Striving for Excellence

Curriculum Overview: Science

Exam Board: AQA Combined Science Trilogy

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
7	Cells & Respiration ○ Animal cells ○ Plant cells ○ Cell structures and functions The Particle Model ○ Solids, liquids and gases ○ Changing state Forces ○ Balanced and unbalanced forces ○ Investigating forces		Human Organ Systems ○ Digestive system ○ Respiratory system ○ Skeletal system ○ Muscular system Atoms, Elements, Compounds & Mixtures ○ Atoms ○ Elements ○ Separating substances ○ Chemical formulae ○ Solubility Energy stores & pathways ○ Conduction ○ Convection ○ Radiation ○ Renewable & non-renewable energy sources		Reproduction ○ Puberty ○ Male and female reproductive systems ○ Plant reproduction Chemical Reaction ○ pH scale ○ Acids and alkalis ○ Oxidation ○ Neutralisation ○ Metals & Acids Space ○ The planets ○ The solar system ○ The wider universe ○ Mass, weight and gravity ○ The moon ○ The seasons	
8	Plants & Ecosystems ○ Photosynthesis ○ Food chains ○ Food webs ○ Classification Periodic Table & Reactivity ○ Periodic table ○ Group1 and 7 ○ Reactivity series Forces & Motion ○ Speed ○ Acceleration ○ Friction ○ Pressure in solids and liquids		Health & Disease ○ Diets ○ Circulatory system ○ Heart disease ○ Smoking ○ Drugs Space ○ The planets ○ The solar system ○ The wider universe ○ Mass, weight and gravity ○ The moon ○ The seasons		Genetics & Evolution ○ DNA ○ Inheritance ○ Variation ○ Evolution ○ Natural selection ○ Extinction Waves ○ Transverse waves ○ Longitudinal waves ○ Hearing & the ear ○ Echoes ○ Light and reflections ○ The Eye Electricity and Magnetism ○ Series & parallel circuits ○ Current & potential difference ○ Resistance ○ Magnetic fields ○ Electromagnets	
9	Cell Biology ○ Eukaryotes & Prokaryotes ○ Animal & Plant cells ○ Cell specialisation ○ Cell differentiation ○ Microscopy ○ Cell Division ○ Transport in cells Atomic Structure and Periodic Table ○ Models of the atom, symbols, relative atomic mass, electronic charge and isotopes. ○ The Periodic table ○ Trends in groups 1, 7 and 0		Energy ○ Energy changes in a system, and the way energy is stored before and after changes. ○ Conservation and dissipation of energy ○ National and global energy resources. Organisation ○ Principles of organisation ○ Animal tissues, organs and organ ○ Plant tissues, organs and systems Bonding, Structure and Properties ○ Chemical bonds, ionic, covalent and metallic. ○ How bonding and structure relate to the properties of substances.		Organisation ○ Principles of organisation ○ Animal tissues, organs and organ ○ Plant tissues, organs and systems Bonding, Structure and Properties ○ Chemical bonds, ionic, covalent and metallic. ○ How bonding and structure relate to the properties of substances. Energy Changes ○ Changes of state and particle model. ○ Internal energy and energy transfers. ○ Particle model and pressure.	
10	Electricity ○ Current, potential difference & resistance ○ Series & parallel circuits. ○ Domestic uses & safety ○ Energy transfers ○ National Grid Inheritance and Response ○ Communicable diseases ○ Body defence systems ○ Responses to infections and viruses Quantitative Chemistry ○ Chemical measurements ○ Conservation of mass ○ Using moles ○ Concentration of solutions Energy Changes ○ Exothermic and endothermic reactions. ○ Reaction profile diagrams		Atomic Structure ○ Atoms & Isotopes ○ Atoms & nuclear radiation. ○ Half-lives & radiation Chemical Changes ○ Reactivity of metals. ○ Reactions of acids ○ Electrolysis Bioenergetics ○ Photosynthesis ○ Rate of photosynthesis ○ Uses of glucose ○ Respiration ○ Response to exercise ○ Metabolism		Rate and Extent of Chemical Change ○ Rate of reaction. ○ Reversible reactions and dynamic equilibrium. Forces ○ Forces and their interactions ○ Work done ○ Energy Transfer. ○ Forces and elasticity ○ Forces and motion ○ Newton's Laws ○ Stopping distance ○ momentum Ecology ○ Communities ○ Biotic and abiotic factors ○ Competition ○ Adaptations ○ Estimating populations ○ Water and carbon cycles ○ Biodiversity and human impact	
11	Homeostasis and Response ○ Homeostasis ○ Human nervous system ○ Hormonal co-ordination in humans Organic Chemistry/ Chemical Analysis ○ Carbon compounds as fuels & feedstock. ○ Cracking & alkanes. ○ Purity, formulations & Chromatography Chemistry of the Atmosphere ○ Composition of Earth's atmosphere. ○ Greenhouse gasses. ○ Pollutants Waves ○ Waves in air, fluids & solids. ○ Electro-magnetic waves.		Magnetism and Electromagnetism ○ Permanent & induced magnets ○ Magnetic forces ○ The motor effect. ○ Electro-magnetism Inheritance, Variation and Evolution ○ Reproduction ○ Understanding genetics ○ Variation and evolution ○ Classification Using Resources ○ Using Earth's resources ○ Sustainable development ○ Potable water ○ Wastewater treatment ○ Life cycle assessments Revision		Revision	GCSE exams

Curriculum Intent

The vision of this faculty is that, together with families and the local community, we are dedicated to helping young people, regardless of their ability or socio-economic background, to develop a lifelong love of learning for Science and the confidence to not just navigate the scientific world, but to shape it. We aim to instil a sense of awe and wonder in the scientific world so fostering an appreciation of the uses and application of Science, both today and in the future.

Science plays a very important part of the curriculum because it links to learners' lives in terms of their own health, medicine, and the environment, supporting them to develop their own ethical standpoint on technological advances. Understanding Science is crucial in helping learners to understand where Physics, Biology and Chemistry is in their homes, in their school and their community. The subject of Science prepares learners for the "next stage" because everything in Science has an impact on what learners say and do. The local community has strong links with Science and technology both historically and in the present. By using these links in Science lessons, we can give the curriculum more relevance for our learners.

The Science curriculum is broad and balanced; it is taught through 10 big ideas linking Biology, Chemistry and Physics which support learners' progression through years 7 to 11, taking into account prior learning. The big ideas help to provide a framework to help learners organise knowledge and directly supports what we know about how students learn in Science for example, grouping related ideas together, moving from concrete to abstract ideas and revisiting and building upon the same idea multiple times. The big ideas are sequenced through a spiral curriculum to enable depth before breadth, this is to prepare learners to develop critical thinking, problem solving and decision making. Concepts learned are applied in practical science to deepen understanding. Practical science allows students to cultivate curiosity, construct hypothesises, observe, record, and analyse data. It allows us to evaluate the scientific method and appreciate how scientific ideas have changed over time. Practical Science is crucial to the curriculum across all age groups, skill being developed with increased rigour and complexity as learners' progress through KS3 and 4.

It is our intention that, when learners leave Beacon Hill Academy, they appreciate the importance of Science in everyday life and have a healthy curiosity in the scientific world, its applications and potential.

Curriculum Implementation

- Learners will have a firm grasp of the powerful, substantive knowledge across the scientific disciplines.
  This will be achieved by:
- Challenging subject content delivered by subject specialists.
- The use of 'I do, We do, You do' strategy to build learning and to challenge and scaffold as appropriate
- The use of recall and retrieval activities in DNA and home learning to help learners to know more and remember more
- The use of appropriate assessment, both summative and formative, which allows teachers to accurately assess gaps in knowledge and identify misconceptions and allows learners to deepen their learning by completing 'Green for Growth' tasks.
- Regular feedback will be given after Demonstrate activities followed by bespoke Connect tasks and 'Green for Growth'

- Learners will be good communicators of science. They will be able to research, inform, argue and debate relevant scientific ideas; interrogate their validity and be immune to the spread of misinformation. They will be able to discuss issues relating to SMSC thus fostering social understanding.
  This will be achieved by:
- Explicit teaching of the disciplinary literacy required for science to include Frayer models and reciprocal reading strategies
- Teachers provide opportunity for students to collaborate on their work.
- Teachers will develop learners thinking around the wider social, environmental and economic impacts of scientific applications.

- Learners will know that theories must be testable and how to apply the scientific method to their everyday lives.
  This will be achieved by:
- Sequencing of disciplinary knowledge within the substantive context.
- Using purposeful practical work to support students to consolidate their understanding.
- Explicit teaching and careful sequencing of substantive & disciplinary knowledge. This will allow learners to develop schema and links between the Science disciplines and other curriculum areas such as Geography and Maths.

- Learners will have flexible, transferrable knowledge of science and the science of learning so that they are confident life-long learners and equipped for further study.

  This will be achieved by:
- Explicit teaching of revision skills and effective study skills.
- Helping learners to develop their revision toolkit and provide opportunities to participate in intervention.

- Learners will have a confident grasp of the key mathematical concepts that underpin Science.
  This will be achieved by:
- Explicit teaching of fundamental maths, embedded within the science programme of study and sequenced to account for prior learning. This will also be informed by links with the Maths department
- The use of "EVERY" scaffold when solving equations. This gives learners a framework on which to build calculations.