SCIENCE CURRICULUM

The Science Department strives to foster a deep appreciation for knowledge and learning among our students. We believe that science is a powerful tool for helping students understand and interpret the world around them. By providing a solid foundation in fundamental scientific principles, we aim to equip our students with the skills necessary to make meaningful contributions to society.

Our vision includes several key areas. We acknowledge that science education extends beyond the classroom, and we seek to provide students with the knowledge and skills needed for personal and environmental responsibility. By understanding scientific concepts, students can lead healthy, meaningful lives. We also view science as more than just an academic subject; it is a vital tool for addressing real-world challenges. Students are taught to critically engage with information and developments presented through various media and professional environments. They learn to recognise the power of science to address contemporary issues and understand the significant impact of natural phenomena on human life.

At the core of our curriculum is the development of critical analytical skills. We place strong emphasis on evidence-based reasoning and the ability to distinguish between factual information and speculative ideas. This prepares students to tackle complex problems with a scientific mindset. Our teaching approach also places theoretical concepts within their historical context, helping students understand how scientific ideas have evolved over time. This approach fosters curiosity and inspires a lifelong passion for learning.

We actively encourage the exploration of STEM (Science, Technology, Engineering, and Mathematics) fields. Whether students pursue careers directly related to science or choose other paths, the analytical thinking and problem-solving skills they develop through our curriculum will equip them for success. We envision a community of scientifically literate individuals who contribute to society and engage with the wonders of the natural world.

At GAA, the Science Department is committed to nurturing a deep understanding of scientific principles while fostering a passion for inquiry and discovery. Our curriculum follows Pearson's Mastery Program, which organises the National Curriculum into overarching themes. These themes provide a cohesive and purposeful framework for our students' educational journey.

In Biology, students explore the complex world of cells, studying their structure, function, and the processes that sustain life. They also investigate the interconnectedness of living organisms within ecosystems, focusing on ecological relationships and sustainability. Additionally, they analyse how organisms adapt, survive, and interact with their environments.

In Chemistry, the curriculum examines the properties of matter, ranging from atoms and elements to compounds and materials. Students study chemical reactions and gain insight into how substances transform and interact. The course also explores Earth's composition, climate, and the impact humans have on the atmosphere.

In Physics, students explore the behaviour of matter, energy transfer, and the properties of materials. They investigate the different forms of energy, their transformations, and the principle of conservation. The curriculum also covers the fundamental forces that shape our universe, including gravity and electromagnetism.

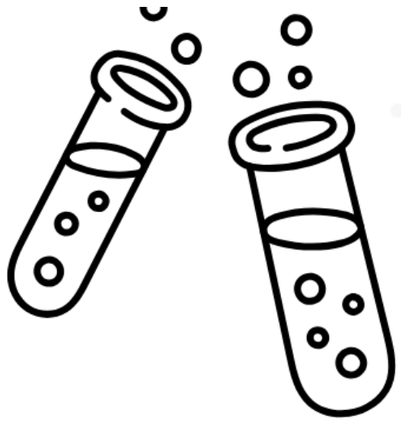
Our curriculum is carefully sequenced to ensure that students can retrieve and build upon their prior knowledge. As they progress through the five-year program, they develop a deeper understanding of each topic, ensuring that scientific concepts are deeply ingrained and applicable across various contexts.

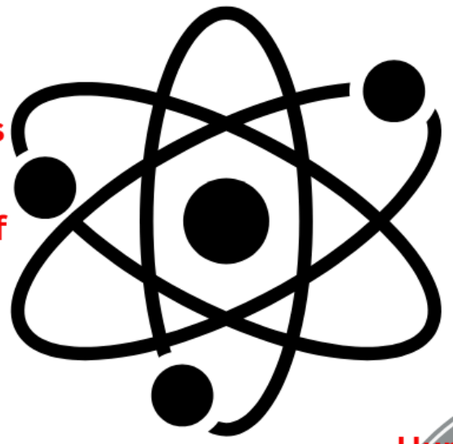
We focus on holistic skill development in several key areas:

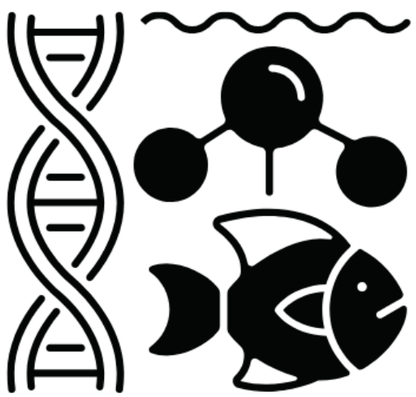
- The scientific method is central to our curriculum. Students are introduced to hypothesis formulation, experimental design, data collection, analysis, and evidence-based conclusion drawing. This approach fosters curiosity, critical thinking, and an appreciation for evidence-driven inquiry.
- Practical skills and laboratory competence are emphasized. Students learn to handle scientific equipment, conduct experiments, and follow safety protocols. They are trained in risk assessment, safe chemical handling, and proper lab practices.
- Health and safety awareness is essential. Students understand the importance of risk assessment and are taught how to handle chemicals safely and follow laboratory procedures.
- Analytical thinking and problem-solving are promoted. Science helps students develop the ability to break down complex problems, identify patterns, and propose solutions. These skills are valuable both in the classroom and in everyday life.
- Scientific literacy is another focus. Students learn to comprehend and interpret scientific texts, graphs, and data. They also develop communication skills, learning how to present their findings and engage in scientific discourse.
- Collaboration and teamwork are vital. Students work together on experiments, share ideas, and appreciate diverse perspectives. This enhances creativity and problem-solving skills.
- Critical evaluation of information is emphasized. In today’s information-rich world, students learn to assess scientific claims, media reports, and research findings, distinguishing between reliable and unreliable sources.
- Adaptability and resilience are essential. Science often involves setbacks and unexpected results. Students are encouraged to adjust hypotheses, troubleshoot experiments, and persist in the face of challenges.
- Ethical awareness is integral to our teaching. Students explore ethical dilemmas related to research, environmental impact, and technological advances. This ensures that they conduct science responsibly.
- Finally, students develop an appreciation for the scientific process. Beyond gaining knowledge, they come to understand that science is an ongoing journey of exploration, questioning, and growth.

GCSE Science Pathways: Our Pearson’s Mastery Program of Study prepares students for GCSE Science qualifications, offering two pathways:

- Pearson/Edexcel Combined Science GCSE: This comprehensive course covers biology, chemistry, and physics, providing a broad foundation in scientific knowledge.
- Pearson/Edexcel Separate Science GCSEs: students can specialise in individual sciences—biology, chemistry, or physics—allowing for deeper exploration and understanding.







KS3 SCIENCE CURRICULUM

Great Academy Ashton
Inspiring Greatness

YEAR 7

- Introduction to Science and the laboratory
- States of matter
- Cells and reproduction
- Energy and electricty
- Earth's atmosphere
- Acids and alkalis
- Denisty, forces and pressures
- Scientific methods

YEAR 8

- Physical and chemical changes
- Light and sound
- Ecosystems and biodiversity
- Forces and fields
- Human digestion
- Types of reactions
- The importance of plants
- Energy

YEAR 9

- Atomic structure
- Application of chemical processes
- Forces and fields
- Cells and cellular processes
- Human evolution

Year 7												
Autumn				**Spring**				**Summer**				
Unit Title: Introduction to the lab Density, Forces and Pressure (7.1,2.1.2.2,3)	Unit Length: 6 weeks	Unit Title: Introduction to scientific method States of matter and solutions (7.1,2,3)	Unit Length: 6 weeks	Unit Title: Cells and reproduction (7.1,2,3,4)	Unit Length: 6 weeks	Unit Title: Energy and electricity (7.4,5,6.1,6.2)	Unit Length: 6 weeks	Unit Title: Acid and alkalis and the Earth's atmosphere (7.4,5,6)	Unit Length: 6 weeks	Unit Title: Movement, Ecosystems and biodiversity (7.5,6,7)	Unit Length: 6 Weeks	
Domains of knowledge: Matter and materials Forces and fields		Domains of knowledge: Materials and their properties		Domains of knowledge: Cells and cellular process Biological systems for life		Domains of knowledge: Forces and fields		Domains of knowledge: Chemical change The Earth's atmosphere		Domains of knowledge: Biological systems for life Organisms and their interactions with the environment		
Key concepts: The particle model of matter. Matter interacts due to forces and/or energy transfers. There are four fundamental forces of nature. Theories are used to explain observed phenomena. Simplified models are used in practice. Theories must be testable. Science is intrinsically social.		Key concepts: Fundamental particles. The particulate nature of matter. Heating and phase (state) change. Pure and impure substances. Simplified models are used in practice.		Key concepts: Microscopy and magnification. Cells and unicellular organisms. Reproduction in animals.		Key concepts: Matter interacts due to forces and/or energy transfers. All matter can be described in terms of the different stores of energy. Theories are used to explain observed phenomena. Simplified models are used in practice. Theories must be testable. Science is intrinsically social.		Key concepts: Acids and bases. Chemical change.		Key concepts: Organisation (cells, tissues, organs and organ systems.) Movement. Ecosystems. Biodiversity and human influences.		
Relevant end points covered: Understanding of how all matter is made up of tiny particles. Understanding that physics uses models to approximate theories. The ability to use a range of mathematical tools. Understanding of how all interactions in the Universe are reliant on forces being exchanged.		Relevant end points covered: Demonstrate a deep understanding of chemistry and how this relates to the real world. Conduct practical work safely and accurately. Visualise physical and chemical processes.		Relevant end points covered: Understanding of core concepts (cells, biochemical molecules, metabolism). Appreciation of how multicellular organisms' function. Having a good grasp of numerical, analytical and literacy skills to communicate scientific ideas effectively.		Relevant end points covered: Understanding that the atoms that contribute to particle theory are themselves composed of even smaller particles. Understanding that all particles carry an abstract quantity labelled as energy that can be stored in different stores. Understanding that energy can be transferred through media in the form of waves. Understanding that the two fields of electricity and magnetism are fundamentally and invariably linked. Understanding that physics uses models to approximate theories.		Relevant end points covered: Demonstrate a deep understanding of chemistry and how this relates to the real world. Conduct practical work safely and accurately. Form reasoned and logical conclusions backed up with evidence.		Relevant end points covered: Understanding of core concepts (cells, biochemical molecules, metabolism). Appreciation of how multicellular organisms' function. Understanding how organisms interact with each other and the environment. Understanding of how to structure scientific investigations. Having a good grasp of numerical, analytical and literacy skills to communicate scientific ideas effectively.		
Assessments: Formative: Rewind Grid. Autumn summative Assessment.		Assessments: Formative: Rewind Grid. Autumn Summative Assessment.		Assessments: Formative: Rewind Grid. Spring Summative Assessment.		Assessments: Formative: Rewind Grid. Spring Summative Assessment.		Assessments: Formative: Rewind Grid. Summer Summative Assessment.		Assessments: Formative: Rewind Grid. Summer Summative Assessment.		

Year 8											
Autumn				Spring				Summer			
Unit Title: Changing states, light and sound (P81,2.1,2.2,8.3.1,3,2)	Unit Length: 6 Week	Unit Title: Physical and Chemical changes (C8.1,2,5)	Unit Length: 6 Weeks	Unit Title: Human Digestion and ventilation (B8.1,2,3,4)	Unit Length: 6 weeks	Unit Title: Forces and fields in and out of this world (P8.4,5,6.1,6.2)	Unit Length: 6 week	Unit Title: Types of Reactions (C8.3,4,6)	Unit Length: 6 Weeks	Unit Title: The importance of plants (B8.5,6,7,8)	Unit Length: 6 weeks
Domains of knowledge: Matter and materials Energy		Domains of knowledge: Materials and their properties Our Earth and its atmosphere		Domains of knowledge: Biological systems for life Cells and cellular processes		Domains of knowledge: Forces and fields		Domains of knowledge: Chemical changes Our Earth and its atmosphere		Domains of knowledge: Cells and cellular processes Organisms and their interaction with the environment	
Key concepts: The particle model of matter. Matter interacts due to forces and/or energy transfers. Energy propagates via waves. Theories are used to explain observed phenomena. Simplified models are used in practice. Science is intrinsically social.		Key concepts: Atoms, elements, and compounds. Heating and phase (state) changes. Chemical change. Periodic table. Sustainability and resources. Energetics.		Key concepts: Food groups and deficiency diseases. Ventilation. Drugs. Respiration.		Key concepts: Matter interacts due to forces and/or energy transfers. There are four fundamental forces of nature. Theories are used to explain observed phenomena. Simplified models are used in practice. Theories must be testable. Science is intrinsically social.		Key concepts: Atoms, elements, and compounds. Chemical change. Acids and Bases. Earth and atmosphere.		Key concepts: Cells and unicellular organisms. Photosynthesis. Plant reproduction. Human impact/influences on ecosystems.	
Relevant end points covered: Understanding of how all matter is made up of tiny particles. Understanding that energy can be transferred through media in the form of waves. Understanding that physics uses models to approximate theories.		Relevant end points covered: Demonstrate a deep understanding of chemistry and how this relates to the real world. Conduct practical work safely and accurately. Visualise physical and chemical processes.		Relevant end points covered: Understanding of core concepts (cells, biochemical molecules, metabolism). Appreciation of how multicellular organisms' function. Understanding of how to structure scientific investigations. Having a good grasp of numerical, analytical and literacy skills to communicate scientific ideas effectively.		Relevant end points covered: Understanding of how all interactions in the Universe are reliant on forces being exchanged. Understanding that the atoms that contribute to particle theory are themselves composed of even smaller particles. Understanding that the two fields of electricity and magnetism are fundamentally and invariably linked. Understanding that physics uses models to approximate theories.		Relevant end points covered: Demonstrate a deep understanding of chemistry and how this relates to the real world. Visualise physical and chemical processes. Conduct practical work safely and accurately.		Relevant end points covered: Understanding of core concepts (cells, biochemical molecules, metabolism). Appreciation of how multicellular organisms' function. Understanding how organisms interact with each other and the environment. Understanding of how to structure scientific investigations. Having a good grasp of numerical, analytical and literacy skills to communicate scientific ideas effectively.	
Assessments: Formative: Rewind Grid. Autumn summative assessment.		Assessments: Formative: Rewind Grid. Autumn summative assessment.		Assessments: Formative: Rewind Grid. Spring summative assessment.		Assessments: Formative: Rewind Grid Spring summative assessment.		Assessments: Formative: Rewind Grid. Summer summative assessment.		Assessments: Formative: Rewind Grid. Summer summative assessment.	

Year 9											
Autumn				**Spring**				**Summer**			
Unit Title: Energy transfers (P9.1,2,3.1,3.2, 5)	Unit Length: 6 weeks	Unit Title: Atomic structure and bonding (C9.1.4.5)	Unit Length: 6 weeks	Unit Title: Prokaryotic and Eukaryotic cells (B9.4,5,6,7)	Unit Length: 6 Weeks	Unit Title: Forces and motion (P9.4.1,4.2, 6.1,6.2)	Unit Length: 6 weeks	Unit Title: Application of chemical processes (C9.2,3,6,7,8)	Unit Length: 6 Weeks	Unit Title: Humans and evolution (B9.1,2,3,8)	Unit Length: 6 weeks
Domains of knowledge: Energy		Domains of knowledge: Materials and their properties		Domains of knowledge: Cells and Cellular Processes Biological Systems for Life		Domains of knowledge: Forces and fields		Domains of knowledge: Materials and their properties Chemical Changes Our Earth and its atmosphere		Domains of knowledge: Organisms and their interactions with the environment Biological Systems for Life	
Key concepts: Matter interacts due to forces and/or energy transfers. All matter can be described in terms of the different stores of energy. Energy propagates via waves. Theories must be testable. Science is intrinsically social		Key concepts: Atoms, elements and compounds. Chemical change. Reactivity. Periodic table. Structure and bonding.		Key concepts: Cells and unicellular organisms. Microscopy and magnification. Movement of substances.		Key concepts: Matter interacts due to forces and/or energy transfers. There are four fundamental forces of nature. Theories are used to explain observed phenomena. Simplified models are used in practice. Science is intrinsically social.		Key concepts: Fundamental particles. Heating and phase (state) changes. Chemical Change Acids and Bases Sustainability and resources Earth and atmosphere Chemical analysis Pure and impure substances		Key concepts: Variation and adaptations. Evolution and extinction. Digestion. Enzymes.	
Relevant end points covered: Understanding of how all interactions in the Universe are reliant on forces being exchanged. Understanding that all particles carry an abstract quantity labelled as energy that can be stored in different store. Understanding that energy can be transferred through media in the form of waves. Understanding that the two fields of electricity and magnetism are fundamentally and invariably linked. Understanding that physics uses models to approximate theories. The ability to use a range of mathematical tools.		Relevant end points covered: Demonstrate a deep understanding of chemistry and how this relates to the real world. Visualise physical and chemical changes. Form reasoned and logical conclusions backed up with evidence.		Relevant end points covered: Understanding of core concepts (cells, biochemical molecules, metabolism). Appreciation of how multi-cellular organisms' function. Understanding of how to structure scientific investigations. Having a good grasp of numerical, analytical and literacy skills in order to communicate scientific ideas effectively.		Relevant end points covered: Understanding of how all interactions in the Universe are reliant on forces being exchanged. Understanding that physics uses models to approximate theories. The ability to use a range of mathematical tools.		Relevant end points covered: Demonstrate a deep understanding of chemistry and how this relates to the real world. Conduct practical work safely and accurately. Visualise physical and chemical processes. Form reasoned and logical conclusions backed up with evidence		Relevant end points covered: Understanding of core concepts (cells, biochemical molecules, metabolism) Appreciation of how multi-cellular organisms' function Understanding how organisms interact with each other and the environment. Understanding of how to structure scientific investigations. Having a good grasp of numerical, analytical and literacy skills in order to communicate scientific ideas effectively.	
Assessments: Formative: Rewind Grid Autumn summative assessment.		Assessments: Formative: Rewind Grid Autumn summative assessment.		Assessments: Formative: Rewind grid Spring summative assessment.		Assessments: Formative: Rewind grid Spring summative assessment		Assessments: Formative: Rewind Grid Summer summative assessment		Assessments: Formative: Rewind Grid Summer summative assessment	

KS4 COMBINED SCIENCE CURRICULUM

Great Academy Ashton
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COURSE ASSESSMENT

Combined science assessment.

Paper 1: Biology
- No calculator is allowed
- 1 hour and 10 minutes (both Foundation and Higher tier papers)
- 60 marks available

Paper 2: Chemistry
- Calculator allowed
- 1 hour and 10 minutes (both Foundation and Higher tier papers)
- 60 marks available

Paper 3: Physics
- Calculator allowed
- 1 hour and 10 minutes (both Foundation and Higher tier papers)
- 60 marks available

Each paper assesses specific topics from biology, chemistry, and physics, using a range of question types, including multiple-choice, short-answer, and extended-response questions. The combined science assessment provides students with two GCSE grades based on overall performance across all six science papers.

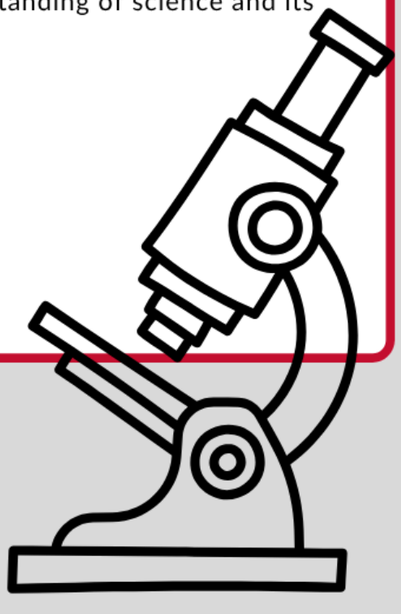
COURSE DETAILS

Course: Edexcel Combined Science

COURSE DESCRIPTION

The Edexcel GCSE Combined Science course offers students a comprehensive understanding of the fundamental principles across biology, chemistry, and physics. In biology, students explore topics such as cell biology, human physiology, genetics, and ecosystems, fostering an appreciation for living organisms and their interactions. Chemistry studies include atomic structure, chemical reactions, periodic trends, and environmental chemistry, providing insights into the composition and behaviour of matter. Physics topics cover forces, energy, waves, electricity, and magnetism, explaining the laws governing the physical world.

Throughout the course, students engage in practical experiments and scientific investigations, enhancing their analytical and problem-solving skills. This integrated approach encourages a holistic understanding of science and its relevance to everyday life.



PROGRESSION ROUTES

Students completing combined science will be able to progress to A Levels in any science discipline. From there, they could go on to further study or careers in medicine, chemistry, veterinary science, physiotherapy, astrophysics, psychology or any of the other science-based subjects.

KS4 PHYSICS CURRICULUM

Great Academy Ashton
Inspiring Greatness

COURSE ASSESSMENT

Physics assessment.
Paper 1
Overview of assessment

- Calculator allowed
- 1 hour and 45 minutes (both Foundation and Higher tier papers)
- 100 marks available

Paper 2
Overview of assessment

- Calculator allowed
- 1 hour and 45 minutes (both Foundation and Higher tier papers)
- 100 marks available

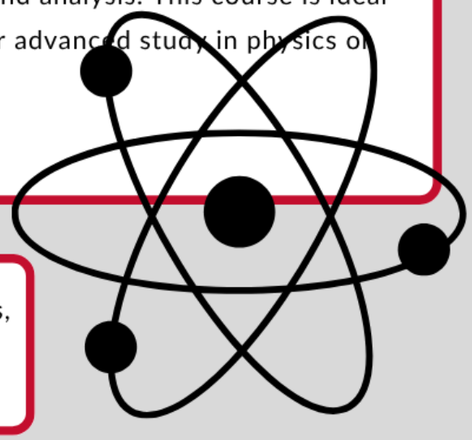
COURSE DETAILS

Course: Edexcel Physics

COURSE DESCRIPTION

The Edexcel Physics GCSE course offers students an in-depth exploration of the fundamental principles that govern the physical world, fostering analytical skills and critical thinking. Through a blend of theoretical learning and practical experiments, students gain a solid foundation in physics, covering key topics such as forces and motion, energy, waves, electricity and magnetism, and atomic structure.

The course encourages students to think scientifically, apply mathematical skills, and solve real-world problems, helping them understand the relevance of physics in technology, engineering, environmental science, and everyday life. Topics like energy conservation, electrical circuits, and wave behavior are explained with practical examples, making complex concepts accessible and engaging. Students also explore emerging areas like nuclear physics and space, broadening their awareness of modern physics applications and the latest scientific advancements.
The Edexcel Physics GCSE emphasizes the development of practical skills, encouraging hands-on experiments to reinforce theoretical concepts and build essential skills in observation, data collection, and analysis. This course is ideal for students with an interest in science, technology, and engineering, preparing them for advanced study in physics or related fields and nurturing a lifelong appreciation of scientific inquiry and discovery.



PROGRESSION ROUTES

For students interested in a career in science, and are considering going onto study engineering, radiology, medicine, dentistry, astrophysics, physics, space technology or any of the other science-based subjects, GCSE Physics is the obvious choice.

KS4 CHEMISTRY CURRICULUM

Great Academy Ashton
Inspiring Greatness

COURSE ASSESSMENT

Chemistry assessment.

Paper 1
Overview of assessment

- Calculator allowed
- 1 hour and 45 minutes (both Foundation and Higher tier papers)
- 100 marks available

Paper 2
Overview of assessment

- Calculator allowed
- 1 hour and 45 minutes (both Foundation and Higher tier papers)
- 100 marks available

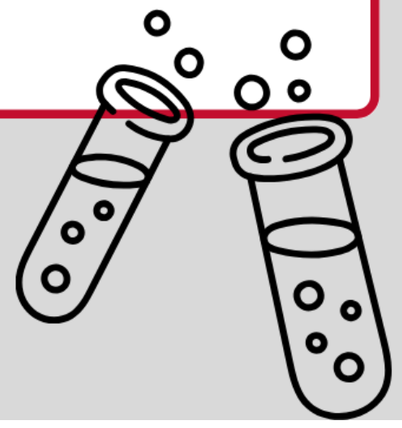
COURSE DETAILS

Course: Edexcel Chemistry

COURSE DESCRIPTION

The Edexcel GCSE Chemistry course offers students a thorough understanding of chemical principles and their applications, sparking curiosity about the substances that make up our world. This course covers essential topics, including atomic structure, the periodic table, bonding and structure, chemical changes, and energy changes. Students also explore quantitative chemistry, rates of reaction, organic chemistry, chemical analysis, and the chemistry of the atmosphere.

In atomic structure and the periodic table, students learn about the building blocks of matter, the organization of elements, and how these relate to their properties and uses. Through bonding and structure, they explore how atoms combine to form various substances, understanding concepts like covalent, ionic, and metallic bonding. Chemical changes and energy transformations provide insights into reactions, including how energy is conserved and transferred.
The course emphasizes practical chemistry, encouraging students to conduct experiments that reinforce theoretical knowledge and develop hands-on skills. Students learn to analyse data, make predictions, and solve real-world problems. They also gain awareness of environmental issues, such as climate change and resource management, understanding how chemistry plays a crucial role in addressing global challenges.



PROGRESSION ROUTES

If you are interested in a career in science, and are considering going onto study medicine, dentistry, veterinary science, physiotherapy, chemistry, materials science, psychology or any of the other science-based subjects, GCSE Chemistry is the obvious choice for you.

KS4 BIOLOGY CURRICULUM

Great Academy Ashton
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COURSE ASSESSMENT

Biology assessment.

Paper 1

- Calculator allowed
- 1 hour and 45 minutes (both Foundation and Higher tier papers)
- 100 marks available

Paper 2

- Calculator allowed
- 1 hour and 45 minutes (both Foundation and Higher tier papers)
- 100 marks available

COURSE DETAILS

Course: Edexcel Chemistry

COURSE DESCRIPTION

The Edexcel GCSE Biology course offers an in-depth exploration of living organisms, equipping students with essential knowledge of biological principles and an appreciation for the natural world. The curriculum covers a wide range of topics, including cell biology, human biology, genetics, ecology, and biodiversity, with a focus on understanding both microscopic and ecological systems.

Students begin with cell biology, studying cell structure, processes, and the role of specialized cells in different organisms. In human biology, they examine the systems that sustain life, such as the circulatory, respiratory, and nervous systems, alongside topics like immunity and health. The genetics section delves into inheritance, DNA, evolution, and genetic engineering, giving students insight into the mechanisms that shape organisms and drive diversity.

Ecology and biodiversity studies encourage students to understand ecosystems, food webs, and the relationships between organisms and their environments. This section also highlights the impact of human activities on biodiversity and environmental sustainability, fostering an awareness of global ecological issues.
Practical work is integral to the course, allowing students to conduct experiments that reinforce theoretical knowledge and develop skills in observation, analysis, and data collection. This hands-on approach nurtures scientific curiosity and critical thinking, preparing students for further study and inspiring a lifelong interest in biology and environmental science.

PROGRESSION ROUTES

Those interested in a career in science, and are considering going onto study medicine, dentistry, veterinary science, physiotherapy, biology, psychology or any of the other science based subjects, GCSE Biology is the obvious choice.