

Science

Introduction and Vision

SUBJECT: Science KS3: Exploring Science,

KS4: Combined Science and Separate Sciences, Biology, Chemistry, Physics.

CURRICULUM INTENT: The Science faculty aim to ensure students achieve a depth of knowledge through varied and imaginative learning activities which include practical work, demonstrations and an underpinning of how Science works. This builds on KS2 Science.

Our curriculum across both KS3 and KS4 encourages students to have resilience and confidence in the Science that they have been taught and to apply it to unfamiliar situations. This is achieved by highlighting links between the three Sciences and their relevance to the wider world.

At KS3, rationales for each lesson are in place ensuring that students are regularly visiting How Science Works skills as well as understanding the key principles.

Students are challenged on the depth of their scientific understanding and vocabulary through regular oral and written assessment. To reinforce this, all assessments are followed by feedback lessons to clarify misunderstandings and to celebrate success. This also gives students the opportunity to reflect on their performance and plan their next steps.

We teach science so that the students can explore the foundations of understanding of the world through biology, physics and chemistry allowing students to confidently analyse and explain what is occurring around them.

- Develop learners' ability to gain a coherent knowledge and understanding of science and scientific processes, knowledge, methods and uses of science.
- Promote a love of learning and intellectual curiosity through learning about essential scientific processes, knowledge, methods and uses of science.
- Enhance and develop employability skills such as working in a team, problem solving and communicating effectively.
- Develop independence through experimentation, building an inquisitive and resilient mind.
- Allow learners to take ownership of their impact upon the world through application of skills and knowledge.
- Embed knowledge, application, steer career paths to produce capable, respectful and responsible citizens.

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Key Stage 3 Pearson Activelearn

Year 7	Topics covered
Autumn	<ul style="list-style-type: none"> • Safety/introduction/baseline test, acids and alkalis, Cells, Atoms Elements and molecules.
Spring	<ul style="list-style-type: none"> • Energy, Reproduction, The particle model, Sound.
Summer	<ul style="list-style-type: none"> • Muscles and bones, Mixtures and separation, Light.

Year 8	Topics covered
Autumn	<ul style="list-style-type: none"> • Ecosystems, the periodic table, Earth and space, Breathing and respiration.
Spring	<ul style="list-style-type: none"> • Metals and their uses, Current electricity, Plants and their reproduction, Combustion.
Summer	<ul style="list-style-type: none"> • Forces, Unicellular organisms, Rocks

Year 9	Topics covered
Autumn	<ul style="list-style-type: none"> • Earth and space, Rocks, Cells, Atoms elements and molecules.
Spring	<ul style="list-style-type: none"> • Energy, Breathing and respiration, Reactivity, Forces
Summer	<ul style="list-style-type: none"> • Current electricity, GCSE topics SB1 and SC3/4

Key Stage 4 – Edexcel

Year 10	Topics covered
Autumn	<p><u>Key Concepts</u> CB1a Microscopes CB1b Plant & Animal Cells CB1c Specialised Cells CB1d Inside Bacteria CB1e Enzymes & Nutrition CB1f Enzyme Action CB1g Enzyme Activity CB1h Transporting Substances</p> <p>Triple science extra lessons: Testing foods including required practical on food testing, pH and enzymes required practical</p> <p><u>Motion</u> CP1a vectors and Scalars CP1b Distance/Time Graph CP1c Acceleration CP1d Velocity/time graphs</p> <p><u>Motion & Forces</u> CP2a Resultant Forces</p>

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	<p>CP2b Newtons First Law CP2c Mass and Weight CP2d Newtons Second Law CP2e Newtons Third Law CP2f Momentum CP2g Stopping distances CP2h Crash Hazards</p> <p>Triple Science extra lessons: Investigating acceleration (core practical) , braking distances and energy</p> <p><u>States of Matter</u> CC1a States of Matter</p> <p><u>Separating & Purifying Substances</u> CC2a Mixtures CC2b Filtration and Crystallisation CC2c Paper Chromatography CC2d Distillation CC2e Drinking Water</p> <p><u>Atomic Structure</u> CC3a Structure of an atom CC3b Atomic Number & Mass Number CC3c Isotopes</p> <p>Triple science extra lessons: Core practical: investigating inks</p> <p><u>Genetics</u> CB3a Meiosis CB3b DNA CB3c Alleles CB3d Inheritance CB3e Gene Mutation CB3f Variation</p> <p>Triple science extra lessons: Protein synthesis, genetic variants, Mendel, missing alleles</p>
Spring	<p><u>Natural Selection & GMO's</u> CB4a Evidence for Human Evolution CB4b Darwin's Theory CB4c Classification CB4d Breeds and Varieties CB4e Genes in Agriculture & Medicine</p>

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Triple science extra lessons: Tissue cultures, GM and agriculture, fertilisers and biological control

Conservation of Energy

CP3a Energy stores and Transfer

CP3b Energy Efficiency

CP3c Keeping Warm

CP3d Stored Energies

CP3e Non-Renewable Energy

CP3f Renewable Resources

Waves

CP4a Describing Waves

CP4b Waves Speeds

CP4c Refraction

Triple science extra lessons: Waves crossing boundaries, Ears and Hearing, Ultrasound, Infrasound)

Light & The EM Spectrum

CP5a Electromagnetic Waves

CP5b Electromagnetic Spectrum

CP5c Using the Long Waves

CP5d Using the Short Waves

CP5e EM Radiation

Triple science extra lessons: Ray Diagrams, colour, Investigating radiation core practical, EM dangers.

The Periodic Table

CC4a Elements and The Periodic Table

CC4b Atomic Number and The Periodic Table

CC4c Electronic Configuration

Ionic & Covalent Bonding

CC5a Ionic Bonds

CC5b Ionic Lattices

CC5c Properties of Ionic Compounds

CC6a – Covalent Bonds

Types of Substances

CC7a Molecular Compounds

CC7b Allotropes of Carbon

CC7c Properties of Metals

CC7d Bonding Models

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Summer	<p><u>Health, Disease & Medicine Development</u> CB5a Health and Disease CB5b Non-Communicable Diseases CB5c Cardiovascular Diseases CB5d Pathogens CB5e Spreading Pathogens CB5f Physical and Chemical Barriers CB5g The Immune System CB5h Antibiotics</p> <p>Triple science extra lessons: Virus lifecycles, plant diseases, Core practical: Antibiotics, monoclonal antibodies</p> <p><u>Radioactivity</u> CP6a Atomic Models CP6b Inside Atoms CP6c Electrons and Orbits CP6d Background Radiation CP6e Types of Radiation CP6f Radioactive Decay CP6g Half-life CP6h Dangers of Radioactivity</p> <p>Triple science extra lessons: Radiation in medicine, nuclear energy, nuclear fission, fusion</p> <p><u>Acids & Alkalis</u> CC8a Acids, Alkali's and Indicators CC8b Looking at Acids CC8c Bases and Salts CC8d Alkali's and Balancing Equations CC8e Alkali's and Neutralisation CC8f Reactions of Acids with Metal Carbonates CC8g Solubility</p> <p><u>Calculations Involving Masses</u> CC9a Mass and Empirical Formulae CC9b Conservation of Mass CC9c Moles</p> <p><u>Electrolytic Processes</u> CC10a Electrolysis CC10b Products of Electrolysis</p> <p><u>Obtaining & Using Metals</u> CC11a Reactivity CC11b Ores</p>
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	<p>CC11c Oxidation and Reduction CC11d Life Cycle Assessment and Recycling CC12a Dynamic Equilibrium</p> <p>Triple science extra lessons: Transition metals, corrosion, alloying, uses of alloys</p>
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Year 11	Topics covered
Autumn	<p><u>Plant Structures & their Function</u> CB6a Photosynthesis CB6b Factors That Affect Photosynthesis CB6c Absorbing Water and Mineral Ions CB6d Transpiration & Translocation</p> <p>Triple science extra lessons: Core practical: light intensity , plant adaptations and hormones, use of plant hormones</p> <p><u>Energy – Forces Doing Work</u> CP7a Work and Power</p> <p><u>Forces & their Effects</u> CP8a Objects Affecting Each other CP8b Vector Diagrams</p> <p><u>Conservation of Energy</u> CP9a Electric Circuits CP9b Current and Potential Difference CP9c Current Charge and Energy CP9d Resistance CP9e More about Resistance CP9f Transferring Energy CP9g Power CP9h Transferring Energy by Electricity CP9i Electrical Safety</p> <p>Triple science extra lessons: The solar system, gravity and orbits, Lifecycle of stars, red shift, origins of the universe.</p> <p><u>Groups in the Periodic Table</u> CC13a Group 1 CC13b Group 7 CC13c Halogen Reactivity CC13d Group 0</p>

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	<p>Triple science extra Topics: SC14/15 : Quantitative analysis, dynamic equilibria calculations, volumes of gases / chemical cells and fuel cells</p> <p><u>Animal Coordination, Control & Homeostasis</u> CB7a Hormones CB7b Hormonal Control of Metabolic Rate CB7c The Menstrual Cycle CB7d Hormones and the Menstrual Cycle CB7e Control of Blood Glucose CB7f Type 2 Diabetes</p> <p>Triple science extra lessons: Thermoregulation, Osmoregulation, Kidney's</p> <p><u>Magnetism & the Motor Effect</u> CP10a Magnets and Magnetic Fields CP10b Electromagnetism CP10c Magnetic Forces</p> <p><u>Electromagnetic Induction</u> CP11a Transformers CP11b Transformers and Energy</p> <p>Triple science extra lessons: Static electricity and dangers, electric fields.</p>
Spring	<p><u>Heat Energy Changes in Chemical Reactions</u> CC15a Exothermic and Endothermic Reactions CC15b Energy Changes in Reactions</p> <p><u>Fuels</u> CC16a Hydrocarbons in Crude Oil and Natural Gas CC16b Fractional Distillation of Crude Oil CC16c The Alkane Homologous Series CC16d Complete and Incomplete Combustion CC16e Combustible Fuels and Pollution CC16f Breaking Down Hydrocarbons</p> <p><u>Exchange & Transport in Animals</u> CB8a Efficient Transport and Exchange CB8b The Circulatory System CB8c The Heart CB8d Cellular Respiration</p>

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	<p><u>Ecosystem & Material Cycles</u> CB9a Ecosystems CB9b Abiotic Factors and Communities CB9c Biotic Factors and Communities CB9d Parasitism and Mutualism CB9e Biodiversity and Humans CB9f Preserving Biodiversity CB9g The Water Cycle CB9h The Carbon Cycle CB9i The Nitrogen Cycle</p> <p>Triple science extra lessons: Rates of decomposition</p> <p><u>Particle Model</u> CP12a Particles and Density CP12b Energy and Changes of State CP12c Energy Calculations CP12d Gas Temperature and Pressure</p> <p><u>Forces & Matter</u> CP13a Bending and Stretching CP13b Extension and Energy Transfers</p> <p>Triple science extra lessons: SP14 : Forces and matter topic</p> <p><u>Earth and Atmospheric Science</u> CC17a The Early Atmosphere CC17b The Changing Atmosphere CC17c The Atmosphere Today CC17d Climate Change</p> <p>Triple science extra Topics:</p> <p>SC22/23/24 : Hydrocarbons, alcohols and carboxylic acids, Polymers SC25/26: Qualitative analysis: Tests for ions, Bulk and surface properties of matter, Nanoparticles</p>
Summer	Revision