Science Curriculum

The Vision for all our students who study Science (Intent)

At King Edward VI High School, we aim to stimulate a curiosity and interest in Science that will stay with pupils beyond their school life. Carl Sagan (An American astronomer, cosmologist, astrophysicist and astrobiologist) said: "We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology.". We strive to change this.

Rationale (Implementation)

At KS3, pupils study a range of Biology, Chemistry and Physics topics aimed at developing a secure understanding of Science's big ideas, such as the structure and function of living organisms, the particulate nature of matter, energy and forces. In years 7 and 8, we are very much about laying down solid foundations upon which our KS4 curriculum can successfully build. We deliver engaging lessons which motivate pupils to be the best they can be.

Our curriculum is based upon the 2013 Science National Curriculum and topics covered are:

Year 7:

- Lab Skills (a focus on using scientific equipment safely, drawing scientific diagrams, labelling equipment, identifying variables and drawing graphs)
- Separating Mixtures
- Cells
- Energy Resources
- Digestion
- Particle Model
- Atoms, Elements and Compounds
- Electricity
- Magnetism
- Acids and Alkalis
- Forces
- Space
- Ecosystems
- Reproduction

Year 8:

- Chemical Reactions
- Energy Transfers
- Breathing and Respiration
- The Periodic Table
- Motion
- Rocks
- The Atmosphere
- Sound
- Photosynthesis
- Useful Materials
- Light

- Genetics and Variation
- Drugs

Not only do we want students to gain scientific knowledge, but to develop higher level thinking skills which will enable them to experiment, analyse, evaluate and persevere, working both independently and with others. To this end, our curriculum contains a significant amount of practical work across all key stages.

KS4 exam courses (Years 9 to 11)

There are two pathways at KS4 – AQA Combined Science, otherwise known as Trilogy or AQA's Separate Sciences – Biology, Chemistry and Physics.

The Separate Sciences are aimed at our most able pupils and those who have a real love of Science. It is the ideal pathway for those wishing to study Science at A level and beyond. In Year 9, the Separate Science content is delivered to both Sets 1 & 2, but once pupils move into Year 10, Separate Science is chosen as an option and then only carried forward by Set 1. We aim to have approximately 25% of our cohort taking the Separate Science route.

Topics covered are:

Year 9:

- Cell biology
- Atomic structure and the periodic table
- Energy
- Structure, bonding and the properties of matter
- Electricity
- Photosynthesis
- Chemical quantities and calculations

Year 10 & 11:

- Moving & changing materials
- Health Matters
- Chemical changes
- Energy Changes
- Particle model of matter
- Atomic structure
- Coordination and control
- Genetics
- Forces
- Ecology in Action
- The rate and extent of chemical change
- Waves
- Variation and Evolution
- Hydrocarbons
- Chemical Analysis
- The atmosphere
- Magnetism and Electromagnetism
- Sustainable development
- Space Physics (Separate Science only)

All required practicals are recorded in red A4 exercise books. This provides all pupils with a clear record of the practicals required for the exams.

Pupil premium money is regularly used to purchase workbooks for lower ability pupils. These are used in class throughout KS4 to help support pupils and embed learning.

KS5 exam courses

All three Sciences are offered for study at A level. As with KS3 & 4, we expect pupils to undertake a significant amount of practical work for their A level studies. This goes above and beyond the statutory requirements of each course. Pupils' documentation for each official practical task is kept in laboratory folders which are routinely scrutinised by the exam boards.

With all our A level Sciences we aim to nurture students' passion for the subjects and lay the foundations for further study and the workplace.

AQA A Level Biology:
First year of A-level:
1. Biological molecules
2. Cells
3. Organisms exchange substances with their environment
4. Genetic information, variation and relationships between organisms

Second year of A-level:
5. Energy transfers in and between organisms
6. Organisms respond to changes in their internal and external environments
7. Genetics, populations, evolution and ecosystems
8. The control of gene expression

OCR A Level Chemistry:
Content is split into six teaching modules:
- 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

AQA A Level Physics:
Core content
1 Measurements and their errors
2 Particles and radiation
3 Waves
4 Mechanics and materials
5 Electricity
6 Further mechanics and thermal physics
7 Fields and their consequences
8 Nuclear physics
Chosen Option
9 Astrophysics

STEM & Careers

Encouraging students to follow science careers is important to us. To help support this we regularly take our most able year 8 pupils to the Big Bang Fair in Birmingham. We also take part in various other trips and initiatives over the course of the academic year. STEM activities undertaken recently include:

- Y11 aspiring A level scientists taken to CERN in Geneva
- MNA STEM Challenge – Won the best presentation award (2 teams of Y8 G&T pupils entered). Supported by STEM ambassadors – Perkins and Stafford College
- Perkin's Tennis ball launcher challenge – won it once (STEM club)
- The Faraday challenge

We are proud of our students and their success (Impact)

Key Stage 4

	2017	2018	2019
Percentage of students achieving 4+ in Ebacc Science		56.5	54.2
Percentage of students achieving 5+ in Ebacc Science		30.6	29.9
Percentage of students achieving 7+ in Ebacc Science			3.7
Average P8 for Ebacc Science			-0.29

Key Stage 5

	2017	2018	2019
Percentage of students achieving A*-E in Biology			100
Percentage of students achieving A*-B in Biology			0
Percentage of students achieving A*-A in Biology			0

	2017	2018	2019
Percentage of students achieving A*-E in Chemistry			100
Percentage of students achieving A*-B in Chemistry			0
Percentage of students achieving A*-A in Chemistry			0

	2017	2018	2019
Percentage of students achieving A*-E in Physics			100
Percentage of students achieving A*-B in Physics			0
Percentage of students achieving A*-A in Physics			0