Science Curriculum

West Meadows Primary School


Intent: Knowledge, skills and the National Curriculum

We encourage children to remain inquisitive throughout their time at West Meadows and beyond. Our science curriculum encourages pupils to have a healthy curiosity about the world around them and to appreciate both living and non-living things. Science teaching, through our approach, ensures the development of knowledge, key concepts, and scientific enquiry skills.

Our approach to the Science curriculum ensures that it is taught discretely to ensure depth and rigour. Underpinned by the accelerated learning approach to teaching and learning, the West Meadows progressive curriculum document supports the progression of substantive content and concepts, which have been carefully selected and well-sequenced, so a child should know more and revisit knowledge and concepts to ensure depth and rigour over time.

The key concepts, principles and themes from the National Curriculum have been developed into a progressive schema through which the children are helped to grow and develop to succeed in 21st century Britain. This curriculum with a focus on knowledge acquisition allows a creative way of teaching and learning, enabling us to deliver a more meaningful and enquiry-based approach for the science curriculum.

The science curriculum we offer is designed to meet the needs of all our pupils by providing purposeful contexts which engage our children. It is rich, varied, imaginative and ambitious and meets the needs of individual learners but can easily be adapted for pupils with additional needs. Through regular assessment, tasks are matched to the ability of each child through differentiated activities, providing a level of challenge that is stimulating for pupils.

HCAT Science Curriculum Coverage	Year 1		Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1	Animals including humans	Seasonal Changes (2 weeks per half term)	Animals including humans	Animals including humans	Animals including humans	Animals including humans	Animals including humans
Autumn 2	Animals including humans		Animals including humans Plants	Forces & Magnets (Forces)	Electricity	Forces and magnets	Electricity
Spring 1	Plants		Plants	Plants	Materials: States of matter (Properties & Comparison)	Plants	Plants
Spring 2	Plants		Living things and habitats	Force & Magnets (Magnets)	Living things and habitats	Earth & Space	Living things and habitats
Summer 1	Materials: Properties and changes		Living things and habitats	Light	Sound	Earth & Space Materials: Properties and changes	Light
Summer 2	Materials: Properties and changes		Use of everyday materials	Rocks Evolution & inheritance	Materials (Changes)	Materials: Properties and changes	Evolution and inheritance

Birdwell Science Coverage

At West Meadows, we have collated various substantive concepts into categories to consider when planning scientific units. Teachers might cover a range of key concepts during the study of a key focus in biology, chemistry or physics and some of these will be revisited in children's later studies to ensure progression in science.

Example of a science curriculum organiser

Children will learn and develop key knowledge that has been identified within each unit and throughout each year group. At West Meadows, we ensure that children's Working Scientifically skills are reinforced and improved throughout their school careers so that they can apply their scientific knowledge when performing experiments, constructing hypotheses, and confidently expressing key concepts.

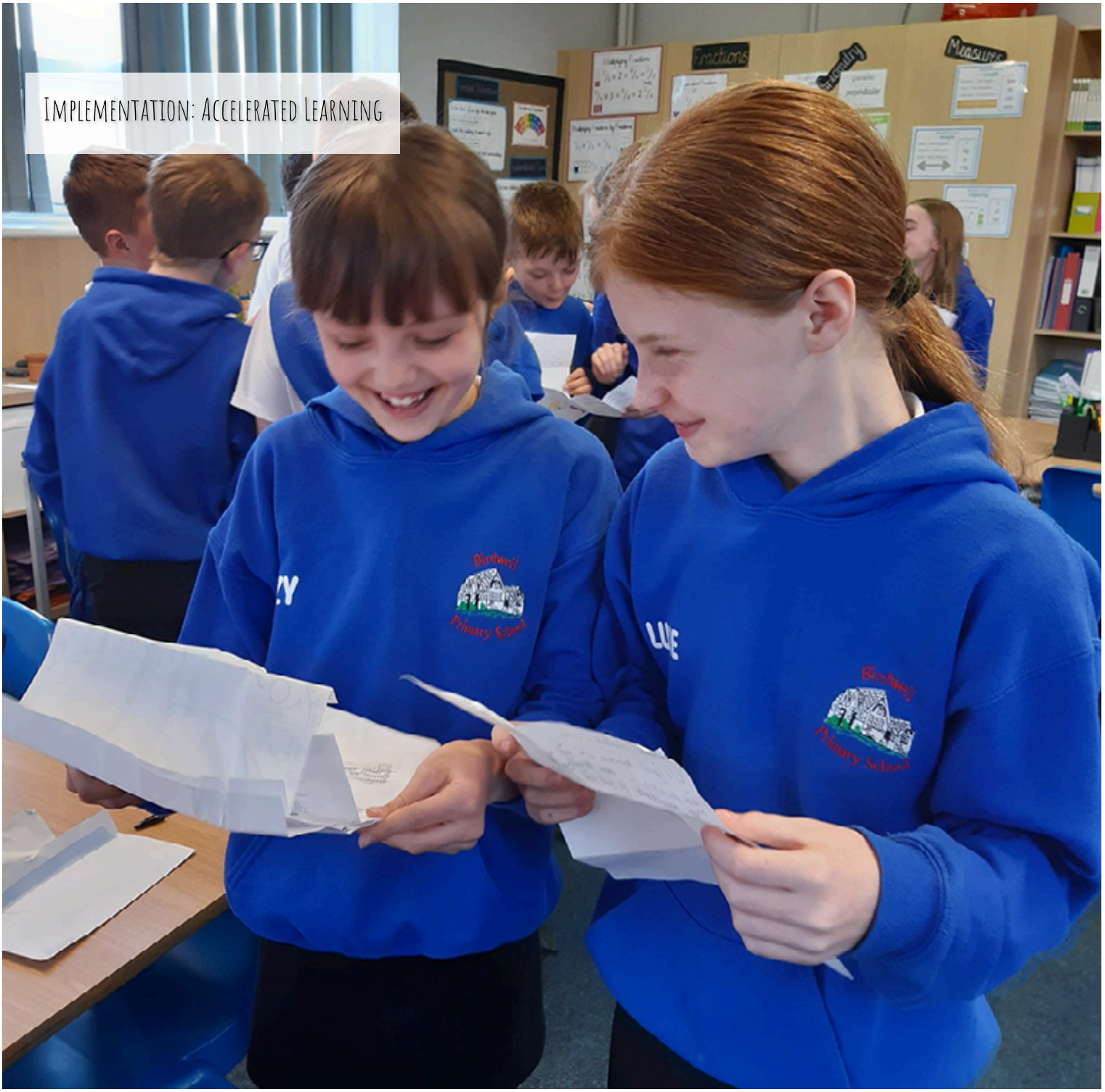
Our school's Science curriculum is designed to foster a deep understanding and appreciation of the natural world through the lens of biology, chemistry and physics. In alignment with the National Curriculum for England, we aim to develop pupils' scientific knowledge and conceptual understanding across these key disciplines. Our intent is to equip students with the skills to explain scientific phenomena, predict outcomes and analyse causes, thereby cultivating a scientific mindset from an early age.

To achieve this, our school implements the Primary Science Quality Mark strands for the development of scientific enquiry. We place particular emphasis on observing changes, grouping and classifying, conducting research using various sources, carrying out fair tests, seeking patterns and encouraging students to ask probing questions. By fostering these essential scientific skills and knowledge, we aim to lay a strong foundation for our students' future academic and personal growth in an increasingly scientific and technological world.

Science is taught through AT1 (Scientific enquiry) which allows children to test and explore scientific theories. West Meadows celebrates Science Week each year and a whole school focus is given to developing specific skills and knowledge.

The HCAT progressive documents supports the progression of knowledge and skills a child should learn in Science throughout their time at school. The progressive skills have been enhanced from the National Curriculum to ensure coverage is appropriate for each year group.

Implementation: Accelerated Learning



Science is taught discretely in three categories: biology, chemistry and physics. It is delivered to raise interest, self-esteem, creativity and aspirations of all our children. The science curriculum is rich and varied, which provides our pupils with the skills required for life in the 21st Century.

The Accelerated Learning Cycle, based on the work of Alastair Smith, is applied in all lessons. It stems from the idea of a supportive and challenging learning environment. The cycle has active engagement through multi-sensory learning, encourages the demonstrating understanding of learning in a variety of ways and the consolidation of knowing.

A gather, skills, apply approach to planning and delivery of lessons is taken across school to ensure children develop a deep understanding of specific skills and are able to apply these in a range of scientific situations.

Ultimately, scientific knowledge and enquiry skills are at the heart of the learning process with the children exploring a wide range of topics, to prepare them for life.

Our curriculum is designed with a core focus on retrieval practice, recognising its pivotal role in helping students know more and remember more. This intent is actualised through a dual approach: integrated retrieval within individual lessons and a structured, subject retrieval practice rota. In-session retrieval activities are carefully crafted to reinforce key concepts and knowledge, promoting immediate recall and application. Complementing this, our weekly retrieval practice rota systematically revisits content across various subjects, ensuring spaced repetition and interleaving of crucial information. This comprehensive strategy aims to strengthen neural connections, facilitate the transfer of knowledge to long-term memory and build increasingly complex mental models. By embedding retrieval practice as a fundamental aspect of our curriculum, we strive to enhance our pupils' ability to retain, recall and apply their learning effectively, thereby fostering deeper understanding and more robust academic progress.

Our curriculum is ambitious for all pupils, including those children with SEND. Curriculum designers and teachers have high expectations of what SEND pupils can achieve and the curriculum is not diluted or unnecessarily reduced for SEND pupils. Every pupil is different and so what works for each pupil varies. Pupil's individual needs are considered and adaptations are planned to ensure the success of pupils in all subjects.

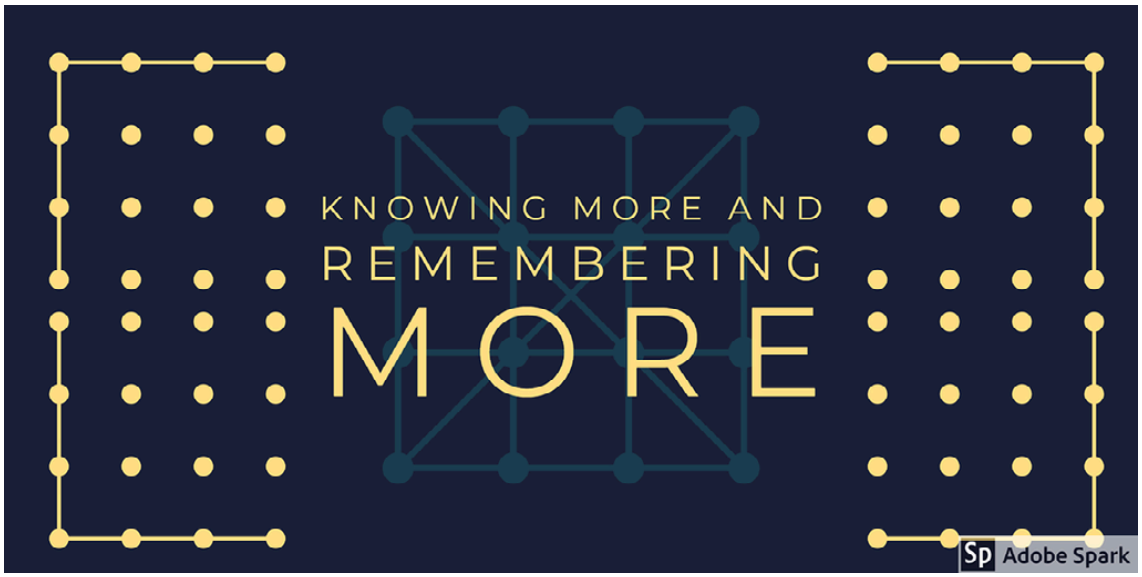
The way that our curriculum is designed ensures that chunks of learning are sequenced in a coherent way to enable all pupils, including those with SEND, to build on prior knowledge. Too much information at once can be a barrier to learning which is one of the reason why we have chosen half termly curriculum drivers.

Where pupils are identified with having complex needs, it may be appropriate to provide a personalised curriculum which will be based on individual needs and will retain ambition for the pupil.

Where working memory is an issue for pupils, including those with SEND, we look to reduce extraneous load as much as possible as well as identifying key information when teaching. This helps pupils to pay attention to the content which they are expected to learn. Adaptations to support individual pupils will be recorded on personal school support plans.

We do not assume that pupils with SEND learn content better through practical work as this can cause distraction and cognitive overload rather than increase clarity or accessibility. The curriculum is not narrowed for any pupils. Knowledge is taught and then pupils are provided with opportunities for scientific enquiry to test and investigate the knowledge taught. Pupils specific needs determine the types of adaptations which are required. These adaptations are in how the subject is taught rather than the content pupils are expected to learn. Where appropriate, learning will be chunked into smaller steps and pre learning and consolidation time in planned in to support need. Time is also planned to ensure pupils with SEND are pre taught vocabulary to support their understanding. Adaptations may include supporting pupils to pay attention to key aspects as well as reducing excessive or unhelpful demands on working memory.

Impact: Assessment



Formative assessment is ongoing throughout each lesson. It judges progress and enables the teacher to make flexible adaptations to thier planned teaching.

Through this regular ongoing assessment, tasks are matched to the ability of each child through adapted activities and including adult support, thus providing a level of challenge that is stimulating for pupils and questioning skills

Our schools are dedicated to providing a high-quality curriculum that is ambitious for all pupils. We have a robust system in place to ensure children are making strong progress in their foundation subjects using the Arbor MIS platform to conduct summative assessments at key points in the year. The purpose of these assessments is for our subject leaders and teachers to analyse pupil understanding against our assessment statements, which are progressively devised from our taught curriculum. This allows children to acquire knowledge that builds upon the fundamentals of their prior knowledge in a well designed curriculum sequence.

Our Progressive Skills Curriculum

	Science Curriculum in EYFS			
	Understanding the world (educational programme) The natural world : Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries, and museums to meeting important members of society such as police officers, nurses, and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes, and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.			
Skills and knowledge (Fluid across FS1 FS2)	**What does this look like in provision/adult interactions?**	**Transition into Year 1**	**Characteristics of effective learning**
- Explore materials with different properties. - Explore natural materials, indoors and outside (0-3).	- Treasure Baskets for repeated exploration of textures, sounds, smells, and tastes. - Offer lots of different textures for exploration with fingers, feet, and whole body e.g. wet and dry sand, water, paint, and playdough.	Biology - I can explain what a plant is (A plant is a living organism that usually grows in a permanent site, using water for food). - I can identify and name some common plants and trees. - I can name some native plants to the UK. - I can describe the basic structures of a plant. - I can name some common animals. - I can identify and name different animals that are carnivorous, herbivorous, or omnivorous. - I can name the different parts of an animal's body. - I can recognise and name parts of the body. - I can name the five senses. - I can say which part of the body is associated with each sense. Chemistry - I can identify what material an object is made from. - I can identify a range of common materials. - I know the names of different everyday materials. - I can describe materials by saying what they look like and what they feel like. - I can compare materials using the physical properties of them. - I can use my knowledge of the properties of materials to sort them into groups. - I can explain how I have grouped materials based on their physical properties.	Children in EYFS learn at different rates and abilities through: • **Playing and exploring –** children investigate and experience things, and 'have a go'. • **Active learning** – children concentrate and keep on trying if they encounter difficulties and enjoy achievements. • **Creating and thinking critically** – children have and develop their own ideas, make links between ideas, and develop strategies for doing things.
- Use all their senses in hands on exploration of natural materials. - Explore collections of materials with similar and/or different properties. - Explore how things work (3-4).	- Provide interesting natural environments for children to explore freely outdoors. Make collections of natural materials to investigate and talk about. - Provide equipment to support these investigations: magnifying glasses. Encourage children to talk about what they see. Model observational and investigational skills. Ask out loud: "I wonder if...?" Plan and introduce new vocabulary, encouraging children to use it to discuss their findings and ideas. - Provide mechanical equipment for children to play with and investigate e.g., wind-up toys, pulleys, sets of cogs with pegs and boards.		
- Plant seeds and care for growing plants. - Understand the key features of the life cycle of a plant and an animal. - Begin to understand the need to respect and care for the natural environment and all living things (3-4).	- Show and explain the concepts of growth, change and decay with natural materials: plant seeds and bulbs so children observe growth and decay over time, eggshell experiment on science week (seeing how different liquids effect eggshells). - Life cycle of a chick, have incubators in linked around learning and topic. Plan and introduce new vocabulary related to the exploration. Other options to investigate life cycle e.g. butterfly.		
- Talk about the differences between materials and changes they notice (3-4). - Explore and talk about different forces they can feel (3-4).	- Draw children's attention to forces e.g., how the water pushes up when they try to push a plastic boat under it, how they can stretch elastic, snap a twig, but cannot bend a metal rod. - Provide children with opportunities to change materials from one state to another e.g. cooking – combining different ingredients, and then cooling or heating (cooking) them melting – leave ice cubes out in the sun, see what happens when you shake salt onto them. Link to science week.		
- Explore the natural world around them. - Describe what they see, hear, and feel whilst outside. - Understand the effect of changing seasons on the natural world around them (4-5).	- Provide children with have frequent opportunities for outdoor play and exploration. - Create opportunities to discuss how we care for the natural world around us. - Offer opportunities to sing songs and join in with rhymes and poems about the natural world. After close observation, draw pictures of the natural world, including animals and plants. - Look for children incorporating their understanding of the seasons and weather in their play.		
Early Learning Goals • Explore the natural world around them, making observations and drawing pictures of animals and plants • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.			

Science Curriculum Progression in Early Years

Science - Biology

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals including humans	Type	I know common animals such as: fish, amphibians, reptiles, birds and mammals. I know different animals that are carnivorous, herbivorous or omnivorous.					
	Structure	I know different parts of an animal's body. I know the key features of an animal's body (bird: wings, beak. Fish: fins, gills etc).		I know some animals have skeletons and muscles. I know how skeletons and muscles support, protect and allow the body to move. I know how to name and label main bones based upon their functions (protective: spine, skull, ribs, pelvis. Other for support: femur, tarsals, etc.)			
	Needs		I know the basic needs required for animals to survive (food, water, air). I know what an animal needs to grow and survive.	I know the similarities and differences between the diets of different organisms. I know how diet can affect the health of animals. I know what nutrition is and where it comes from: different types of foods. I know sources of nutrition: carbohydrates, protein, fats, dairy, fruit & veg, oils and spreads, sugar. I know the different ways that animals obtain their food.	I know producers, predators, prey, and examples of these. I know how to interpret food chains and gain information. I know how to construct different food chains and label animals with their titles (producer, primary consumer, secondary consumer, tertiary consumer).		
	Reproduction		I know why animals have offspring. I know how to match parent animals to their offspring. I know how to identify animals that give birth to live offspring and those that lay eggs.			I know how to identify and describe a life cycle for a mammal, an amphibian, an insect and a bird. I know how to compare the differences between the life cycles of a mammal, an amphibian, an insect and a bird. I know how animals reproduce.	
	Humans	I know parts of the body: head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, nose and teeth. I know the five senses: feel, smell, see, taste and hear. I know which part of the body is associated with each sense (feel: every part of the body, NOT hands).	I know the importance of exercise for humans. I know how different exercises effect different parts of the body. I know how to group foods into more or less healthy. I know how to group foods into types and quantities to maintain a healthy lifestyle. I know the importance of keeping myself clean.		I know what the digestive system does. I know simple functions of each part of the digestive system: mouth, teeth, tongue, oesophagus, stomach, large and small intestine, anus). I know the different types of teeth in the human body: incisors, canine, pre-molar and molar. I know the functions of different types of teeth.	I know the human life cycle: foetus, baby, infant, toddler, child, teenager, adult, elderly and death. I know ways in which the human body changes as it ages.	I know the functions of the heart, lungs and circulatory system. I know the different structures within blood: red blood cells, white blood cells, plasma and platelets. I know the purpose of blood in transporting nutrients within the body. I know the ways in which diet, exercise, drugs and lifestyle can affect how the body functions. I know the impact diet, exercise, drugs and lifestyle has on the human body.

Science (Biology) - Progressive Curriculum document example