Science Overview – Year 7

At Weston Secondary School, students study five hours of science over a two-weekly timetable.

	Autumn 1	Autumn 2	Spring 1
Topic(s)	Biology – Cells, Tissues and Organs	Chemistry – Particles and States of Matter	Physics – Forces and Motion
Topic Objectives	To understand that living organisms are made of cells which are organised into tissues, organs and organ systems, and to explain how their structures are related to their functions.	To use the particle model to explain the properties of solids, liquids and gases, and to describe changes of state using scientific vocabulary.	To investigate how forces affect the movement and shape of objects, and to explain motion using ideas about speed, direction and balanced and unbalanced forces.
Acquired Knowledge/Skills	**Acquired Knowledge** • Cells are the basic unit of life. • Specialised cells have adaptations for their function. • Cells are organised into tissues, organs and organ systems. **Acquired Skills** • Use microscopes safely and accurately. • Identify and label cells and tissues. • Explain structure–function relationships using scientific language.	**Acquired Knowledge** • Matter is made of particles in constant motion. • Solids, liquids and gases have different properties. • Changes of state involve energy transfer. **Acquired Skills** • Use the particle model to explain observations. • Interpret diagrams and graphs showing state changes. • Carry out and record heating and cooling experiments.	**Acquired Knowledge** • Forces can change an object's speed, direction or shape. • Balanced forces result in no change in motion. • Unbalanced forces cause acceleration or deceleration. **Acquired Skills** • Measure speed and distance accurately. • Draw and interpret force diagrams. • Analyse data to identify patterns and relationships.
Assessments	End of Topic Test	End of Topic Test	End of Topic Test
Citizenship	**PSHE Development:** Understanding growth, health, and body systems promotes personal wellbeing. **Careers Education:** Science requires students to communicate effectively and to solve problems whilst developing good organisational and teamwork skills. Studying Biology in Year 7 develops a foundation of life and living organisms. Following a pathway in Biology can lead to careers in medicine, healthcare, lab technician roles, and biomedical research. **Fundamental British Values:** Individual liberty in making informed health choices; rule of law for ethical research. **SMSC Development:** Moral (ethics of stem cells), Social (collaborative science), Spiritual	**PSHE Development:** Safe handling of materials and awareness of chemical hazards. **Careers Education:** Science requires students to communicate effectively and to solve problems whilst developing good organisational and teamwork skills. Studying Chemistry in Year 7 develops a foundation of particles and properties of matter. Following a pathway in Chemistry can lead to careers in Chemistry, materials science, pharmaceuticals, chemical engineering. **Fundamental British Values:** Rule of law (chemical safety regulations). **SMSC Development:** Moral (responsible use of chemicals), Social (teamwork in practicals), Cultural (historical scientific discoveries).	**PSHE Development:** Understanding risk and safety in movement and physical activities. **Careers Education:** Science requires students to communicate effectively and to solve problems whilst developing good organisational and teamwork skills. Studying Physics in Year 7 develops a foundation of forces that change the motion or shape of an object. Following a pathway in Physics can lead to careers in Engineering, sports science, automotive, aerospace. **Fundamental British Values:** Rule of law (safety laws in transport and sports). **SMSC Development:** Moral (responsible use of force and machines), Social (collaborative investigations).

	(complexity of life), Cultural (global scientific contributions)		

	Spring 2	Summer 1	Summer 2
Topic(s)	Biology - Reproduction	Chemistry – Elements, Mixtures and Compounds	Physics - Energy
Topic Objectives	To understand how plants and animals reproduce, including sexual and asexual reproduction, and to describe the role of reproduction in the life cycle of organisms.	To identify elements, mixtures and compounds, and to explain how substances can be separated using physical methods.	To recognise different forms of energy, describe how energy is transferred, and explain how energy is conserved in everyday situations.
Acquired Knowledge/Skills	**Acquired Knowledge** • Sexual and asexual reproduction have different advantages. • Human reproduction involves fertilisation and development. • Plant reproduction includes pollination and seed dispersal. **Acquired Skills** • Compare reproductive methods. • Sequence life cycles correctly. • Use diagrams and models to explain processes.	**Acquired Knowledge** • Elements consist of one type of atom. • Compounds are formed from chemically bonded elements. • Mixtures can be separated using physical methods. **Acquired Skills** • Classify substances correctly. • Choose and carry out separation techniques. • Record and interpret experimental results.	**Acquired Knowledge** • Energy exists in different forms (e.g. thermal, kinetic, chemical). • Energy can be transferred but not created or destroyed. • Some energy transfers are more useful than others. **Acquired Skills** • Identify energy stores and transfers. • Use diagrams to represent energy changes. • Evaluate energy efficiency in real-life contexts.
Assessments	End of Topic Test	End of Topic Test	End of Topic Test / End of year assessment
Citizenship	**PSHE Development:** Understanding human reproduction and relationships, responsibility for sexual health. **Careers Education:** Science requires students to communicate effectively and to solve problems whilst developing good organisational and teamwork skills. Studying Biology in Year 7 develops an understanding of how living things produce new life. Following a pathway in Biology can lead to careers in Medicine, midwifery, nursing, fertility science. **Fundamental British Values:** Individual liberty (making informed lifestyle choices); mutual respect and tolerance. **SMSC Development:** Moral (ethics of reproductive technologies), Social (communication about sensitive topics), Cultural (diverse reproductive practices).	**PSHE Development:** Safe use of chemicals, awareness of environmental impact. **Careers Education:** Science requires students to communicate effectively and to solve problems whilst developing good organisational and teamwork skills. Studying Chemistry in Year 7 develops an understanding of the fundamental nature of matter and the building blocks essential to life. Following a pathway in Chemistry can lead to careers in Chemistry, pharmacy, materials science, environmental science. **Fundamental British Values:** Rule of law (handling hazardous substances legally). **SMSC Development:** Moral (responsible experimentation), Social (teamwork in labs), Cultural (scientific heritage).	**PSHE Development:** Awareness of energy use, sustainability, and safety. **Careers Education:** Science requires students to communicate effectively and to solve problems whilst developing good organisational and teamwork skills. Studying Physics in Year 7 develops an understanding of the ability to do work and cause change. Following a pathway in Physics can lead to careers in Renewable energy, engineering, environmental science, architecture. **Fundamental British Values:** Democracy (policy on energy use), Rule of law (energy regulations). **SMSC Development:** Moral (responsibility for environment), Social (impact of energy on communities), Cultural (global energy solutions).

Science Overview – Year 8

At Weston Secondary School, students study five hours of science over a two-weekly timetable.

	Autumn 1	Autumn 2	Spring 1
Topic(s)	Biology – Nutrition and Digestion	Chemistry – Acids and Alkalis	Physics – Electricity and Circuits
Topic Objectives	To understand the role of nutrients in a healthy diet and to describe how the digestive system breaks down food so it can be absorbed and used by the body.	To identify acids and alkalis, investigate their properties using indicators, and explain their uses and hazards in everyday life.	To build and interpret simple electrical circuits, and to explain how current, voltage and resistance affect how circuits work.
Acquired Knowledge/Skills	**Acquired Knowledge** • Different nutrients have specific functions in the body. • The digestive system breaks food into absorbable molecules. • Enzymes speed up digestion. **Acquired Skills** • Analyse food labels and diets. • Explain digestion using models and diagrams. • Evaluate the impact of diet on health.	**Acquired Knowledge** • Acids and alkalis have characteristic properties. • pH measures how acidic or alkaline a substance is. • Neutralisation produces a salt and water. **Acquired Skills** • Use indicators and pH scales. • Carry out neutralisation experiments safely. • Interpret results and draw conclusions.	**Acquired Knowledge** • Electric current flows in complete circuits. • Voltage provides energy; resistance limits current. • Components have different functions in circuits. **Acquired Skills** • Build and test circuits safely. • Draw and interpret circuit diagrams. • Investigate relationships between current, voltage and resistance.
Assessments	End of Topic Test	End of Topic Test	End of Topic Test
Citizenship	**PSHE Development:** Healthy diet, wellbeing, and lifestyle awareness. **Careers Education:** Science requires students to explain and present ideas and to identify key issues whilst planning how best to use their time when working with others. Studying Biology in Year 8 develops understanding of body processes of food and the nutrients it needs to function. Following a pathway in Biology can lead to careers in Nutritionist, dietician, medicine, healthcare. **Fundamental British Values:** Individual liberty (making healthy choices). **SMSC Development:** Moral (food ethics), Social (sharing meals, public health), Cultural (dietary practices).	**PSHE Development:** Safe handling of household and laboratory chemicals. **Careers Education:** Science requires students to explain and present ideas and to identify key issues whilst planning how best to use their time when working with others. Studying Chemistry in Year 8 develops fundamental concepts characterised by properties and reactions. Following a pathway in Chemistry can lead to careers in Chemistry, pharmaceuticals, chemical engineering. **Fundamental British Values:** Rule of law (chemical safety legislation). **SMSC Development:** Moral (responsible chemical use), Social (collaboration in practicals).	**PSHE Development:** Electrical safety, responsible use of technology. **Careers Education:** Science requires students to explain and present ideas and to identify key issues whilst planning how best to use their time when working with others. Studying Physics in Year 8 develops the concepts of electricity, components and electrical pathways. Following a pathway in Physics can lead to careers in Electrical engineering, electronics, IT, renewable energy. **Fundamental British Values:** Rule of law (electrical safety standards). **SMSC Development:** Moral (responsibility in technology), Social (teamwork in experiments).

	Spring 2	Summer 1	Summer 2
Topic(s)	Biology – Respiration and Photosynthesis	Chemistry – Reactions of Metals and Non-Metals	Physics – Light and Sound

Topic Objectives	To understand how plants and animals obtain energy through respiration and photosynthesis, and to explain the importance of these processes for life on Earth.	To investigate how metals and non-metals react, and to use patterns in reactivity to predict and explain chemical reactions.	To understand how light and sound travel, and to explain how reflection, refraction, pitch and volume affect what we see and hear.
Acquired Knowledge/Skills	**Acquired Knowledge** • Photosynthesis transfers energy from light into glucose. • Respiration releases energy from glucose. • Both processes are essential for life. **Acquired Skills** • Write word equations. • Interpret experimental data. • Compare aerobic and anaerobic respiration.	**Acquired Knowledge** • Metals and non-metals react differently. • Reactivity varies between elements. • Chemical reactions involve rearrangement of atoms. **Acquired Skills** • Predict reactions using patterns. • Write word equations. • Carry out reactions safely and record observations.	**Acquired Knowledge** • Light travels as waves and can be reflected and refracted. • Sound is produced by vibrations and travels through media. • Pitch and volume relate to wave properties. **Acquired Skills** • Draw ray diagrams. • Investigate wave behaviour. • Analyse results using graphs and tables.
Assessments	End of Topic Test	End of Topic Test	End of Topic Test/ End of year assessment
Citizenship	**PSHE Development:** Health and exercise awareness. **Careers Education:** Science requires students to explain and present ideas and to identify key issues whilst planning how best to use their time when working with others. Studying Biology in Year 8 develops understanding of important biological processes that are crucial for life on Earth. Following a pathway in Biology can lead to careers in Biology, medicine, agriculture, environmental science. **Fundamental British Values:** Individual liberty (making healthy choices). **Fundamental British Values:** Mutual respect (appreciating life), Individual liberty (lifestyle choices). **SMSC Development:** Spiritual (appreciation of natural processes), Moral (sustainability), Cultural (agriculture practices worldwide)	**PSHE Development:** Safe chemical handling, awareness of hazards. **Careers Education:** Science requires students to explain and present ideas and to identify key issues whilst planning how best to use their time when working with others. Studying Chemistry in Year 8 develops ideas around chemical processes and reactions. Following a pathway in Chemistry can lead to careers in materials science, metallurgy, engineering. **Fundamental British Values:** Rule of law (chemical safety compliance). **SMSC Development:** Moral (responsible experimentation), Social (collaborative labs), Cultural.	**PSHE Development:** Eye and ear safety; awareness of environmental noise and lighting. **Careers Education:** Science requires students to explain and present ideas and to identify key issues whilst planning how best to use their time when working with others. Studying Physics in Year 8 develops concepts of energy forms that travel in waves. Following a pathway in Physics can lead to careers in Optics, acoustics, audio engineering, physics research. **Fundamental British Values:** Individual liberty (choice of safe exposure), Mutual respect (considering others' safety). **SMSC Development:** Spiritual (wonder of natural phenomena), Cultural (applications in music, art, technology).

Science Overview – Year 9

	At Weston Secondary School, students study five hours of science over a two-weekly timetable.		
	Autumn 1	Autumn 2	Spring 1

Topic(s)	Cells	Organisation	Atomic Structure and the Periodic Table
Topic Objectives	To develop a detailed understanding of cell structure, division and specialisation, and to apply quantitative microscopy skills to explain how cells enable growth, repair and reproduction in living organisms.	To understand how cells work together in tissues, organs and organ systems, and to explain how specialised structures and enzymes allow organisms to function efficiently.	To understand the basic structure of atoms and to explain how the periodic table is organised to show patterns in the properties of elements
Acquired Knowledge/Skills	**Acquired Knowledge** • Eukaryotic and prokaryotic cells have different structures and functions. • Specialised cells are adapted through structural features such as surface area, number of mitochondria and cell differentiation. • Cells divide by mitosis to allow growth, repair and asexual reproduction. • Stem cells can differentiate into specialised cells. • Microscopy techniques affect resolution and magnification. **Acquired Skills** • Calculate total magnification and actual cell size using scale bars. • Compare plant, animal and bacterial cells using evidence. • Explain adaptations of cells using precise scientific terminology. • Interpret and evaluate microscope images and biological data. • Construct and use biological diagrams to GCSE standards.	**Acquired Knowledge** • Multicellular organisms are organised into tissues, organs and organ systems. • Enzymes are biological catalysts that control metabolic reactions. • The digestive system breaks food into soluble molecules for absorption. • The circulatory system transports substances efficiently around the body. • Gas exchange surfaces are adapted for diffusion. **Acquired Skills** • Explain structure–function relationships at increasing levels of organisation. • Analyse data related to enzyme activity (temperature, pH, concentration). • Describe and explain processes using extended, logically sequenced answers. • Interpret graphs and experimental results linked to biological systems. • Apply biological knowledge to unfamiliar contexts (e.g. disease or exercise).	• Atoms consist of protons, neutrons and electrons. • Elements are arranged by atomic number. • The periodic table shows patterns in properties. **Acquired Skills** • Interpret periodic table data. • Construct atomic models. • Use evidence to explain trends.
Assessments	End of Topic Test	End of Topic Test	End of Topic Test
Citizenship	**PSHE Development:** Understanding growth, repair, health, and wellbeing. **Careers Education:** Science requires students to use knowledge and experience to tackle problems. To organise time and work under pressure. Studying Cells in Year 9 explores the basic unit of life in greater detail which can lead to Combined and Separate Science pathways at KS4. Following a pathway in this area can lead to careers in Medicine, healthcare, biomedical research, laboratory technician roles. **Fundamental British Values:** Individual liberty	**PSHE Development:** Understanding body systems, healthy living, and personal responsibility for health. **Careers Education:** Science requires students to use knowledge and experience to tackle problems. To organise time and work under pressure. Studying Organisation in Year 9 explores the hierarchal structure of living organisms which can lead to Combined and Separate Science pathways at KS4. Following a pathway in this area can lead to careers in Medicine, nursing,	**PSHE Development:** Safe understanding of chemical elements and radioactive materials. **Careers Education:** Science requires students to use knowledge and experience to tackle problems. To organise time and work under pressure. Studying Atomic Structure and the Periodic Table in Year 9 explores the structure and arrangement of elements which can lead to Combined and Separate Science pathways at KS4. Following a pathway in this area can lead to careers in Chemistry, nuclear science, pharmacy, materials

	(making informed health choices); rule of law (ethical research regulations). **SMSC Development:** Moral (ethical use of stem cells); Social (collaboration in scientific investigations); Spiritual (appreciation of life complexity); Cultural (recognising global scientific contributions).	physiotherapy, sports science, nutrition. **Fundamental British Values:** Individual liberty (making informed lifestyle choices); mutual respect and tolerance (appreciating diverse health needs). **SMSC Development:** Moral (ethical considerations such as organ donation); Social (how healthcare supports communities); Spiritual (appreciation of the human body); Cultural (diverse approaches to diet and health across the world).	science. **Fundamental British Values:** Rule of law (handling hazardous substances). **SMSC Development:** Moral (ethical use of materials), Spiritual (understanding the building blocks of matter), Cultural (scientific heritage).

	Spring 2		Summer 1		Summer 2
Topic(s)	Bonding	Energy	Energy Changes	Particle Model of Matter	Infection
Topic Objectives	To understand how atoms join by forming bonds, and to explain how different types of bonding affect the properties of substances.	To apply the principle of energy conservation to analyse energy stores, transfers and efficiency in physical and chemical systems, using diagrams, calculations and real-world contexts.	To identify energy changes in physical and chemical processes, and to explain whether energy is released or absorbed during these changes.	To apply the particle model to explain diffusion, gas pressure and temperature changes in different states of matter.	To understand how diseases are caused by microorganisms, how infections spread, and how the body and medicines help to prevent and treat disease.
Acquired Knowledge/Skills	**Acquired Knowledge** • Atoms bond to form stable structures. • Different types of bonding exist. • Bonding affects physical properties. **Acquired Skills** • Represent bonding using diagrams and models. • Link bonding to properties.	**Acquired Knowledge** • Energy is stored in energy stores and transferred by specific pathways. • Energy transfers can be represented using Sankey diagrams and energy profiles. • The conservation of energy applies to all physical and chemical processes. • Energy efficiency is reduced by	**Acquired Knowledge** • Energy changes occur during physical and chemical processes. • Some reactions are exothermic or endothermic. • Energy change diagrams represent these processes. **Acquired Skills** • Interpret energy profile diagrams. • Measure temperature changes. • Draw conclusions from experimental data	**Acquired Knowledge** • Particle motion explains diffusion and pressure. • Temperature affects particle movement. • Gases behave differently from solids and liquids. **Acquired Skills** • Apply models to explain phenomena. • Analyse experimental results. • Communicate explanations using scientific language.	**Acquired Knowledge** • Microorganisms can cause disease. • Infections spread in different ways. • The immune system defends the body. **Acquired Skills** • Interpret data on disease spread. • Evaluate prevention methods. • Use evidence to explain health decisions

	• Compare substances based on structure.	unwanted energy transfers. • Non-renewable and renewable energy resources have advantages and disadvantages. **Acquired Skills** • Calculate energy efficiency using equations. • Interpret and construct Sankey diagrams. • Apply energy concepts to real-world contexts such as appliances and transport. • Use mathematical skills to rearrange equations and analyse quantitative data.			
Assessments	End of Topic Test	End of Topic Test	End of Topic Test	End of Topic Test	End of Topic Test/ End of year assessment
Citizenship	**PSHE Development:** Awareness of chemical safety and material properties. **Careers Education:** Studying Bonding in Year 9 explores the attraction between atoms which can lead	**PSHE Development:** Awareness of energy use, sustainability, and safety. **Careers Education:** Studying Energy in Year 9 develops the concept of doing work or causing change. This can lead to	**PSHE Development:** Awareness of energy efficiency and sustainability. **Careers Education:** Studying Energy Changes in Year 9 explores the transformation of energy in chemical reactions. This can lead to Combined and Separate Science pathways at	**PSHE Development:** Safe laboratory practice and risk awareness. **Careers Education:** Studying Particle Model of Matter in Year 9 explores the physical properties of matter. This can lead to Combined and Separate Science pathways at	**PSHE Development:** Personal hygiene, disease prevention, understanding public health. **Careers Education:** Studying Infection in Year 9 explores organism infection and its response. This can lead to Combined and Separate Science pathways at KS4. Following a

	to Combined and Separate Science pathways at KS4. Following a pathway in this area can lead to careers Chemistry, materials science, chemical engineering. **Fundamental British Values:** Rule of law (material safety standards). **SMSC Development:** Moral (responsible lab work), Social (teamwork in experiments), Cultural (historical development of chemistry).	Combined and Separate Science pathways at KS4. Following a pathway in this area can lead to careers in Renewable energy, engineering, environmental science, architecture. **Fundamental British Values**: Democracy (policy on energy use); rule of law (energy regulations). **SMSC Development:** Moral (responsibility for environment); Social (energy in communities); Cultural (global energy solutions).	KS4. Following a pathway in this area can lead to careers in Engineering, chemistry, renewable energy, environmental science. **Fundamental British Values:** Democracy (energy policies), Rule of law (energy regulations). **SMSC Development:** Moral (environmental responsibility), Social (community energy use), Cultural (global energy solutions).	KS4. Following a pathway in this area can lead to careers in Chemistry, physics, engineering, materials science. **Fundamental British Values:** Rule of law (chemical safety legislation). **SMSC Development:** Moral (ethical experimentation), Social (collaborative practical work), Spiritual (curiosity about matter).	pathway in this area can lead to careers in Medicine, nursing, microbiology, epidemiology, public health. **Fundamental British Values:** Democracy (public health decisions), Rule of law (vaccination regulations). **SMSC Development:** Moral (responsibility to others), Social (preventing disease spread), Cultural (global approaches to infection control).