

# Science Curriculum Overview

## Year 10

Year 10 is when students fully embark on their GCSE journey. They begin to build a more in depth understanding of the concepts learned earlier in each theme and develop aspirations of a career in STEM.

Throughout year 10 the students will use experimental techniques, critical thinking and considered questioning to explore a range of topics in biology, chemistry and physics.

Knowledge overview	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6
Topic	Bioenergetics	Chemical changes	Domestic electricity	Genetic inheritance	Chemistry of the atmosphere	Waves in depth
Theme	Ecosystems 3	Chemical reactions 3	Electromagnetism 5	Genes and Evolution 3	Earth's resources 3	Electromagnetism 6
Overview	In this topic students will take a detailed look at respiration and photosynthesis and the factors which affect them. Students will consider the implication of changing these factors on real world contexts such as sport and farming	In this topic students will explore some of the various different chemical reaction which occur in industrial processes. Students will use their understanding of experimental techniques to explain how metals can be extracted from their ores.	In this topic students will take an in depth look at how electricity can be used at home. Students will consider how the to calculate the power of various appliances along with evaluating the safety measure in place for domestic electricity.	In this topic students will look at genetic inheritance and how it occurs. Students will use models and established techniques to demonstrate and communicate ideas about inheritance.	In this topic students look at in depth how human activity is having an impact on the atmosphere an how these changes can affect to world we live in. Students will consider how bias and misinformation can cause misconceptions regarding to scientific theories and principles.	In this topic students will take a detailed look at waves and their properties. Students will use algebraic equations to understand the relationship between wavelength, frequency and wave speed. Students will also consider the risk associated with EM waves and evaluate their use in everyday society.

Knowledge overview	Topic 7	Topic 8	Topic 9	Topic 10	Topic 11	Topic 12
Topic	Adaptations and interdependence	Quantitative chemistry	Forces in depth	Infection and response	Rates of reactions	Space physics
Theme	Ecosystems 4	Chemical reactions 4	Forces and motion 3	Organisms 5	Chemical reactions 5	Forces and motion 4
Overview	In this topic students will take an in depth look at how certain organisms become adapted to their habitats. Students will consider how organisms have physical and behavioural adaptations to thrive in the environment in which they live as well as to cope with interactions with other organisms.	In this topic students will delve into the methods used to quantify the amounts of substance used and produced in chemical reactions. Students will use mathematical concepts such as algebraic equations and ratios to calculate the yields expected to be produced.	In this topic students will take an in depth look at how forces act on objects. Students will use algebraic equations to calculate the effects of forces as well identify how forces can be used in real world applications.	In this topics students will explore how pathogens can infect organisms and cause disease. Students will also look at the preventative measure in place to reduce disease as well as your bodies own defence mechanisms to combat pathogen.	In this topic students will explore how the speed at which reactions occur can be measured and changed. Students will consider real world industrial processes and they will explain the importance of how these chemical reactions progress.	In this topic students will look up to the stars to explain how they formed and how their motion can be explained. Students will analyse and critique the evidence put forward to explain the beginnings of the universe and how it will change in the future.

# Science Curriculum Overview

## Year 11 - Combined science

Year 11 combined science is where students begin to refine their understanding of the themes they have studied in their high school career, and further extend and challenge themselves with the most difficult concepts in the GCSE course

The work they complete through their five year journey will allow students to leave Rastrick High school as scientifically literate members of society.

Knowledge overview	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5
Topic	Forces in depth	How forces affect motion	Adaptations and interdependence	Nutrient cycles & human impact on the environment	Chemical analysis
Theme	Forces and motion 3	Forces and motion 5	Ecosystems 4	Ecosystems 5	Matter and the periodic table 5
Overview	In this topic students will take an in depth look at how forces act on objects. Students will use algebraic equations to calculate the effects of forces as well identify how forces can be used in real world applications.	In this topic students will investigate how unbalanced forces can change the motion of an object. Students will apply their skills of using algebraic equations, using line graphs as well and calculating areas so explain how an objects motion can vary.	In this topic students will take an in depth look at how certain organisms become adapted to their habitats. Students will consider how organisms have physical and behavioural adaptations to thrive in the environment in which they live as well as to cope with interactions with other organisms.	In this topic students will investigate the various types of nutrient cycles which occur on Earth. Students will evaluate the impact of human activities on these nutrient cycles.	In this topic students will investigate the various techniques scientists use to identify unknown substances. Students will also practice the techniques used separate a variety of mixtures.

Knowledge overview	Topic 7	Topic 8	Topic 9	Topic 10	Topic 11	Topic 12
	Magnetism in depth	Quantitative chemistry	Genetic inheritance	Theories of evolution	Using Earth's resources	Rates of reactions
	Electromagnetism 7	Chemical reactions 4	Genes and Evolution 3	Genes and Evolution 4	Earth's resources 5	Chemical reactions 5
	In this topic students will take an in depth look at magnetism and electromagnetism. Students will use models to represent the ways in which magnetic fields can interact and will use equations to help calculate the forces produced.	In this topic students will delve into the methods used to quantify the amounts of substance used and produced in chemical reactions. Students will use mathematical concepts such as algebraic equations and ratios to calculate the yields expected to be produced.	In this topic students will look at genetic inheritance and how it occurs. Students will use models and established techniques to demonstrate and communicate ideas about inheritance.	In this topic students will explore the theory of evolution and critique the evidence put forward to support it. Students will use their understanding to apply evolution and changing ecosystems to explain why organisms may become extinct.	In this topic students will take an in depth look at how humans use the resources found on Earth and the impact the over use of certain resources is having on the planet. Students will evaluate and justify new techniques and practices relating to reduce the impact we have in our use of these resources.	In this topic students will explore how the speed at which reactions occur can be measured and changed. Students will consider real world industrial processes and they will explain the importance of how these chemical reactions progress.

# Science Curriculum Overview

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