Science Curriculum Map

Intent:

The curriculum has been designed to empower pupils with virtues that enable them to excel academically and spiritually inspiring them to serve humanity selflessly, with an abundance of love, compassion and forgiveness.

Our curriculum is constructed around our vision to ensure we remain:

Faith-inspired: learning from the wisdom of religion

At Primley Wood we aim to foster holistic growth and character development. We focus on nurturing compassionate, responsible human beings who aspire for excellence in all aspects of life. Exploring religious wisdom allows pupils to respect diverse faith traditions and the beliefs of those without faith.

Virtues-led: We aim to develop pupils to become compassionate, responsible human beings

This is done through promoting virtues which we believe form the foundation of all goodness and prepares children for lifelong learning. Our curriculum is carefully enriched to allow experiences where our pupils, teachers and parents alike learn to grow through a conscious focus on virtues. Our virtues-led education approach helps to provide guidance to enable pupils to understand their choices in order to help lead better lives. Our pupils become self-reflective and flourish; they are able to build strong, meaningful relationships and understand their responsibilities to the wider world.

Aspiring for Excellence: in all that we do.

Our pupils and staff alike aim to become the best human beings they can possibly be, in all aspects of spiritual, social, intellectual and physical life. We foster a school culture which inspires optimism and confidence, hope and determination for all to achieve their best possible. This is accomplished through a rich and challenging curriculum, along with excellent teaching to nurture awe and wonder. Pupils gain a breadth and depth of knowledge and a love of learning to achieve their full potential.

The curriculum at Primley Wood Primary School has been carefully crafted to be broad, balanced and stimulating, giving every pupil the opportunity to be knowledgeable, multi-skilled, highly literate, highly numerate, creative, expressive, compassionate and confident people.

The science curriculum is designed to give pupils a strong understanding of the world around them and promote curiosity. As pupils move through the science curriculum, they will acquire and practice the use of specific knowledge and skills from the disciplines of biology, chemistry and physics to help them think scientifically, explain what is occurring and predict how things will behave. The curriculum is sequenced in a way to allow learners to regularly revisit topics, therefore new knowledge and skills are built on what has already been taught. Each unit has built in practice, retrieval and reinforcement of the key concepts to ensure knowledge sticks in the long-term memory.

The curriculum is necessarily aspirational, focused on excellence and on securing in all learners a love of learning through the acquisition of knowledge and an understanding of the world around them.

Implementation

The science curriculum at Primley Wood is based upon the principles of a spiral curriculum so that each year pupils will build on existing components of knowledge formed in ever-increasing depth and complexity to develop fluency in the fundamentals of science. Retrieval and practice help to promote recall and application of knowledge and skills. There is an even coverage of all three sciences to ensure there is sufficient mastery of each discipline.

In all year groups, the 'Developing Experts" scheme is used to guide the teaching of science. The scheme provides full coverage of the National Curriculum, following the programmes of study for each year group carefully. It provides the right balance between working scientifically and learning scientific facts. It links directly to scientific knowledge, skills and understanding to ensure that learning is progressive and continuous.

Our curriculum gradually builds on prior learning, embedding new knowledge into larger concepts. Substantive knowledge is sequenced so that pupils can establish links between concepts from different topics. Connections are made between years and stages so that core scientific principles are regularly highlighted and revisited. For example; Animals, including humans' units begin at a basic level in Year 1 and build through the year groups to more complex concepts in Year 6. The variety of ways new learning is presented is designed to help pupils remember new concepts in the long term: these include text, images, videos, games, quizzes and practical experiments. The research behind Rocket Thinking activities has shown that generating open-ended discussions with learners helps them with the retention of knowledge. Rocket Thinking discussions enable learners to make links between scientific concepts and provide an opportunity for them to see the relevance of these concepts in the real world.

Teachers are supported through high-quality documents and resources. Expert films are embedded within every lesson to demonstrate how the lesson's knowledge is relevant to the wider world. These experts show the application of the scientific topic within their workplace and showcase 3 potential employment opportunities.

Curriculum overview

EYFS					
Our Body - Learn about your body parts – arms, legs, chest, hands, feet, eyes, nose, ears, mouth and hair. - Discover how our bodies change. - Explore our similarities and differences Weather and Seasons - Seasonal changes in Autumn and Winter	Weather and Seasons - Describe why the air moves - Discover how rainbows are formed. The Senses - Learn about the senses of sight and touch - Explore ways to make sound. - Discover the senses of hearing and sight. - Explore the senses of smell and touch - Learn about your sense of taste.	Weather and Seasons - Learn about rain, ice and water. - Explore snow and melting. Materials - Explore the process of melting. - Learn about different materials. - Discover how to make the perfect sandcastle.	Machines - Explore different types of machines and mechanisms. - Learn how machines make jobs easier. - Discover different types of transport. Forces - Understand what happens when you pull or push something. - Explore objects that float and sink. Space - Explore outer space. - Discover why rockets are important.	Plants - Discover that plants are living things. - Learn about plants and where they come from. - Explore how to look after plants. Insects and Invertebrates - Learn about insects and invertebrates. - Discover where insects and invertebrates live. - Explore more about insects and invertebrates.	Materials - Learn about living and non-living things. Animals - Learn that animals are living things. - Discover where animals live and what they need to survive. - Learn about farm animals - Learn about dinosaurs that lived on Earth.
Half Term 1	**Half Term 2**	**Half Term 3**	**Half Term 4**	**Half Term 5**	**Half Term 6**
Year 1					
Animals Including Humans 1 – All about me. - Discover the basic parts of the human body. - Learn about eyes and sight. - Learn about ears and hearing. - Explore the tongue and taste.	Animals, including humans 2 – All about animals - Discover animal families. - Learn about the differences between mammals and birds. - Learn about the differences between amphibians, reptiles and fish.	Seasonal Changes - Understand there are four seasons. - understand the changes that take place in autumn, winter, spring and summer. - Investigate how you can measure rainfall.	Plants - Understand that seeds grow into plants. - Identify the basic parts of a plant and tree. - Understand that different plants can grow in the same environment. - Know the difference between deciduous and evergreen trees.	Everyday Materials- Exploring everyday materials. - Identify and name a variety of everyday materials. - Distinguish between an object and the material it is made from. - Describe the properties of everyday materials.	Everyday Materials – Building (based on the Three Little Pigs) - Build a structure strong enough to withstand wind. - Build a waterproof structure. - Understand the properties if glass and its uses.

-Explore the sense of touch. -Discover how your nose smells.	- Discover the types of food living things eat. - Explore the difference between wild animals and pets. - Explain the characteristics of an animal.		- Know that fruit trees and vegetables are varieties of plants. - Record the growth of a plant.	- Identify objects that are natural and those that are manmade. - Predict and identify if an object will float or sink. - Explore which materials are best for different objects.	- Understand that materials are used to create a variety of furniture. - Explore a variety of fabrics and understand their different properties. - Explain the uses of materials and why they are suitable.
Year 2					
<u>Living things and their habitats.</u> - Explore and compare the differences between things that are living, dead, and things that have never been alive. - Identify and name a variety of plants and animals in a microhabitat. - Design a suitable microhabitat where living things could survive. - Find out what animals eat to survive in their habitats. - Understand a food chain. - Understand the journey food makes from the farm to the supermarket.	<u>Living things and their habitats – Habitats from around the world.</u> - Learn about habitats. - Appreciate that environments are constantly changing. - Explore the rainforest and its problems. - Describe life in the ocean. - Discover the Arctic and Antarctic habitat. - Create a model of a habitat.	<u>Uses of Everyday Materials</u> - Identify different materials and their uses. - Understand how to select the right materials to build a bridge. - Explore and test the stretchiness of materials. - Understand that materials can change their shape by twisting, bending, squashing or stretching. - Find out about Charles Macintosh and explore how materials are suitable for different purposes. - Discover which materials change shape when making a road with John McAdam.	<u>Plants</u> - Know the difference between seeds and bulbs. - Design an experiment to find out what plants need to grow. - Describe what plants need to grow and stay healthy. - Describe the life cycle of a plant. - Observe and record the growth of plants over time. - Understand that plants adapt to suit their environment	<u>Animals, including humans 1 – Health and survival.</u> - Describe the needs of animals for survival. - Describe the needs of humans, for survival. - Explore the importance of eating the right food. - Describe what a healthy, balanced diet looks like. - Investigate the impact of exercise on our bodies. - Investigate the importance of hygiene.	<u>Animals, including humans 2 – Life Cycles.</u> - Order the stages of the human life cycle. - Describe the stages of a human life cycle. - Identify the offspring and parent of an animal. - Explore the life cycle of a chicken. - Describe the life cycle of a butterfly. - Explore the life cycle of a frog.

Year 3					
<u>Rocks</u> - Explore the formation and properties of igneous rocks. - Explore the formation and properties of sedimentary and metamorphic rocks. - Weathering and the suitability of rocks for different purposes. - Explore how water contributes to the weathering of rocks. - Understand how fossils are formed. - Explore different types of soil.	<u>Light Unit</u> - Identify the difference between light sources and non-light sources. - Explore the light that comes from the sun and how to stay safe. - Explore materials which are reflective. - Discover how shadows are formed. - Investigate how shadows change throughout the day. - Investigate how you can change the size of a shadow.	<u>Forces and Magnets</u> - Explore contact and noncontact forces. - Compare how things move on different surfaces. - Explore different types of magnets. - Explore the properties of magnets and everyday objects that are magnetic. - Understand that magnetic forces can act at a distance. - Explore the everyday uses of magnets.	<u>Animals, including humans.</u> - Explore the 5 key food groups. - Learn about the nutrition in the food we eat. - Learn about the different types of skeletons. - Learn about the human skeleton. - Learn about animals and their skeletons. - Explore the role of muscles.	<u>Plants</u> - Compare the effect of different factors on plant growth. - Identify and describe the functions of different parts of a flowering plant and how they are used in photosynthesis. - Investigate the way in which water is transported within plants. - Explore the part that flowers play in the life cycle of flowering plants. - Understand the pollination process and the ways in which seeds are dispersed. - Compare the effect of different factors on plant growth.	<u>Scientific Enquiry</u> - How can a solar oven be made more effective: posing questions and writing predictions. - How can a solar oven be made more effective: recording and presenting results. - Cleaning coins: writing a method and carrying out a practical test. - Cleaning coins: writing a conclusion. - Making a cake: fair testing, controls and variables. - Making a cake: scientific enquiry.
Year 4					
<u>States of Matter</u> - Compare and group the 3 states of matter. - Explore how particles behave in solids, liquids and gases. - Investigate melting points. - Explore freezing and boiling points.	<u>Electricity</u> - Explore electrical appliances and electrical safety. - Learn about electrical components in a series circuit. - Investigate electrical circuits. - Explore conductors and insulators. - Learn about electrical switches.	<u>Sound</u> - Identify how sounds are made. - Explore how vibrations from sounds travel through a medium to the ear. - Explore sound insulation. - Explore volume - Explore pitch. - Explore sounds from near and from far.	<u>Animals, including humans</u> - Identify the organs in the digestive system. - Describe the functions of the main organs in the digestive system. - Identify the types of human teeth and their functions. - Investigate the effects of different liquids on the teeth. - Understand food chains. - Explore food webs.	<u>Living things and their habitats</u> - Explore different habitats. - Research a habitat. - Explore how animals can be classified. - Create a classification key. - Adaptations and classification within species. - Explore and classify pond plants.	<u>Living things and their habitats- Conservation</u> - Describe ecosystems and how they are affected by changes in the seasons. - Understand human impact on the environment through deforestation. - Explore air pollution. - Understand water pollution.

- Explore evaporation and condensation. - Understand the water cycle.	- Investigate how electrical components can change within a circuit.				- Explore methods that can be used to conserve water. - Understand that humans can have a positive impact on nature.
Year 5					
<u>Earth and Space.</u> - Explore the solar system and its planets. - Understand the heliocentric model of the solar system. - Explain the Earth's movement in space. - Explain the Earth's rotation and night and day. - Explain the movement of the Moon. - Design a planet using knowledge gained. - Explore how mixtures could be separated by filtering, sieving, evaporating or magnets.	<u>Forces</u> - Explore gravity and the life and work of Isaac Newton. - Examine the connection between air resistance and parachutes. - Explore factors which affect an object's ability to resist water. - Investigate the effects of friction on different surfaces. - Investigate mechanisms - levers and pulleys. - Investigate mechanisms - gears	<u>Living things and their habitats</u> - Understand the life process of a plant. - Understand the life cycles of mammals. - Compare the life cycles of insects and amphibians. - Understand the life cycle of birds and reptiles. - Know about the life and work of Jane Goodall and David Attenborough. - Research and present the life cycle of a creature.	<u>Animals, including humans</u> - Identify the key stages of a mammal's life cycle - Explore the gestation periods of mammals. - Learn about foetal development. - Investigate the hand span of different aged children. - Learn about the changes experience. - Describe the changes humans may experience during adulthood and old age.	<u>Properties of materials</u> - Exploring properties of materials. - Explore thermal conductors and thermal insulators. - Explore the hardness of materials. - Discover materials that become soluble in water. - Investigate the solubility of materials.	<u>Changes of materials</u> - Use evaporation to recover the solute from a solution. - Recognise and describe reversible changes. - Observe chemical reactions and describe how we know new materials are made. - Investigate rusting reactions. - Investigate burning reactions. - Investigate chemical reactions - acids and bicarbonate of soda
Year 6					
<u>Animals, including humans</u> - Understand the function of the heart	<u>Looking after the environment</u> - Learn about climate change.	<u>Evolution and inheritance</u> - Understand how offspring vary and are not identical to their parents.	<u>Light</u> - Explore how light travels. - Explore reflection.	<u>Living things and their habitats</u> - Classify living organisms.	<u>Electricity</u> - Describe the parts of an electric circuit.

and its role in the circulatory system. - Identify and compare blood vessels. - Explore blood. - Learn how the body transports water and nutrients. - Investigate what affects your heart rate. - Learn about the impact of drugs and alcohol on the body.	- Explore ways to reduce how much rubbish is sent to landfill. - Explore ways to reduce energy consumption. - Explore what happens when fuels are burnt. - Explore the outcomes of COP26. - Compare data associated with the weather.	- Learn about animal adaptations. - Learn about plant adaptations. - Explore what we can learn from fossils. - Explore the theory of evolution. *- Explore human evolution*	- Explore reflection and explain how it can be used to help us see. - Investigate how shadows can change. - Investigate how we can show why shadows have the same shape as the object that casts them. - Investigate how we see objects.	- Understand the kingdoms of life. - Classify living things using the Linnaean system. - Identify the characteristics of different types of microorganisms. - Investigate asexual reproduction through spore dispersal. - Classify and describe a living organism.	- Explore voltage and its effect on an electrical circuit. - Apply knowledge to identify and correct problems in a circuit. - Investigate what affects the output of a circuit. - Build a set of traffic lights. - Apply knowledge of conductors and insulators.

Transitions:

Moving from EYFS to KS1:

Our learning journey starts in the Early Years where children are exposed to the changing seasons throughout the year with weekly visits to the local woodland. They are taught about living and non-living things and understand how both animals and plants change during the cycle of life. Whilst allowing pupils to work successfully towards the Development Matters statements and Early Learning Goals, the Scientific elements taught in the EYFS provide a solid foundation of scientific skills, knowledge and enquiry for children to transition successfully onto Key stage 1 Science learning.

Moving on to KS3:

After exposure to our Science curriculum, pupils will leave school equipped with a range of skills and knowledge to enable them to study Science with confidence at Key stage 3. We hope to shape children into curious and inspired scientists with respect and appreciation for the world around them alongside an understanding of the importance of science in their day to day lives. We make links with our local secondary schools asking teachers to come in and provide Science opportunities for our pupils.

Enrichment Opportunities

Enrichment goes beyond curriculum requirements for the teaching of science. It will have an impact on a pupil's learning by creating memorable experiences both in the classroom and beyond. This involves, educational visits, topical workshops, speakers and science projects. Our science curriculum aims to give every child the opportunity to feel like an expert within the subject. We believe that pupils learn best when they are engaged and see a true purpose to their learning.

Learning is enriched with a range of educational visits such as: Tropical World, Harewood House, Stump Cross Caverns, Eureka science and discovery centre, Yorkshire Wildlife Park and Bradford Science and Media Museum. Pupils also have opportunities to discover more about their own local environment using the school grounds and nearby woodland to enhance their experiences of real-life science.

Cultural capital is developed through access to 'live lessons' where pupils can interact with scientists from a range of scientific disciplines. Workshops and visits from prominent members of our local community such as dentists enhance our cultural capital. A celebration of science is planned annually with 'British Science Week', this is a whole school celebration of science, technology, engineering and maths.

Impact:

Pupils will know more, remember more and understand more about the curriculum. Pupils retain prior-learning and explicitly make connections between what they have previously learned and what they are currently learning.

All pupils will have:

- A wider variety of skills linked to both scientific knowledge and understanding, and scientific enquiry/investigative skills.
- A richer vocabulary which will enable them to articulate their understanding of taught concepts.
- Confidence and a love of learning for all things science.

Formative assessment is an integral part of our approach to Teaching and Learning. Teachers use questioning and assessment for learning to assess and respond to pupil learning in real time. This ensures pupil misconceptions are identified and addressed quickly.

At Primley Wood, teachers use assessment for learning within lessons to provide live feedback to allow pupils to deepen their understanding and identify gaps in knowledge and skills. Knowledge reviews are planned for spaced retrieval and allow for misconceptions to be addressed and further embed pupils understanding of key knowledge, skills and vocabulary. The progression of skills and knowledge allows teachers to assess the impact over the course of a unit, year and across phases. The scheme of learning is used to identify prior links and future learning which informs teacher assessment and allows building blocks of learning to further develop schemas within topics and across subjects.

Summative assessments are used alongside knowledge organisers to assess the impact of learning at the end of a unit. This in turn informs future teaching adaptations, based on misconceptions and gaps in knowledge and skills. Enquiry questions are used to assess the impact of the teaching of knowledge, skills and vocabulary by allowing pupils to apply their understanding through reflections and critical thinking.