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

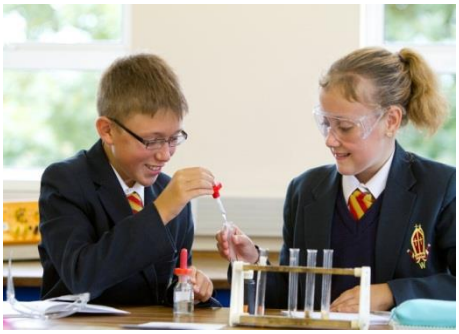
The Year 13 A2 Physics course consists of three units:

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.