



HORNCASTLE PRIMARY SCHOOL

Subject Progression – Science

Purpose & Aims	<p>Science has changed our lives and is vital to the world's future prosperity. We aim to ensure our children have a passion for science and its application in past, present and future technologies. Science encourages children to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. The science curriculum develops scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. It is vitally important children develop secure understanding of each key block of knowledge in order to progress to the next stage. Children are thus equipped with knowledge that enables them to understand the uses and implications of science today, and for the future. Excellent scientific knowledge will be presented through written and verbal explanations where children should be able to describe processes and key characteristics using the correct technical terminology. Spoken language is an important part of all National Curriculum subjects and in science children are taught scientific vocabulary so they can articulate concepts clearly and precisely. Throughout learning in science, embedded within all content (biology, chemistry and physics), children's ability to 'work scientifically' is fundamental. Children should develop an understanding of the nature, processes and methods of science using different kinds of scientific enquiries that help them to answer specific questions about the world around them. The opportunity to work practically in a variety of contexts, including fieldwork, underpins most learning.</p>		
Curriculum Drivers	Community	Creative Thinking	Confident and Resilient Learners
	<ul style="list-style-type: none"> Know and understand how science responds to societal needs and global challenges. Explain how science shapes our future and the impact it has on our everyday lives. 	<ul style="list-style-type: none"> Units of learning consist of one enquiry question per unit. Coverage across the year consist of all five types of enquiry (how, do, does, why and what). Make connections between science concepts and sustainability. 	<ul style="list-style-type: none"> Explain how and why science is key to our society. Children will be able to plan and carry out investigations and explain their results accurately using scientific vocabulary. Children know what it is to be a 'scientist' and can talk about what they have learned using subject specific vocabulary.
EYFS	<p>As children begin to grow, science to small children is about exploring the world around them and learning through play. This importance is facilitated by questions of 'Why' questions such as 'Why do you think the caterpillar got fat?'. These then build up the foundations of a child beginning to understand how things work.</p> <p>Understanding the world involves children using all of their senses in hands-on exploration of natural materials and exploring collections of materials with similar and/or different properties. Children are encouraged to talk about what they see, using a wide range of vocabulary and explore how things work. Doing this, children begin to make sense of their own life-story and family's history. Children will carry out experiments such as planting seeds and caring for them as they grow. They will understand the features of the life cycle of a plant and an animal and make links to being respectful for the natural environment and all living things. They will also explore forces and talk about which ones they can feel.</p> <p>Using the environment around them, they will describe what they can hear and feel when they are outside whilst recognising that some environments are different to the one they live in. Through the year, children will understand the effect that seasons have on the world around them.</p> <p>As the children's learning develops, they will learn new vocabulary, ask questions to find out more and check what has been said to them and articulate their ideas and thoughts in well-formed sentences. They will also begin to solve problems through talk, organise thinking and activities, explain how things work and why they might happen.</p> <p>Throughout the year, children will be taught about personal hygiene and caring for their own basic needs. This includes exercise, healthy eating, toothbrushing, sensible amounts of screen time, having a good sleep routine and being a safe pedestrian.</p> <p>By the end of EYFS, most children will be able to:</p> <ul style="list-style-type: none"> Make comments about what they have heard and ask questions to clarify their understanding. Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. Explore the natural world around them, making observations and drawing pictures of animals and plants. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 		

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Focus Areas	<p>Human Body Seasonal Changes Materials Animals Caring for the Planet Plants Growing and Cooking</p>	<p>Animal Needs for Survival Humans Materials Plastic Plants – Light and Dark Living Things & Their Habitats Plants, Bulbs and Seeds Growing Up Wildlife</p>	<p>Skeletons Movement Nutrition and Diet Food Waste Rocks Fossils Soils Light Plants Forces Magnets Biodiversity</p>	<p>Group and Classify Living Things Data Collection States of Matter Sound Electricity Energy Habitats The Digestive System Food Chains</p>	<p>Forces Space Global Warming Properties of Materials Animals Including Humans Life Cycles Reproduction Reversible and Irreversible Changes Plastic Pollution</p>	<p>Living Things and Their Habitats Electricity Renewable Energy Light Light Pollution The Circulatory System Diet, Drugs and Lifestyle Variation Adaptation Fossils Themed Projects (Year 7 Ready)</p>
Significant Scientists	<p>Joseph Banks (plants) Greta Thunberg (seasonal changes)</p>	<p>John Dunlop (materials) Charles Macintosh (materials) Elizabeth Blackwell (plants)</p>	<p>Thomas Edison (Light) Isaac Newton (Forces) Etheldred Benett (rocks)</p>	<p>Alexander Graham Bell (Sound) Anders Celsius (States of matter) Antoine Lavoisier (States of Matter)</p>	<p>David Attenborough (Living things) Jane Goodall (Living things) Mae Jemison (Earth and Space) Zhang Heng (Earth and Space)</p>	<p>Charles Darwin (Evolution) Mary Anning (Evolution) Linnaeus (Classification) Aristotle (Classification)</p>
RSE Objective link	<p>Explain why I think my body is amazing and identify some ways to keep it safe and healthy.</p> <p>Recognise how being healthy helps you to feel happy.</p> <p>To identify healthy and unhealthy foods.</p>	<p>Express how it feels to share healthy food with friends.</p> <p>To identify elements of a healthy diet.</p> <p>To understand what affects their food choices (Geography, personal taste, environment, money and social status)</p>	<p>To understand the principles of planning and preparing a range of healthy meals.</p> <p>Make some healthy snacks and explain why they are good for the body.</p>	<p>To understand the principles of planning and preparing a range of healthy meals.</p>	<p>Describe the different roles food can play in people's lives and can explain how people can develop eating problems (disorders) relating to body image pressures.</p> <p>Explain how they expect and value their body To identify the elements of a poor diet.</p> <p>To know the risks associated with unhealthy eating habits, including the importance of calories</p>	<p>Evaluate when alcohol is being used responsibly, anti-socially or being misused</p> <p>Explain how they feel about using alcohol when they are older and their reasons for this.</p>

Substantive Knowledge

<p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</p> <p>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</p> <p>Distinguish between an object and the material from which it is made</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>Describe the simple physical properties of a variety of everyday materials</p>	<p>Notice that animals, including humans, have offspring which grow into adults</p> <p>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> <p>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</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats</p> <p>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</p>	<p>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> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement</p> <p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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> <p>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</p> <p>Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>Describe magnets as having 2 poles</p> <p>Predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p>	<p>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</p> <p>Recognise that living things can be grouped in a variety of ways Recognise that environments can change and that this can sometimes pose dangers to living things</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> <p>Identify common appliances that run on electricity</p> <p>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</p> <p>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</p> <p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	<p>Describe the changes as humans develop to old age</p> <p>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</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>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</p> <p>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</p> <p>Describe the sun, Earth and moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p> <p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>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</p>	<p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans</p> <p>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</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p> <p>Recognise that light travels in straight lines</p> <p>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</p> <p>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</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>
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<p style="text-align: center;">Skills Progression – Working Practically</p>	<p>Observe changes across the 4 seasons Observe and describe weather associated with the seasons and how day length varies</p>	<p>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>	<p>Investigate the way in which water is transported within plants Find patterns in the way that the size of shadows change Observe how magnets attract or repel each other and attract some materials and not others</p>	<p>Construct and interpret a variety of food chains, identifying producers, predators and prey 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) Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p>	<p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p>	<p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p>
<p style="text-align: center;">Skills Progression –Scientific Enquiry</p>	<p>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p>	<p>Explore and compare the differences between things that are living, dead, and things that have never been alive 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>	<p>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 Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties Compare how things move on different surfaces 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</p>	<p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Compare and group materials together, according to whether they are solids, liquids or gases 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</p>	<p>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 Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p>	<p>Give reasons for classifying plants and animals based on specific characteristics 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 the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>

Working scientifically

Ask questions

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Ask simple questions. 	<ul style="list-style-type: none"> Ask simple questions and recognise that they can be answered in different ways. 	<ul style="list-style-type: none"> Ask questions and understand there are different enquiry types they could use to answer them. 	<ul style="list-style-type: none"> Ask relevant questions and use different types of scientific enquiry to answer them. 	<ul style="list-style-type: none"> Ask scientific questions and begin to understand which questions would be best suited to each enquiry type. 	<ul style="list-style-type: none"> Ask relevant scientific questions and choose which enquiry type would be best suited to answer them.

Plan

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Verbally state what they are going to investigate. 	<ul style="list-style-type: none"> Make simple predictions based on a question. Identify what they will change and keep the same. 	<ul style="list-style-type: none"> Make relevant predictions. Identify what they will change, observe and keep the same. With support, set up simple practical enquiries. 	<ul style="list-style-type: none"> Make predictions based on simple scientific knowledge. Identify what they will change, observe or measure and keep the same. Set up simple practical enquiries, comparative and fair tests. 	<ul style="list-style-type: none"> Make predictions based on scientific knowledge. With support, plan different types of scientific enquiry. Where appropriate, identify the dependent, independent and controlled variables. 	<ul style="list-style-type: none"> Make predictions based on scientific knowledge. Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

Make observations

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Observe closely. 	<ul style="list-style-type: none"> Observe closely, using simple equipment. 	<ul style="list-style-type: none"> Begin to use scientific equipment to make observations. 	<ul style="list-style-type: none"> Make systematic and careful observations. 	<ul style="list-style-type: none"> Use a range of scientific equipment to make systematic and careful observations. 	<ul style="list-style-type: none"> Use a range of scientific equipment to make systematic and careful observations with increased complexity.

Take measurements

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Carry out simple tests using non-standard measurements when appropriate. 	<ul style="list-style-type: none"> Perform simple tests using standard units when appropriate. 	<ul style="list-style-type: none"> Carry out tests and simple experiments and take measurements using standard units. 	<ul style="list-style-type: none"> Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. 	<ul style="list-style-type: none"> Take accurate measurements using a range of scientific equipment. Start to take repeat readings when appropriate. 	<ul style="list-style-type: none"> Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Gather, record and classify data

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Gather and record simple data. Sort objects and living things into groups based on simple properties. 	<ul style="list-style-type: none"> Gather and record data to help in answering questions. Identifying and classifying. 	<ul style="list-style-type: none"> Gather and record data in different ways to help answer questions. Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Present findings

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Explain what they found out to an adult or a partner. 	<ul style="list-style-type: none"> Talk about what they have found out and how they found it out. (non-statutory) 	<ul style="list-style-type: none"> Report on findings from enquiries, including oral and written explanations. 	<ul style="list-style-type: none"> Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. 	<ul style="list-style-type: none"> Report and present findings from enquiries, including conclusions. Begin to identify causal relationships in oral and written forms such as displays and other presentations. 	<ul style="list-style-type: none"> Report and present 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.

Answer questions and make conclusions

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> Answer simple questions. 	<ul style="list-style-type: none"> Use their observations and ideas to suggest answers to questions. 	<ul style="list-style-type: none"> Make simple conclusions. Use results, findings or observations to answer questions. 	<ul style="list-style-type: none"> Use straight-forward 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. 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.

Evaluate

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		<ul style="list-style-type: none"> Suggest questions for further investigation. 	<ul style="list-style-type: none"> Begin to make predictions for new values, suggest improvements and raise further questions. 	<ul style="list-style-type: none"> Make predictions for new values, suggest improvements and raise further questions. 	<ul style="list-style-type: none"> Use test results to make predictions to set up further comparative and fair tests. Suggest investigation improvements including accuracy of results. Provide some simple examples of how to extend the investigation.