

## Science Curriculum Overview

### Our Science Curriculum

At West Earlham Junior, we aim to instil a love of science and develop curiosity about the world in our students. We want our students to grow their scientific knowledge and conceptual understanding through scientific inquiry.

#### We will do this through;

- Using the National Curriculum as the basis for our science curriculum with the learning presented coherently through the context of our termly inquiries.
- Providing opportunities for our students to ask questions and delve deeper into problem solving in order to understand the science behind 'the way things are',
- Using an investigative approach linked to our inquiries which develops students' understanding of the scientific method within a context,
- Coherent planning which gives students the opportunity to communicate scientific information through diagrams, graphs and charts in a progressive way throughout key stage two,
- Teaching students to work safely when using scientific equipment.

#### By the end of Key Stage Two, we want our children to;

- Have an enthusiasm for and enjoyment of scientific learning and discovery,
- Have the skills, knowledge and confidence to ask scientific questions and explore scientific ideas,
- Know how to carry out a fair test and record their results accurately,
- Use a variety of graphs and data to justify and explain their thinking,
- Know some famous scientists and their contribution to human knowledge and understanding.

### Working scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content

- asking relevant questions and using different types of scientific enquiries to answer them

- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

	Area of Scientific Study		Context of Inquiry
<b>Year Three</b>	Animals Including Humans	<ul style="list-style-type: none"> <li>● 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.</li> <li>● Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>	<p><b>Term 1</b></p> <ul style="list-style-type: none"> <li>● Know that humans and other animals cannot make their own food different nutrients are needed for a healthy diet. (Cooking and nutrition curriculum.)</li> <li>● Group rocks and fossils according to different characteristics.</li> <li>● Investigate the best rocks for shelter building based on porosity and hardness.</li> <li>● Know how fossils are formed and how they can provide scientists with knowledge of life in the past.</li> <li>● Recognise that nearly all plants that grow on land need soil to provide water, nutrients and anchorage.</li> <li>● Know that soil is made of rocks and organic material.</li> </ul> <p><b>Term 2</b></p> <ul style="list-style-type: none"> <li>● Know that humans and other animals cannot make their own food and</li> </ul>
	Rocks	<ul style="list-style-type: none"> <li>● Compare and group together different types of rock on the basis of appearance and simple physical properties.</li> <li>● Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</li> <li>● Recognise that soils are made from rocks and organic matter.</li> </ul>	
	Plants	<ul style="list-style-type: none"> <li>● Identify and describe the functions of different parts of flowering plants; roots, stem/trunk, leaves and flowers.</li> <li>● Explore the requirements of plants for life and growth</li> </ul>	

		<p>(air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.</p> <ul style="list-style-type: none"> <li>Investigate the way in which water is transported within plants.</li> <li>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</li> </ul>	<p>that different nutrients are needed for a healthy diet- identify that proteins are needed to build muscles. (Cooking and nutrition curriculum.)</p> <ul style="list-style-type: none"> <li>Understand the differences between vertebrates and invertebrates and classify animals accordingly.</li> <li>Know how skeletons provide support, protection and movement.</li> <li>Look at similarities and differences between human and fish skeleton.</li> </ul> <p><b>Term 3</b></p> <ul style="list-style-type: none"> <li>Know how to make shadows by blocking the light with an opaque object.</li> <li>Investigate how shadows are made and how the size of the shadows change with distance from the light source.</li> <li>Know that light is needed to see things and can be reflected from shiny surfaces.</li> <li>Identify that some materials are attracted by a magnet and some objects are repelled.</li> <li>Be able to describe magnets as having two poles and predict whether they will attract or repel each other based on which poles are facing.</li> <li>Know that some forces need contact between two objects and investigate and compare how different objects move on different surfaces.</li> </ul> <p><b>Longitudinal Study- the effects of growing different seeds in different conditions.</b></p> <ul style="list-style-type: none"> <li>Know that plants require certain conditions to grow well and investigate the best conditions for different plants.</li> <li>Know how water is transported within plants and that heat can affect the rate it travels.</li> <li>Identify the names of the parts of flowering plants.</li> <li>Know the function of flowers in the reproduction of plants</li> </ul>
	Light	<ul style="list-style-type: none"> <li>Recognise that they need light in order to see things and that dark is the absence of light.</li> <li>Notice that light is reflected from surfaces.</li> <li>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</li> <li>Find patterns in the way the size of shadows change.</li> </ul>	
	Forces and Magnets	<ul style="list-style-type: none"> <li>Compare how objects move on different surfaces. Notice that some forces need contact between two objects but magnetic forces can act at a distance.</li> <li>Observe how magnets attract or repel each other and attract some materials and not others.</li> <li>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.</li> <li>Describe magnets as having two poles.</li> <li>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul>	
<b>Year Four</b>	Electricity	<ul style="list-style-type: none"> <li>Identify common appliances which run on electricity.</li> <li>Construct a simple series circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>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.</li> <li>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> </ul>	<p><b>Term 1</b></p> <ul style="list-style-type: none"> <li>Identify common appliances which run on electricity.</li> <li>Construct a simple series circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>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.</li> <li>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit- application</li> </ul> <p><b>Term 2</b></p>

	Sound	<ul style="list-style-type: none"> <li>● Identify how sounds are made with vibration.</li> <li>● Recognise sounds from vibration travel through a medium to the ear.</li> <li>● Find patterns between the pitch or volume and the features of the object that produces it.</li> <li>● Recognise that sounds get fainter with distance.</li> </ul>	<ul style="list-style-type: none"> <li>● Identify how sounds are made with vibration.</li> <li>● Recognise sounds from vibration travel through a medium to the ear.</li> <li>● Find patterns between the pitch or volume and the features of the object that produces it.</li> <li>● Investigate how pitch can be changed to make sounds of different pitch.</li> <li>● Recognise that sounds get fainter with distance.</li> </ul>
	States of Matter	<ul style="list-style-type: none"> <li>● Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>● 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.</li> <li>● Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<p><b>Term 3</b></p> <ul style="list-style-type: none"> <li>● Recognise that living things can be grouped in a variety of ways.</li> <li>● Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> <li>● Recognise that environments can change and this can sometimes pose dangers to living things.</li> <li>● Describe the simple functions of the basic parts of the digestive system in humans.</li> <li>● Identify the different types of teeth in humans and their simple functions.</li> <li>● Construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>
	Living things and their Habitats	<ul style="list-style-type: none"> <li>● Recognise that living things can be grouped in a variety of ways.</li> <li>● Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> <li>● Recognise that environments can change and this can sometimes pose dangers to living things.</li> </ul>	<p><b>Longitudinal Study</b></p> <ul style="list-style-type: none"> <li>● Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>● 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. (Cooking and nutrition)</li> <li>● Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>
	Animals Including Humans	<ul style="list-style-type: none"> <li>● Describe the simple functions of the basic parts of the digestive system in humans.</li> <li>● Identify the different types of teeth in humans and their simple functions.</li> <li>● Construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>	

- **Working scientifically**

- During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

<b>Year Five</b>	Animals Including Humans	<ul style="list-style-type: none"> <li>● Describe the changes as humans develop to old age.</li> </ul>	<p><b>Term 1</b></p> <ul style="list-style-type: none"> <li>● Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>● Identify the effects of air resistance, water resistance and friction that act between moving surfaces.</li> <li>● Recognise that some mechanisms, including gears, pulleys, levers allow a smaller force to have a greater effect.</li> <li>● Investigate how levers can change the force acting on an object.</li> </ul> <p><b>Term 2</b></p> <ul style="list-style-type: none"> <li>● Describe the movement of the Earth and the other planets, relative to the Sun in the solar system.</li> <li>● Describe the movement of the Moon relative to the Earth.</li> <li>● Describe the Sun, Earth and Moon as approximately spherical bodies.</li> </ul>
	Forces	<ul style="list-style-type: none"> <li>● Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>● Identify the effects of air resistance, water resistance and friction that act between moving surfaces.</li> <li>● Recognise that some mechanisms, including gears, pulleys, levers allow a smaller force to have a greater effect.</li> </ul>	
	Living things and	<ul style="list-style-type: none"> <li>● Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> </ul>	

	their habitats	<ul style="list-style-type: none"> <li>Describe the life process of reproduction in some animals.</li> <li>Describe the life process of reproduction in some plants</li> </ul>	<ul style="list-style-type: none"> <li>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul>
	Properties and changes of materials	<ul style="list-style-type: none"> <li>Compare and group together everyday materials based on the basis of their properties including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</li> <li>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</li> <li>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</li> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>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.</li> </ul>	<p><b>Longitudinal Study 1- Life Cycles and Reproduction</b></p> <ul style="list-style-type: none"> <li>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> <li>Describe the life process of reproduction in some animals.</li> <li>Describe the life process of reproduction in some plants</li> <li>Describe the changes as humans develop to old age.</li> </ul> <p><b>Longitudinal Study 2- Properties and Changes of Materials</b></p> <ul style="list-style-type: none"> <li>Compare and group together everyday materials based on the basis of their properties including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.</li> <li>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.</li> <li>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</li> <li>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</li> <li>Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>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.</li> </ul>
	Earth and Space	<ul style="list-style-type: none"> <li>Describe the movement of the Earth and the other planets, relative to the Sun in the solar system.</li> <li>Describe the movement of the Moon relative to the Earth.</li> <li>Describe the Sun, Earth and Moon as approximately spherical bodies.</li> <li>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.</li> </ul>	
<b>Year Six</b>	Evolution and Inheritance	<ul style="list-style-type: none"> <li>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> </ul>	<p><b>Term 1</b></p> <ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</li> <li>Describe the ways in which nutrients and water are transported within</li> </ul>

	<ul style="list-style-type: none"> <li>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</li> </ul>	<p>animals, including humans.</p> <p><b>Term 2</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul> <p><b>Term 3</b></p> <ul style="list-style-type: none"> <li>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</li> <li>Identify how animals (penguins) and plants (T1 Potatoes) are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> <li>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents-mongrel dogs</li> </ul> <ul style="list-style-type: none"> <li>Recognise that light appears to travel in straight lines.</li> <li>Use the idea that light travels in straight lines to explain that objects are seen because they give out and reflect light into our eyes.</li> <li>Explain that we see things because light travels from a light source to our eyes or from light sources to objects and then to our eyes.</li> <li>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul> <ul style="list-style-type: none"> <li>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>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.</li> <li>Use recognised symbols when representing a simple circuit diagram.</li> </ul>
Animals including humans	<ul style="list-style-type: none"> <li>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> <li>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</li> <li>Describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul>	
Living things and their habitats	<ul style="list-style-type: none"> <li>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.</li> <li>Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>	
Light	<ul style="list-style-type: none"> <li>Recognise that light appears to travel in straight lines.</li> <li>Use the idea that light travels in straight lines to explain that objects are seen because they give out and reflect light into our eyes.</li> <li>Explain that we see things because light travels from a light source to our eyes or from light sources to objects and then to our eyes.</li> <li>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.</li> </ul>	
Electricity	<ul style="list-style-type: none"> <li>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>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.</li> <li>Use recognised symbols when representing a simple circuit diagram.</li> </ul>	