

Science

Introduction

Our purpose-built Science Centre contains 8 laboratories, one of which is a specialist A-Level lab and an ICT Suite.

The Science Department deliver the KS3 Science curriculum to Years 7 and 8 using an exciting resource called 'Activate'. The course has been designed to capture the imagination of students at every opportunity. Science teachers are using interactive teaching materials and engaging activities to build around the key areas of student motivation, personalisation, and the integration of How Science Works. Students are assessed for each topic and their progress is monitored throughout the course.

Curriculum Information: Key Stage 3

The units of study for Key Stage 3 are outlined below:

| Year 7 Activate Science: | Year 8 Activate Science: |
|---|---|
| Working Scientifically | Biology 2.1: Health and lifestyle |
| Biology 1.1: Cells | Biology 2.2: Ecosystem processes |
| Biology 1.2: Structure and function of body systems | Biology 2.3: Adaptation and inheritance |
| Biology 1.3: Reproduction | Chemistry 2.1: The periodic table |
| Chemistry 1.1: Particles and their behaviour | Chemistry 2.2: Separation techniques |
| Chemistry 1.2: Elements, atoms, and compounds | Chemistry 2.3: Metals and acids |
| Chemistry 1.3: Reactions | Chemistry 2.4: The Earth |
| Chemistry 1.4: Acids and alkalis | Physics 2.1: Electricity and magnetism |
| Physics 1.1: Forces | Physics 2.2: Energy |
| Physics 1.2: Sound | Physics 2.3: Motion and pressure |
| Physics 1.3: Light | |
| Physics 1.4: Space | |

Curriculum Information: Key Stage 4

From Year 9 students will start the new AQA Science specification. This offers a double combined Science or a triple separate Science pathway. Below is a summary of the content covered.

| Biology | Chemistry | Physics |
|--------------------------------------|--|--------------------------------|
| Cell biology | Atomic structure and the periodic table | Forces |
| Organisation | Bonding, structure, and the properties of matter | Energy |
| Infection and response | Quantitative chemistry | Waves |
| Bioenergetics | Chemical changes | Electricity |
| Homeostasis and response | Energy changes | Atomic structure |
| Inheritance, variation and evolution | The rate and extent of chemical change | Magnetism and electromagnetism |
| Ecology | Organic chemistry | Particle model of matter |
| | Chemical analysis | |
| | Chemistry of the atmosphere | |
| | Using resources | |

Curriculum Information: Key Stage 5

Biology

Year 12/ 1st Year A Level Biology (Exam Board – OCR)

The Year 12/ 1st year Biology course consists of four modules:

Module 1: Development of Practical Skills

Practical activities will be incorporated into all relevant topics throughout the year. 12 specific skill sets or Practical Activity Groups (PAGs) will be assessed over the course of two years with several opportunities to demonstrate capability and a pass/ fail grade will be given for each skill set/ PAG.

| Module 2: Foundations in Biology | Module 3: Exchange and Transport | Module 4: Biodiversity, Evolution and Disease |
|---|---|--|
| Cell Structure and Microscopy | Exchange Surfaces | Communicable Diseases |
| Biological Molecules | Transport in animals | Biodiversity |
| Enzymes | Transport in plants | Classification and evolution |
| Biological Membranes | | |
| Cell Division | | |

Exams in June cover all 4 modules:

1. Breadth in Biology 50%
2. Depth in Biology 50%

Year 13/ 2nd Year A Level Biology

During the 2nd Year of the A Level Biology course, two additional modules will be covered:

| Module 5: Communication, Homeostasis and Energy | Module 6: Genetics, Evolution and Ecosystems |
|--|---|
| Communication and homeostasis | Cellular control |
| Excretion as an example of homeostatic control | Patterns of inheritance |
| Neuronal communication | Manipulating genomes |
| Hormonal communication | Cloning and biotechnology |
| Plant and animal responses | Ecosystems |
| Respiration | Populations and sustainability |

| Assessment Overview; 2nd Year A Level Biology | | |
|--|------------------------------|----------------------|
| Component details | Topics assessed | Weighting |
| 01: Biological Processes 100 marks 2 hrs 15 minutes Written paper | Modules 1, 2, 3 and 5 | 37% of total A level |
| 02: Biological Diversity 100 marks 2 hrs 15 minutes Written paper | Modules 1, 2, 4 and 6 | 37% of total A level |
| 03: Unified Biology 70 marks 1hr 30 minutes Written paper | Modules 1 to 6 | 26% of total A level |
| 04: Practical Endorsement in biology Non exam assessment (carried out over the course of two years) | 12 Practical Activity Groups | Reported separately |

Chemistry

Year 12 AS level Chemistry: OCR specification A (H032)

(Exam Board - OCR specification A)

Years 12 and 13 A level Chemistry: OCR specification A (H432)

Content:

Module 1: Development of practical skills in chemistry

Module 2: Foundations in chemistry

Module 3: Periodic table and energy

Module 4: Core organic chemistry

Module 5: Physical chemistry and transition elements

Module 6: Organic chemistry and analysis

Examinations:

1. Component 01: Periodic table, elements and physical chemistry, 2 hours 15 minutes, 37% of total A level grade. Assesses content from modules 1, 2, 3 and 5.
2. Component 02: Synthesis and analytical techniques, 2 hours 15 minutes, 37% of total A level grade. Assesses content from modules 1, 2, 4 and 6.
3. Component 03: Unified chemistry, 1 hour 30 minutes, 26% of total A level grade. Assesses content from all modules (1 to 6).

Teacher assessment:

Component 04: Practical endorsement in chemistry (non-exam assessment)

Physics

The Year 12 AS Physics course consists of 4 modules:

| Development of Practical Skills | Foundations of Physics | Forces and Motion | Electrons, waves and Photons |
|--|---|--------------------------|---|
| Planning and experimental design | Physical Quantities, units and measurements | Kinematics | Electricity: Current and Charge |
| Analysing data | Uncertainties and Errors | Forces in Action | Electricity: Energy, Power and Resistance |
| Plotting and interpreting data | Nature of Quantities (Scalar and Vector) | Work Energy and Power | Electricity: Circuits |
| Evaluating experiments | | Materials | Waves |
| | | | Quantum Physics |

The Year 13 A2 Physics course consists of three units:

| The Newtonian World | Fields, Particles and Frontiers of Physics | Practical Skills in Physics 2 |
|----------------------------------|---|--|
| Newton's laws and momentum | Electric and magnetic fields | Qualitative, quantitative and evaluative tasks |
| Circular motion and oscillations | Capacitors and exponential decay | |
| Thermal physics | Nuclear physics | |
| | Medical imaging | |
| | Modelling the universe | |

Extra-Curricular Activities

Students go on visits and to lectures and have participated in events such as Surrey SATRO – Go4Set, CISCO App Challenge and BP Young Scientist Challenge.

Key Stage 3 students participate in a Science and Engineering Club which is linked to STEMNET (Science Technology Engineering Maths Network) to promote science and encourage students to study it beyond A level.

We field teams in lots of competitions including the "Water Rocket Challenge" at the National Physical Laboratory and University Challenge at Royal Holloway.

At Bishop Wand we offer a broad and balanced curriculum with opportunities for all students to join in the fun and develop their understanding of Science in an ever changing world.

