

# Science Curriculum Overview

## Year 8

Year 8 science focuses on exploring the key scientific concepts which were introduced in year 7 as well as continuing to build the foundation of knowledge and skills needed for KS4.

Throughout year 8, students will develop a deeper understanding of the natural world and will be able to apply it to both familiar and unfamiliar context.

Knowledge overview	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5
Topic	Working scientifically 2	Forces and their interactions	Digestion and breathing	The building blocks of chemistry	Work and heating
Theme	Working scientifically	Forces and motion 2	Organisms 2	Matter and the periodic table 2	Energy and Particles 2
Overview	In this topic we will introduce the skills which will be practiced and developed throughout year 8 and beyond.	In this topic students will consider what makes a force and how they interact with objects around us. Students will use algebraic equations to and units to represent the effects of forces on everyday objects.	In this topic students will consider what makes a balanced diet as well as explore the digestive system. Students will use models to represent the process of digestion and they will investigate the role of enzymes in digestion.	In this topic students will review how the theories and organisation of the periodic table has changed over the years. Students will retrace the steps of pioneers like Mendeleev in their quest to understand the building blocks of the universe.	In this topic students will gain an understanding of heat transfers and apply this understanding to the concept of insulation. Students will investigate the ideas of conduction, convectional and radiation and deduce ways to reduce heat transfers from this.

Knowledge overview	Topic 6	Topic 7	Topic 8	Topic 9	Topic 10	Topic 11
Topic	Evolution and inheritance	Resources from Earth	Magnetism	Energy in an ecosystem	Energy in reactions	Properties of waves
Theme	Genes and Evolution 2	Earth's resources 2	Electromagnetism 3	Ecosystems 2	Chemical reactions 2	Electromagnetism 4
Overview	In this topic students will consider how organisms have changed over millions of years. Students will review the theories presented and interrogate the sources given to explain evolution.	In this topic students will use scientific models to explain natural processes such as the greenhouse effect and will consider the scientific theories of how the atmosphere of the Earth as evolved over millions of years.	In this topic students will investigate the properties of magnets and electromagnets. Students will use their understanding of scientific equipment to build their very own electromagnets and use scientific concepts to explain how they work.	In this topic students will relate the process of respiration and photosynthesis. Students will design experiments to investigate the factors which affect both of the biochemical processes.	In this topic students will gain an understanding of the role energy plays in chemical reactions. Students will devise hypothesis, plan variables, evaluate risks and collect data to help gain a better understanding of chemical reactions.	In this topic students will investigate how waves interact with matter. Students will use their knowledge of waves to develop a working understanding of objects such as speakers and microphones.

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Our curriculum has been broken down in 9 themes which run from year 7 to 11. This allows students to gain a better comprehension of how their knowledge, understandings and skills develop through their lessons.

Each topic will form part of a greater theme within the science curriculum and as the students move through a theme they will not only apply the concepts and skills previously encountered but will challenge themselves further as they delve deeper into that subject.

Our curriculum is broad and balanced covering a wide variety of topics through KS3 and KS4 as well as developing many important transferrable skills.

Biology		
	Theme	Topic
Organisms	Organisms 1	Movement and cells
	Organisms 2	Digestion and breathing
	Organisms 3	Cells in depth
	Organisms 4	Organ systems
	Organisms 5	Infection and response
	Organisms 6	Homeostasis and control
Genes and Evolution	Genes and Evolution 1	Variation and reproduction
	Genes and Evolution 2	Evolution and inheritance
	Genes and Evolution 3	Genetic inheritance
	Genes and Evolution 4	Theories of evolution
Ecosystems	Ecosystems 1	Organisation in ecosystems
	Ecosystems 2	Energy in ecosystems
	Ecosystems 3	Bioenergetics
	Ecosystems 4	Adaptations and interdependence
	Ecosystems 5	Nutrient cycles and the human impact on the environment

Chemistry		
	Theme	Topic
Matter and the periodic table	Matter and the periodic table 1	States of matter & separating mixtures
	Matter and the periodic table 2	Building blocks of chemistry
	Matter and the periodic table 3	Atomic structure and the periodic table
	Matter and the periodic table 4	Bonding, structure, and the properties of materials
	Matter and the periodic table 5	Chemical analysis
Earth's resources	Earth's resources 1	The Earth as a planet
	Earth's resources 2	Resources from Earth
	Earth's resources 3	Chemistry of the atmosphere
	Earth's resources 4	Organic chemistry
	Earth's resources 5	Using Earth's resources
Chemical reactions	Chemical reactions 1	Simple chemical reactions
	Chemical reactions 2	Energy in reactions
	Chemical reactions 3	Chemical changes
	Chemical reactions 4	Quantitative chemistry
	Chemical reactions 5	Rates of reactions
	Chemical reactions 6	Energy changes

Physics		
	Theme	Topic
Forces and motion	Forces and motion 1	Objects in motion
	Forces and motion 2	Forces and their interactions
	Forces and motion 3	Forces in depth
	Forces and motion 4	Space physics
	Forces and motion 5	How forces affect motion
	Forces and motion 6	Forces in action
Energy and particles	Energy and particles 1	Energy transfers
	Energy and Particles 2	Work and heating
	Energy and Particles 3	Energy stores and systems
	Energy and Particles 4	Particle model of matter
	Energy and Particles 5	Nuclear physics
Electromagnetism	Electromagnetism 1	Electrical circuits
	Electromagnetism 2	Sound and light
	Electromagnetism 3	Magnetism
	Electromagnetism 4	Properties of waves
	Electromagnetism 5	Domestic electricity
	Electromagnetism 6	Waves in depth
	Electromagnetism 7	Magnetism in depth

# Science Curriculum Overview

## Skills Overview

The skills we teach, hone and embed have been broken down into four categories and have been taken directly from the AQA syllabus for KS3 AQA specifications for KS4.

These skills are all introduced in KS3 (years 7 to 9) and are continually practiced and developed throughout each theme from year 7 to year 11.

Analyse	Rastrick code
Calculate a mean, mode, median and range from a set of data	A1
Use appropriate number of significant figures	A2
Make order of magnitude calculations	A3
Change the subject of an equation	A4
Substitute numerical quantities into equations	A5
Identify the variables in an investigation	A6
Draw and interpret a line graph	A7
Identify and express a linear relationship (including $y=mx+c$ at KS4)	A8
Determine slope and intercept of a line graph	A9
Identify a pattern in data from a results table or bar graph	A10
Make conclusions, use data and explain them with scientific reasons	A11
Estimate uncertainties	A12
Use the terms accuracy, precision, repeatability and producibility	A13
Discuss errors in a practical and ways to reduce these	A14
Evaluate practical methods and suggest improvements and developments	A15

Communicate	Rastrick code
Use scientific vocabulary accurately with appropriate units and chemical nomenclature	C1
Use diagrams to make meaning clearer	C2
Record observations using scientific words	C3
Use models to explain scientific ideas	C4
Consider ethical issues	C5
Consider personal, social, economic and environmental implications	C6
Understand the importance of communicating results to a range of audiences	C7
Use SI units	C8
Use prefixes and powers of ten	C9

Enquiry	Rastrick code
Predict what will happen in an investigation and decide whether the conclusion agrees with the	E1
Develop hypotheses	E2
Plan a method	E3
Select appropriate control variables	E4
Apply sampling techniques if appropriate	E5
Use measurement instrument correctly	E6
Gather sufficient data for the investigation and repeat when needed	E7

Solve	Rastrick code
Explain what is meant by a theory and state examples of theories	S1
Understand how scientific ideas have changed	S2
Complete risk assessments by identifying hazards and ways to reduce the risks of these	S3
Examine consequences	S4
Evaluate the evidence for a claim	S5
Use ratios, fractions and percentages	S6
Calculate and use simple probabilities	S7
Calculate areas of triangles, rectangles, surface areas and volumes of cubes	S8