

Science Curriculum

At Clarendon Primary Centre, the science curriculum aims to support the development of scientists who, through an understanding of science, are able to gain interest from everyday activities, like taking a walk, cooking a meal or playing in the playground. Through developing a greater understanding of the world around them, individuals can respond with delight and wonder. Our curriculum encourages creativity, effective communication, creative thinking, the ability to ask and try to answer questions and a sense of awe and wonder. Children will learn how to ask questions and plan ways to find answers through observation, experimentation, classification and investigation. The skills learnt as a scientist will support independent living, the science content taught at Clarendon Secondary Centre and future employment. Our curriculum emphasises the importance of developing scientific enquiry skills and assumes that knowledge will be developed through investigation and enquiry. This curriculum has been developed from the content of the Early Years and Key Stage 1 programmes of study, with additional content from aspects of the Key Stage 2 curriculum. There are also links to the life skills curriculum and topics of interest to ensure a broad and balanced offer for our pupils.

ASSESSMENT OF SCIENTIFIC SKILLS

Scientific Enquiry

Encountering	Foundation	Core	Development	Enrichment	Enhancement
<p><u>OBSERVING OVER TIME</u></p> <p>Use senses to explore and observe the things in the immediate environment, anticipating events and develop understanding of cause and effect.</p>	<p>Begin to observe things that change and make simple observations and records with help. Comment on what is observed.</p>	<p>Communicate ideas about how to find out if things change and use simple equipment to make observations, commenting on what is noticed.</p>	<p>Ask questions about why things change Suggest ways to identify, observe and measure things that change and measure these using non-standard units. Record these in words, pictures or using prepared formats. Begin to use scientific language to communicate findings and report if it was what was expected.</p>	<p>Recognise when questions can be answered by observing over time and decide what observations to make, the frequency required and what equipment to use. Collect data using standard measures and record results in tables and bar charts. With help, interpret graphs produced by dataloggers. Draw simple conclusions and use scientific language to communicate these, suggesting improvements to the method.</p>	<p>Know when observing may help answer a question. Plan and carry out investigations mostly independently presenting results and recognising the effects. Draw valid conclusions from observations. Recognise the significance of things changing over time Communicate about and explain changes using scientific knowledge and understanding and evaluate the effectiveness of observations over time.</p>
<p><u>IDENTIFYING AND CLASSIFYING</u></p> <p>Recognise familiar items and their purpose. Match things that are the same</p>	<p>Curious about similarities and differences. With help, ask questions about similarities and differences. Communicate ideas for sorting or matching things. Use senses to sort and match things, find things that are similar or different and sort</p>	<p>Ask questions about how and why things are similar or different. Decide what to observe, identify or sort from presented items. Make comparisons between simple features of objects, materials or living things. Record observations in words,</p>	<p>Decide what to observe, identify or sort. With support, communicate about what criteria to use to sort and classify things. Through questioning, draw simple conclusions about the things I have sorted and classified Begin to use records to help</p>	<p>Communicate about what criteria to use to sort and classify things Decide what equipment to use to identify and classify things I can communicate about things that can be grouped and recognise when questions can be answered by sorting</p>	<p>Decide when identifying and classifying will be helpful to answer my questions Decide what equipment, tests and secondary sources of information to use to identify and classify things Use a series of tests to sort and classify materials</p>

	<p>or group things according to own criteria using simple equipment to help sort (e.g. boxes, hoops)</p> <p>Communicate how things have been sorted or matched</p>	<p>with pictures or simple tables.</p> <p>Sort objects by observable and behavioural features</p> <p>Record sorting in sorting circles or tables</p> <p>Identify similarities and differences and talk about them</p> <p>Begin to use simple scientific language to communicate about how things are similar or different</p>	<p>sort or identify other things</p>	<p>and classifying</p> <p>Carry out simple tests to sort and classify according to properties or behaviour</p> <p>Use Carroll diagrams, Venn diagrams and more complex tables to sort things</p> <p>Use simple keys and branching databases to identify things</p> <p>I can make simple branching databases (keys) for things that have clear differences</p> <p>Draw simple conclusions about the things I have sorted and classified</p> <p>Talk about the similarities and differences identified using some scientific language</p> <p>Suggest improvements to the way things have been sorted and identified.</p>	<p>Use secondary sources to identify and classify things</p> <p>Make keys and branching databases with four or more items</p> <p>Use more than one piece of scientific evidence to identify and classify things</p> <p>Draw valid conclusions when sorting and classifying</p> <p>Recognise the significance of sorting and classifying</p> <p>Communicate about and explain what has been done using scientific knowledge.</p> <p>Evaluate how well a key developed by the pupil has worked.</p>
<u>PATTERN SEEKING</u>	<p><u>Plan</u></p> <p>I am curious about patterns</p> <p>With help, I can ask questions about patterns</p> <p>I can communicate about my ideas for finding out about patterns</p> <p><u>Do</u></p> <p>I can use my sense to look closely for patterns</p> <p>I can observe more than one thing at a time</p> <p>I can make simple records of what I notice (with help where necessary)</p> <p>I can use simple equipment to observe and record patterns</p> <p><u>Review</u></p> <p>I can communicate about what I have done and the patterns I noticed</p>		<p><u>Plan</u></p> <p>I can ask questions about why and how things are linked</p> <p>With help, I can decide what patterns to observe and measure and suggest how to do it</p> <p><u>Do</u></p> <p>I can use non standard units and simple equipment to record events that might be related</p> <p>I can record in words or pictures or in simple prepared formats such as tables, tally charts and maps</p> <p><u>Review</u></p> <p>I can identify simple patterns and talk about them</p> <p>I can make links between two sets of observations</p> <p>I can begin to use scientific</p>	<p><u>Plan</u></p> <p>I can communicate about where patterns might be found and recognise when questions can be investigated by pattern seeking</p> <p>I can decide on which sets of data to collect, what observations to make and what equipment to use</p> <p><u>Do</u></p> <p>I can use a range of equipment to collect data using standard measures</p> <p>I can make records using tables, bar charts or simple scatter graphs</p> <p>I can begin to use and interpret data collected through dataloggers</p> <p><u>Review</u></p> <p>I can draw conclusions about</p>	<p><u>Plan</u></p> <p>I can recognise when variables cannot be controlled and decide when pattern seeking will help to answer my questions</p> <p>I can decide how detailed my data needs to be, and which equipment to use, to make my measurements as accurate as possible</p> <p><u>Do</u></p> <p>I can use equipment accurately to collect observations</p> <p>I can record data appropriately and accurately</p> <p>I can present data in scatter graphs and frequency charts</p> <p>I can recognise patterns in results</p> <p>I can recognise the effect of</p>

			<p>language to talk about patterns I can communicate about whether the pattern was what I expected</p>	<p>simple patterns between two sets of data I can communicate about patterns using some scientific language I can suggest improvements to the way I looked for patterns</p>	<p>sample size on reliability <u>Review</u> I can draw valid conclusions from data about patterns and recognise their limitations I can recognise the significance of relationships between sets of data I can talk about and explain cause and effect patterns using scientific knowledge and understanding I can evaluate how well I looked for patterns</p>
<p><u>RESEARCH</u></p> <p><u>Plan</u> I am able to show interest in motivating things that I am presented with</p> <p><u>Do</u> I can explore my environment with my senses</p> <p><u>Review</u> I can show another person something I am unsure of or to get help</p>	<p><u>Plan</u> I am curious about things in my surroundings</p> <p><u>Do</u> I can look at pictures and answer simple questions about what I see</p> <p><u>Review</u> I can answer simple questions about things I have learnt about</p>	<p><u>Plan</u> With help, I can ask questions that I can answer with support using secondary sources</p> <p><u>Do</u> I can listen carefully I know that information in books and electronic media can be used to answer questions I can find pictures of things I can communicate with people about what they do and how things work</p> <p><u>Review</u> I can communicate about the things I found out</p>	<p><u>Plan</u> I ask questions about how things are and the way they work With help, I make suggestions about how to find things out</p> <p><u>Do</u> I use simple books and electronic media to find things out I ask questions to find out what people do and how things work I record in words and pictures what I found out</p> <p><u>Review</u> I begin to use scientific language to talk about what I found out I talk about whether the information source was useful I give an opinion about some things I found out</p>	<p><u>Plan</u> I communicate about how things are and the way they work and recognise when questions can be answered by research using secondary sources</p> <p><u>Do</u> I use information sources to find the information I need I use someone else's data I record what I found out in my own words I present information in different ways</p> <p><u>Review</u> I draw conclusions from what I found out from different sources I communicate about what the information and data means using some scientific language I suggest ways to improve how I find out and use information</p>	<p><u>Plan</u> I decide when research using secondary sources will help to answer my questions I decide which sources of information might answer my questions</p> <p><u>Do</u> I use relevant information and data from a range of secondary sources I recognise how data has been obtained I start to notice when information and data is biased or based on opinions rather than facts I present my findings in suitable formats</p> <p><u>Review</u> I draw valid conclusions from my research I communicate about and explain my research using scientific knowledge and understanding I evaluate how well my research has answered my questions</p>

					I recognise that some scientific questions may not have been answered definitively
<p><u>FAIR TESTING</u></p> <p>I explore items within my immediate environment</p>	<p><u>Plan</u> I am curious about how things behave With help I ask questions about things I can test I communicate about my ideas for testing how things behave <u>Do</u> I use my senses to look closely at how things behave I carry out simple tests I make simple records of what I notice (with help where necessary) I use simple equipment to observe and record <u>Review</u> I communicate about what I have done and what I noticed I communicate about whether something make a difference</p>	<p><u>Plan</u> I ask why questions With support, I begin to make comparisons about how things behave With help, I notice links between cause and effect With help, I identify simple variables to change and measure With support, I plan simple comparative tests <u>Do</u> I am beginning to use non-standard units and simple equipment to record data With support, I begin to record in words or pictures, or in simple prepared formats such as tables and tally charts <u>Review</u> With support I communicate simple observations about my data I use comparative data to rank materials or objects I use simple scientific language to describe simple causal relationships With help, I can say if my test was fair I say if the relationship was what I expected</p>	<p><u>Plan</u> I ask how questions I make comparisons about how things behave I notice links between cause and effect I identify simple variables to change and measure I plan simple comparative tests <u>Do</u> I use non-standard units and simple equipment to record data I can record simply in words or pictures, or in simple prepared formats such as tables and tally charts <u>Review</u> I communicate simple observations about my data</p>	<p><u>Plan</u> I communicate about links between cause and effect and (with help) pose a fair test I help to plan a comparative or fair test I decide what data to collect I decide what equipment to use and how to make observations <u>Do</u> I use a range of equipment to collect data using standard measures I make records using tables and bar charts I begin to use and interpret data collected through data loggers <u>Review</u> I draw simple conclusions from my comparative and fair tests I communicate about, and explain, simple causal relationships using some scientific language I suggest ways that I can improve my fair tests</p>	<p><u>Plan</u> I recognise when variables need to be controlled and decide when a comparative or fair test is the best way to answer my question I plan a comparative or fair test, selecting variables to measure, change and keep the same I decide what equipment to use to make my measurements as accurate as possible <u>Do</u> I use equipment accurately to collect observations I record data appropriately and accurately I present data in online graphs I identify causal relationships <u>Review</u> I draw valid conclusions based on the data I recognise the significance of the results of comparative and fair tests I communicate about and explain causal relationships using scientific knowledge and understanding I evaluate the effectiveness of my comparative and fair testing, recognising variables that were difficult to control</p>

CURRICULUM CONTENT TO TEACH THROUGH SCIENTIFIC ENQUIRY AND TO INCORPORATE SIGNIFICANT SCIENTISTS AND INVENTORS

LIFE

Encountering	Foundation	Core	Development	Enrichment	Enhancement
<p><u>PLANTS</u> I can use my senses to smell flowers and herbs or watch trees moving in the wind. I can show an interest in plants and trees when my attention is drawn to them and enjoy running through piles of leaves.</p>	<p>I can plant a bean with adult support. I can explore leaves and flowers, for example when they are an enhancement in the mud kitchen.</p>	<p>I can make simple communications about the plants I see and talk about their features. I am learning to observe more closely and can draw simple pictures of plants. I know that I can eat some plants and that some are not safe to eat.</p>	<p>I am able to identify plants by matching leaves they have collected to pictures. I am beginning to know the names of some common plants/flowers/trees. I know that I can eat different parts of plants and can sort familiar foods according to the different parts of a plant they are from. I know the names of some common plants and can name some parts of a plant/tree. (flower, trunk, stem, branch) I am beginning to take care of plants, by watering them and know what a plant needs to survive.</p>	<p>I can plant a seed or bulb independently, when the resources are available to me and observe it as it grows. With support I can investigate and communicate my findings about what plants need to grow. I can group living things in a range of ways</p>	<p>I can explain the part that flowers play in the life cycle of flowering plants, including explaining seed dispersal. I am able to sort leaves into deciduous or evergreen and know that plants convert sunlight into energy (simple understanding of photosynthesis) I can investigate and explain the way in which water is transported within plants</p>
<p><u>HUMANS</u> I can recognise some important people in my life and respond to people I know.</p>	<p>I can name parts of my body in songs, or by pointing to areas when named</p>	<p>I can name and label parts of the human body I can name the five senses and perform simple tests to find out more about them I know that humans need food, water and air to survive. I can investigate simple questions to investigate changes as we grow, such as if children are faster when they are older I know how and why I should keep myself clean</p>	<p>I know that humans have skeletons I can suggest ways to improve my diet and give reasons why humans need to exercise</p>	<p>I know that skeletons have bones and can name some and identify and explain the three main functions of a skeleton I know that humans have muscles and can investigate how muscles work with support I know about nutrition and can communicate about the types and amounts people need to eat to be healthy</p>	<p>I can identify the different types of teeth in humans and describe their simple functions. I am able to investigate tooth decay I am able to describe the simple functions of basic parts of the digestive system I can name the six stages of human development and give reasons why changes occur during puberty</p>
<p><u>ANIMALS</u></p>	<p>I can identify and name some</p>	<p>I can describe how animals</p>	<p>I can identify, name and sort</p>	<p>I can explain how living things</p>	

	common animals I can match animals with their babies	change as they grow I can describe the basic needs of animals	animals that are herbivores, carnivores and omnivores	obtain food	I can identify vertebrates by observing their similarities and differences and use keys to identify an invertebrate
HABITATS I can demonstrate recognition of familiar objects in my environment	I can identify things that are alive I can match animals with their habitats	I can compare the difference between things that are living, dead and have never been alive I can simply map my habitat and identify what is in it with support I can describe different habitats and identify animals that live there	With support I can identify some minibeasts and answer a question about their preferred habitat I can identify how animals are suited to their habitat	I can explain how living things in a habitat depend on each other and describe how animals get their food	I can construct and interpret food chains I can research and describe environmental dangers to endangered species (geography link?)

Physical

Encountering	Foundation	Core	Development	Enrichment	Enhancement
MATERIALS I can explore natural materials inside and outside and respond with curiosity to a variety of materials I am shown or find in the environment.	I can explore collections of materials with similar and/or different properties. I am able to begin to simply describe materials from a choice of two adjectives. I can explore how objects can be manipulated	I am able to name some familiar objects and I am using objects in my play with purpose. I am learning to sort and can sort objects into two groups (i.e. by colour) I can identify and group the uses of everyday materials I can explain how the shape of objects can be made,	I am able to identify and name everyday materials and can distinguish between an object and the material it is made from I am able to compare the suitability of different everyday materials for particular uses	I can describe and compare the properties of everyday materials and begin to solve problems involving materials, using trial and error. For example finding out a material that could keep a teddy dry in the rain. I am learning to make simple observations	I am able to perform simple tests about materials suitability for a task and can use my observations, ideas and experience to answer simple questions. I can group materials based on their physical properties and
LIGHT AND DARK			I can 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	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.	To recognise that light appears to travel in straight lines To 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.

			there are ways to protect their eyes.		
<u>FORCES</u>		Observe how things move on different surfaces and compare surfaces that allow objects to move faster or slower	Begin to describe the properties of objects and make predictions as to why this may affect how an object moves on that surface. 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.	Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Predict whether two magnets will attract or repel each other, depending on which poles are facing. Describe magnets as having two poles.	When one object moves over another one there will be a force between them that opposes motion. This is called friction. The force of gravity caused by the Earth pulls objects towards its centre
<u>ELECTRICITY</u>			Identify common appliances that run on electricity	Construct a simple series electrical circuit, identifying and naming it's 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
<u>SOUND</u>				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 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	Find patterns between the pitch of a sound and features of the object that produced it
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Earth and Space

<p><u>SEASONAL CHANGES</u> I can explore the outdoor environment during each season. I will allow caregivers to put on my hats, gloves, coats, sunscreen etc.</p>	<p>I can explore and actively participate in the natural environment and seasonal invitations to play such as leaves, ice in a water tray and respond to these, communicating what I see/experience</p>	<p>I can observe and communicate about things associated with each season e.g. blossom, falling leaves, sunshine... I am able to communicate some ideas linked to the season in which I am in and am able to simply describe the weather.</p>	<p>I can understand the effect of changing seasons on the natural world around me. I am able to communicate what I need for the weather that day (coat/hat/boots) I know the names of the four seasons.</p>	<p>I can observe and describe the weather associated with each season and suggest clothing suitable for each season. I can communicate what happens to trees during each season.</p>	<p>I can interpret and identify patterns in simple data and begin to suggest explanations for this , I am able to observe and describe how day length varies from season to season.</p>
<p><u>SPACE</u></p>		<p>The Earth, Sun and Moon are approximately spherical</p>	<p>The Earth is one of eight planets that orbit the Sun</p>	<p>The Earth rotates on its own axis once every 24 hours The Earth orbits the Sun once every year Y5 Earth</p>	<p>The Moon orbits the Earth and looks different at different times of the month The seasons change as the Earth's position changes relative to the Sun It is due to the rotation of the earth that we experience day and night</p>