



Curriculum Aim

We offer a high-quality science education that provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Our curriculum offer ensures all pupils are taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Pupils are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Our curriculum offer ensures that all pupils:

- develop scientific knowledge and conceptual understanding through three threshold concepts: Planning, Conducting and Evaluating.
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Key

AT 1 - Scientific enquiry - Threshold Concepts	AT 2 - Life processes and living things	AT 3 - Materials and their properties	AT 4 - Physical processes
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Year Group	Question	AT 1 - Threshold Concepts	Content Knowledge - NC Objectives
6	Electricity: How can we adapt circuits for different purposes?	<p><u>Planning</u></p> <p>Can they explore different ways to test an idea, choose the best way, and give reasons?</p> <ul style="list-style-type: none"> • Can they vary one factor whilst keeping the others the same in an experiment? Can they explain why they do this? • Can they plan and carry out an investigation by controlling variables fairly and accurately? • Can they make a prediction with reasons? • Can they use information to help make a prediction? 	<ul style="list-style-type: none"> • 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.
	Evolution and inheritance: Why is evolution important?	<ul style="list-style-type: none"> • Can they use test results to make further predictions and set up further comparative tests? • Can they explain, in simple terms, a scientific idea and what evidence supports it? <p><u>Conducting</u></p> <p>Can they explain why they have chosen specific equipment? (incl ICT based equipment)</p> <ul style="list-style-type: none"> • Can they decide which units of measurement they need to use? 	<ul style="list-style-type: none"> • 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 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.
	Animals, including humans: Why is diet and exercise important for health?	<ul style="list-style-type: none"> • Can they explain why a measurement needs to be repeated? • Can they record their measurements in different ways? (incl bar charts, tables and line graphs) • Can they take measurements using a range of scientific equipment with increasing accuracy and precision <p><u>Evaluating</u></p> <p>Can they find a pattern from their data and explain what it shows?</p> <ul style="list-style-type: none"> • Can they use a graph to answer scientific questions? 	<ul style="list-style-type: none"> • 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. • identify that humans and some other animals have skeletons and muscles for support, protection and movement.



		<ul style="list-style-type: none"> •Can they link what they have found out to other science? •Can they suggest how to improve their work and say why they think this? •Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? 	
5	<p>Properties and changes of materials: Why is understanding properties of materials important?</p>	<p><u>Planning</u> Can they plan and carry out a scientific enquiry to answer questions, including recognising and controlling variables where necessary?</p> <ul style="list-style-type: none"> •Can they make a prediction with reasons? •Can they use test results to make predictions to set up comparative and fair tests? <p><u>Conducting</u></p> <ul style="list-style-type: none"> •Can they take measurements using a range of scientific equipment with increasing accuracy and precision? •Can they take repeat readings when appropriate? •Can they record more complex data and results using scientific diagrams, labels, classification keys, tables, scatter graphs, bar and line graphs? <p><u>Evaluating</u></p> <ul style="list-style-type: none"> •Can they report and present findings from enquiries through written explanations and conclusions? •Can they use a graph to answer scientific questions? •Can they present a report of their findings through writing, display and presentation? 	<ul style="list-style-type: none"> • compare and group materials together, according to whether they are solids, liquids or gases (Yr 4) • 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 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. • 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) (Yr 4) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.(Yr4)



	<p>Earth and Space: Is Earth the only planet that can sustain life?</p>		<ul style="list-style-type: none"> 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. explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
	<p>Animals, including humans: What processes are fundamental to life?</p>		<ul style="list-style-type: none"> 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. describe the changes as humans develop to old age recognise that living things can be grouped in a variety of ways (Yr 4) Explore and use categorisation keys to help group, identify and name a variety of living things and in their local and wider environment. (Yr 4) Recognise that environments can change and that this can sometime pose dangers to living things. (Yr4) 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 (Yr6)
<p>4</p>	<p><i>Animals, including humans: What happens when we eat?</i></p>	<p><i>Planning</i> Can they set up a simple fair test to make comparisons? •Can they plan a fair test and isolate variables, explaining why it was fair and which variables have been isolated?</p>	<ul style="list-style-type: none"> 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.



		<ul style="list-style-type: none"> •Can they suggest improvements and predictions? •Can they decide which information needs to be collected and decide which the best way for collecting it is? 	<ul style="list-style-type: none"> • 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
	<p>Forces: Why do things move as they do?</p>	<p><u>Conducting</u></p> <ul style="list-style-type: none"> •Can they take measurements using different equipment and units of measure and record what they have found in a range of ways? •Can they make accurate measurements using standard units? •Can they explain their findings in different ways (display, presentation, and writing)? 	<ul style="list-style-type: none"> • 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. ???? • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance <p>(Linked to rocket cars and DT)</p>
	<p>Sound: How are sounds made?</p>	<p><u>Evaluating</u></p> <ul style="list-style-type: none"> •Can they find any patterns in their evidence or measurements? •Can they make a prediction based on something they have found out? •Can they use their findings to draw a simple conclusion? •Can they evaluate what they have found using scientific language, drawings, labelled diagrams, bar charts and tables? •Can they use straightforward scientific evidence to answer questions or to support their findings? •Can they identify differences, similarities or changes related to simple scientific ideas or processes? 	<ul style="list-style-type: none"> • identify how sounds are made, associating some of them with something vibrating • 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.



<p>3</p>	<p>Forces and magnets: How do forces and magnets work? Is electricity a force?</p>	<p>Planning</p> <ul style="list-style-type: none"> • Can they use different ideas and suggest how to find something out? • Can they make and record a prediction before testing? • Can they plan a fair test and explain why it was fair? • Can they set up a simple fair test to make comparisons? • Can they explain why they need to collect information to answer a question? <p>Conducting</p> <p>Can they record and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables?</p> <p>Can they measure using different equipment and units of measure?</p> <ul style="list-style-type: none"> • Can they record their observations in different ways? <labelled diagrams, charts etc> <ul style="list-style-type: none"> • Can they make accurate measurements using standard units? <p>Evaluating</p> <p>Can they explain what they have found out and use their measurements to say whether it helps to answer their question?</p> <p>Can they describe what they have found using scientific language?</p> <ul style="list-style-type: none"> • Can they suggest how to improve their work if they did it again? 	<ul style="list-style-type: none"> • observe how magnets attract or repel each other and attract some materials and not others • 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 two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing. • 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. <ul style="list-style-type: none"> • 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. • describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. • 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.
	<p>Plants: What do plants need to thrive?</p>		



	<p>Light: Why can't humans see in the dark?</p>	<p>Can they explain their findings in different ways (display, presentation, and writing)?</p> <ul style="list-style-type: none"> • Can they use their findings to draw a simple conclusion? • Can they suggest improvements and predictions for further tests? 	<ul style="list-style-type: none"> • 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. • Recognise that light appears to travel 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 have the same shape as the objects that cast them
2	<p>Living things and their habitats: Could humans and dinosaurs live side by side?</p>	<p><u>Planning</u></p> <ul style="list-style-type: none"> • Can they explain why it might not be fair to compare two things? • Can they compare several things? • Can they suggest how to find things out? • Can they use prompts to find things out? <p><u>Conducting</u></p> <p>Can they use <text, diagrams, pictures, charts, tables> to record their observations?</p> <ul style="list-style-type: none"> • Can they carry out a simple fair test? • Can they measure using simple equipment? <p>Can they use <see, touch, smell, hear or taste> to help them answer questions?</p>	<ul style="list-style-type: none"> • 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 • 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
	<p>Uses of everyday materials: How can properties</p>	<ul style="list-style-type: none"> • Can they identify animals and plants by a specific criterion, eg, lay eggs or not; have feathers or not? <p>Can they organise things into groups?</p>	<ul style="list-style-type: none"> • 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.



	<p>help you classify materials?</p>	<p>Evaluating</p> <ul style="list-style-type: none"> • Can they use some scientific words to describe what they have seen and measured? • Can they say whether things happened as they expected? • Can they find simple patterns (or associations)? 	<ul style="list-style-type: none"> • 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
	<p>Animals, including humans: What do animals need to survive?</p>		<ul style="list-style-type: none"> • 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
1	<p>Everyday materials: Which materials have the most uses?</p>	<p>Planning Can they think of some questions to ask?</p> <p>Conducting Can they perform a simple test? Can they use simple equipment to help them make observations? • Can they record their findings using standard units? • Can they put some information in a chart or table?</p> <p>Evaluating Can they identify and classify things they observe? Can they tell other people about what they have done • Can they answer some scientific questions? • Can they give a simple reason for their answers? • Can they explain what they have found out? Can they show their work using pictures, labels and captions?</p>	<ul style="list-style-type: none"> • 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.
	<p>Animals, including humans: What makes animals different?</p>		<ul style="list-style-type: none"> • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • 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)
	<p>Plants: How do plants change throughout the year?</p>		<ul style="list-style-type: none"> • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees observe changes across the four seasons • identify and describe the basic structure of a variety of common flowering plants, including trees.



			<ul style="list-style-type: none"> observe and describe weather associated with the seasons and how day length varies.
EYFS	<p>Materials</p> <p>How can you decide which materials to use?</p> <p>*Links to EAD</p>	<p>Planning Can they ask questions about materials and their purpose?</p> <p>Conducting Can they explore materials and their uses, making observations and describing the task?</p> <p>Evaluating Can they talk about the similarities and differences between materials and their purposes, drawing on their experiences and what has been read in class?</p> <p>Can children discuss some important processes including changing states of matter?</p>	<ul style="list-style-type: none"> 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. Describe why a material is particularly useful for a task
	<p>Animals, plants</p> <p>What do you notice?</p>	<p>Planning Can they ask questions about aspects of their familiar world such as the place where they live or the natural world?</p> <p>Conducting Can they explore the natural world around them, making observations and drawing pictures of animals and plants?</p> <p>Evaluating Can they talk about the similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class?</p>	<ul style="list-style-type: none"> Observe and create artwork associated with plants and animals Describe what they have noticed, including similarities and differences Relate what they have observed to what has been read and discussed in class



		<p>Can children discuss some important processes and changes in the natural world around them, including the seasons and changing states of matter?</p>	
	<p><i>Plants: How do plants change throughout the year?</i></p>	<p><u>Planning</u> Can they ask questions about aspects the natural world?</p> <p><u>Conducting</u> Can they explore the natural world around them, making observations and drawing pictures of the environment?</p> <p><u>Evaluating</u> Can they talk about the similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class?</p> <p>Can children discuss some important processes and changes in the natural world around them, including the seasons and changing states of matter?</p>	<ul style="list-style-type: none"> • identify and name a variety of common plants, including deciduous and evergreen trees observe changes across the four seasons • describe and create artwork on plants, including trees. • observe and describe weather associated with the seasons