Queen Elizabeth's ACADEMY

Curriculum Rationale

Science

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Diverse Academies

Introduction

The science curriculum at Queen Elizabeth's Academy is designed to develop our students into citizens who have the knowledge needed to understand the phenomena they see in the world around them.

Without a deep, broad understanding of science, students may lack a sense of wonder when they see the natural world and miss out on being able to fully engage with the environment in which they live.

The powerful knowledge we teach allows students to understand science in the news and be aware of the implications of what they hear and read in the media for themselves and others. They can make informed decisions about their health based on what they learn in our lessons. Our curriculum allows students to understand how to look after the world they live in and to become people who can discuss important issues that arise with confidence as they are well informed.

Christian Distinctiveness

In science learning without limits means that every student has access to the knowledge we believe is needed to feel part of the world around them.

We teach empathy through consideration of ethics as students learn about genetic engineering, embryo screening and fertility treatment.

In practical work students work in groups and practice togetherness by helping each other to succeed as they learn experimental techniques and gather data to observe the phenomena that they have learnt the scientific theory behind.

Learning about the world around them in our science lessons increases the joy that students can experience in their surroundings, joy matters to us and we take great joy in sharing how the living and non-living parts of our world interact with each other.

Knowledge and wisdom are gained by our students in every science lesson and the knowledge is frequently revisited to ensure it is remembered and built upon to develop a clear picture of scientific discoveries and phenomena.

Knowledge in Science

We follow the National Curriculum, it has been put together by educational experts and covers a broad spectrum of the key ideas across the scientific disciplines of biology, chemistry and physics. The knowledge that we teach our students is carefully sequenced by considering prerequisite knowledge for each topic and ensuring that is taught in advance, or checking understanding of concepts covered at key stage two that underpin the new content being delivered.

We collaborate with the mathematics department so that we know when students will have learnt mathematical concepts that are relevant to science and ensure our sequencing reflects this, for example the energy topic at GCSE is taught later in the course than the specification guidance as it has the most challenging calculations, allowing students to develop competence in algebra before attempting these.

Students are taught the history of scientific theories including evolution and the development of the model of the atom so they can understand how scientists adjust their theories based on new information and understand the importance of scientific research in ensuring a stable food supply, improving medical treatment and preserving the Earth for future generations.

Our teachers are passionate about science and share stories that are relevant to the topics they teach, from their own life experiences and from their academic study. We share real life examples to increase interest in our topics and to show how relevant they are to our students lives. When topics such as ecology are taught we refer to our own field work we have done, raising aspirations to degree level study and showing how the knowledge students are gaining is used in conservation, medicine and genetic engineering.

We want to impart knowledge that students would otherwise not come across. We focus on scientific content that needs to be explained by experts to be fully understood. Students with an interest in the natural world can learn a lot themselves through wildlife television shows so we do not need to include examples that are common in the media and can focus on the detail of scientific concepts that is not in the media.

Our curriculum is carefully sequenced so that knowledge builds in related themes. We make the links between new and existing knowledge explicit for students and use retrieval practice to help students remember what we have taught them. Our topics are interleaved so that the links between different topics are explicit, for example, students learn about specialised cells when they learn cell structure but we return to this knowledge when we teach reproduction and photosynthesis as we refer to the role of specialised cells in these processes.

Careers and Aspirations

In every topic we teach there are careers that the knowledge we are imparting is essential to and we explain this to students. We tell them how engineers use the knowledge of forces that we study to build structures, how technological advancements have been possible because of scientific research into the chemical structures we are learning and explain how medicine has developed through scientific research.

Our students have the opportunity to study triple science, which is excellent preparation for scientific A levels and university courses. Students will often express a passion about a particular area of science and we explain how their interests could lead to a particular career or course of study, encouraging students to be ambitious in their future plans.

Overview of curriculum plan

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	Working scientifically, Energy and forces.	Discovering the atom, Development of the periodic table.	Practical techniques, maths for science, Fields and materials.	Atomic interactions, Cell structure	Organisation of living things, The Earth	Ecology, Nutrition and digestion.
Year 8	Scientific method, Reproduction.	Energy, Chemical interactions.	Space	Electricity	Forces, Magnetism	Biological molecules, Energy in chemical reactions.
Year 9	Scientific models, Patterns in the periodic table.	Respiration and photosynthesis, Disease and a healthy lifestyle.	Evolution and extinction	The particle model of matter, Atomic structure and the periodic table.	Bonding, structure and the properties of matter, Cell biology	Atomic structure and radiation, Organisation of living things.
Year 10	Energy, chemical changes	Infection and response, Electricity	Bioenergetics, Energy changes	Homeostasis and response, quantitative chemistry.	Forces, The rate and extent of	Waves, Organic chemistry.

					chemical change.	
Year 11	Ecology, Inheritance, variation and evolution.	Chemical analysis, Magnetism, Space.	Chemistry of the atmosphere, using resources.	Revision	Revision	Exams