

Programme of Learning – Science

	Year 7	Year 8	Year 9	Year 10	Year 11	Post 16
Knowledge & Understanding	Solids, liquids and Gases (The Particle Theory) Solutions Acids and Alkalis Chemical Reactions Forces Energy The Solar System Electricity Cells Reproduction Variation and Classification The Environment	Atoms and Elements Compounds and Mixtures Reactivity Rocks and the Rock Cycle Heat Transfer Light Sound Gravity and Space Respiration Photosynthesis Health and Digestion	Health Ecosystems and Decay Adaptation, Competition and the Environment Nervous system and Hormones Variation, reproduction and cloning Atomic Structure Limestone Extraction of metals Oils Earth and the Atmosphere Heat Transfer and Sankey Diagrams Heat Transfer Energy Resources Waves EM Spectrum and The Big Bang Theory	Core AQA Science A Specification Diet and Immunology Nervous system and Hormones Tropisms Adaptations and Competition Ecological relationships, biomass Carbon cycle and decay Genes, DNA and chromosomes Reproduction, Cloning Limestone Extraction of metals Crude oil, Polymers Plant oils Structure of the Earth and movement The Atmosphere Kinetic Theory Heat Transfer Energy Efficiency Cost of Electricity Energy Resources Waves and the Electromagnetic Spectrum The Big Bang Theory	Additional AQA Specification Cells and Specialised cells Enzymes Genetics Aerobic and Anaerobic Respiration Photosynthesis Structures and Bonding Salt Preparation Quantitative Chemistry Electrolysis Motion Electricity Radioactivity Lifecycle of a star Nuclear Fusion and Fission Further Additional AQA Specification (Triple pupils only) Cell transport Homeostasis Heart and lungs Human Impact Energy Efficiency The Periodic Table Hardness of Water Identification of Positive and Negative Ions Ammonia production Energy Changes Alcohols, carboxylic acids and esters	Biology Yr12 Unit 1 – Biology and Disease Unit 2 – Variety of life Yr13 Unit 4 – Populations and the environment Unit 5 – Control in cells and in organisms Chemistry Yr12 F321 – Foundation Chemistry F322 – Energy and Organics Yr13 F324 – Organics F325 – Kinetics, Acids, Energy, Enthalpy, Transition metals Physics Yr12 Unit 1 – Electricity, Particles and Quantum Physics Unit 2 – Mechanics, Material Physics, Waves and Vibrations. Yr13 Unit 4 – Fields and Further Mechanics.

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					Ultrasound, X-rays Refraction and lenses Centre of mass, Moments, Hydraulics and circular motion Electromagnetic force and induction Transformers	Unit 5 – Nuclear, Thermal and Astrophysics Applied A-Level A mixture of Biology, Chemistry and Physics units assessed by examinations and coursework.
Skills & Application	Obtaining Evidence - Presentation of data - Quantitative and Qualitative data Graphs and Conclusions - Plotting points on given axes - Spot simple patterns in graphs Evaluation - Improvements of investigations with basis reasons Science in Society - Identifying advantages and disadvantages - Discussion of timeline of development of ideas Ethical and Economic issues - Identifying points for and against. Discussion of	Obtaining Evidence - Including units and repeat columns - describe simple patterns in tables Graphs and Conclusions - Selecting suitable scales - describe simple patterns in graphs using data Evaluation - Reliability and repeatability in relation to methodology - strengths and weaknesses of method Science in Society - Careers. Applying science to different careers, e.g William Beaumont - The importance of Science - Why are timelines of development so long?	Obtaining Evidence - Anomalies - calculating averages with anomalies Graphs and Conclusions - Scaling graphs with difficult numbers - drawing line of best fit Relate conclusion to hypothesis Evaluation - Errors and suggestions for anomalies - suggest improvements to method to improve reliability Science in Society - Debate topical issues such as quarrying. - discuss how science can affect different groups of people Ethical and Economic issues - How does science help	Obtaining Evidence - Analysing case studies of similar investigations - dealing with anomalies Graphs and Conclusions - linking variables to type of graph - strength of line of best fit - description of graph and manipulation of data (direct proportionality) - mathematical relationships Evaluation - Reproducibility - Evaluation of others' method - Explain suggested improvements Science in Society - Explain how new ideas are slowly accepted Ethical and Economic issues - debate more complex issues such as the use of Nuclear energy Interpretation	Extension of Yr10 investigative skills	

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	<p>'Right or Wrong' e.g. designer babies</p> <p>Interpretation</p> <ul style="list-style-type: none"> - making conclusions from simple graphs <p>Modelling</p> <ul style="list-style-type: none"> - differences between physical and scientific models 	<p>Ethical and Economic issues</p> <ul style="list-style-type: none"> - Discussion of ethical issues of scientific methods and decisions <p>Interpretation</p> <ul style="list-style-type: none"> - Describing two part graphs <p>Modelling</p> <ul style="list-style-type: none"> - Identifying the strengths and weaknesses of models 	<p>people? (Cern)</p> <p>Interpretation</p> <ul style="list-style-type: none"> - Comparing and contrasting information from data and text <p>Modelling</p> <ul style="list-style-type: none"> - Suggest improvements to models 	<ul style="list-style-type: none"> - Forming overall opinion based on evaluation of all facts <p>Modelling</p> <ul style="list-style-type: none"> - Development of new theories from observations and how these are supported by evidence 		
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Learning Approaches

Topics are introduced by challenging preconceived ideas about the world we live in and sparking intrigue and interest. We assess prior knowledge to ascertain our starting point and to identify misconceptions. Alongside detailed support from the subject teacher, our higher level teaching assistant develops and delivers structured support to ensure all pupils make excellent progress. We utilise a range of technologies including data loggers and IPAD Apps to enhance the learning of our pupils.

Student Support & Development

The teaching staff in the science department all come from a science background and have the full range of specialisms. There is also a higher level teaching assistant who has a science degree plus two research associates who have worked in industry.

We offer extracurricular activities such as science club, the extreme physics competition and numerous enrichment visits.

Subject vision

Advances in technology and science are transforming our world at an incredible pace. Being 'science literate' is no longer an advantage but an absolute necessity!

Progression

Our KS3 and KS4 curriculums build on prior knowledge to develop the skills and understanding needed to access our Post 16 science courses. We offer Biology, Chemistry, Physics and Applied Science at Post 16. These courses allow our pupils to progress onto any science related degree, including the more traditional academic courses like medicine, veterinary science and dentistry.

Assessment & Monitoring of Progress

Each module across KS3 and 4 is formally assessed by an extended written task and a summative test. Specific targets are given to each pupil based on the outcomes of the assessment. Pupils are then given the opportunity to act on the feedback given to ensure the maximum progress is made.

Development of Subject Specific language

The correct use of scientific language is essential. The department focuses on developing our pupils' scientific vocabulary. To do this spelling, punctuation and grammar are assessed plus corrections are made to their scientific language. Pupils will develop this further by peer and self assessing their work against success criteria and peer critiquing model answers.