

Curriculum | Science



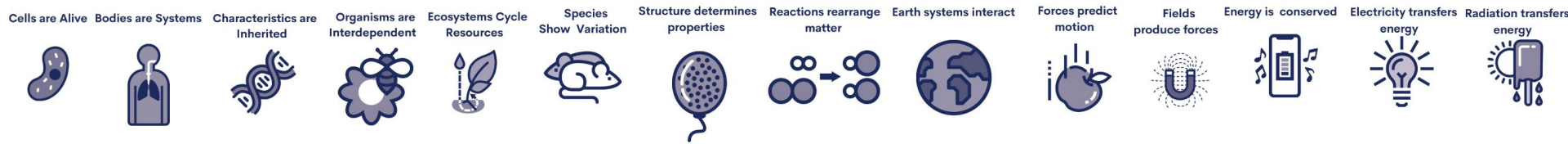
Co-op Academy
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Curriculum Intent

‘Science is changing our lives and is vital to the world’s future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science’ (DfE, 2015).

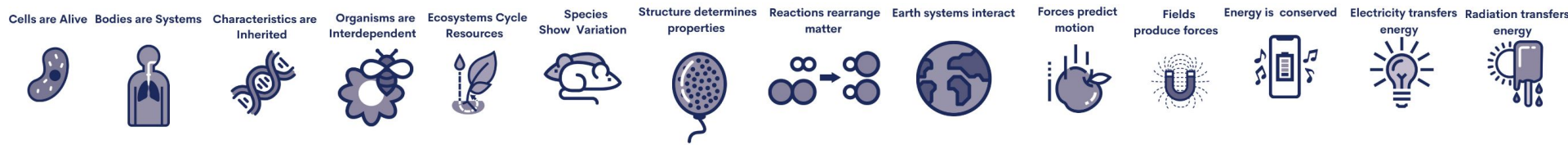
The Science Mastery programme intends to aim to improve opportunities for all young people. This means enabling every child to develop a comprehensive understanding of the big picture of science and leave school with the science capital required to inform their decision-making throughout their lives.

Our programme aims to prepare all pupils academically for further scientific study and a career in science, and to inform pupils about the dynamic complexities of the natural world and their place in it. Our curriculum is therefore broad, coherent, practical and rigorous, allowing pupils to be ‘inspired and challenged by the subject and its achievements’ (DfE, 2015).



Curriculum Intent

What are young people expected (broadly) to know and do having learnt this curriculum, which explains why it is in the overall curriculum? The Science Mastery curriculum builds on pupils' scientific understanding from KS1 and KS2. The principal focus of science teaching in KS1 and KS2 is to enable pupils to 'broaden their scientific view of the world around them and develop an understanding of a wide range of scientific ideas' (DfE, 2015). Pupils are first introduced to the subject disciplines of biology, chemistry and physics at KS3, and the principal focus of science teaching at this stage is to allow pupils to 'develop a deeper understanding of content within each of the three subject disciplines' (DfE, 2015). This remains the principal focus into KS4, which explains why the Science Mastery curriculum shows a five-year progression of content and skills within each of the three subject disciplines. By the end of KS4, pupils are expected to 'appreciate the achievements of science in showing how the complex and diverse phenomena of the natural world can be described in terms of a number of key ideas relating to the sciences which are inter-linked, and which are of universal application' (DfE, 2015). To ensure all young people are able to do this, the Science Mastery curriculum sequences the knowledge and content pupils must learn across the five years of secondary education under a series of 'big ideas'. The Science Mastery curriculum provides the foundations for understanding the natural world by ensuring the delivery of accurate scientific knowledge and supplying relevant and engaging example applications of this knowledge. The curriculum also allows pupils to appreciate how our increasingly technological society is evolving using engaging news stories and novel applications.



	Autumn Term	Spring Term	Summer Term
7	<u>B1.1 - Cells</u> Animal & Plant Cells, Microscopes, Specialised Cells, Tissues, Organs & Systems. <u>C1.1 - Particles</u> States of Matter, Particle Model, Properties of Matter, Changes of State, Diffusion, Variables, Gas Pressure, Density.	<u>B1.2 - Reproduction</u> Types of Reproduction, Gametes, Reproductive Systems, Pregnancy & Embryo Development, Plant Reproduction, Seed Dispersal. <u>C1.2 Atoms, Elements & Compounds</u> Elements, Atoms, The Periodic Table, Metals & Non-metals, Reactivity of Metals, Compounds, Chemical Formulae.	<u>C1.3 - Mixtures</u> Mixtures, Solutions, Melting & Boiling Points, Purity, Filtration, Crystallisation, Fractional Distillation, Chromatography. <u>P1.3 - Energy Transfers</u> Energy Stores, Energy Transfers, Energy in Food, Wasted Energy, Efficiency, Thermal Energy, Conductors & Insulators.
	<u>C1.1 - Particles</u> <u>P1.1 - Forces</u> Balanced & Unbalanced Forces, Resultant Force, Springs & Deformation. Drag Forces & Friction. <u>B1.2 - Reproduction</u>	<u>P1.2 - Space</u> The Solar System, Gravity, Orbits, Day & Night, Seasons, Satellites, Eclipses. <u>B1.3 - Interdependence</u> Ecosystems, Sampling, Food Chains & Food Webs, Trophic Levels. Biotic & Abiotic Factors, Competition.	<u>P1.4 - Electric Circuits</u> Models of Circuits, Circuit Symbols, Series & Parallel, Current, Voltage & Potential Difference.
8	<u>B2.1 Tissues & Organs</u> Skeletal & Muscular Systems, The Respiratory System, Breathing, Gas Exchange, Drugs, Organ Donation. <u>C2.1 - Acids & Alkalis</u> The pH Scale, Indicators, Neutralisation, Making Salts, Writing Methods, Acids & Metal Carbonates.	<u>C2.2 - Changing Substances</u> Chemical Changes, Conservation of Mass, Balanced Equations, Oxidation & Reduction, Reactions of Acids, Testing for Gases. <u>P2.2 - Magnetism</u> Magnetism, Magnetic Fields, Electromagnets, Earth's Magnetic Field.	<u>C2.3 - Earth Systems</u> <u>B2.4 - Nutrition</u> Diet & Nutrition, Food Tests, Food Samples, The Digestive System, The Small Intestine, Enzymes, Plant Nutrition.
	<u>P2.1 - Movement & Pressure</u> Speed, Distance-Time Graphs, Pressure, Moments. <u>B2.2 - Respiration & Photosynthesis</u> Lifestyle Habits & Risks, Respiration, Exercise, Muscle Fatigue, Uses of Anaerobic Respiration, Photosynthesis, Plant Adaptations, Biodomes.	<u>P2.2 - Magnetism</u> <u>B2.3 - Life Diversity</u> Variation, Inheritance, Artificial Selection, Natural Selection, Evolution. <u>C2.3 - Earth Systems</u> Igneous Rocks, Sedimentary Rocks, Metamorphic Rocks, Rock Cycle, Water Cycle, Material Cycling, Air Pollution.	<u>P2.4 - Light</u> Light, Reflection, Refraction, Lenses, Colour.
9	<u>B3.1 - Growth & Differentiation</u> Eukaryotic & Prokaryotic Cells, Aseptic Technique, Microscopes & Magnification, Diffusion, Osmosis, Active Transport, Cell Division, Cancer, Stem Cells. <u>C3.1 - Periodic Table</u> Atoms, Electron Configuration, Isotopes, The Periodic Table, Noble Gases, Alkali Metals, Halogens, Transition Metals, Reactivity.	<u>B3.2 - Human Interaction</u> Biodiversity, Pollution, Human Impacts, Global Warming. <u>C3.2 Intro to Quantitative Chemistry</u> Relative Formula Mass, Percentage by Mass, Conservation of Mass, Balancing Equations, Uncertainty, Concentration, Soluble Salts.	<u>B3.3 - Genetics</u> <u>C3.3 - Using Resources</u> Reactivity Series, Treating Water, Testing Water, Using Materials, Life Cycle Assessments, Reduce Reuse Recycle. <u>P3.3 - Sound & Waves</u>
	<u>C3.1 - Periodic Table</u> <u>P3.1 - Acceleration</u>	<u>P3.2 - Heating</u> Internal Energy, Thermal Transfers, Specific Heat Capacity, Specific Latent Heat. <u>B3.3 - Genetics</u>	<u>P3.3 - Sound & Waves</u> Types of Wave, Properties of Waves, Velocity of Waves, Reflection & Refraction, Using Waves. <u>P3.4 - Home Electricity</u>

	Autumn Term	Spring Term	Summer Term
7	<u>HT1</u> <u>B1.1 - Cells</u> Animal & Plant Cells, Microscopes, Specialised Cells, Tissues, Organs & Systems. <u>C1.1 - Particles</u> States of Matter, Particle Model, Properties of Matter, Changes of State, Diffusion, Variables, Gas Pressure, Density.	<u>HT3</u> <u>B1.2 - Reproduction</u> Types of Reproduction, Gametes, Reproductive Systems, Pregnancy & Embryo Development, Plant Reproduction, Seed Dispersal. <u>C1.2 Atoms, Elements & Compounds</u> Elements, Atoms, The Periodic Table, Metals & Non-metals, Reactivity of Metals, Compounds, Chemical Formulae.	<u>HT5</u> <u>C1.3 - Mixtures</u> Mixtures, Solutions, Melting & Boiling Points, Purity, Filtration, Crystallisation, Fractional Distillation, Chromatography. <u>P1.3 - Energy Transfers</u> Energy Stores, Energy Transfers, Energy in Food, Wasted Energy, Efficiency, Thermal Energy, Conductors & Insulators.
	<u>HT2</u> <u>C1.1 - Particles</u> <u>P1.1 - Forces</u> Balanced & Unbalanced Forces, Resultant Force, Springs & Deformation. Drag Forces & Friction. <u>B1.2 - Reproduction</u>	<u>HT4</u> <u>P1.2 - Space</u> The Solar System, Gravity, Orbits, Day & Night, Seasons, Satellites, Eclipses. <u>B1.3 - Interdependence</u> Ecosystems, Sampling, Food Chains & Food Webs, Trophic Levels. Biotic & Abiotic Factors, Competition.	<u>HT6</u> <u>P1.4 - Electric Circuits</u> Models of Circuits, Circuit Symbols, Series & Parallel, Current, Voltage & Potential Difference.

Cells are Alive



Bodies are Systems



Characteristics are Inherited



Organisms are Interdependent



Ecosystems Cycle Resources



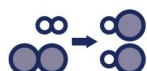
Species Show Variation



Structure determines properties



Reactions rearrange matter



Earth systems interact



Forces predict motion



Fields produce forces



Energy is conserved



Electricity transfers energy

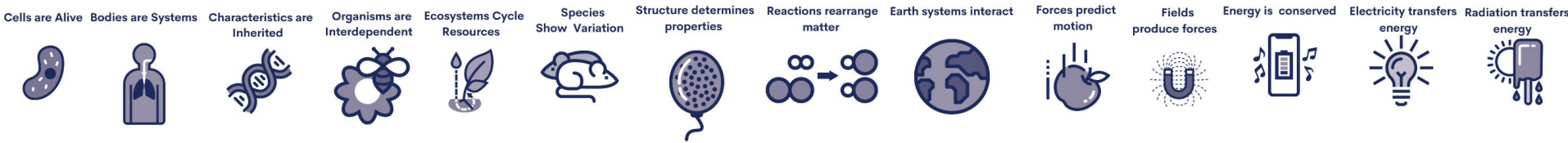


Radiation transfers energy



	Autumn Term	Spring Term	Summer Term
8	<u>HT1</u> <u>B2.1 Tissues & Organs</u> Skeletal & Muscular Systems, The Respiratory System, Breathing, Gas Exchange, Drugs, Organ Donation. <u>C2.1 - Acids & Alkalis</u> The pH Scale, Indicators, Neutralisation, Making Salts, Writing Methods, Acids & Metal Carbonates.	<u>HT3</u> <u>C2.2 - Changing Substances</u> Chemical Changes, Conservation of Mass, Balanced Equations, Oxidation & Reduction, Reactions of Acids, Testing for Gases. <u>P2.2 - Magnetism</u> Magnetism, Magnetic Fields, Electromagnets, Earth's Magnetic Field.	<u>HT5</u> <u>C2.3 - Earth Systems</u> <u>B2.4 - Nutrition</u> Diet & Nutrition, Food Tests, Food Samples, The Digestive System, The Small Intestine, Enzymes, Plant Nutrition.
	<u>HT2</u> <u>P2.1 - Movement & Pressure</u> Speed, Distance-Time Graphs, Pressure, Moments. <u>B2.2 - Respiration & Photosynthesis</u> Lifestyle Habits & Risks, Respiration, Exercise, Muscle Fatigue, Uses of Anaerobic Respiration, Photosynthesis, Plant Adaptations, Biodomes.	<u>HT4</u> <u>P2.2 - Magnetism</u> <u>B2.3 - Life Diversity</u> Variation, Inheritance, Artificial Selection, Natural Selection, Evolution. <u>C2.3 - Earth Systems</u> Igneous Rocks, Sedimentary Rocks, Metamorphic Rocks, Rock Cycle, Water Cycle, Material Cycling, Air Pollution.	<u>HT6</u> <u>P2.4 - Light</u> Light, Reflection, Refraction, Lenses, Colour.

	Autumn Term	Spring Term	Summer Term
9	<u>HT1</u> <u>B3.1 - Growth & Differentiation</u> Eukaryotic & Prokaryotic Cells, Aseptic Technique, Microscopes & Magnification, Diffusion, Osmosis, Active Transport, Cell Division, Cancer, Stem Cells. <u>C3.1 - Periodic Table</u> Atoms, Electron Configuration, Isotopes, The Periodic Table, Noble Gases, Alkali Metals, Halogens, Transition Metals, Reactivity.	<u>HT3</u> <u>B3.2 - Human Interaction</u> Biodiversity, Pollution, Human Impacts, Global Warming. <u>C3.2 Intro to Quantitative Chemistry</u> Relative Formula Mass, Percentage by Mass, Conservation of Mass, Balancing Equations, Uncertainty, Concentration, Soluble Salts.	<u>HT5</u> <u>B3.3 - Genetics</u> <u>C3.3 - Using Resources</u> Reactivity Series, Treating Water, Testing Water, Using Materials, Life Cycle Assessments, Reduce Reuse Recycle. <u>P3.3 - Sound & Waves</u> Types of Wave, Properties of Waves, Velocity of Waves, Reflection & Refraction, Using Waves.
	<u>HT2</u> <u>C3.1 - Periodic Table</u> <u>P3.1 - Acceleration</u> Scalar & Vectors, Resultant Vectors, Newton's Third Law, Newton's First Law, Acceleration, Velocity-Time Graphs.	<u>HT4</u> <u>P3.2 - Heating</u> Internal Energy, Thermal Transfers, Specific Heat Capacity, Specific Latent Heat. <u>B3.3 - Genetics</u> The Cell Cycle, Meiosis, Types of Reproduction, DNA & Proteins, Genes & Alleles, Punnett Squares, Inherited Disorders, Sex Determination.	<u>HT6</u> <u>P3.3 - Sound & Waves</u> <u>P3.4 - Home Electricity</u> Mains Electricity, Plugs, Power, Cost of Electricity, Power in Circuits, Energy Resources, The National Grid, Static Electricity.



Biology

Cells are Alive



Bodies are Systems



Characteristics are Inherited



Organisms are Interdependent



Ecosystems Cycle Resources



Species Show Variation

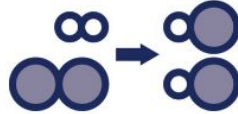


Chemistry

Structure determines properties



Reactions rearrange matter



Earth systems interact



Physics

Forces predict motion



Fields produce forces



Energy is conserved



Electricity transfers energy



Radiation transfers energy



Termly Curriculum Overview

	Autumn Term	Spring Term	Summer Term
Year 7	B1.1 Cells C1.1 Particles P1.1 Forces B1.2 Reproduction	C1.2 Elements, Atoms and Compounds P1.2 Gravity B1.3 Interdependence	C1.3 Mixtures P1.3 Energy Transfers P1.4 Electric Circuits: Current and Voltage
Year 8	B2.1 Tissues and Organs C2.1 Acids and Alkalis P2.1 Movement and Pressure B2.2 Respiration and Photosynthesis	C2.2 Changing Substances P2.2 Magnetism B2.3 Life Diversity C2.3 Earth Systems	P2.3 Electric Circuits: Resistance B2.4 Nutrition P2.4 Light
Year 9	B3.1 Growth and Differentiation C3.1 The Periodic Table P3.1 Acceleration	B3.2 Human Interaction C3.2 Introduction to Quantitative Chemistry P3.2 Heating B3.3 Genetics	C3.3 Using Resources P3.3 Sound and Waves P3.4 Home Electricity
Year 10	B4.1 The Digestive System C4.1 Structure and Bonding P4.1 Matter B4.2 Circulation and Respiration C4.2 Extraction of Metals P4.2 Energy Conservation	B4.3 Plants and Material Cycling C4.3 Quantitative Chemistry P4.3 Movement B4.4 Health and Disease	C4.4 Energy Changes P4.4 Electric Circuits P4.5 Radioactivity B4.5 Ecology
Year 11	B5.1 Feedback and Control C5.1 Carbon Chemistry P5.1 Electromagnetic Radiation B5.2 Controlling Reproduction C5.2 Controlling Reactions P5.2 Force Fields B5.3 Controlling Nature C5.3 Our Atmosphere	B5.4 Evolution C5.4 Chemical Analysis	