3.2
Year 12 Biology	Biological Molecules: carbohydrates, lipids, proteins, nucleic acids, ATP, water, inorganic ions. Cells: cell structure, cells arise from other cells, transport across cell membranes, cell recognition and immune systems.		Genetic information, variation and relationships between organisms: DNA, genes and chromosomes, protein synthesis, genetic diversity mutation, species taxonomy, biodiversity. Exchange of substances: surface area to volume ratio, gas exchange, digestion and absorption, mass transport.		Energy Transfers: photosynthesis Genetics & populations: inheritance	
Year 13 Biology	Energy Transfers: respiration, energy and ecosystems, nutrient cycles. Organisms responding to changes in the environment: stimuli detection and response, nervous co-ordination. Genetics, populations: populations, evolution and speciation.		Organisms responding to changes in the environment: skeletal muscles as effectors, homeostasis. Control of gene expression: alteration of bases in DNA, gene expression control, using genome projects, gene technologies.		Revision, exam preparations. Examinations.	



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Year 12 Chemistry	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
Year 13 Chemistry	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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	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 3.1	Summer Term 3.2
Year 12 Physics	Measurements & quantities. Particles	Newton's laws, momentum Waves	Work Optics, circular motion.	Materials Simple harmonic motion	Electricity, gravitational fields	Electric fields Thermal physics
Year 13 Physics	Capacitors Gas laws	Magnetic fields Nuclear physics	Electromagnetism Option topic	Revision & consolidation	Revision & consolidation	Examinations