Science in the OCL Primary Curriculum

Intent

The OCL Curriculum Statement of Intent has been carefully considered for each curriculum area to ensure the content designed meets this at every opportunity.

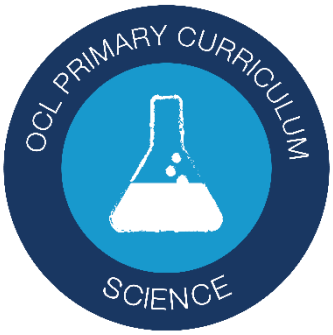
The context that our children and young people live in:

- Our children live in a world where they require the skills and qualifications, flexibility, emotional intelligence and expertise to be leaders and to thrive as human beings.
- Our children live in world where accepting themselves as individuals and celebrating who they are is key in navigating a complex and ever-changing environment.
- Our children live in a world where they need to feel a sense of ability to change things for the better and have self efficacy.
- Our children live in a world where they need a network of relationships and a network of support to thrive and excel.
- Our children live in a world where early development of vocabulary skills is the single most important factor to get right as early as possible.

We want our children and young people to:

- Be inspired to improve the world around them.
- Have the ambition, skills and expertise to thrive in a fast changing, interconnected and communication rich world, with the confidence and technical expertise to thrive.
- Have a network that supports them.
- Be comfortable in who they are and able to continuously explore who they are becoming.
- Be rich in language with a passion for learning.
- Seek to include others, be other-centred and celebrate difference.
- Have a values approach to life and a sense of what is right and wrong through the lived experience of the 9 habits.

Therefore, we focus on developing character, competence and community. The Science curriculum specifically meets the OCL statement of intent by focussing on character, competence and community in the following areas:

	**Character:** Children are naturally curious and want to be able to explain the world around them; Science enables them to do this. Through studying Science, children will learn systematic ways to approach answering their own questions, become problem solvers and build resilience when approaching tasks and investigations.
	Competence: Through studying several strands of science: Biology, Chemistry, Physics and Earth Science children will begin to understand the huge role Science has to play in our ever-developing world. The knowledge and skills they will develop over the primary curriculum will inspire them to want to continue their scientific journey and become the change of the future.
	Community: Science enables communities to bring about change; our curriculum shows the children how this can be achieved on a small local scale to a huge global contribution. They will learn that through Science some of the problems we face as a population can be addressed. Our children will feel empowered enough to want to make these changes.

Implementation

To ensure our intent transfers into everyday classroom practice, we use current research in cognitive science to develop pedagogy and specific CPD to ensure subject content is expertly delivered. This is alongside individualised coaching in constantly striving to continually improve practice. Responsive feedback approaches, delivered through out highly effective one-to-one horizons approach, ensure each adult knows the relevant next steps to maximise learning opportunities.

Using research from Dan Williamson's Models of Memory, Sweller's Cognitive Load Theory, Rosenshine's Principles of Instruction and the thinking behind Ebbinghaus' Forgetting Curve, the curriculum is implemented effectively through a set of core concepts, developed for each curriculum area. This enables children to assimilate new information into

growing schema as they move through the academy. By presenting new information to students as another example of these core concepts it allows them to process information in relation to previously learned knowledge and make connections.

The core concepts for science:

<table>
<tr><th colspan="3">Big Ideas & Core Concepts in Science</th></tr>
<tr>
<td>The universe follows unbreakable rules that are all about forces, matter and energy.
 
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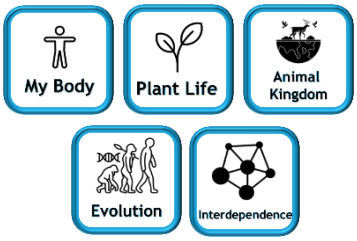
<td>All matter in the universe is made up of tiny particles whose appearance can change if the particles change.
 
</td>
<td>Living things all started from the same start point but have evolved over millions of generations to survive in their environment.
 
</td>
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<tr>
<td>Earth is one of eight planets that orbit our sun in a vast universe. It's movement within that orbit determines climate, seasons, night and day.
 
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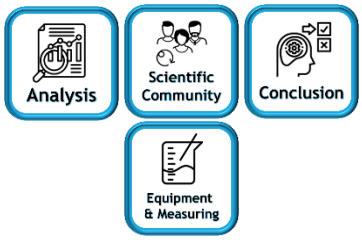
<td>Science seeks to explain everyday phenomena but as our knowledge, technology and skills advance so do our theories.
 
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 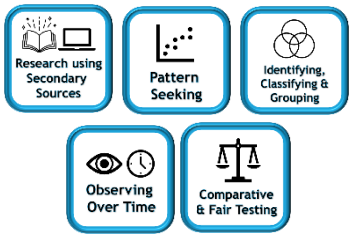
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The curriculum topics are mapped to ensure by the end of year 6 children will understand the big idea for each domain through the connected core concepts. However, it is important to remember some concepts (such as energy) can be covered in multiple domains. We plan for progression using the key points outlined in the impact section below. Lesson content is planned towards these progression points and follows the model of direct instruction, shared and modelled practice before culminating in independent practice and mastery. Specific knowledge is acquired through the knowledge organisers in each curriculum area and unit of study to ensure broad and balanced coverage and as a tool for children to add to, revise and structure that knowledge.

Subject Delivery

Lesson Timings	Type of delivery
Science is taught weekly for an hour per lesson. In additional to this, there are links within PE and PSHE.	The Science lessons are predominantly discrete to enable focus on the knowledge for each area and concept, although vocabulary is continually developed using sentence stems and tiers universally across the subject areas.

Annual Organisation per year group

Term	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	My body and the senses	Growing and changing	Skeletons & Muscles	Digestion and teeth	Living things	Electricity
Autumn 2	Animal groups	Use of everyday materials	Rocks & Soils	States of mater	Earth & Space	Circulatory system
Spring 1	Space	Materials for building	Super Scientists	Living sustainably	Healthy Me	Evolution & Inheritance
Spring 2	Objects made of materials	Save the planet	Forces & Magnets	Sound	Forces	Classification
Summer 1	Plants	Growing plants	Plants	Classifying living things	Growing & changing	Working like a scientist

Summer 2	Seasonal change	Living things and their habitats	Light	Electricity	Changing materials	Light

Impact

The ultimate test of the impact of the curriculum is in whether the students know what you want them to know, and what you think they should know. This has been carefully mapped against the core concepts for Science in the tables on the following pages.

To determine this, we check and monitor children's learning, providing teachers and students with information about progress and analysis of deliberate retrieval practice. We need to be able to fluidly use 'checking for understanding' techniques in the moment as well as being able to know what has been learnt and retained over time and the depth of that learning:

- We use checking for understanding techniques through Socrative quizzes and hinge questions to ensure we are aware of all students learning during the lesson and adapt the pace as necessary.
- Retrieval practice is built in where most impactful to interrupt the forgetting curve and secure constructs in long term memory.
- Depth of knowledge is then assessed through spaced quizzing, end of unit assessment quizzes and Student Portfolios in Showbie.

Science Specific Impact Measures

In Science quizzing is used as a method of assessing pupils understanding at the end of a core concept to analyse the extent to which knowledge has been consolidated into long-term memory. Retrieval practice tasks throughout the lessons also interrupt the forgetting curve to enable faster access to prior learning. Depth tasks at the end of particular units across the year pull together the learning for the subject under the core concept areas to consolidate learning and to prepare children to make links to the future learning in subsequent years.

Core concept	End point
	Understand how energy flows through living things, powers our world, and shapes how we see, hear, and grow. They will explore light, sound, food, circuits, and particles, gaining vital knowledge to make sense of their bodies, the environment, and everyday life.
	Children will understand how forces shape the world through pushes, pulls, and motion. They'll explore contact and non-contact forces, gravity, magnetism, friction, and simple machines, developing skills to measure, investigate, and explain how forces affect everyday life and living things.
	Children will confidently explore, describe, and test a wide range of materials, understanding their properties, uses, and changes. They'll investigate natural and synthetic materials, recycling, states of matter, and light interactions—developing scientific thinking and language to make sense of the material world around them.
	Children will understand how heating and cooling affect materials, causing changes in state. They'll explore seasonal changes, reversible reactions, and how the water cycle works—gaining insight into the natural processes that shape our world through hands-on activities like cooking with food they've grown.
	Children will understand how fuels provide energy through combustion, identify pure and impure substances, and use separation techniques to explore mixtures. They'll investigate dissolving, solutions, and irreversible chemical reactions, gaining insight into how substances change and interact in the world around them
	Children will understand how plants grow, reproduce, and adapt in different environments. They'll explore the plant life cycle, identify key parts and functions, and compare global plant growth—developing a rich, hands-on appreciation for how plants support life on Earth.

	Children will understand how genetic material is passed on through reproduction, how traits vary and evolve, and how life adapts to survive. They'll explore evolution, extinction, and fossil evidence—gaining insight into the diversity and development of life across Earth's geological history.
	Children will understand how to keep their bodies healthy through good nutrition, hygiene, exercise, and lifestyle choices. They'll explore body parts, senses, the skeleton, organs, and human development—building lifelong knowledge for making informed decisions about their physical and emotional wellbeing.
	Children will understand how animals and plants grow, reproduce, and adapt to their habitats. They'll explore life cycles, diets, classification, and global animal diversity—developing curiosity, observation skills, and scientific language to describe living things and the natural world around them.
	Children will understand how food chains reflect the balance of ecosystems, the role of microhabitats, and the importance of each organism. They'll explore predator-prey relationships, human impact on nature, and how living things depend on one another to survive and thrive.
	Children will understand Earth's place in the universe, how day, night, and seasons occur, and what makes up our solar system. They'll explore planets, moons, and celestial bodies, gaining a deeper appreciation for space, astronauts, and the vastness of the cosmos beyond our atmosphere.
	Children will understand how to care for the environment through sustainability and recycling, recognise renewable and non-renewable resources, and explore the Earth's structure. They'll investigate rocks, soils, water conservation, and fossil formation—gaining knowledge to help protect and preserve our planet.
	Children will understand seasonal changes, weather patterns, and the Earth's movement. They'll explore global environments, hibernation, migration, and climate change—developing observation skills, curiosity, and awareness of how nature shifts throughout the year and how our planet responds to environmental changes.
	Children will understand the roles of different scientists, the tools they use, and how scientific ideas evolve over time. They'll explore space, classification, medicine, and communication—building appreciation for scientific discovery and how it shapes our understanding of the world.
	Children will confidently use a range of scientific tools and methods to observe, measure, sort, and investigate. They'll collect, compare, and present data effectively—developing skills to explore the world around them with accuracy, curiosity, and a systematic approach to scientific enquiry
	Children will confidently collect, sort, and present data using tables, pictograms, and bar graphs. They'll analyse patterns, draw conclusions, and spot anomalies—developing key skills to interpret information, make comparisons, and explain their findings using clear data vocabulary and visual representations.
	Children will confidently form hypotheses, interpret data, and draw logical conclusions. They'll present findings clearly, using diagrams, evidence, and structured explanations—developing the ability to think critically, justify ideas, and communicate scientific understanding in creative and meaningful ways.