Queen Elizabeth's Girls' School
Educating Women of the Future
Founded in 1888

# Science Key Stage 3 Curriculum

| | Topic / Big question | Focus |
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| Year 7 | **How do you work like a scientist?** | **Key focus: Science Skills**<br>**Topic name: Working Scientifically**<br>Students will learn how to work safely in a laboratory. They will learn how to select, plan and carry out investigations to answer scientific enquiries to test predictions. They will learn how to present observations and data and evaluate the validity of methods. |
| | **What is matter?** | **Key focus: Particles (Chemistry) Reactions rearrange matter (Chemistry)**<br>**Topic name: Particles and Their Behaviour**<br>Students will learn what scientists mean by the particle model and how it can explain the properties of substances in their state of matter i.e. gas, liquid or solid. They will observe melting and boiling point data and how to interpret it and learn how to explain evidence for the diffusion of particles and gas pressure.<br>**Topic name: Acids and Alkalis**<br>Students will learn what pH measures, what indicators do and what the reaction neutralisation means. |
| | **What makes things move?** | **Key focus: Forces predict motion (Physics)**<br>**Topic name: Forces**<br>Students will learn what forces do, how they deform objects and what is meant by an interaction pair via the concept of balanced / unbalanced forces. They will learn how drag and friction forces arise and learn about gravity and the extension of a spring. |
| | **What are bodies made of and how do we know?** | **Key focus: Cells are alive (Biology)**<br>**Topic name: Cells**<br>Students will learn how plant and animal cells can be compared, how different cells are specialised for their particular functions, how to investigate cells using a microscope and how substances diffuse into and out of cells. |
| | **How do living things make more living things?** | **Key focus: Characteristics are inherited (Biology)**<br>**Topic name: Reproduction**<br>Students will learn the structures and functions of the main parts of the human reproductive system. They will learn how to describe the structure and function of gametes and the processes of fertilisation, gestation, birth and the menstrual cycle.<br>They will learn how to identify the main structures in a flower and the process of pollination. |
| | **Why is energy so important?** | **Key focus: Radiation transfers energy (Physics)**<br>**Topic name: Sound and Light**<br>Students will learn how to describe waves and their features e.g. when they hit barriers and superimpose. They will look at how sound waves are produced and travel and the links between loudness and amplitude, pitch and frequency. |

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| | | They will compare the speed of sound and light and look at how the ear works and what is meant by ultrasound. They will investigate the properties of reflection and refraction of light waves, study how the eye works and what is meant by colour and how it is altered by filters. |
| | **What is an atom?** | **Key focus: Structure determines properties (Chemistry)**<br>**Topic name: Atoms, Elements and Compounds**<br>Students will learn the difference between atoms, elements and compounds, how they are represented by chemical formulae and how to compare their properties. |
| | **What type of substances can be separated and how?** | **Key focus:Structure determines properties (Chemistry)**<br>**Topic name: Separation Techniques**<br>Students will learn how to use the particle model to explain mixtures and solubility. They will learn how to identify a pure substance and how to separate mixture using the processes of distillation, filtration and chromatography. |
| | **How do bodies work?** | **Key focus: Bodys are systems (Biology)**<br>**Topic name: Structure and Function of Body Systems**<br>Students will learn how to explain the hierarchy of organisation in multicellular organisms, and study the structure and function of the Respiratory system, focusing on Gas exchange and the Musculo-skeletal system. |
| | **What is Earth's place in the universe?** | **Key focus: Fields produce forces**<br>**Topic name: Space**<br>Students will look at how we describe the universe and study the solar system, the seasons, the phases of the moon and eclipses. |

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| Year 8 | **What does it mean to be healthy?** | **Key focus:Body and Systems (Biology)**<br>**Topic name: Health and Lifestyle**<br>Students will learn the roles of the main nutrients needed by the body and some of the health issues caused by an unhealthy diet. They will also look at calculating energy requirements of different people. They will study the structure and function of all parts of the digestive system and look at how lifestyle choices such as drugs, alcohol, smoking can affect us. |
| | **What makes you, you?** | **Key focus:Species show variation (Biology)**<br>**Topic name: Adaptation and Inheritance**<br>Students will learn how organisms are adapted to their environments and environmental changes. They will look at competition and variation within species. They will also learn how characteristics are inherited, the process of natural selection, how organisms have evolved and what is meant by extinction. |
| | **What skills do I need as a scientist?** | **Key focus: Science Skills**<br>Students will be completing project work. They will reinforce the ideas covered during the working scientifically topic. They will be planning and carrying out investigations to answer scientific questions and testing predictions. They will review how to present data and evaluate the validity of methods. |
| | **Should we describe energy as being consumed or just transferred?** | **Key focus:Energy is conserved (Physics)**<br>**Topic name: Energy**<br>Students will learn what brings about transfers in energy, the difference between heat and temperature and how thermal transfer can occur via conduction , convection and radiation. They will also look at equilibrium, how insulation reduces energy transfer, the difference between a renewable and non renewable energy resource and how electricity is generated in a power station. |
| | **Do forces explain why things happen?** | **Key focus:Forces predict motion (Physics)**<br>**Topic name: Motion and Pressure**<br>Students will learn how to calculate speed and interpret distance time graphs. They will learn how to describe relative motion and Brownian motion. They will also look at atmospheric pressure and pressure in solids and liquids. How it can be calculated and applied to different situations. They will also look at what is meant by a moment and how to calculate the moment of a force. |
| | **Why is it important that the Periodic table is structured as a table and not a list of elements?** | **Key focus:Structure determines properties (Chemistry)**<br>**Topic name: Periodic Table**<br>Students will study the Periodic table of elements and how to use the patterns of the periodic table to predict, compare and interpret the properties of the elements in Groups 1,7 and 0. They will also look at displacement reactions. |
| | **Why are some chemical reactions so important?** | **Key focus:Reactions rearrange matter (Chemistry)**<br>**Topic name: Metals and Acids**<br>Students will learn how to compare the reactions of different metals with acids, oxygen and water. They will look at how to predict displacement reactions and how reactions can be represented using chemical formulae. They will link this to extracting metals from the Earth. They will also learn about the properties of ceramics, composites and polymers and their uses. |

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| | **How reliant are you on relationships with other animals?** | **Key focus:Ecosystems recycle resources (Biology)**<br>**Topic name: Ecosystems**<br>Students will learn about the process of photosynthesis and how plants are adapted for the process. They will learn about the processes of aerobic and anaerobic respiration. They will look at food chains and food webs and how the processes of photosynthesis and respiration are integral into the concept of being alive. |
| | **What is the link between electricity and energy?** | **Key focus:Fields produce forces (Physics)**<br>**Topic name: Electricity**<br>Students will learn what is meant by an electric charge, current, potential difference and how to calculate electrical resistance. They will investigate the difference between series and parallel circuits. |
| | **What makes things move?** | **Key focus: Fields Produce Forces**<br>**Topic name: Electromagnetism**<br>Students learn how to represent magnetic fields and investigate factors that affect the strength of an electromagnet and its uses. |
| | **What type of substances can be separated and how?** | **Key focus:Structure determines properties (Chemistry)**<br>**Topic name: Separation Techniques**<br>Students will learn how to use the particle model to explain mixtures and solubility. They will learn how to identify a pure substance and how to separate mixture using the processes of distillation, filtration and chromatography. |

| KS4 Curriculum | Topic/Big Question | Focus |
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| **Year 9** | **Structure determines properties** | **Chemistry: Atomic structure**<br>Students will learn about the History and Structure of Atoms, Ions and Isotopes, the Electronic structure of atoms and Separation techniques for separating mixtures. |
| | **Cells are alive** | **Biology: Cell structure and transport**<br>Students will learn about Microscopy, Eukaryotic and Prokaryotic cells, Diffusion, Osmosis and Active transport. |
| | **Bodys and Systems** | **Biology: Organisation and the digestive system**<br>Students will learn about the Digestive system and Enzyme action. |
| | **Energy is conserved** | **Physics: Conservation and Dissipation of Energy**<br>Students will learn about Energy stores (Gravitational/Kinetic/Elastic), the Dissipation of energy, Energy Efficiency and the relationship between Power and Work. |
| | **Electricity transfers energy** | **Physics: Energy resources**<br>Students will learn about Renewable energy, Energy demand and Big energy issues. |
| | **Reactions rearrange matter** | **Chemistry: Chemical changes**<br>Students will learn about The Reactivity Series, Displacement reactions and Neutralisation reactions making salts. |
| | **Bodys and Systems**<br>**Ecosystems recycle resources** | **Biology: Organisation of animals and plants**<br>Students will learn about the Circulatory System, Respiratory System and Transport systems in plants. |
| | **Electricity transfers energy** | **Physics: Wave Properties**<br>Students will learn about the Properties of waves, Reflection and Refraction. |
| | **Bodies are systems** | **Biology: Non Communicable Diseases**<br>Students will learn about the Causes and risk of diseases e.g Cancer, Smoking, Alcohol. |