

# The curriculum explained...

Our curriculum design is based on evidence from cognitive science; three main principles underpin it:

1. Learning is most effective with spaced repetition (interleaved processing)
2. Interleaving helps pupils to discriminate between topics and aids long-term retention.
3. Retrieval of previously learned content is frequent and regular, which increases both storage and retrieval strength.

In addition to the three principles we also understand that learning is invisible in the short-term and that sustained mastery takes time.

Some of our content is subject specific, whilst other content is combined in a cross-curricular approach (mini-adventures).

The impact of our curriculum is that by the end of each Milestone, the vast majority of pupils have sustained an advanced level of the content and elements of a mastery that is shown through that of 'remembering, recalling and fluency of learning'. Some pupils may have a greater depth of understanding. We track carefully to ensure pupils are on track to reach the expectations of our curriculum.

We ask our 4 key questions in our lessons to ensure children base their learning on what they already know to create the memory links, therefore encouraging the transfer of learning to the long-term memory:

- What do I need to recall?
- What am I learning?
- Why am I learning it?
- How have I been successful?

## **.Sustained Mastery**

Nothing is learned unless it rests in pupils' long-term memories. This does not happen, and cannot be assessed, in the short term. Assessment, therefore answers two main questions: 'How well are pupils coping with curriculum content?' and 'How well are they retaining previously taught content?'



# Science

## INTENT

At SSPP, we encourage our children to develop an enquiring mind and analytical thinking skills through an interesting and relevant enquiry-based science curriculum. Science continues to change our lives in many different ways and learning about scientific knowledge, methods, processes and uses provides the foundations for understanding the world in which we live today and for the future. We study a varied curriculum which is carefully planned to interleave into other contexts to help build long term memory. The knowledge and skills are built year by year and covers the three scientific disciplines of biology, physics and chemistry.

## Characteristics of a Scientist

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out and reviewing scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts, including fieldwork.
- A passion for science and its application in past, present and future technologies

## **National curriculum: Purpose of study**

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

### **Aims**

The national curriculum for science aims to ensure that all pupils:

- ♣ develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- ♣ develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- ♣ are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

### **Scientific knowledge and conceptual understanding**

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

## IMPLEMENTATION

Our pupils should be able to organise their knowledge, skills and understanding around:

- Working scientifically

<ul style="list-style-type: none"><li>• Biology:<ul style="list-style-type: none"><li>○ Plants</li><li>○ Animals and humans</li><li>○ Investigate living things</li><li>○ Evolution and inheritance</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Chemistry:<ul style="list-style-type: none"><li>○ Investigate materials</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Physics:<ul style="list-style-type: none"><li>○ Understand movement, forces and magnets</li><li>○ Understand the Earth's movement in space</li><li>○ Investigate light and seeing</li><li>○ Investigate sound and hearing</li><li>○ Understand electrical circuits</li></ul></li></ul>
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These key concepts underpin learning in each phase. This enables pupils to reinforce and build upon prior learning, make connections and develop subject specific language. Their work will be further enriched by studies of 'Science Giants'

## IMPACT

Through the explicit teaching of Science skills and repeated through different contexts, both the teachers and the pupils assess their learning continuously throughout the lessons. The children will be encouraged to reflect on their progress within each session and how they have been successful. At the end of each term, we use the national curriculum framework and skills grids, alongside evidence of children's work to assess their current progress through our electronic tracking system that will, over time, show an informed judgement about the depth of learning and progress made.

Long term overview:

Term and Year Group	Early Years	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Autumn One	Autumn Woodland animals	The Human Body and Senses	Animals Including Humans Healthy Eating	Rocks and Soils	Animals including Humans Digestion System Teeth	Living Things and Their Habitats	Light
Autumn Two	Winter Hibernation States of matter - water to ice and snow	Materials ( linked to Victorians) Victorian scientist?	Changing Materials	Animals And Humans Bones	States Of Matter Melting and The Water Cycle	Earth And Space	Living Things And Their Habitats Grouping and Classifying plants and animals
Spring One	Flying High - what makes things fly? aerodynamics  Science Week	Materials Ice / Kites / Seasonal changes Science Week	Animals and Humans Science Week	Magnets And Forces Science Week	States Of Matter Science Week	States Of Matter Reversible and Irreversible Changes Science Week	Animals including Humans (The Heart and Circulatory System) Science Week
Spring Two	Springs	Changing Materials Flight Space/Planets	Living Things And Their Habitats	Lights And Shadows	Electricity	Forces	CSI Materials Separating materials/filtration
Summer One	Plants - how they grow Healthy eating	Animals And Plants	Plants	Plants	Sound	Animals Including Humans Reproduction	Evolution And Inheritance Charles D
Summer Two	Summer STEM - house building	Floating And Sinking (Forces) Weather	Plants	Plants	Living Things And Their Habitats	Materials	Electricity

## Study of 'Science Giant' Overview

Content Area	Giant	Contemporary	Other	Additional 'Science Giants' studied to be added annually
Materials	<ul style="list-style-type: none"> <li>Charles Macintosh</li> <li>John McAdam</li> <li>Boyd Dunlop Spencer Silver and Arthur Fry</li> </ul>	<ul style="list-style-type: none"> <li>Natalie Von Goetz</li> <li>Julie and Scott Brusaw</li> <li>(road surfaces)</li> <li>Dr Santo Padula II(metal tyres)</li> <li>Jeffrey Karp</li> <li>(surgical glue)</li> </ul>	Optics and photonics SMART clothing Electronic engineer Computer engineer (wearable devices) Ceramics/plastic engineers  Adhesive Chemist Biochemist Surgeons	SW3 JD 4 AK 5 JO 1
Rocks	Mary Anning	Prof Alice Roberts (skeletons)	Evolutionary biologist Taxonomist	SW 3
Living Things	Jane Goodall (Animals and their habitats/conservationist)  Charles Darwin  Santorio Santorio (Circulation and pulse)  Alexander Fleming  Marie Curie	Dr Paula Kahumbu  Ojore Oka (genetic research)  Dr Kat Dibb (Cardiology and Heart failure research)	Conservationist Animal Behaviourist Zoologist Botanist Zoologist EcologistsBotanists Cardiologists Nutritionist Pathologists Health Educator GP Microbiologists	  CHH 6 CHH 6  SW 3
Forces	Galileo Galilei	Helen Margolis (lasers and atomic clocks)	Physicist Cosmologists	AK 5 JS 2
Space	Isaac Newton  Alexander G Bell	Stephen Hawking	Astronomers Aerospace engineer Climatologist	JO 1  JD 4
Electricity	Michael Faraday	Henry Smith (Solar energy)	Electrical car engineers	CHH SW

Progression in SC1 skills - whole school:

KS 1	Emerging (KS1 children ...)	Expected (KS1 children can...)	Exceeded (KS1 Children can...)		
LKS 2		Emerging (LKS2 children can...)	Expected (LKS2 children can...)	Exceeding (LKS2 children can...)	
UKS 2			Emerging (UKS2 children can...)	Expected (UKS2 children can...)	Exceeding (UKS2 children can...)
<p>Work Scientifically</p> <p>Plan</p> <p>Do</p> <p>Record</p> <p>Review</p>	<ul style="list-style-type: none"> <li>Know about similarities and differences in relation to places, objects, materials and living things.</li> <li>They talk about the features of their own immediate environment and how environments might vary from one another.</li> <li>They make observations of animals and plants and explain why some things occur, and talk about changes.</li> </ul>	<ul style="list-style-type: none"> <li>asking simple questions and recognising that they can be answered in different ways</li> <li>observe closely, using simple equipment</li> <li>perform simple tests</li> <li>identify and classify</li> <li>gather and recording data to help in answering questions</li> <li>use their observations and ideas to suggest answers to questions</li> </ul>	<ul style="list-style-type: none"> <li>ask relevant questions and using different types of scientific enquiries to answer them</li> <li>set up simple practical enquiries, comparative and fair tests</li> <li>make systematic and careful observations and , where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>gather, record, classify and present data in a variety of ways to help in answering questions</li> <li>record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>report on findings from enquiries, include oral and written explanations, displays or presentations of results and conclusions</li> <li>use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> <li>identify differences, similarities or changes related to simple scientific ideas and processes</li> <li>use straightforward scientific evidence to answer questions or to support their findings.</li> </ul>	<ul style="list-style-type: none"> <li>plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>use test results to make predictions to set up further comparative and fair tests</li> <li>take measurements, using a range of scientific equipment, with</li> <li>increasing accuracy and precision, taking repeat readings when appropriate</li> <li>record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs,</li> <li>report and present findings from enquiries, including conclusions, causal relationships and explanations results, explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>identify scientific evidence that has been used to support or refute ideas or arguments.</li> </ul>	<ul style="list-style-type: none"> <li>ask questions and develop a line of enquiry based on observations of the real world alongside prior knowledge and experience</li> <li>make predictions using scientific knowledge and understanding</li> <li>select, plan and carry out the most appropriate types of scientific enquiries to test predictions...</li> <li>make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements</li> <li>present observations and data using appropriate methods, including tables and graphs</li> <li>interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions</li> <li>present reasoned explanations, including data in relation to predictions and hypotheses</li> <li>evaluate data, showing awareness of potential sources of error</li> <li>identify further questions arising from results</li> </ul>

Progression of skills in Physics:

KS 1	Emerging (KS1 children ...)	Expected (KS1 children can...)	Exceeded (KS1 Children can...)		
LKS 2		Emerging (LKS2 children can...)	Expected (LKS2 children can...)	Exceeding (LKS2 children can...)	
UKS 2			Emerging (UKS2 children can...)	Expected (UKS2 children can...)	Exceeding (UKS2 children know...)
Electricity	<ul style="list-style-type: none"> <li>Know about similarities and differences in relation to objects</li> <li>talk about the features of their own</li> <li>explain why some things occur, and talk about changes.</li> </ul>	<ul style="list-style-type: none"> <li><i>(explore battery powered toys and carry out a variety of enquires related to these).</i></li> </ul>	<ul style="list-style-type: none"> <li>-identify common appliances that run on electricity</li> <li>-construct a simple series electrical circuit identifying and naming the basic parts of a simple electrical circuit, including cells, wires, bulbs, switches and buzzers</li> <li>-identify whether or not a lamp will light in a simple series circuit based on whether or not the lamp is part of a complete loop with a battery</li> <li>-recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</li> <li>-recognise some common conductors and insulators, and associate metals with being good conductors</li> </ul>	<ul style="list-style-type: none"> <li>-associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</li> <li>-compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</li> <li>use recognised symbols when representing a simple circuit in a diagram</li> </ul>	<ul style="list-style-type: none"> <li>-electric current...</li> <li>-potential difference, measured in volts, battery and bulb rating...</li> <li>-differences in resistance between conducting and insulating components</li> </ul>
Forces and Movement	<ul style="list-style-type: none"> <li>-Know about similarities and differences in relation to objects</li> <li>-They explain why some things occur, and talk about changes.</li> </ul>	<ul style="list-style-type: none"> <li><i>(explore things that move including toys that need a push or a pull. Compare how different things move.)</i>---- describe the simple physical properties of a variety of everyday materials <i>(attracted to a magnet or not)</i>-compare and group together a variety of everyday materials on the basis of their simple physical properties</li> </ul>	<ul style="list-style-type: none"> <li>-compare how things move on different surfaces</li> <li>-notice that some forces need contact between two objects but magnetic forces act at a distance</li> <li>-observe how magnets attract or repel each other and attract some materials and not others</li> <li>-compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials <ul style="list-style-type: none"> <li>describe magnets as having two poles</li> </ul> </li> <li>-predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul>	<ul style="list-style-type: none"> <li>-explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</li> <li>-identify the effect of air resistance, water resistance and friction, that act between moving surfaces</li> <li>-recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</li> </ul>	<ul style="list-style-type: none"> <li>-forces as pushes or pulls, arising from the interaction between two objects</li> <li>-non-contact forces: gravity forces acting at a distance on earth and in space, forces between magnets ...</li> <li>-using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces</li> <li>-forces: associated with deforming objects; stretching and squashing-springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water</li> <li>-forces being needed to cause an object to stop or start moving, or to change their speed or direction of motion</li> <li>-forces measured in newtons</li> </ul>



light	<ul style="list-style-type: none"> <li>• Know about similarities and differences in relation to places, objects &amp; materials</li> <li>• They talk about the features of their own immediate environment and how environments might vary from one another.</li> </ul>	<ul style="list-style-type: none"> <li>• -describe the simple physical properties of a variety of everyday materials (<i>opaque, translucent, transparent materials</i>)</li> <li>• -compare and group together a variety of everyday materials on the basis of their simple physical properties (<i>opaque, translucent, transparent material</i>)</li> <li>• -observe and describe weather associated with the seasons and how day length varies.</li> <li>• (<i>explore making shadows</i>)</li> <li>• (<i>observe and name a variety of sources of light, including electric lights, flames and <b>the Sun</b></i>)</li> </ul>	<ul style="list-style-type: none"> <li>• -recognise that they need light in order to see things and that dark is the absence of light</li> <li>• -notice that light is reflected from surfaces</li> <li>• -recognise that shadows are formed when a light source is blocked by a solid object</li> <li>• -find patterns in the way that the size of shadows change</li> <li>• -recognise that light from the Sun can be dangerous and that there are ways to protect our eyes</li> </ul>	<ul style="list-style-type: none"> <li>• -recognise that light appears to travel in straight lines</li> <li>• -use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye</li> <li>• -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</li> <li>• -use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</li> <li>• -describe the movement of the Earth, and other planets relative to the Sun in the solar system</li> <li>• -describe the movement of the Moon relative to the Earth</li> <li>• -describe the Sun, Earth and Moon as approximately spherical bodies</li> <li>• -use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</li> </ul>	<ul style="list-style-type: none"> <li>• -use of ray model to explain imaging in mirrors...</li> <li>• -colours and the different frequencies of light, white light and prisms (qualitative only)</li> <li>• -the Sun as a star, other stars in our galaxy, other galaxies</li> <li>• -the seasons and the Earth's tilt, day length at different times of the year, in different hemispheres</li> </ul>
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	<ul style="list-style-type: none"> <li>-Know about similarities and differences in relation to places, objects, materials and living things.</li> <li>-talk about the features of their own immediate environment and how environments might vary from one another.</li> <li>explain why some things occur, and talk about changes.</li> </ul>	<ul style="list-style-type: none"> <li><i>( explore different ways of making and altering sounds ... experiment making sounds of differing volume and pitch)</i></li> <li><i>(observe and name a variety of sources of sound, noticing that we hear with our ears)</i></li> </ul>	<ul style="list-style-type: none"> <li>-identify how sounds are made, associating some of them with something vibrating</li> <li>-recognise that vibrations from sound travel through a medium to the ear</li> <li>-recognise that sounds get fainter as the distance from the sound source increases</li> <li>-find patterns between the pitch of a sound and features of the object that produced it</li> <li>-find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> </ul>	<ul style="list-style-type: none"> <li><i>(Enquiry based unit linked to design technology with either children designing sound proofing for a house or ear protectors and designing and making a musical instrument )</i></li> </ul>	<ul style="list-style-type: none"> <li>-sound needs a medium to travel, the speed of sound in air, in water, in solids</li> <li>-Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum</li> <li>-Sound waves are longitudinal</li> </ul>
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Progression of skills in Biology:

KS 1	Emerging (KS1 children...)	Expected (KS1 children can...)	Exceeded (KS1 Children can...)		
LKS 2		Emerging (LKS2 children can...)	Expected (LKS2 children can...)	Exceeding (LKS2 children can...)	
UKS 2			Emerging (UKS2 children can...)	Expected (UKS2 children can...)	Exceeding (UKS2 children can...)
Humans and other animals	<p>Know about similarities and differences in relation to living things</p> <p>They make observations of animals and plants and explain why some things occur, and talk about changes.</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>describe and compare the structure of a variety of common animals fish, amphibians, reptiles, birds and mammals including pets)</p> <p>notice that animals, including humans, have offspring which grow into adults</p> <p>explore and compare the differences between things that are living, dead, and things that have never been alive</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>identify that humans and some animals have skeletons and muscles for support, protection and movement.</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>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>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>describe the life process of reproduction in some animals</p> <p>describe the changes as humans develop to old age</p> <p>identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (including the pulse and clotting).</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>Know the structure and function of the human skeleton , to include support, protection, movement and making blood cells</p> <p>describe reproduction in humans, including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones)...</p> <p>the structure and function of gas exchange systems in humans...</p> <p>the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases...</p> <p>the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases</p> <p>the effects of recreational drugs on behaviour, health and life processes</p>
Plants	<p>Know about similarities and differences in relation to living things</p> <p>They make observations of animals and plants...and talk about changes</p>	<p>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>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</p>	<p>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> <p>investigate the way in which water is transported within plants</p>	<p>recognise that living things (plants) produce offspring of the same kind but normally offspring vary and are not identical to their parents</p> <p>describe the life process of reproduction in some plants</p>	<p>explain that plants make carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots</p> <p>describe the role of leaf stomata in gas exchange in plants</p> <p>explain reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and</p>

		observe and describe how seeds and bulbs grow into mature plants observe changes across the four seasons	explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.		dispersal, including quantitative investigation of some dispersal mechanisms.
Habitats	<p>Know about similarities and differences in relation to living things</p> <p>talk about the features of their own immediate environment and how environments might vary from one another.</p> <p>make observations of animals and plants</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>identify and name a variety of plants and animals in their habitats, including micro-habitats</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>observe changes across the four seasons</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>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 constantly changing and that this can sometimes pose dangers to specific habitats</p> <p>construct and interpret a variety of food chains, identifying producers, predators and prey</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>describe the difference in the life cycles of a mammal, an amphibian an insect and a bird</p> <p>identify how animals and plants are adapted to suit their environment in different ways and adaption leads to evolution</p>	<p>describe the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</p> <p>explain how organisms affect, and are affected by, their environment, including the accumulation of toxic materials</p> <p>identify differences between species</p> <p>understand heredity as the process by which genetic information is transmitted from one generation to the next</p>

## Progression Of Skills In Chemistry:

KS 1	Emerging (KS1 children ...)	Expected (KS1 children can...)	Exceeded (KS1 Children can...)		
LKS 2		Emerging (LKS2 children can...)	Expected (LKS2 children can...)	Exceeding (LKS2 children can...)	
UKS 2			Emerging (UKS2 children can...)	Expected (UKS2 children can...)	Exceeding (UKS2 children can...)
<b>Chemistry</b>  Properties of materials	<ul style="list-style-type: none"> <li>Know about similarities and differences in relation to materials</li> </ul>	<ul style="list-style-type: none"> <li>distinguish between an object and the material from which it is made</li> <li>compare and group together a variety of everyday materials on the basis of their simple physical properties</li> <li>describe the simple physical properties of a variety of everyday materials</li> <li>identify and compare the uses of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</li> </ul>	<ul style="list-style-type: none"> <li>compare and group together different kinds of rocks on the basis of their simple physical properties</li> <li>recognise that soils are made from rocks and organic matter</li> <li>compare and group materials together, according to whether they are solids, liquids or gases</li> </ul>	<ul style="list-style-type: none"> <li>compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</li> <li>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</li> <li>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering,</li> </ul>	<ul style="list-style-type: none"> <li>explain the rock cycle and the formation of igneous, sedimentary and metamorphic rocks</li> <li>describe the different states of matter in terms of particle model...</li> <li>explain simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography</li> </ul>
Changing materials	<ul style="list-style-type: none"> <li>Know about similarities and differences in relation to materials</li> </ul>	<ul style="list-style-type: none"> <li>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</li> <li>describe the simple physical properties of a variety of everyday materials</li> <li>compare and group together a variety of everyday materials on the basis of their simple physical properties</li> </ul>	<ul style="list-style-type: none"> <li>observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</li> <li>describe in simple terms how fossils are formed when things that have lived are trapped within rock</li> <li>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</li> </ul>	<ul style="list-style-type: none"> <li>demonstrate that dissolving, mixing and changes of state are reversible changes</li> <li>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</li> <li>explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</li> </ul>	<ul style="list-style-type: none"> <li>explain changes of state in terms of particle model</li> <li>describe the differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition</li> </ul>

