

Science Overview – Year 10



At Weston Secondary School, students study GCSE Science for eight hours of a two-week timetable.

	Autumn 1		Autumn 2		Spring 1	
Topic(s)	Infection	Electricity	Bioenergetics	Quantitative Chemistry	Chemical Changes	Atomic Structure and Radiation
Topic Objectives	Study of pathogens, the immune system, disease transmission, and prevention, including the role of vaccination, antibiotics, and public health measures.	Exploring electrical circuits, current, voltage, resistance, power, and the safe use of electricity in practical and real-world contexts.	Study of energy flow in biological systems, including photosynthesis, respiration, and energy usage in cells and organisms.	Chemical calculations including moles, concentrations, formulae, and reacting masses.	Exploration of acids, bases, metals, redox reactions, electrolysis, and reactivity trends	Study of atomic models, isotopes, ionisation, nuclear radiation, and its uses and risks.
Acquired Knowledge/Skills	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Types of pathogens: bacteria, viruses, fungi, protists. Human immune system and defence mechanisms. How infections are spread and controlled. Role of vaccines, antibiotics, and hygiene in preventing disease. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Analyse data on disease spread and control. Interpret graphs and epidemiological data. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Ohm's Law, series and parallel circuits. Relationship between current, voltage, resistance, and power. Electrical safety and energy efficiency. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Construct and measure electrical circuits accurately. Analyse and interpret circuit diagrams and quantitative data. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Photosynthesis and factors affecting its rate. Aerobic and anaerobic respiration. Energy transfer and storage in cells. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Analyse experimental data on photosynthesis and respiration. Construct and interpret graphs and energy diagrams. Explain energy transformations in living systems. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Mole concept and Avogadro's number. Calculations with mass, concentration, and gas volumes. Balancing chemical equations accurately. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Solve quantitative problems using equations. Apply stoichiometry to predict yields and limiting reagents. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Properties of acids, bases, and salts. Reactivity series and displacement reactions. Oxidation, reduction, and electrolysis. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Predict products of chemical reactions. Conduct practical investigations safely. Write and balance chemical equations 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Structure of atoms, isotopes, ions. Types and properties of radiation (alpha, beta, gamma). Applications and hazards of radiation. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Analyse and interpret radioactive decay data. Use models to explain atomic structure. Evaluate safety procedures for radiation use.

	<ul style="list-style-type: none"> Apply knowledge to evaluate public health strategies. 	<ul style="list-style-type: none"> Solve calculations using Ohm's Law and power equations. 		<ul style="list-style-type: none"> Interpret quantitative experimental data. 		
Assessments	End of Topic Test	End of Topic Test	End of Topic Test	End of Topic Test	End of Topic Test	End of Topic Test
Citizenship	<p>PSHE Development: Understanding personal hygiene, disease prevention, and public health responsibility.</p> <p>Careers Education: Medicine, nursing, microbiology, epidemiology, public health.</p> <p>Fundamental British Values: Democracy (public health decisions); rule of law (vaccination and hygiene regulations).</p> <p>SMSC Development: Moral (responsibility to others); Social (preventing disease spread); Cultural (global infection control approaches).</p>	<p>PSHE Development: Electrical safety, responsible technology use.</p> <p>Careers Education: Electrical engineering, electronics, IT, renewable energy.</p> <p>Fundamental British Values: Rule of law (safety regulations).</p> <p>SMSC Development: Moral (responsible use of electricity); Social (collaboration in experiments); Cultural (engineering achievements).</p>	<p>PSHE Development: Awareness of diet, exercise, and energy balance.</p> <p>Careers Education: Medicine, agriculture, sports science, environmental science.</p> <p>Fundamental British Values: Individual liberty (lifestyle choices affecting health); mutual respect (understanding human health needs).</p> <p>SMSC Development: Spiritual (appreciation of life processes); Moral (healthy choices); Cultural (food and exercise practices).</p>	<p>PSHE Development: Awareness of chemical safety and lab responsibility.</p> <p>Careers Education: Chemistry, chemical engineering, pharmacology, lab work.</p> <p>Fundamental British Values: Rule of law (safe chemical handling).</p> <p>SMSC Development: Moral (accuracy and responsibility in experimentation); Social (collaboration); Cultural (scientific heritage and discovery).</p>	<p>PSHE Development: Safe chemical handling and hazard awareness.</p> <p>Careers Education: Chemistry, metallurgy, environmental chemistry, pharmaceuticals.</p> <p>Fundamental British Values: Rule of law (chemical safety regulations).</p> <p>SMSC Development: Moral (responsible experimentation); Social (teamwork); Cultural (historical and industrial applications).</p>	<p>PSHE Development: Awareness of radiation risks and personal safety.</p> <p>Careers Education: Nuclear engineering, medicine (radiography), environmental monitoring.</p> <p>Fundamental British Values: Rule of law (radiation regulations).</p> <p>SMSC Development: Moral (responsible use of radiation); Social (community safety); Spiritual (appreciation of atomic complexity).</p>

	Spring 2		Summer 1	Summer 2
Topic(s)	Molecules and Matter	Rate of Chemical Reactions	Inheritance	Ecology
Topic Objectives	Structure, bonding, and physical properties of solids, liquids, and gases, including particle theory and states of matter.	Factors affecting reaction rates, collision theory, catalysts, and energy changes in reactions.	Genetics, DNA structure, inheritance patterns, genetic disorders, and evolution.	Interactions between organisms and their environment, including ecosystems, energy flow, biogeochemical cycles, and human impact.

<p>Acquired Knowledge/Skills</p>	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> • Types of bonding: ionic, covalent, metallic. • Particle model of matter and states. • Physical properties linked to bonding and structure. <p>Acquired Skills:</p> <ul style="list-style-type: none"> • Explain properties of substances using particle theory. • Compare and contrast bonding types. • Apply theory to practical observations. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> • Effect of temperature, concentration, surface area, and catalysts. • Collision theory and activation energy. • Exothermic and endothermic reactions. <p>Acquired Skills:</p> <ul style="list-style-type: none"> • Analyse experimental data to determine reaction rates. • Apply theory to predict outcomes. • Evaluate the effect of variables on reaction speed. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> • Structure and function of DNA and chromosomes. • Monohybrid inheritance and Punnett squares. • Genetic variation and natural selection. • Ethical considerations in genetics. <p>Acquired Skills:</p> <ul style="list-style-type: none"> • Analyse family pedigrees and inheritance patterns. • Apply genetic diagrams to predict outcomes. • Evaluate ethical issues in genetics. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> • Ecosystems and interdependence. • Energy transfer and trophic levels. • Population dynamics, succession, and environmental change. • Human impact on ecosystems and sustainability. <p>Acquired Skills:</p> <ul style="list-style-type: none"> • Interpret ecological data and graphs. • Conduct fieldwork and investigations safely. • Evaluate human impact and propose solutions.
<p>Assessments</p>	<p>End of Topic Test</p>	<p>End of Topic Test</p>	<p>End of Topic Test</p>	<p>End of Topic Test/ Paper 1 Mock</p>
<p>Citizenship</p>	<p>PSHE Development: Laboratory safety and risk awareness. Careers Education: Chemistry, materials science, engineering, pharmaceuticals. Fundamental British Values: Rule of law (lab safety regulations). SMSC Development: Moral (responsible lab practice); Social (teamwork); Cultural</p>	<p>PSHE Development: Safe lab practices and awareness of reaction hazards. Careers Education: Chemistry, chemical engineering, pharmaceuticals, industrial processes. Fundamental British Values: Rule of law (health and safety). SMSC Development: Moral (responsibility in chemical</p>	<p>PSHE Development: Understanding genetic risks and personal responsibility. Careers Education: Medicine, genetics, biotechnology, research. Fundamental British Values: Individual liberty (informed choices about genetics); mutual respect (diversity in genetics). SMSC Development: Moral (ethical use of genetic information); Social (impact on families); Cultural (attitudes to genetics worldwide).</p>	<p>PSHE Development: Awareness of sustainability and environmental responsibility. Careers Education: Ecology, environmental science, conservation, agriculture. Fundamental British Values: Democracy (participation in environmental policy); rule of law (environmental regulations). SMSC Development: Moral (responsibility to protect the environment); Social (community sustainability); Cultural (global approaches to conservation).</p>

	(history of chemical discoveries).	experiments); Social (collaboration); Cultural (industrial and historical applications).		
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Science Overview – Year 11



At Weston Secondary School, students study GCSE Science for eight hours of a two-week timetable.

	Autumn 1	Autumn 2	Spring 1	
Topic(s)	Forces	Organic Chemistry	Chemical Analysis	Chemistry of the Atmosphere
Topic Objectives	Study of motion, forces, energy, momentum, and the laws governing them, including practical applications in mechanics and real-world contexts.	Study of carbon compounds, hydrocarbons, functional groups, polymers, fuels, and practical applications in everyday life and industry.	Techniques to identify substances, including qualitative and quantitative analysis, and their practical applications in chemistry, medicine, and industry.	Study of Earth's atmosphere, composition, chemical changes over time, human impact, and strategies to reduce environmental damage.
Acquired Knowledge/Skills	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Newton's Laws of Motion and their applications. Concepts of speed, velocity, acceleration, and momentum. Forces in equilibrium, friction, gravity, and pressure. Work, energy, and power relationships. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Calculate speed, acceleration, force, work, and power using appropriate formulas. Analyse motion graphs and experimental data. Apply theoretical knowledge to real-life scenarios, e.g., vehicle safety, sports science. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Structure, properties, and reactions of alkanes, alkenes, alcohols, and carboxylic acids. Functional groups and homologous series. Polymers, fuels, and their environmental impact. Crude oil fractionation and industrial relevance. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Represent and interpret structural and molecular formulas. Predict and explain reactions of organic compounds. Evaluate industrial and environmental implications of organic chemistry. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Techniques such as chromatography, spectroscopy, titration, and gas tests. Distinguishing elements, compounds, and mixtures. Purity tests and identifying ions and gases. <p>Acquired Skills:</p> <ul style="list-style-type: none"> Perform and interpret chemical tests accurately. 	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> Composition of the atmosphere and changes over geological time. Greenhouse gases, global warming, and air pollution. Acid rain, carbon footprint, and climate change mitigation strategies. <p>Acquired Skills:</p>

			<ul style="list-style-type: none"> Analyse experimental results and draw conclusions. Apply techniques to real-world scenarios, e.g., quality control or environmental monitoring. 	<ul style="list-style-type: none"> Analyse data on atmospheric composition and environmental changes. Evaluate the impact of human activities on the atmosphere. Propose scientific solutions to reduce environmental harm.
Assessments	End of Topic Test	End of Topic Test/ Paper 1 Mocks	End of Topic Test	End of Topic Test
Citizenship	<p>PSHE Development: Awareness of personal and public safety in everyday activities.</p> <p>Careers Education: Engineering, mechanics, physics research, transport design, sports science.</p> <p>Fundamental British Values: Rule of law (safety and traffic regulations).</p> <p>SMSC Development: Moral (responsibility in applying forces safely); Social (collaborative problem-solving); Cultural (engineering achievements and transport innovations).</p>	<p>PSHE Development: Awareness of safe handling of chemicals and environmental responsibility.</p> <p>Careers Education: Chemistry, chemical engineering, pharmaceuticals, materials science, environmental science.</p> <p>Fundamental British Values: Rule of law (chemical safety and environmental regulations).</p> <p>SMSC Development: Moral (responsibility for chemical and environmental impact); Social (collaboration in practical investigations); Cultural (historical development of petrochemical industry).</p>	<p>PSHE Development: Safe handling of chemicals and laboratory risk awareness.</p> <p>Careers Education: Chemistry, forensic science, environmental analysis, pharmaceuticals, quality control.</p> <p>Fundamental British Values: Rule of law (lab safety and environmental compliance).</p> <p>SMSC Development: Moral (accuracy and responsibility in analysis); Social (teamwork in investigations); Cultural (importance of chemical testing in society).</p>	<p>PSHE Development: Understanding environmental responsibility and personal impact.</p> <p>Careers Education: Environmental science, climate research, chemistry, renewable energy, sustainability consultancy.</p> <p>Fundamental British Values: Democracy (policy and international agreements on climate); rule of law (environmental legislation).</p> <p>SMSC Development: Moral (responsibility to protect the planet); Social (impact on</p>

				communities); Cultural (global approaches to environmental management).
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	Spring 2	Summer 1	Summer 2
Topic(s)	Ecology	Reteach and revision	Reteach and revision
Topic Objectives	Interactions between organisms and their environment, including ecosystems, energy flow, biogeochemical cycles, and human impact.		
Acquired Knowledge/Skills	<p>Acquired Knowledge:</p> <ul style="list-style-type: none"> • Ecosystems and interdependence. • Energy transfer and trophic levels. • Population dynamics, succession, and environmental change. • Human impact on ecosystems and sustainability. <p>Acquired Skills:</p> <ul style="list-style-type: none"> • Interpret ecological data and graphs. • Conduct fieldwork and investigations safely. • Evaluate human impact and propose solutions. 		
Assessments	End of Topic Test/ Paper 2 Mocks	GCSE EXAMS	GCSE EXAMS
Citizenship	<p>PSHE Development: Awareness of sustainability and environmental responsibility.</p> <p>Careers Education: Ecology, environmental science, conservation, agriculture.</p> <p>Fundamental British Values: Democracy (participation in environmental policy); rule of law (environmental regulations).</p> <p>SMSC Development: Moral (responsibility to protect the environment); Social (community sustainability); Cultural (global approaches to conservation).</p>		

