Science Curriculum

Introduction

A FEDMAS scientist ...

… is aspirational, curious and raises questions to develop their scientific knowledge. Their love of learning is rooted in confidence and resilience. They show competence in a full range of practical skills, for example, planning and carrying out scientific investigations. They have love to grow in their scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings. They have a passion for science and its application in past, present and future technologies.

At The Federation of Middleham (VA) Junior School & Spennithorne (VA) CE Infant Schools, we acknowledge and celebrate that each child is unique and that they learn in different ways. We provide a rich and varied science learning experience that allows children to develop their knowledge, skills and abilities to their full potential. Our science curriculum is ambitious and designed to meet the diverse needs of the children who attend our schools. It aims to provide all pupils with the knowledge, skills and cultural capital they need to succeed in their lives.

The Federation of Middleham (VA) Junior School & Spennithorne (VA) CE Infant Schools follow the national curriculum and Early Years Framework to ensure knowledge; skills and understanding are taught throughout all key stages. The school has created its own long and medium term planning which details the topics, objectives, knowledge, skills and vocabulary which should be covered. Through this planning, the national curriculum breadth of study for science is fully covered.

Our core aims are to provide teaching and learning opportunities through the science curriculum that empowers the children to be:

ASPIRATIONAL **RESPECTFUL** **RESILIENT**

We believe that by having these three aims at the root, will equip our pupils to LIVE FRUITFUL LIVES and to LEARN, LOVE and GROW.

Our Curriculum

The science curriculum, delivered using Developing Experts, is designed to develop curious, confident and scientifically literate pupils who can explore and explain the natural and physical world. It is structured around three golden threads — love for ourselves and our community, love for our country, love for our world — which shape content choices, pedagogical emphasis and assessment of learning. Our self-designed curriculum is organised around a whole school, thematic progression:

Autumn	Spring	Summer
Love for ourselves and our community	Love for our country	Love for our world
Ourselves – human body Rocks (local area study) Materials	Materials Processes + investigations	Plants Habitats Animals

Our two-year rolling cycle maps biology, chemistry and physics across the school year with an intentional seasonal and developmental structure. Working scientifically skills progress across year groups so that the same topic (for example, rocks) is taught at an age-appropriate cognitive and practical level for each year group. Content repetition across the two-year cycle is used deliberately to deepen understanding while advancing investigative complexity. We aim to secure foundational skills in science by starting the sequence with the human body in autumn, capitalising on pupils' immediate interests in themselves and community health, which is highly engaging for younger pupils and builds social-emotional links to science for all ages. Spring term's emphasis on physical processes works well with hands-on, indoor and outdoor experiments during variable weather, allowing children to build on their investigative and enquiry skills. Summer term's outward focus supports application of investigative skills to outdoor fieldwork and wider questions about global environmental issues, including living things and their habitats.

Biology	Chemistry	Physics

	Autumn		Spring		Summer	
	Cycle A	Cycle B	Cycle A	Cycle B	Cycle A	Cycle B
Reception						
KS1	Seasonal changes Y1	**Everyday materials**	**Everyday materials**	**Animals including humans (animal focus)**	**Plants**	Living things and their habitats Y2
	Animals including humans (human focus)	**Animals including humans (human focus)**			**Animals including humans (animal focus)**	**Plants**
LKS2	Animals including humans (nutrition) Y3 POS)	Rocks (local exploration) Y3	Light Y3	Electricity Y4	**Plants**	Forces and magnets Y3
	Living things and habitats (local focus) Y4	Animals including humans (human focus digestion and teeth Y4 POS)	Sound Y4	States of matter Y4	Animals including humans (animal focus – skeletons etc) Y3	**Plants**
UKS2	Animals including humans Y5	Animals including humans Y6	Light Y6	Forces Y5	Living things and habitats Y5	Living things and habitats Y6
	Evolution and inheritance Y6		Electricity Y6	Properties of materials Y5	Earth and space Y5	

Progression and inclusion are secured by termly mapping of skills and knowledge in our progression documents and medium-term planning. These documents show age-appropriate end points and how concepts deepen across mixed-age classes so teachers can plan adaptive approaches that secure foundational skills for pupils with SEND without denying them age-appropriate content.

What are our aims for our science curriculum?

At The Federation of Middleham CE (VA) Junior School and Spennithorne CE (VA) Infant Schools, we want to develop children who understand the natural and physical world, can ask and answer questions scientifically, and who act with curiosity and responsibility towards their local and global environment. Science is taught to cultivate evidence-based thinking, practical problem solving, and a lifelong interest in learning. we want our pupils to know their place in the world— physically, culturally and environmentally — so they can make informed choices that benefit themselves, their community and the wider planet. By progressing through "love for our country" to "love for our world," pupils develop personal wellbeing, local civic identity and global environmental responsibility alongside robust scientific understanding. Pupils will acquire disciplinary and substantive knowledge in biology, chemistry and physics through a coherent, sequenced curriculum that balances knowledge acquisition and inquiry skills.

The curriculum aims for depth over superficial coverage: pupils revisit core concepts regularly, deepening understanding and application each year, so even our youngest pupils experience ambitious, meaningful science. Our self-designed cycle is intentionally built for mixed-year classes: our progression documents ensure that pupils in mixed-age classes are accessing curriculum content at their age-appropriate level. Termly

mapped objectives enable teachers to adapt activities and scaffolds for pupils with SEND and for those needing greater stretch, ensuring all pupils access age-appropriate curriculum aims while securing foundational scientific skills first.

How do we deliver our geography curriculum?

Quality-first teaching

Our universal offer ensures that all pupils have access to high-quality science teaching. Lessons follow a clear 'I do, we do, you do' sequence, enabling teachers to model new knowledge and skills before pupils practise with support and move towards confident independence. Rosenshine's Principles of Instruction underpin teaching and learning, with small steps of learning, regular questioning, modelling and opportunities for guided and independent practice. Well-sequenced units, clear explanations, purposeful vocabulary and appropriate resources help all pupils to develop secure knowledge and skills.

Adaptive teaching

Science lessons are designed to enable all pupils, including those with SEND, to access and engage with the same ambitious curriculum. Teachers identify potential barriers to learning and use adaptive strategies such as explicit instruction, modelling, carefully selected visuals, worked examples and diagrams, pre-teaching of vocabulary, chunking of information and scaffolds for extended responses. Practical investigations are planned inclusively, with appropriate adaptations to ensure all pupils can participate in scientific enquiry and develop working scientifically skills. These may include visual prompts, adapted recording methods, additional modelling, accessible equipment or carefully considered groupings and adult support. Adaptations are responsive to individual need and are used purposefully, with scaffolds reduced as pupils develop knowledge, confidence and independence.

Retrieval practice

Retrieval practice is used at the start of each lesson to strengthen pupils' retention of scientific knowledge and help them make connections between previous and new learning. Lessons provide opportunities to revisit key vocabulary, scientific concepts and prior learning through questioning, low-stakes quizzes and retrieval activities. Teachers deliberately draw upon knowledge from previous lessons, units and year groups using a 'Flashback Four' format. Retrieval opportunities are mapped out in the curriculum overview for each term, and progression documents support teachers in identifying core knowledge to revise before each new unit. This enables pupils to build increasingly complex scientific understanding and apply previously learned knowledge to new scientific concepts, enquiries and investigations.

Assessment

Assessment is embedded throughout the science curriculum and is used to identify what pupils know, understand and can do, as well as misconceptions or gaps in knowledge. Teachers use questioning, retrieval activities, pupil discussion, written work and scientific enquiry tasks to assess understanding during lessons and adapt teaching accordingly. Teachers track progress termly using Insight, assessing core knowledge and skills. Curriculum leaders analyse data to identify trends and gaps across year groups, providing feedback to teachers to inform future planning.

Enrichment opportunities

Enrichment opportunities enable pupils to experience science beyond the classroom and apply their knowledge in meaningful contexts. Educational visits, visitors, and local studies (e.g. collecting data through minibeast hunts and habitat surveys) are used where appropriate to deepen curriculum learning. For example, we plan a

STEM week with practical investigations, organize experiences for pupils such as a mobile planetarium, and complete projects around sustainability, e.g. developing minibeast habitats and planting pollinator-friendly plants. These experiences help pupils develop working scientifically skills, particularly enquiry, observation and evaluation, and encourage scientific curiosity, confidence and enjoyment.

Contextual safeguarding

Curriculum planning takes account of the school's local context, and the potential risks pupils may encounter within their environment. Pupils are supported to recognise and manage risks within their school, home, local community and online environments. Through practical investigations, outdoor learning and enrichment opportunities, pupils develop an understanding of how to keep themselves and others safe. This includes electrical safety, safe handling of materials, environmental awareness, personal hygiene and the responsible use of scientific information. Pupils are also taught how to conduct investigations safely, following instructions to use age-appropriate equipment correctly and accurately. Fieldwork and educational visits are carefully risk assessed, and teachers remain alert to safeguarding issues that may arise through scientific content, creating opportunities for pupils to discuss these within a safe and respectful environment.

British Values

British Value	**Opportunities to demonstrate this through geography**
Democracy	1. Pupils vote on scientific questions they would like to investigate and contribute to planning their enquiries. 2. Pupils work collaboratively, sharing ideas and making group decisions about how to carry out fair tests.
Rule of Law	1. Pupils follow safety rules when handling scientific equipment and materials, understanding why these are important. 2. Pupils learn about environmental protection and the importance of rules and laws that protect wildlife and habitats
Mutual Respect	1. Pupils listen respectfully to others' predictions, explanations and conclusions during scientific discussions. 2. Pupils collaborate during practical investigations, valuing everyone's contributions and supporting one another.
Individual Liberty	1. Pupils develop independence by choosing their own scientific questions, equipment and methods of investigation. 2. Pupils use scientific knowledge to make informed choices about healthy eating, exercise and personal wellbeing.
Tolerance of Different Faiths and Beliefs	1. Pupils learn about scientists from diverse cultures, faiths and backgrounds, recognising their contributions to scientific discoveries. 2. Pupils respectfully explore different cultural and religious perspectives when discussing topics such as Earth and space or evolution, while understanding that scientific explanations are based on evidence.

Equal Opportunities

The science curriculum is designed to ensure that all pupils have equal opportunities to participate, achieve and develop as scientists, regardless of their background, gender, ethnicity, SEND or disadvantage. Pupils are supported to access the same ambitious curriculum through appropriate adaptations, including during investigations and enrichment opportunities. Curriculum content reflects a diverse range of places, communities, cultures and perspectives, helping pupils to develop respect for different ways of life and challenge stereotypes or misconceptions.