



Science at Hempsted C of E Primary School

Science has changed our lives and is vital to the understanding of our world and its future.

As such, at Hempsted, we want our children to be naturally curious about the world around them. We want to foster a sense of wonder about natural phenomena and respect for environment and living organisms.

We aim to develop scientific knowledge and vocabulary through full coverage of the National Curriculum.

Children are encouraged to develop and use a range of working scientifically skills including questioning, researching and reporting.

We want every child to be happy and enthusiastic learners of Science, and to be eager to achieve their very best in order to fulfil their God-given talents.

Our Big Ideas

To achieve this, our curriculum will pay particular focus to the following 'big ideas':

Big idea One: To develop a bank of scientific knowledge and understanding as detailed in the National Curriculum programmes of study.

Big Idea Two: To promote the skills of scientific enquiry in order to operate as successful scientists.

Big idea Three: To focus on the correct use and understanding of key scientific vocabulary.

How it is taught

At Hempsted, Science is taught in ways that are imaginative, purposeful, well-managed and enjoyable. The children develop scientific knowledge and conceptual understanding through the disciplines of biology, chemistry and physics. The children will develop an understanding of the nature, processes and methods of Science through different types of science enquiry that help them to answer scientific questions about the world around them. This will ensure that the children are equipped with the scientific knowledge required to understand the uses and implications of Science today and for the future. Science will be taught to the whole class with opportunities for investigative work woven throughout each unit.

Developing Spirituality through Science through learning about the natural world; appreciating and caring for nature; growing food in our own garden; splitting light into a rainbow.

Science Topic Overview 2021-22

	Autumn	Autumn	Spring	Spring	Summer	Summer
Year One	Animals Incl. Humans- The Senses	Seasonal Changes	Everyday Materials	Animals Incl. Humans	Plants	Seasonal Changes
Year Two	Animals & Humans: Health & Growth	Uses of Everyday Materials	Living Things & their Habitats	Living Things & their Habitats The Environment	Plants	
Year Three	Rocks & Soils	Animals Incl. Humans	Plants		Light	Forces & Magnets
Year Four	Electricity	Sound	Animals Incl. Humans	Scientists and Inventors	States of Matter	Living things & their Habitats
Year Five	Forces	Earth and Space	Properties and Changes of Materials		Living Things and their Habitats	Animals Including Humans
Year Six	Living Things & their habitats	Evolution & Inheritance	Electricity	Light	Animals including Humans	Science and inventors

Science in EYFS

Science			
30-50 Months	Physical Development	Health and Self-Care	<ul style="list-style-type: none"> To observe the effects of physical activity on their bodies.
	Understanding the World	The World	<ul style="list-style-type: none"> To comment and ask questions about aspects of their familiar world, such as the place where they live or the natural world. To talk about some of the things they have observed, such as plants, animals, natural and found objects. To talk about why things happen and how things work. To develop an understanding of growth, decay and changes over time. To show care and concern for living things and the environment.
	Expressive Arts and Design	Exploring and Using Media and Materials	<ul style="list-style-type: none"> To begin to be interested in and describe the texture of things.
40-60 Months	Physical Development	Health and Self-Care	<ul style="list-style-type: none"> To eat a healthy range of foodstuffs and understand a need for variety in food. To show some understanding that good practices with regard to exercise, eating, sleeping and hygiene can contribute to good health.
	Understanding the World	The World	<ul style="list-style-type: none"> To look closely at similarities, differences, patterns and change.
ELG	Physical Development	Health and Self-Care	<ul style="list-style-type: none"> To know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.
	Understanding the World	The World	<ul style="list-style-type: none"> To know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another.

Working Scientifically Skills Progression in Science- Years 1-6

	KS1	LKS2	UKS2
Asking Questions and Carrying Out Fair and Comparative Tests	<p>KS1 Science National Curriculum (Sc1- Year 1, Sc2- Year 2)</p> <p>Sc1/1.1 Sc2/1.1- Asking simple questions and recognising that they can be answered in different ways.</p> <p>Sc1/1.3 Sc2/1.3- Perform simple tests.</p> <p>Children can:</p> <ul style="list-style-type: none"> • explore the world around them, leading them to ask some simple scientific questions about how and why things happen; • begin to recognise ways in which they might answer scientific questions; • ask people questions and use simple secondary sources to find answers; • carry out simple practical tests, using simple equipment; • experience different types of scientific enquiries, including practical activities; • talk about the aim of scientific tests they are working on. 	<p>Lower KS2 Science National Curriculum (Sc3- Year 3, Sc4- Year 4)</p> <p>Sc3/1.1 Sc4/1.1 -Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Sc3/1.2 Sc4/1.2- Setting up simple practical enquiries, comparative and fair tests.</p> <p>Children can:</p> <ul style="list-style-type: none"> • start to raise their own relevant questions about the world around them in response to a range of scientific experiences; • start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; • recognise when a fair test is necessary; • help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used; • set up and carry out simple comparative and fair tests. 	<p>Upper KS2 Science National Curriculum</p> <p>Sc5/1.1 and Sc6/1.1 -Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Sc5/1.4 and Sc6/1.4 -Using test results to make predictions to set up further comparative and fair tests.</p> <p>Children can:</p> <ul style="list-style-type: none"> • with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences; • with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; • explore and talk about their ideas, raising different kinds of scientific questions; • ask their own questions about scientific phenomena; • select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; • make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; • plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary; • use their test results to identify when further tests and observations may be needed; • use test results to make predictions for further tests

Observing and Measuring Changes	<p>KS1 Science National Curriculum</p> <p>Sc1/1.2 Sc2/1.2- Observing closely, using simple equipment.</p> <p>Children can:</p> <ul style="list-style-type: none"> a observe the natural and humanly constructed world around them; b observe changes over time; c use simple measurements and equipment; d make careful observations, sometimes using equipment to help them observe carefully. 	<p>Lower KS2 Science National Curriculum</p> <p>Sc3/1.3 Sc4/1.3- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Children can:</p> <ul style="list-style-type: none"> a make systematic and careful observations; b observe changes over time; c use a range of equipment, including thermometers and data loggers; d ask their own questions about what they observe; e where appropriate, take accurate measurements using standard units using a range of equipment. 	<p>Upper KS2 Science National Curriculum</p> <p>Sc5/1.2 and Sc6/1.2 -Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Children can:</p> <ul style="list-style-type: none"> a choose the most appropriate equipment to make measurements and explain how to use it accurately; b take measurements using a range of scientific equipment with increasing accuracy and precision; c make careful and focused observations; d know the importance of taking repeat readings and take repeat readings where appropriate.
Identifying, Classifying, Recording and Presenting Data	<p>KS1 Science National Curriculum</p> <p>Sc1/1.4 Sc2/1.4 -Identifying and classifying. Sc1/1.6 Sc2/1.6 -Gathering and recording data to help in answering questions.</p> <p>Children can:</p> <ul style="list-style-type: none"> a use simple features to compare objects, materials and living things; b decide how to sort and classify objects into simple groups with some help; c record and communicate findings in a range of ways with support; d sort, group, gather and record data in a variety of ways to help in answering questions such as in simple sorting diagrams, pictograms, tally charts, block diagrams and simple tables. 	<p>Lower KS2 Science National Curriculum</p> <p>Sc3/1.4 and Sc4/1.4- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Sc3/1.5 and Sc4/1.5 -Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Children can:</p> <ul style="list-style-type: none"> a talk about criteria for grouping, sorting and classifying; b group and classify things; c collect data from their own observations and measurements; d present data in a variety of ways to help in answering questions; e use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge; f record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables. 	<p>Upper KS2 Science National Curriculum</p> <p>Sc5/1.3 and Sc6/1.3 -Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Children can:</p> <ul style="list-style-type: none"> a independently group, classify and describe living things and materials; b use and develop keys and other information records to identify, classify and describe living things and materials; c decide how to record data from a choice of familiar approaches; d record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.

Drawing Conclusions, Noticing Patterns and Presenting Findings	<p>KS1 Science National Curriculum</p> <p>Sc1/1.5 Sc2/1.5 -Using their observations and ideas to suggest answers to questions.</p> <p>Children can:</p> <ol style="list-style-type: none"> notice links between cause and effect with support; begin to notice patterns and relationships with support; begin to draw simple conclusions; identify and discuss differences between their results; use simple and scientific language; read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1; talk about their findings to a variety of audiences in a variety of ways. 	<p>Lower KS2 Science National Curriculum</p> <p>Sc3/1.7 and Sc4/1.7- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Sc3/1.6 and Sc4/1.6 -Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Children can:</p> <ol style="list-style-type: none"> draw simple conclusions from their results; make predictions; suggest improvements to investigations; raise further questions which could be investigated; first talk about, and then go on to write about, what they have found out; report and present their results and conclusions to others in written and oral forms with increasing confidence. 	<p>Upper KS2 Science National Curriculum</p> <p>Sc5/1.5 and Sc6/1.5- 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.</p> <p>Children can:</p> <ol style="list-style-type: none"> notice patterns; draw conclusions based in their data and observations; use their scientific knowledge and understanding to explain their findings; read, spell and pronounce scientific vocabulary correctly; identify patterns that might be found in the natural environment; look for different causal relationships in their data; discuss the degree of trust they can have in a set of results; independently report and present their conclusions to others in oral and written forms.
Using Scientific Evidence and Secondary Sources of Information		<p>Lower KS2 Science National Curriculum</p> <p>Sc3/1.8 and Sc4/1.8 - Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Sc3/1.9 and Sc4/1.9- Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Children can:</p> <ol style="list-style-type: none"> make links between their own science results and other scientific evidence; use straightforward scientific evidence to answer questions or support their findings; identify similarities, differences, patterns and changes relating to simple scientific ideas and processes; recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. 	<p>Upper KS2 Science National Curriculum</p> <p>Sc5/1.6 and Sc6/1.6- Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Children can:</p> <ol style="list-style-type: none"> use primary and secondary sources evidence to justify ideas; identify evidence that refutes or supports their ideas; recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact; use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas; talk about how scientific ideas have developed over time.

Knowledge Progression in Science- Years 1-6

Year 1	<p>Sc1/2.1 Plants</p> <p>Sc1/2.1a identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Sc1/2.1b identify and describe the basic structure of a variety of common flowering plants, including trees</p> <p>Sc1/2.2 Animals including humans</p> <p>Sc1/2.2a identify and name a variety of common animals including, fish, amphibians, reptiles, birds and mammals Sc1/2.2b identify and name a variety of common animals that are carnivores, herbivores and omnivores Sc1/2.2c describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) Sc1/2.2d 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>Sc1/3.1 Everyday materials</p> <p>Sc1/3.1a distinguish between an object and the material from which it is made Sc1/3.1b identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Sc1/3.1c describe the simple physical properties of a variety of everyday materials Sc1/3.1d compare and group together a variety of everyday materials on the basis of their simple physical properties</p> <p>Sc1/4.1 Seasonal Changes</p> <p>Sc1/4.1a observe changes across the 4 seasons Sc1/4.1b observe and describe weather associated with the seasons and how day length varies.</p>
Year 2	<p>Sc2/2.1 Living things and their habitats</p> <p>Sc2/2.1a explore and compare the differences between things that are living, dead, and things that have never been alive Sc2/2.1b 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 Sc2/2.1c identify and name a variety of plants and animals in their habitats, including microhabitats Sc2/2.1d 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>Sc2/2.2 Plants</p> <p>Sc2/2.2a observe and describe how seeds and bulbs grow into mature plants</p>

	<p>Sc2/2.2b find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p> <p>Sc2/2.3 Animals including humans</p> <p>Sc2/2.3a notice that animals, including humans, have offspring which grow into adults</p> <p>Sc2/2.3b find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Sc2/2.3c describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> <p>Sc2/3.1 Uses of everyday materials</p> <p>Sc2/3.1a identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses</p> <p>Sc2/3.1b compare how things move on different surfaces</p> <p>Sc2/3.1c find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p>
<p>Year 3</p>	<p>Sc3/2.1 Plants</p> <p>Sc3/2.1a identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>Sc3/2.1b 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> <p>Sc3/2.1c investigate the way in which water is transported within plants</p> <p>Sc3/2.1d explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p> <p>Sc3/2.2 Animals including humans</p> <p>Sc3/2.2a 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>Sc3/2.2b identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> <p>Sc3/3.1 Rocks</p> <p>Sc3/3.1a compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Sc3/3.1b describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>Sc3/3.1c recognise that soils are made from rocks and organic matter.</p> <p>Sc3/4.1 Light</p>

	<p>Sc3/4.1a recognise that they need light in order to see things and that dark is the absence of light</p> <p>Sc3/4.1b notice that light is reflected from surfaces</p> <p>Sc3/4.1c recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>Sc3/4.1d recognise that shadows are formed when the light from a light source is blocked by a solid object</p> <p>Sc3/4.1e find patterns in the way that the size of shadows change.</p> <p>Sc3/4.2 Forces and Magnets</p> <p>Sc3/4.2a compare how things move on different surfaces</p> <p>Sc3/4.2b notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>Sc3/4.2c observe how magnets attract or repel each other and attract some materials and not others</p> <p>Sc3/4.2d 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>Sc3/4.2e describe magnets as having 2 poles</p> <p>Sc3/4.2f predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p>
<p>Year 4</p>	<p>Sc4/2.1 All Living Things</p> <p>Sc4/2.1a recognise that living things can be grouped in a variety of ways</p> <p>Sc4/2.1b explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Sc4/2.1c recognise that environments can change and that this can sometimes pose dangers to living things.</p> <p>Sc4/2.2 Animals including humans</p> <p>Sc4/2.2a describe the simple functions of the basic parts of the digestive system in humans</p> <p>Sc4/2.2b identify the different types of teeth in humans and their simple functions</p> <p>Sc4/2.2c construct and interpret a variety of food chains, identifying producers, predators and prey.</p> <p>Sc4/3.1 States of Matter</p> <p>Sc4/3.1a compare and group materials together, according to whether they are solids, liquids or gases</p> <p>Sc4/3.1b 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>Sc4/3.1c identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> <p>Sc4/4.1 Sound</p> <p>Sc4/4.1a identify how sounds are made, associating some of them with something vibrating</p> <p>Sc4/4.1b recognise that vibrations from sounds travel through a medium to the ear</p>

	<p>Sc4/4.1c find patterns between the pitch of a sound and features of the object that produced it Sc4/4.1d find patterns between the volume of a sound and the strength of the vibrations that produced it. Sc4/4.1e recognise that sounds get fainter as the distance from the sound source increases</p> <p>Sc4/4.2 Electricity</p> <p>Sc4/4.2a identify common appliances that run on electricity Sc4/4.2b construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Sc4/4.2c 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 Sc4/4.2d recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Sc4/4.2e recognise some common conductors and insulators, and associate metals with being good conductors.</p>
Year 5	<p>Sc5/2.1 Living Things and their habitats</p> <p>Sc5/2.1a describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Sc5/2.1b describe the life process of reproduction in some plants and animals.</p> <p>Sc5/2.2 Animals, including humans</p> <p>Sc5/2.2a describe the changes as humans develop to old age.</p> <p>Sc5/3.1 Properties and Changes of Materials</p> <p>Sc5/3.1a 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 Sc5/3.1b know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Sc5/3.1c use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Sc5/3.1d give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Sc5/3.1e demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>Sc5/3.1f 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>Sc5/4.1 Earth and Space</p> <p>Sc5/4.1a describe the movement of the Earth, and other planets, relative to the Sun in the solar system Sc5/4.1b describe the movement of the Moon relative to the Earth Sc5/4.1c describe the Sun, Earth and Moon as approximately spherical bodies Sc5/4.1d 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>Sc5/4.2 Forces</p> <p>Sc5/4.2a explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object Sc5/4.2b identify the effects of air resistance, water resistance and friction, that act between moving surfaces Sc5/4.2c recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p>
<p>Year 6</p>	<p>Sc6/2.1 Living Things and their habitats</p> <p>Sc6/2.1a 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 Sc6/2.1b give reasons for classifying plants and animals based on specific characteristics.</p> <p>Sc6/2.2 Animals including humans</p> <p>Sc6/2.2a identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Sc6/2.2b recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function Sc6/2.2c describe the ways in which nutrients and water are transported within animals, including humans.</p> <p>Sc6/2.3 Evolution and Inheritance</p> <p>Sc6/2.3a 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>Sc6/3.2b recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Sc6/2.3c identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</p> <p>Sc6/4.1 Light</p>

Sc6/4.1a recognise that light appears to travel in straight lines

Sc6/4.1b 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

Sc6/4.1c 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

Sc6/4.1d use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Sc6/4.2 Electricity

Sc6/4.2a associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit

Sc6/4.2b 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

Sc6/4.2c use recognised symbols when representing a simple circuit in a diagram.