



HEARTS ACADEMY TRUST

Science

HEARTS CURRICULUM - KNOWLEDGE PROGRESSION



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At HEARTS children are encouraged to understand how science can be used to explain what is occurring, predict how things will behave and analyse causes. We want children to be inquisitive about the world around them and develop a sense of curiosity. Within the Science curriculum, we facilitate opportunities for pupils to explore and test their own ideas.

In the science curriculum, topics are often revisited and developed through different key stages. This allows children to build upon their prior knowledge, develop their curiosity and embed essential knowledge into their long-term memory.

In EYFS, every term includes at least one class investigation question which children explore in adult led sessions, developing their skills in suggesting ways to find answers, predicting what will happen, observing and explaining. There are also frequent opportunities for children to pose their own questions and explore ways to answer them.

In KS1, every lesson has an element of scientific enquiry developing one or more working scientifically skills. Children are given opportunity to observe and explore real items wherever possible and to pose and answer their own questions. Each unit also includes one full investigation where children apply their knowledge and a range of scientific skills. Review of previous knowledge and a specific focus on scientific vocabulary are features of all units.

In KS2, scientific enquiry skills are delivered systematically allowing them opportunities to observe, explore, investigate, research and communicate their ideas. Each unit has an opportunity for child-led enquiry, helping them to develop their understanding of scientific ideas and begin to make sense of science as a way of finding out about the world.

	EYFS	KS1	LKS2	UPKS2
Working scientifically Using evidence / Communicating ideas				
Asking questions	Pupils should be taught to: Ask simple questions about their environment and things that change	Pupils should be taught to: Ask simple questions and recognise that they can be answered in different ways	Pupils should be taught to: Ask relevant questions and use different types of scientific enquiries to answer them Set up simple practical enquiries, comparative and fair tests	Pupils should be taught to: Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
Observing, measuring and recording	Pupils should be taught to: Explore the natural world around them, making observations and drawing pictures of animals and plants.	Pupils should be taught to: Observe closely, using simple equipment Perform simple tests Gather and record data to help in answering questions	Pupils should be taught to: Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Pupils should be taught to: Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

			Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Gather, record, classify and present data in a variety of ways to help in answering questions	
Concluding	<p>Pupils should be taught to:</p> <p>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.</p>	<p>Pupils should be taught to: Identify and classify</p> <p>Use their observations and ideas to suggest answers to questions</p>	<p>Pupils should be taught to: Identify differences, similarities or changes related to simple scientific ideas and processes</p> <p>Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>Use straightforward scientific evidence to answer questions or to support their findings</p>	<p>Pupils should be taught to: Identify scientific evidence that has been used to support or refute ideas or arguments</p> <p>Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p>
Evaluating	<p>Pupils should be taught:</p> <p>To use their observations to make suggestions about how something could be changed to alter the outcome</p>		<p>Pupils should be taught to: Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p>	<p>Pupils should be taught to: Use test results to make predictions to set up further comparative and fair tests</p>
TOPIC PROGRESSION				
Plants	<p>EYFS:</p> <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> Recognise evergreen and deciduous trees through the seasons 	<p>Pupils should be taught to: Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>Pupils should be taught to:</p>	<p>YR 3</p> <p>Pupils should be taught to: Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</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</p>	

	<ul style="list-style-type: none"> Identify the key parts of a flower/ plant <p>Identify and explain some things plants need to survive</p>	<p>Observe and describe how seeds and bulbs grow into mature plants</p> <p>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</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>	
<p>Animals inc humans</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> Name animals and their young (farm animals) Observe and describe the life cycle of an animal – insect/ chick <p>Identify and describe how people grown and change (baby, child, teenager, adult, elderly person)</p>	<p>Pupils should be taught to:</p> <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>Pupils should be taught to:</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)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p>	<p>YR 3</p> <p>Pupils should be taught to:</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>YR 4</p> <p>Pupils should be taught to:</p> <p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p>Yr 5</p> <p>Pupils should be taught to:</p> <p>Describe the changes as humans develop to old age</p> <p>YR6</p> <p>Pupils should be taught to:</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>Living Things and their habitats</p>	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> Explore and describe local animal habitats <p>Understand 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"> Plant seeds and care for growing plants. Understand the key features of the life cycle of a plant and an animal. Begin to understand the need to respect and care for the natural environment and all living things. 	<p>Pupils should be taught to:</p> <p>Explore and compare the difference between things that are living, dead, and things that have never been alive</p> <p>Identify that most living things live in habitats to which they are suited and describe how different habitats provide 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 micro-habitats</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>YR 4</p> <p>Pupils should be taught to:</p> <p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p>YR 5</p> <p>Pupils should be taught to:</p> <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</p> <p>YR 6</p> <p>Pupils should be taught to:</p> <p>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p>
<p>Light</p>	<p>Children should be taught to:</p> <p>Explore and comment on how colours change</p> <p>Know that lights helps us to see and begin to explore light and dark (linked to day and night)</p>		<p>YR 3</p> <p>Pupils should be taught to:</p> <p>Recognise that light appears to travel in straight lines</p> <p>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</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>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>	<p>YR 6</p> <p>Pupils should be taught to:</p> <p>Recognise that light appears to travel in straight lines</p> <p>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</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>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>

Electricity			<p>YR4 Pupils should be taught to:</p> <p>identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</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</p> <p>recognise some common conductors and insulators, and associate metals with being good conductors</p>	<p>Yr 6 Pupils should be taught to:</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>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</p> <p>use recognised symbols when representing a simple circuit in a diagram.</p>
Sound			<p>YR 4 Pupils should be taught to:</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>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p>	

<p>Forces and Magnets</p>	<p>3-4 years: Explore and talk about different forces they can feel.</p>		<p>YR 3 Pupils should be taught to: Compare how things move on different surfaces</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>Observe how magnets attract or repel each other and attract some materials and not others</p> <p>Compare and group together a variety of everyday materials on the basis on whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Describe magnets as having two poles</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing</p>	<p>YR 5 - Forces only Pupils should be taught to: 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</p> <p>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p>
<p>Evolution and Inheritance</p>				<p>YR 6 Pupils should be taught to: Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>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>
<p>Physical Properties (including states of matter)</p>	<p>Understand some important processes and changes in the natural world around them, including the seasons</p>	<p>Everyday materials: identifying, comparing and grouping</p> <p>Pupils should be taught to:</p>	<p>YR 3 - ROCKS Pupils should be taught to:</p>	<p>YR 5 Pupils should be taught to: Compare and group together everyday materials on the basis of their properties, including their hardness,</p>

<p>Changes of Materials</p>	<p>and changing states of matter</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>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <p>Pupils should be taught to: Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>	<p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Recognise that soils are made from rocks and organic matter</p> <p>YR4 - STATES OF MATTER Pupils should be taught to: Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p>solubility, transparency, conductivity (electrical and thermal) and response to magnets</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>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</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>Earth and Space</p>		<p>Seasonal changes Pupils should be taught to: Observe changes across the four seasons</p> <p>Observe and describe weather associated with the seasons and how day length varies</p>		<p>YR 5 Pupils should be taught to: Describe the movement of the Earth, and other planets, relative to the Sun</p> <p>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>