

# Science

---



**GEORGE  
SALTER  
ACADEMY**

## Overview

George Salter Science Department is a dynamic place to learn and is one in which students learn about the way in which the world around them works. Students learn to be curious, to question why things happen and to experiment to aid their discovery of the laws underpinning the universe. We have a brand new science block with 10 amazing science laboratories, and more importantly we have an incredible science team, who will go the extra mile to ensure that all students progress and achieve to their potential.

## What the students say about the department

"Science at George Salter is exciting and is full of new experiences"

"The work in Science is hard and tests your knowledge, but the rewards are life changing"

"Science tests your knowledge of many other subjects. That's why it's challenging yet rewarding"

"The experience of the Space Centre in Leicester was very interesting and gave me lots of knowledge about space"

"The Science teachers are very helpful and great at explaining things"

"I enjoy Science as there is always something new to learn. Even though Science can be challenging, School makes it enjoyable and interesting"

"The Science department brings everyone a fun new way of learning with fascinating experiments"

## Contact

Mrs S. Hussain (Head of Science Department), email: [s.hussain1@georgesalter.com](mailto:s.hussain1@georgesalter.com)

## Key Stage 3 (Years 7 and 8)

Our lessons at KS3 are designed to support the ability of your child. We regularly assess the progress of each child with an assessment at the end of every unit. The assessments are made to challenge the students and help them to reach their full potential.

We also support the continued learning of each student at KS3 with a variety of practical activities to enhance their understanding of the science they will be studying."

In **Biology**, topics covered include: cells, respiration, photosynthesis, organ systems, adaptations and environmental biology.

In **Chemistry**, topics covered include chemical changes, rates of reaction, elements compounds and mixtures, as well as environmental chemistry.

In **Physics**, topics covered include forces, energy transfers, electrical circuits, energy efficiency and heat transfer.

## Key Stage 4 (Years 9, 10 and 11)

At GCSE we follow AQA GCSE Science and Edexcel BTEC Science and we have a track record of success with students achieving well above national averages in terms of achievement and attainment of students. This is achieved through the differentiated scheme of work, the subject knowledge and passion of staff, and the hard work ethos which is embedded into students in the science department. Students are streamlined into a BTEC, Double Science or a Triple Science Pathway and each pathway enables each student to achieve to their potential.

### Year 9

Year 9 is part of key stage 4 and we run a bespoke core principles scheme of work which prepares students for the challenges and the learning they will encounter when they start their GCSE studies in year 10.

### Year 10

#### ***GCSE Pathway***

Students in year 10 following the GCSE pathway will study AQA Core Science. Students study Biology, Chemistry and Physics and will sit a Unit 1 exam for each of these and combined with their ISA (controlled assessment) which was completed in year 9 forms the overall grade for core science. Students achievement in core science determines whether a student follows double or triple science in year 11.

Topics covered in **Biology** Unit 1 include health and disease, evolution, nerves and hormones, interdependence and adaptation, as well as energy in ecosystems and genetic variation.

Topics covered in **Chemistry** Unit 1 include atomic structure, the periodic table, the uses of limestone and metals, crude oil and organic chemistry, as well as changes in the Earth and its atmosphere.

Topics covered in **Physics** Unit 1 include heat transfer, efficiency, generating electricity, use of waves for communication and the Big Bang theory.

#### ***BTEC Science Pathway***

Students in year 10 are following the BTEC pathway will study Edexcel BTEC Application of Applied Science which follows on from their year 9 studies. Students complete units 5, 6, 7 and 8 of the BTEC course, with unit 8 being the examined module and units 5,6 and 7 being coursework based.

### Year 11

#### ***GCSE Pathway***

For students following the GCSE pathway students who achieved at least a strong B in their core science will be considered to follow the Triple Science Pathway studying both Additional and Further Additional Science. Those who achieved below this will be entered for Additional (double) Science and will possibly take a resit of core science. The focus is upon ensuring each child takes the qualifications which will suit their needs. Triple science is a bonus science, and doing double science allows students to follow science at A-Level and study at the top Universities.

In **Additional Science** students study unit 2 modules in Biology, Chemistry and Physics.

In **Biology** Unit 2 topics covered include cells and organ systems, distribution of organisms, photosynthesis, respiration, proteins, cell division and inheritance.

In **Chemistry** Unit 2 topics covered include structure and bonding, nanotechnology, polymers, analytical chemistry, rates of reaction and acids, bases and salts.

In **Physics** Unit 2 topics covered include graphs of motion, forces and motion, household electricity, radiation and nuclear physics.

If studying **Further Additional Science** students will study unit 3 modules in Biology, Chemistry and Physics.

In **Biology** Unit 3 topics covered include, movement of substances in and out of cells, transport in plants and animals, and homeostasis.

In **Chemistry** Unit 3 topics covered include the development of the periodic table, hard and soft water, calculating energy changes in reactions, ammonia, as well as organic chemistry.

In **Physics** Unit 3 topics covered include medical physics, circular motion, centre of mass and moment, the motor effect and electromagnetic induction.

### ***BTEC Pathway***

For students following the BTEC Pathway students will improve their BTEC and ensure that they are achieving at least their target grade and hopefully aim for Merit and Distinction Level work.

### **Study Support**

- KS4 & 5 Saturday interventions
- KS4 ISA interventions

<b>Subject</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
Core Science	14% A*-A; 77% A*-C 100% A*-G	21% A*-A; 96% A*-C 100% A*-G	18% A*-A; 94% A*-C 100% A*-G
Additional Science	14% A*-A; 88% A*-C 100% A*-G	21% A*-A; 96% A*-C 100% A*-G	15% A*-A; 86% A*-C 100% A*-G
Further Additional Science	n/a	56% A*-A; 92% A*-C 100% A*-G	15% A*-A; 92% A*-C 100% A*-G
<b>BTEC</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
Principles of Science	n/a	n/a	9% A*-A; 84% A*-C
Applications of Applied Science	n/a	n/a	1% A*-A; 67% A*-C

### **Key Stage 5 / Post-16**

At KS5 we offer AQA A-Levels in Biology, Chemistry and Physics with students fully prepared as a result of their GCSE studies. We also offer Applied Science for students who prefer to learn in a vocational context. We pride ourselves on pushing students at A-Level, and we challenge students with the learning and encourage them to be independent through the use of personalised learning checklists and an emphasis upon independent study and revision. For more specific information.

## **A-Level**

In science we offer A-Levels in Physics, Biology and Chemistry as well as BTEC's in Applied Science/Forensics.

### ***Physics***

We follow OCR Physics A, in which students study 3 modules in year 12 and 3 modules in year 13. These modules are outlined below:

#### **AS Physics**

- Unit 1 – Mechanics – Students study forces, motion, energy and materials science.
- Unit 2 – Electrons Photons and Waves – students learn about the design and use of electric circuits, wave properties such as interference, standing waves and learn some basic quantum mechanics.
- Unit 3 – Practical skills for Physicists 2 – students sit 3 controlled assessments assessing their qualitative, quantitative and evaluative skills in science investigations.

#### **A2 Physics**

- Unit 4 – Newtonian World – students learn about momentum, circular motion, gravitational fields, thermal physics and simple harmonic oscillations.
- Unit 5 – Fields, Particles and Frontiers of Physics – students learn about forces and fields, fundamental particles, radiation, capacitors, medical physics and cosmology.
- Unit 6 – Practical skills for Physicists 2 – students sit 3 controlled assessments assessing their qualitative, quantitative and evaluative skills in science investigations.

### ***Biology***

We follow AQA Biology, in which students study 3 modules in year 12 and 3 modules in year 12. These modules are outlined below:

#### **AS Biology**

- Unit 1 Biology and Disease – students learn about pathogens and healthy lifestyles, the digestive system, cell structure, lung and heart function and immunology.
- Unit 2 The variety of living organisms – students learn about genetic and environmental variation, DNA and genetic diversity, cell division and levels of structure within organisms, as well as taxonomy, adaptation and how this leads to evolution.
- Unit 3 Investigative and practical skills in As Biology – students sit controlled assessments which assess aspects of their practical skills.

#### **A2 Biology**

- Unit 4 Populations and environment
- Unit 5 Control in cells and in organisms
- Unit 6 Investigative and practical skills in A2 Biology.

### ***Chemistry***

We follow AQA Chemistry, in which students study 3 modules in year 12 and 3 modules in year 12. These modules are outlined below:

## As Chemistry

- Unit 1 – Foundation Chemistry – students learn the basic principles which underpin chemistry, including atomic structure and how it directly links to bonding and periodicity. Students also learn how to perform molar calculations and are introduced to organic chemistry.
- Unit 2 – Chemistry in Action – students build upon their learning in unit 1 by studying group 7 and 2 of the periodic table, as well as a more in-depth study of organic compounds, and students also learn about analytical techniques, rates of reactions and equilibria.
- Unit 3 – Controlled Assessment

## A2 Chemistry

- Unit 4 – Kinetic, Equilibria and Organic Chemistry – students learn about rates of reactions, pH titrations, and learn about the structures and uses of organic compounds and the pathways which link these compounds together, as well as techniques such as NMR and Mass Spectroscopy which we use to analyse chemicals.
- Unit 5 - Energetics, Redox and Inorganic Chemistry – Students learn about the laws of thermodynamics, enthalpy changes, redox equilibria, the transition metals and inorganic reactions.
- Unit 6 - Controlled Assessment – students perform a piece of work in controlled conditions which is marked by the teacher.

## Study Support

- KS4 & 5 Saturday interventions
- STEM Big Kids and Little Kids
- Garden club
- Experiment club
- BTEC interventions

## Special Projects

- STEM- Crest Award Forensics
- STEM- Boing, build a plane
- BHF Heart Start

## Trips

- STEM- Cern
- Costerica
- Think Tank
- Space centre
- Young Scientist Centre
- National Science and Engineering Fair
- Field Studies at Edmund Hal
- Sandwell Valley Park
- Air Kicks
- Birmingham University
- Jurassic Coast
- British Science Festival
- Silverstone
- Oxford and Cambridge Universities Science Experience
- Robinsons
- Marstons
- West Bromwich Library
- Sandwell General Hospital

	<b>2013</b>	<b>2014</b>	<b>2015</b>
AS Biology	65% A*-C; 100% A-E	64% A*-C; 91% A-E	75% A*-C; 95% A-E
A2 Biology	33% A*-C; 100% A-E	59% A*-C; 100% A-E	43% A*-C; 100% A-E
AS Chemistry	69% A*-C; 81% A-E	82% A*-C; 100% A-E	59% A*-C; 95% A-E
A2 Chemistry	60% A*-C; 100% A-E	67% A*-C; 100% A-E	81% A*-C; 100% A-E
AS Physics	83% A*-C; 100% A-E	50% A*-C; 80% A-E	25% A*-C; 81% A-E
A2 Physics	100% A*-C; 100% A-E	83% A*-C; 100% A-E	66% A*-C; 100% A-E
AS Applied Science	67% A*-C; 100% A-E	100% A*-C; 100% A-E	100% A*-C; 100% A-E
A2 Applied Science	100% A*-C; 100% A-E	80% A*-C; 100% A-E	100% A*-C; 100% A-E