

Science

Overview

Science is so much more than a body of knowledge created through hundreds of years of experiments and observations. Science is a way of thinking and approaching problems. As a department we aim to empower our students to think scientifically about the world around them by equipping them with the knowledge and skills to achieve this.

KS3 curriculum

The KS3 curriculum covers biology, chemistry and physics gives students a thorough grounding in a wide range of scientific ideas and knowledge. Students develop practical skills alongside their theory and subject knowledge, giving them the best possible preparation for beginning their GCSE studies as they enter Year 9 on the Hillgrove site. The KS3 curriculum is in the process of being re-vamped, with a new Year 7 course being taught from September 2015 and new Year 8 course from September 2016.

Students are introduced to safe working practices in the lab then study topics including heat, materials, recycling, chemical reactions, diseases, geology and rocks, electricity, ecology, forces, classification, space and many others. There is a focus on understanding the process of scientific discovery and on planning investigations.

KS4 curriculum

For the current Year 9

The current Year 9 students study an introductory course based on the current GCSE requirements. When the new specifications have been published the students will move on to the substantive content of the new courses. We anticipate them beginning the new course during the Spring Term.

For current Years 10-11

Students will either study core science and additional science or they will study separate sciences (triple science – an option subject that begins in Year 10).

Some of the topics studied include:

- Forces and energy
- The periodic table
- Classification of living things
- Our solar system
- Acids and bases
- The human body

In addition, students consider how science can be used to conduct a balanced argument on some current issues:

- Should we clone humans?
- Are hydrogen fuel cells the answer to our energy needs?
- Has there ever been life on mars?

From September 2016 – current Y8 students

There will be two routes through KS4 Science.

Route 1 – Combined Science

This course combines biology, chemistry and physics in a two to three year course, with examinations at the end of Year 11. The new specifications are currently in draft form. When they are finalised we will select the course that we feel best meets the needs of our students.

Route 2 – Separate Sciences (Triple Science)

These three separate courses run concurrently over three years, with examinations at the end of Year 11. The new specifications are currently in draft form. When they are finalised we will select the course that we feel best meets the needs of our students.

KS5 curriculum

New A-level courses from AQA in biology, chemistry and physics are being taught from September 2015.

Biology

Topics covered include biological molecules, cell structure, transport in plants and animals, genetics and biodiversity.

Chemistry

Topics covered include atomic structure, equilibria, organic and inorganic chemistry, analytical techniques and the pharmaceutical industry.

Physics

Topics covered include waves, electromagnetic spectrum, sub-atomic particles, radiation and space.

There is a programme of enrichment activities that runs through the year in each subject, including Olympiad competitions, university visits and lectures.

Students' progress is monitored closely during their studies by experienced A-level teachers and practical advice given to ensure students fulfill their potential.

External assessment and controlled assessment

KS4

For each course the assessment takes the following form:

Unit 1 Examination of topics 35% of GCSE	1 hour 15 minute examination in May/June
Unit 2 Examination of topics 40% of GCSE	1 hour 30 minute examination in May/June
Controlled assessment (coursework) 25% of GCSE	Marked by teachers Moderated by examination board

So for those not doing triple science, there will be two exams and one piece of assessment for both core science and additional science.

For those doing triple science, there will be two exams and one piece of controlled assessment for each of the three subjects.

KS5

Biology

AS assessment at the end of Year 12 is two 90 minutes exams, worth 50% each.

A2 assessment at the end of Year 13 is three 2 hour exams, worth 35%, 35% and 30%

Chemistry

AS assessment at the end of Year 12 is two 90 minutes exams, worth 50% each.

A2 assessment at the end of Year 13 is three 2 hour exams, worth 35%, 35% and 30%.

Physics

AS assessment at the end of Year 12 is two 90 minutes exams, worth 50% each.

A2 assessment at the end of Year 13 is three 2 hour exams, worth 34%, 34% and 32%.

SMSC in science

Spiritual development in science

In the science department we look to maintain a neutral approach as we study issues and ideas which are sometimes a source of tension in our society today. The modern world is full of potential areas for conflict, when scientific and spiritual ideas come together. Students will study topics such as evolution and the universe's origins using an evidence-based approach. This means scientific theories can be introduced then evaluated from an unbiased perspective. From this students often see how it is possible for spiritual and scientific theories to exist alongside each other, and how this may lead to more tolerance of different viewpoints.

Moral development in science

Rapid advances in science have given us the opportunity to influence and change the world in which we live, often with positive outcomes. However, the new powers given to society by science have also led to moral issues arising, and in lots of cases vigorous debate surrounds these ideas, for example with genetically modified organisms. We give students the opportunity to engage with some of the most significant scientific developments and to weigh up the evidence to form their own conclusions on some moral issues facing society today. This is not only a key exam skill, but a vital skill for all students as they develop as young adults.

Social development in science

The impact of science on society is extremely significant. Medical advances in particular are changing the way we live, with a continued increase in global population and longer life expectancy. Students will study the scientific advances that have led to this, the problems caused and possible solutions to them, whilst being encouraged to deepen their own understanding and form and support views using scientific fact. Through this approach students will gain a wider perspective on the changing society that surrounds them.

Cultural development in science

Achievement in the field of science is truly global, and promoting cultural awareness is an intrinsic part of the science curriculum. From the Russian origins of the periodic table to the discovery of radioactivity by the French physicist Henri Becquerel, progress in all areas of scientific study is a consequence of a worldwide commitment to continuing discovery.