SCIENCE CURRICULUM OVERVIEW

VISION	**Our vision is that all children will leave Wildmoor Heath School with the knowledge and skills to explore and investigate the world as scientists; curious and excited to discover more.**
INTENT	In Science, our intent is to give all our learners a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically. We want our children to be naturally curious so we have developed our curriculum to ensure full coverage of the National Curriculum whilst fostering a sense of awe and wonder of the world. It is our intention that all children develop a curiosity about the world they live in and enjoy sharing their findings both in school and at home. We set out to offer the children rich experiences, experiments, field trips and visits to help develop their understanding, knowledge and skills in science. Wherever possible, we strive to spiral knowledge and skills through subject teaching and across the curriculum. In this way, pupils learn more deeply by revisiting concepts, widening their understanding and having multiple opportunities to apply their skills.
IMPLEMENTATION	We implement our science teaching based on the National Curriculum. Units are planned and sequenced to build sequential learning, following a seven-year journey that begins with the Early Years Foundation Stage. Each unit of work is taught and layered to ensure that all children have a good understanding and knowledge of scientific concepts and become confident in using a range of working scientific skills which they can then apply to inquiry-based learning. We teach and revisit explicit scientific vocabulary and key learnings in each lesson across the year groups. Headstart Science assessments are used to identify gaps in learning. At Wildmoor children are given the opportunity to learn about science through their locality, contrasting areas and through cross-curricular work. This includes field trips to Wildmoor Heath, residential trips to Snowdonia National Park as well as regular visits to our outdoor learning area where hands-on learning opportunities bring science to life (e.g. pond studies of newts and plants) make science real for children. Other opportunities for science include a trip to Winchester Planetarium, STEM workshops and participating in British Science Week. Specific scientific content is linked explicitly to our teaching of Relationships and Health Education, where we discuss human biology, how to stay healthy, mental and physical well-being and age appropriate sexual education.
IMPACT	By the time learners leave us for secondary school, they will be fully prepared for transition to secondary school when they leave Wildmoor Heath. They will have gained a rich body of scientific knowledge and a wide range of transferable skills, which they can apply to other subjects, contexts and environments. We assess our learners are making good or better progress based on their knowledge and understanding of the National Curriculum. We monitor this through book audits, having discussions with the children (pupil voice) and observing a range of science lessons. We formally assess on a termly basis, tracking the child's progress. We also check the children's knowledge after each unit, using practical opportunities, quizzes, discussions and targeted questions. This allows teachers to set appropriate, progressive targets and challenge children in their thinking and learning, especially as they move into the next academic year.

Learning Sandwich

ENQUIRY		
KNOWLEDGE & KEY AREAS	**SKILLS & CONCEPTS**	**BIG IDEAS**
Biology Chemistry Physics	Ask Questions & Plan Enquiry Predict Observe & Measure Record Data Interpret & Report Evaluate	Fair Testing Research Observation Pattern Seeking Grouping & Classifying Problem Solving
COMMUNICATION		

SCIENCE CURRICULUM OVERVIEW

Big Ideas

Fair Testing 	Changing one variable to see its effect on another, whilst keeping all others the same. Children first talk about what can be changed (the 'variables') and whether this might make a difference to the outcome.
Research 	Using secondary sources of information to answer scientific questions. Pupils might use pictures, books, websites or information sheets that have been pre-prepared to help them to find out answers to questions about any area of science. They may visit a museum, or talk to a visitor in school or parent about science. Children particularly like learning using online materials. It is important that the websites children use are age-appropriate and that children are not discouraged from their research by too much text or complex vocabulary. You will find some excellent websites through WOWScience which includes games, activities, apps, and videos.
Observation 	Observing changes that occur over a period of time ranging from minutes to months. All sorts of questions can be answered through observation over time. The period of time might be seconds, minutes, days or even months depending on the question asked.
Pattern Seeking 	Identifying patterns and looking for relationships in enquiries where variables are difficult to control. Pattern seeking often starts with a question about a possible link between two events or phenomena (variables). To answer these types of questions, children will need to collect data: observing, measuring and recording events or systems. Or they could collect data from secondary sources such as images or texts.
Grouping & Classifying 	Making observations to name, sort and organise items. Young children (ages 4 -5 years) perform simple grouping tasks, sorting items by simple observable features such as colours, shape and size. As children develop their knowledge of plants, animals and materials, they will sort and classify living things and materials using specific criteria. Older children may make charts or keys to help identify different animals and plants according to their observable features, and materials according to their properties.
Problem Solving 	Applying prior scientific knowledge to find answers to problems. To help children develop independence in scientific enquiry, pupils should be encouraged to use their own initiative in problem solving. You might challenge your pupils with a question or show a particular phenomenon and ask them to explain it. Posing problems with a real-life context can stimulate children's interest and thinking.

SCIENCE CURRICULUM OVERVIEW

Long Term Plan

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	What makes me special?	How do we celebrate?	Why do we wear different clothes at different times of the year?	Can it be recycled?	What can we find in the garden?	How have I changed since I was a baby?
YEAR 1	**Chemistry:** Everyday materials	**Physics:** Seasonal changes	**Biology:** Plants	**Physics:** Seasonal changes	**Biology:** Animals	**Physics:** Seasonal changes
YEAR 2	**Biology:** Living things & habitats (local environment)	**Chemistry:** Materials	**Biology:** Animals including humans	**Biology:** Animals including humans	**Biology:** Plants	**Biology:** Plants
YEAR 3	**Biology:** Plants	**Biology:** Animals including humans	**Chemistry:** Rocks and Fossils	**Physics:** Light and Shadows	**Physics:** Forces and Magnets	**Biology:** Plants
YEAR 4	**Biology:** Living Things & Their Habitats	**Physics:** Sound	**Physics:** Electricity	**Biology:** Teeth and Eating	**Chemistry:** States of Matter	**Chemistry:** States of Matter
YEAR 5	**Chemistry:** Properties & Changes of Materials	**Chemistry:** Properties & Changes of Materials	**Physics:** Forces	**Physics:** Earth & Space	**Biology:** Living Things & Their Habitats	**Biology:** Growing Up and Growing Old
YEAR 6	**Physics:** Electricity	**Physics:** Light	**Biology:** Classifying Living Things	**Biology:** Classifying Living Things	**Biology:** Healthy Bodies	**Biology:** Evolution and Inheritance

SCIENCE CURRICULUM OVERVIEW

Progression Objectives

PHASE	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
KNOWLEDGE							
Biology	**Animals in. Humans:** Talk about members of their immediate family and community. Name and describe people who are familiar to them. Recognise some environments that are different to the one in which they live. Make observations of animals and plants and explain why things occur and talk about changes (Reception - **plants**) **Plants:** Draw information from a simple map. (Reception – **Living things and their habitats**) Explore the natural world around them. (Reception – **Living things and their habitats / Seasonal changes / materials / forces / Earth & Space**) Describe what they see, hear and feel whilst outside. (Reception – **Living things and their habitats / Seasonal changes / materials / light / forces / sound / Earth & Space**) Recognise some environments that are different to the one in which they live. (Reception	**Animals inc. Humans:** Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals Identify and name a variety of common animals that are carnivores, herbivores and omnivores Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense **Plants:** Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees	**Animals inc. Humans:** Notice that animals, including humans, have offspring which grow into adults Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene **Living Things & Habitats:** Explore and compare the differences between things that are living, dead, and things that have never been alive Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other Identify and name a variety of plants and animals in their habitats, including microhabitats Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and	**Animals inc. Humans:** Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Identify that humans and some other animals have skeletons and muscles for support, protection and movement **Plants:** Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant Investigate the way in which water is transported within plants Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	**Animals inc. Humans:** Describe the simple functions of the basic parts of the digestive system in humans Identify the different types of teeth in humans and their simple functions Construct and interpret a variety of food chains, identifying producers, predators and prey **Living Things & Habitats:** Recognise that living things can be grouped in a variety of ways Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Recognise that environments can change and that this can sometimes pose dangers to living things	**Animals inc. Humans:** Describe the changes as humans develop to old age **Living Things & Habitats:** Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the life process of reproduction in some plants and animals	**Animals inc. Humans:** Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Describe the ways in which nutrients and water are transported within animals, including humans **Living Things & Habitats:** Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals Give reasons for classifying plants and animals based on specific characteristics **Evolution:** Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago Recognise that living things produce offspring of the

SCIENCE CURRICULUM OVERVIEW

	– **Living things and their habitats / evolution**) Understand the effect of changing seasons on the natural world around them. (Reception – **Seasonal change**s)		name different sources of food **Plants:** Observe and describe how seeds and bulbs grow into mature plants Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy				same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
Chemistry		**Materials:** Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties	**Materials:** Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching	**Rocks:** Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Describe in simple terms how fossils are formed when things that have lived are trapped within rock Recognise that soils are made from rocks and organic matter	**States of Matter:** Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	**Materials:** Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Demonstrate that dissolving, mixing and	

SCIENCE CURRICULUM OVERVIEW

						changes of state are reversible changes Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda	
Physics		**Seasonal Changes:** Observe changes across the 4 seasons Observe and describe weather associated with the seasons and how day length varies		**Light:** Recognise that they need light in order to see things and that dark is the absence of light Notice that light is reflected from surfaces Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that shadows are formed when the light from a light source is blocked by an opaque object Find patterns in the way that the size of shadows change **Magnets:** Compare how things move on different surfaces Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance Observe how magnets attract or repel each other and attract some materials and not others	**Electricity:** Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors **Sound:** Identify how sounds are made, associating some of them with something vibrating	**Earth & Space:** Describe the movement of the Earth and other planets relative to the sun in the solar system Describe the movement of the moon relative to the Earth Describe the sun, Earth and moon as approximately spherical bodies Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky **Forces:** Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect	**Electricity:** Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Use recognised symbols when representing a simple circuit in a diagram **Light:** Recognise that light travels in straight lines Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes Use the idea that light travels in straight lines to explain why shadows

SCIENCE CURRICULUM OVERVIEW

				Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials Describe magnets as having 2 poles Predict whether 2 magnets will attract or repel each other, depending on which poles are facing	Recognise that vibrations from sounds travel through a medium to the ear Find patterns between the pitch of a sound and features of the object that produced it Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases		have the same shape as the objects that cast them
CONCEPTS & SKILLS							
	EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Ask Questions & Plan Enquiry 	Show curiosity & ask questions	Ask simple questions. Verbally state what they are going to investigate.	Ask simple questions and recognise that they can be answered in different ways. Identify what they will change and keep the same.	Ask questions and understand there are different enquiry types they could use to answer them. Identify what they will change, observe and keep the same. With support, set up simple practical enquiries.	Ask relevant questions and use different types of scientific enquiry to answer them. Set up simple practical enquiries, comparative and fair tests.	Ask scientific questions and begin to understand which questions would be best suited to each enquiry type. With support, plan different types of scientific enquiry. Where appropriate, identify the dependent, independent and controlled variables.	Ask relevant scientific questions and choose which enquiry type would be best suited to answer them. Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Predict 			Make simple predictions based on a question.	Make relevant predictions.	Make predictions based on simple scientific knowledge. Identify what they will change, observe or measure and keep the same.	Make predictions based on scientific knowledge.	Make predictions based on scientific knowledge.
Observe & Measure 	Make observations using their senses and simple equipment Use their observations to help them to answer their questions	Observe closely. Carry out simple tests using nonstandard measurements when appropriate.	Observe closely, using simple equipment. Perform simple tests using standard units when appropriate.	Begin to use scientific equipment to make observations. Carry out tests and simple experiments and take measurements using standard units.	Make systematic and careful observations. Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	Use a range of scientific equipment to make systematic and careful observations. Take accurate measurements using a range of scientific equipment. Start to take repeat readings when appropriate.	Use a range of scientific equipment to make systematic and careful observations with increased complexity. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

SCIENCE CURRICULUM OVERVIEW

Record Data 	Record their observations by drawing, taking photographs, using sorting rings or boxes and on simple tick sheets	Gather and record simple data. Sort objects and living things into groups based on simple properties.	Gather and record data to help in answering questions. Identifying and classifying.	Gather and record data in different ways to help answer questions. Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.	Gather, record and classify data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Gather, record and classify data with increasing complexity to help in answering questions. Record data using scientific diagrams and labels, classification keys, tables, bar and line graphs.	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Interpret & Report 	Make direct comparisons talk about what they have done and found out identify, sort and group.	Answer simple questions. Explain what they found out to an adult or a partner.	Use their observations and ideas to suggest answers to questions. Talk about what they have found out and how they found it out. (non-statutory)	Make simple conclusions. Use results, findings or observations to answer questions. Report on findings from enquiries, including oral and written explanations.	Use straightforward scientific evidence to answer questions or to support their findings. Use results to draw simple conclusions. Begin to identify differences, similarities or changes related to simple ideas or processes. Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Use scientific evidence to answer questions. Make conclusions based on scientific evidence and from their own testing and findings. Identify differences, similarities or changes related to simple ideas or processes. Report and present findings from enquiries, including conclusions in oral and written forms such as displays and other presentations.	Use scientific evidence to answer questions. Make conclusions based on scientific evidence and from their own testing and findings. Identify scientific evidence that has been used to support or refute ideas or arguments. Report and present findings from enquiries, including conclusions, and explanations in oral and written forms such as displays and other presentations.
Evaluate 				Suggest questions for further investigation.	Begin to make predictions for new values, suggest improvements and raise further questions.	Make predictions for new values, suggest improvements and raise further questions.	Use test results to make predictions to set up further comparative and fair tests. Suggest investigation improvements. Provide some simple examples of how to extend the investigation.

SCIENCE CURRICULUM OVERVIEW

Assessment

PSTT TAPS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Include these enquiry skills: **Fair Testing** **Research** **Observation** **Pattern Seeking** **Grouping & Classifying** **Problem Solving** **Click on the links for assessment tasks.** **Topics based in:** **Biology** **Chemistry** **Physics**						
Ask Qs & Plan Enquiry	Reflectiveness Transparency Dunlop balls	Waterproof Separating colours Animal home build	Investigating skeletons Cupcake parachutes Litter pick Qs	Investigating pitch Cornflour slime Microfibres	Dissolving Nappy absorbency Paper planes Space travel Qs	Bulb brightness Light Qs O-wing flight Flower sampling
Set up Test / Predict	Floating and sinking Teddy zipline	Rocket mice Daisy footprints Feeding simulation	Shoe grip forces Magnet tests	Drying materials	Thermal insulation layers Zipline testing	Human heart rate Bird beaks
Observe & Measure	Plant structure Leaf look Shades of colour	Plant growth Ice escape Drops on coin	Measuring plants Plant close obs Ice cream Forensic fingerprints	Measure temperature Circuit products	Human growth survey Spinner dropping Titanic pulleys	Conductive dough Terrific tasters
Record Data	Seasonal change Bridge material testers	Woodlice habitats Materials hunt	Making shadows Cars down ramps	Local survey of living things	Sugar cubes Space craters Bottle flip Seed dispersal	Living things keys Shadows invest Camouflaged moths
Interpret & Report	Animal classification Humans body parts Surprise materials	Nature spotters Living and non Human handspan Muffling sound Boat materials	Rock reports Eco Action Wind power vehicle Macintosh waterproof	Electrical conductors String phones Digestion model	Champion tapes Research: Life cycle Solar system Dirty water filter	Invertebrate research
Evaluate			Function of stem Balloon rockets Egg drop packaging	Teeth(eggs) in liquids Dunking biscuits	Aquadynamics, Marblerun force Forensic powders Jump patterns	Bridge engineers Pollution survey Fossil habitats Egg strength