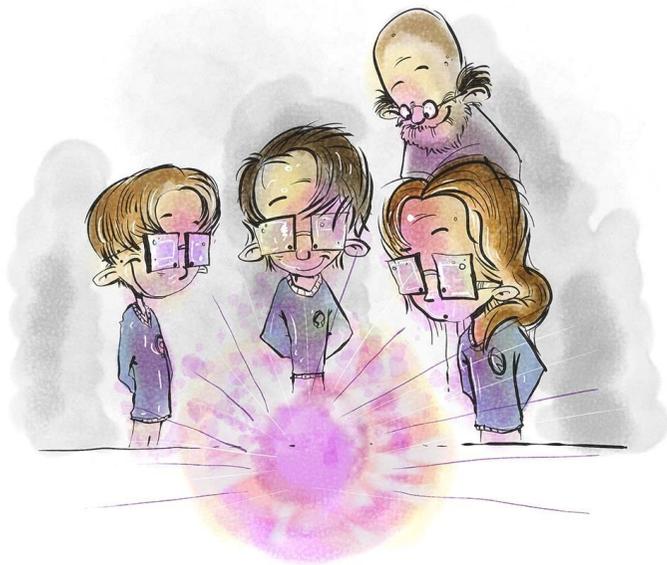


SCIENCE Curriculum



Subject Leader: Julie Wiskow

Rode Heath Primary School

Intent

The 2014 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 skills required to understand the uses and implications of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

At Rode Heath Primary we aim to give all pupils a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science, today and for the future.

Scientific enquiry skills are embedded in each topic the pupils study and these topics are revisited and developed throughout their time at school. Wherever possible, teachers are encouraged to identify cross curricular opportunities for science to further strengthen pupils' scientific knowledge whilst enriching their learning.

All pupils are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged. Concepts taught are reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

All the above is underpinned by our whole school ethos of fostering Engineering Habits of Mind (EHoM) in pupils.

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all pupils are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following:

- Science is taught in planned and arranged topic blocks by the class teacher, wherever possible culminating in a project-based task. This is a strategy to enable the achievement of a greater depth of knowledge.
- Existing knowledge is checked at the beginning of each topic, using various strategies such as KWL grids, Odd One Outs and What Ifs. This ensures that teaching is informed by the pupils' starting points and that it takes account of pupil voice, incorporating children's interests.
- Science planning includes problem solving opportunities to allow children to apply their knowledge, and find out answers for themselves. Pupils are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom. Planning involves teachers creating engaging lessons, using contexts that are relevant and current. Teachers use precise questioning in class to test conceptual knowledge and skills, and assess pupils regularly to identify those children with gaps in learning, so that all pupils keep up. Tasks are selected and designed to provide appropriate challenge to all learners, in line with the school's commitment to inclusion.
- The knowledge and skill development of the previous years is built upon. As the pupils' knowledge and understanding increases, they become more proficient in selecting, using scientific equipment, collating and interpreting results; they become increasingly confident in their growing ability to come to conclusions based on real evidence.
- Working Scientifically skills are embedded into lessons to ensure that skills are systematically developed throughout the pupils' school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
- Pupils are offered a wide range of extra-curricular activities, visits, trips and visitors to complement and broaden the curriculum. These are purposeful and link with the knowledge being taught in class.
- Regular events, such as Science Week or project days, such as the Great Science Share for Schools (GSSfS), allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills. These events often involve families and the wider community.

Impact

- The above results in an engaging, fun, relevant and high-quality science education, fostering a curiosity in our pupils whilst providing them with the foundations for understanding the world around them. This is augmented by the embracing of the EHoM, which support pupils in becoming effective problem solvers.
- Through a variety of engineering and science-themed events throughout the year which include various workshops, trips and interactions with experts, pupils develop the understanding that science has changed our lives and it vital to the world's future.
- From interactions with various scientists and engineers, children begin to understand the true purpose of these disciplines. They feel like they are scientists and this results in more pupils developing STEM-related ideas for their future careers.
- Pupils at Rode Heath Primary thoroughly enjoy science. This results in highly-engaged children, leading in turn to motivated learners with sound scientific understanding.

Any subject specific information:

- Pupils should be specifically taught how to use various pieces of equipment as they become needed for science investigations
- Teachers should make sure that they cover all 5 enquiry types over the course of the academic year.

Curriculum Overview Key Stage 1 (Working scientifically objectives are detailed in a separate table and should be covered along with content)

<p>Year 1</p>	<p>Animals including humans:</p> <p>How are humans and animals different and the same?</p> <ul style="list-style-type: none">• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals• Identify and name a variety of common animals that are carnivores, herbivores and omnivores• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated to which sense <p>Seasonal changes:</p> <p>What are the seasons and how are they different?</p> <ul style="list-style-type: none">• Observe changes across the 4 seasons	<p>Everyday materials:</p> <p>Are all materials the same?</p> <ul style="list-style-type: none">• Distinguish between an object and the material from which it was made• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock• Describe the simple physical properties of a variety of everyday materials• Compare and group together a variety of everyday materials on the basis of their simple physical properties <p>Seasonal changes:</p> <p>What are the seasons and how are they different?</p> <ul style="list-style-type: none">• Observe changes across the 4 seasons• Observe and describe weather associated with the seasons and how day length varies	<p>Plants:</p> <p>How do plants grow?</p> <ul style="list-style-type: none">• 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>Seasonal changes:</p> <p>What are the seasons and how are they different?</p> <ul style="list-style-type: none">• Observe changes across the 4 seasons• Observe and describe weather associated with the seasons and how day length varies
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	<ul style="list-style-type: none"> Observe and describe weather associated with the seasons and how day length varies 		
	<p style="text-align: center;">Composite Task</p> <p><i>Sort pictures of animals into different groups and explain why they have made these choices, Take photographs for Big Book with children's comments.</i></p> <p><i>Seasons – large drawing of bare tree in Big Book (for each season). Children to record their ideas around tree of what changes on the tree – this could be drawings of leaves or post-notes.</i></p>	<p style="text-align: center;">Composite Task</p> <p><i>Label a picture or diagram of an object made of different materials and describe the properties of some of these materials.</i></p> <p><i>Seasons – add appropriately to tree. Record children's ideas about what they can see.</i></p>	<p style="text-align: center;">Composite Task</p> <p><i>Make a plant out of playdough or other materials – coloured paper. Talk about the different parts that make up the structure.</i></p> <p><i>Seasons – add appropriately to tree. Record children's ideas about what they can see.</i></p>
<p>Year 2</p>	<p>Materials:</p> <p>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>Plants:</p> <ul style="list-style-type: none"> 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>Living things and their Habitats:</p> <p>Where do plants and animals live and how do they survive?</p> <ul style="list-style-type: none"> Explore and compare the differences between things that are living, dead and that have never been alive 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>Animals including humans:</p> <ul style="list-style-type: none"> Notice that animals, including humans, have offspring which grow into adults 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 foods, and hygiene

		<ul style="list-style-type: none"> Identify and name a variety of plants and animals in their habitats, including microhabitats 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 align="center">Composite Task</p> <p><i>Investigating ballast in the Titanic as part of the term's project:</i> https://pstt.org.uk/resources/curriculum-materials/Titanic-Investigations</p>	<p align="center">Composite Task</p> <p><i>Explore a local habitat – i.e. the school woodland. Create a map of where they have been, noting the plants and animals they have seen that day.</i></p> <p><i>And/or – growing maze in box.</i></p>	<p align="center">Composite Task</p> <p><i>Choose and do three exercises. Consider the effect of exercise on their bodies and discussed why it is important for humans to exercise.</i></p>

Curriculum Overview Key Stage 2

Year 3	<p>Forces/Magnets</p> <p>Are all metals magnetic?</p> <ul style="list-style-type: none"> Compare how things move on different surfaces Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance Observe how magnets attract or repel each other and attract some materials but not others 	<p>Rocks & Fossils</p> <p>What do rocks tell us?</p> <ul style="list-style-type: none"> Compare and group together different types of rocks on the basis of their appearance and simple physical properties 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>Plants</p> <p>How do plants survive?</p> <ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers 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
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<ul style="list-style-type: none"> • Compare and group together a variety of everyday materials on the basis of whether they attracted to a magnet, and identify some magnetic materials • Describe magnets as having 2 poles • Predict whether 2 magnets will attract or repel each other, depending on which poles are facing <p>Light</p> <p>Why can't we see in the dark?</p> <ul style="list-style-type: none"> • 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 a solid object • Find patterns in the way that the size of shadows changes 		<ul style="list-style-type: none"> • Identify the way in which water is transported within plants • Explore the part that flowers play in the life cycle <p>Animals including humans</p> <p>Why do animals need food?</p> <ul style="list-style-type: none"> • 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 • Identify that humans and some other animals have skeletons and muscles for support, protection and movement
<p style="text-align: center;">Composite Task</p> <p><i>Forces - challenge the children to design their own experiment to test</i></p>	<p style="text-align: center;">Composite Task</p>	<p style="text-align: center;">Composite Task</p>

	<p><i>which magnets are the strongest – follow the TAPS assessment lesson.</i></p> <p><i>Light – design and make sunglasses (show understanding of transparent/translucent and opaque materials)</i></p>	<p><i>Produce a presentation to advise farmers about how best to use their land so that it is good for plants and will not add to flooding of local areas.</i></p>	<p><i>Make a model of the muscles in the arm.</i></p>
Year 4	<p>Sound</p> <p>Why do some noises sound different to others?</p> <ul style="list-style-type: none"> • Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the 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 • Recognise that sounds get fainter as the distance from the sound source increases <p>States of Matter</p> <p>How do some materials change state?</p> <ul style="list-style-type: none"> • Compare and group materials together, according to whether they are solids, liquids or gases • Observe that some materials change state when they are 	<p>Electricity</p> <p>How does a circuit work?</p> <ul style="list-style-type: none"> • Identify common appliances that run on electricity • Construct a simple series electrical, identifying and naming its basic parts, including cells, buzzers, wires, bulbs and switches • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery, • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors 	<p>Animals including humans:</p> <ul style="list-style-type: none"> • 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 • Construct and interpret a variety of food chains, identifying producers, predators and prey <p>Classification:</p> <p>What is the difference between a shark and a deer?</p> <ul style="list-style-type: none"> • Recognise that living things can be grouped in a variety of ways • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • Recognise that environments can change and that this can sometimes pose dangers to living things

	<p>heated or cooled, and measure or research the temperature at which this happens in degrees Celsius</p> <ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature 		
	<p align="center">Composite Task</p> <p><i>Sound – make musical instrument and investigate changing pitch – sound sandwich, guitar and shoebox etc.</i></p> <p><i>And/or hydrophone</i></p> <p><i>States of Matter – Research and produce poster of melting points of different substances.</i></p>	<p align="center">Composite Task</p> <p><i>Make a scribbling machine.</i></p> <p>https://www.teachengineering.org/sprinkles/view/cub_lightyourway</p>	<p align="center">Composite Task</p> <p><i>Make a system for collecting fresh water from sea water – desalination – from Making with States of Matter book. Maker profile: Maria Telkes – portable solar still.</i></p> <p><i>Chocolate art.</i></p> <p><i>Melting Ice People.</i></p>

<p>Year 5</p>	<p>Earth & Space</p> <p>Why is it important for everyday life that we understand about the movement of the earth?</p> <ul style="list-style-type: none"> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system 	<p>Properties & Changes of Materials</p> <p>What makes a material?</p> <ul style="list-style-type: none"> 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 	<p>Animals including humans</p> <p>Why do we need to keep our bodies healthy?</p> <ul style="list-style-type: none"> Describe the changes as humans develop to old age
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<ul style="list-style-type: none"> • Describe the movement of the Moon relative to the Earth • Describe the Sun, Earth and Moon as approximately spherical bodies • Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky <p>Forces</p> <p>How has our knowledge of forces influenced everyday life?</p> <ul style="list-style-type: none"> • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Identify the effects of air resistance, water resistance and friction, the act between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect 	<ul style="list-style-type: none"> • Know that some materials will dissolve in liquid form a solution, and describe how to recover a substance from a solution • Use knowledge of solids, liquids and gases to decide how mixtures might have separated, including through filtering, sieving and evaporating • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • Demonstrate that dissolving, mixing and changes of state are reversible changes • 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>Living things & their Habitats</p> <p>How are all living things similar and different?</p> <ul style="list-style-type: none"> • Describe the difference 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 style="text-align: center;">Composite Task</p> <p><i>Earth & Space: Moon Hotel</i></p> <p><i>Forces: Design and build a marble run.</i></p>	<p style="text-align: center;">Composite Task</p> <p><i>Design your own smart material – what properties does it have. Design a product that uses thermochromic materials.</i></p> <p><i>Breed some ladybirds:</i> https://www.greengardener.co.uk/product/ladybird-breeding-kit/</p>	<p style="text-align: center;">Composite Task</p> <p><i>Create a scenario for the children whereby aliens have contacted us. They have been secretly visiting the same houses on Earth over a period of many years. They now want to know what happened to some of the ‘small people’ that they saw 80 years ago. They are a little confused, as on their planet they are</i></p>

		<p><i>Build a habitat for a ladybird:</i> https://www.greengardener.co.uk/product/ladybird-house/</p>	<p><i>born a certain size and shape, and then they stay like this until they finally die.</i></p> <p><i>Create a poster to explain the changes.</i></p>
<p>Year 6</p>	<p>Light</p> <p>How does light help us see?</p> <ul style="list-style-type: none"> • Recognise that light appears to travel in straight lines • 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 • 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 • 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> <p>How does a switch make a room bright?</p> <ul style="list-style-type: none"> • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • 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>Living things & their Habitats</p> <ul style="list-style-type: none"> • Classify living things into broad groups according to observable characteristics and based on similarities and differences • Know how living things have been classified • Give reasons for classifying plants and animals in a specific way <p>Evolution & Inheritance</p> <p>Why are humans so diverse?</p> <ul style="list-style-type: none"> • 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 • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution 	<p>Animals including humans</p> <ul style="list-style-type: none"> • Identify and name the main parts of the human circulatory system • Know the function of the heart, blood vessels and blood • Know the impact of diet, exercise, drugs and life style on health • Know the ways in which nutrients and water are transported in animals, including humans

	<ul style="list-style-type: none"> • Use recognised symbols when representing a simple circuit in a diagram 		
	<p style="text-align: center;">Composite Task</p> <p><i>Light: Make a kaleidoscope</i></p> <p><i>Electricity: Use knowledge of circuits to make a device such as a burglar alarm.</i></p>	<p style="text-align: center;">Composite Task</p> <p><i>Living Things & Their Habitats: Design a Zoo layout, thinking about how animals are grouped together.</i></p> <p><i>Evolution: Design your own animal – show how it has adapted to its environment.</i></p>	<p style="text-align: center;">Composite Task</p> <p><i>Make a simple model heart.</i></p>



Progression in knowledge

National Curriculum statements in red are from other linked topics.

Plants

Birth to three	<ul style="list-style-type: none"> Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. 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.
Reception	<ul style="list-style-type: none"> Draw information from a simple map. (Reception – Living things and their habitats) Explore the natural world around them. (Reception – Living things and their habitats) Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats) Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats) Understand the effect of changing seasons on the natural world around them. (Reception – Seasonal changes)
Year 1	<ul style="list-style-type: none"> 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.
Year 2	<ul style="list-style-type: none"> 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. Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)
Year 3	<ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. 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. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
Year 4	<ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)
Year 5	<ul style="list-style-type: none"> Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
Year 6	<ul style="list-style-type: none"> 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. (Y6 - Living things and their habitats) Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)
Key Stage 3	<ul style="list-style-type: none"> Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

Living things and their habitats

Birth to three	<ul style="list-style-type: none"> Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Begin to understand the need to respect and care for the natural environment and all living things.
Reception	<ul style="list-style-type: none"> Draw information from a simple map. Explore the natural world around them. Describe what they see, hear and feel whilst outside. Recognise some environments that are different to the one in which they live.
Year 1	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans) Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans) Observe changes across the four seasons. (Y1 - Seasonal change)
Year 2	<ul style="list-style-type: none"> Explore and compare the differences between things that are living, dead, and things that have never been alive. 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. Identify and name a variety of plants and animals in their habitats, including microhabitats. 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. Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals including humans)
Year 3	<ul style="list-style-type: none"> Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)
Year 4	<ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans)
Year 5	<ul style="list-style-type: none"> 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.
Year 6	<ul style="list-style-type: none"> 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. Give reasons for classifying plants and animals based on specific characteristics. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. (Y6 - Evolution and inheritance) Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. (Y6 - Evolution and inheritance)
Key Stage 3	<ul style="list-style-type: none"> Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. Differences between species.

Animals, including humans

Birth to three	<ul style="list-style-type: none"> • Explore natural materials, indoors and outside. • Make connections between the features of their family and other families. • Notice differences between people.
Nursery	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. • Begin to make sense of their own life-story and family's history. • 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.
Reception	<ul style="list-style-type: none"> • Talk about members of their immediate family and community. • Name and describe people who are familiar to them. • Recognise some environments that are different to the one in which they live.
Year 1	<ul style="list-style-type: none"> • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
Year 2	<ul style="list-style-type: none"> • Notice that animals, including humans, have offspring which grow into adults. • 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. • 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. (Y2 - Living things and their habitats)
Year 3	<ul style="list-style-type: none"> • 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. • Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
Year 4	<ul style="list-style-type: none"> • 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. • Construct and interpret a variety of food chains, identifying producers, predators and prey.
Year 5	<ul style="list-style-type: none"> • Describe the changes as humans develop to old age. • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) • Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
Year 6	<ul style="list-style-type: none"> • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • Describe the ways in which nutrients and water are transported within animals, including humans. • 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. (Y6 - Living things and their habitats) • Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)
Key Stage 3	<ul style="list-style-type: none"> • Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. • The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. • The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. • The structure and functions of the gas exchange system in humans, including adaptations to function. • The mechanism of breathing to move air in and out of the lungs. • The impact of exercise, asthma and smoking on the human gas exchange system.

Evolution and inheritance

Birth to three	<ul style="list-style-type: none"> • Make connections between the features of their family and other families. • Notice differences between people.
Nursery	<ul style="list-style-type: none"> • Begin to understand the need to respect and care for the natural environment and all living things. (Nursery – Living things and their habitats)
Reception	<ul style="list-style-type: none"> • Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats)
Year 1	
Year 2	<ul style="list-style-type: none"> • 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. (Y2 - Living things and their habitats) • Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)
Year 3	<ul style="list-style-type: none"> • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)
Year 4	<ul style="list-style-type: none"> • Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)
Year 5	<ul style="list-style-type: none"> • Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)
Year 6	<ul style="list-style-type: none"> • 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. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Key Stage 3	<ul style="list-style-type: none"> • Heredity as the process by which genetic information is transmitted from one generation to the next. • A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. • The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. • Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.

Seasonal changes

Birth to three	<ul style="list-style-type: none"> •
Nursery	<ul style="list-style-type: none"> • Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants & Animals, excluding humans)
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them.
Year 1	<ul style="list-style-type: none"> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.
Year 2	
Year 3	<ul style="list-style-type: none"> • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)
Year 4	
Year 5	<ul style="list-style-type: none"> • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (Y5 - Earth and space)
Year 6	
Key Stage 3	<ul style="list-style-type: none"> • The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.

Materials

Birth to three	<ul style="list-style-type: none"> • Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about the differences between materials and changes they notice.
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties.
Year 2	<ul style="list-style-type: none"> • 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.
Year 3	<ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (Y3 - Rocks) • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) • 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. (Y3 - Forces and magnets)
Year 4	<ul style="list-style-type: none"> • Compare and group materials together, according to whether they are solids, liquids or gases. • 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). • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity)
Year 5	<ul style="list-style-type: none"> • 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. • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes. • 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.
Year 6	
Key Stage 3	<ul style="list-style-type: none"> • Chemical reactions as the rearrangement of atoms. • Representing chemical reactions using formulae and using equations. • Combustion, thermal decomposition, oxidation and displacement reactions. • Defining acids and alkalis in terms of neutralisation reactions. • The pH scale for measuring acidity/alkalinity; and indicators.

Rocks

Birth to three	<ul style="list-style-type: none"> • Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	<ul style="list-style-type: none"> • Use all their senses in hands-on exploration of natural materials. (Nursery – Living things and their habitats) • Explore collections of materials with similar and/or different properties. (Nursery – Living things and their habitats)
Reception	<ul style="list-style-type: none"> • Explore the natural world around them. (Reception – Living things and their habitats) • Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats)
Year 1	<ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)
Year 2	<ul style="list-style-type: none"> • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)
Year 3	<ul style="list-style-type: none"> • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • 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.
Year 4	
Year 5	
Year 6	<ul style="list-style-type: none"> • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. (Y6 - Evolution and inheritance)
Key Stage 3	<ul style="list-style-type: none"> • The composition of the Earth. • The structure of the Earth. • The rock cycle and the formation of igneous, sedimentary and metamorphic rocks.

Light

Birth to three	<ul style="list-style-type: none"> Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> Explore how things work. Talk about the differences in materials and changes they notice.
Reception	<ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)
Year 2	
Year 3	<ul style="list-style-type: none"> 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. Find patterns in the way that the size of shadows change.
Year 4	
Year 5	<ul style="list-style-type: none"> 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. (Y5 - Properties and changes of materials)
Year 6	<ul style="list-style-type: none"> Recognise that light appears to travel in straight lines. 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. 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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Key Stage 3	<ul style="list-style-type: none"> The similarities and differences between light waves and waves in matter. Light waves travelling through a vacuum; speed of light. The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye. Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.

Forces

Birth to three	<ul style="list-style-type: none"> Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> Explore how things work. Explore and talk about different forces they can feel. Talk about the differences between materials and changes they notice.
Reception	<ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside.
Year 1	
Year 2	<ul style="list-style-type: none"> Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)
Year 3	<ul style="list-style-type: none"> Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.
Year 4	
Year 5	<ul style="list-style-type: none"> Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. 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.
Year 6	
Key Stage 3	<ul style="list-style-type: none"> Magnetic fields by plotting with compass, representation by field lines. Earth's magnetism, compass and navigation. Forces as pushes or pulls, arising from the interaction between two objects. Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. Moment as the turning effect of a force. 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. Forces measured in Newtons, measurements of stretch or compression as force is changed.

Sound

Birth to three	<ul style="list-style-type: none"> Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> Explore how things work.
Reception	<ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)
Year 2	
Year 3	
Year 4	<ul style="list-style-type: none"> Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the 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. Recognise that sounds get fainter as the distance from the sound source increases.
Year 5	
Year 6	
Key Stage 3	<ul style="list-style-type: none"> Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. Sound needs a medium to travel, the speed of sound in air, in water, in solids. Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. Auditory range of humans and animals. Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. Waves transferring information for conversion to electrical signals by microphone.

Electricity

Birth to three	<ul style="list-style-type: none"> Repeat actions that have an effect.
Nursery	<ul style="list-style-type: none"> Explore how things work.
Reception	
Year 1	
Year 2	
Year 3	
Year 4	<ul style="list-style-type: none"> Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.
Year 5	
Year 6	<ul style="list-style-type: none"> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. 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 recognised symbols when representing a simple circuit in a diagram.
Key Stage 3	<ul style="list-style-type: none"> Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. Differences in resistance between conducting and insulating components (quantitative). Static electricity.

Earth and space

Birth to three	<ul style="list-style-type: none"> Explore and respond to different natural phenomena in their setting and on trips.
Nursery	
Reception	<ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside.
Year 1	<ul style="list-style-type: none"> Observe changes across the four seasons. (Y1 – Seasonal changes) Observe and describe weather associated with the seasons and how day length varies. (Y1 – Seasonal changes)
Year 2	
Year 3	
Year 4	
Year 5	<ul style="list-style-type: none"> 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. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
Year 6	
Key Stage 3	<ul style="list-style-type: none"> Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10$ N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). Our Sun as a star, other stars in our galaxy, other galaxies. The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. The light year as a unit of astronomical distance.

Progression of Working Scientifically Skills: Science

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Questioning	<p>They are beginning to ask a range of questions.</p> <p>They can answer how or why questions about their environment.</p> <p>They can answer how and why questions about their experiences</p> <p>They can ask appropriate questions about what they have heard.</p>	<p>Ask some simple questions using everyday language and begin to use some simple scientific words.</p> <p>Begin to recognise that questions can be answered in different ways such as: observing changes over time, grouping and classifying and simple tests.</p> <p>With support, use observations and ideas to suggest answers to questions.</p>	<p>Ask simple questions using everyday language and year 2 scientific language.</p> <p>Recognise that questions can be answered in different ways such as: observing changes over time, grouping and classifying, simple tests, researching using secondary sources and noticing patterns.</p> <p>Use observations and ideas to suggest answers to questions.</p>	<p>Begin to ask some relevant questions using scientific language.</p> <p>Begin to make some decisions about which type of enquiry will be the best way of answering questions including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.</p>	<p>Ask a range of relevant questions using scientific language.</p> <p>Make some decisions about which type of enquiry will be the best way of answering questions including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.</p>	<p>Begin to ask some significant scientific questions based on scientific concepts.</p> <p>Begin to plan different types of scientific enquiries to answer questions: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations, including recognising and controlling variables); and researching using secondary sources.</p>	<p>Ask a range of significant scientific questions based on scientific concepts.</p> <p>Plan the most appropriate type of scientific enquiry to answer questions including: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations, including recognising and controlling variables); and researching using secondary sources.</p>

Progression of Working Scientifically Skills: Science

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Investigating	<p>Begin to compare two things</p> <p>Can look for similarities and differences.</p> <p>Can identify a similarity or difference between two places, objects, materials or living things.</p>	<p>Begin to perform simple tests</p> <p>Begin to use practical resources to gather evidence to answer questions.</p> <p>With support, carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.</p>	<p>Perform simple tests</p> <p>Use practical resources to gather evidence to answer questions.</p> <p>Carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.</p>	<p>Begin to set up simple practical enquiries, comparative and fair tests</p> <p>Begin to select practical resources to gather evidence to answer questions generated by themselves or given to them.</p> <p>With support, they follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.</p>	<p>Set up simple practical enquiries, comparative and fair tests</p> <p>Select from a range of practical resources to gather evidence to answer questions generated by themselves or given to them.</p> <p>They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.</p>	<p>Plan different types of scientific enquiries to answer questions</p> <p>Begin to decide for themselves how to gather evidence to answer a scientific question, choosing a type of enquiry to carry out.</p> <p>Select from a range of practical resources to gather evidence.</p> <p>Begin to recognise how secondary sources can be used to answer questions.</p> <p>Decide what observations or measurements to make over time and for how long.</p> <p>With support, look for patterns and relationships using a suitable sample.</p> <p>Carry out fair tests, beginning to recognise and control variables.</p>	<p>Independently, plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p> <p>Decide for themselves how to gather evidence to answer a scientific question, choosing a type of enquiry to carry out and justifying their choice.</p> <p>Independently select from a range of practical resources to gather evidence.</p> <p>Recognise how secondary sources can be used to answer questions.</p> <p>Independently decide what observations or measurements to make over time and for how long.</p> <p>Look for patterns and relationships using a suitable sample.</p> <p>Carry out fair tests, recognising and controlling variables.</p>

Progression of Working Scientifically Skills: Science

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Drawing conclusions	<p>Begin to talk about what they have found out</p> <p>Begin to say what happened</p>	<p>Suggest answers to questions</p> <p>Describe what happened and whether they were surprised at the findings or not.</p> <p>Begin to orally answer questions based upon their findings and their experiences of the world</p>	<p>Suggest answers to questions and begin to look for patterns</p> <p>Use observations from their investigations to answer questions based upon their findings and their experiences of the world</p> <p>With support, begin to look for changes, patterns, similarities and differences in their findings</p>	<p>Draw simple conclusions and raise further questions</p> <p>Begin to use straightforward scientific evidence to answer questions or to support their findings using age-appropriate scientific language.</p> <p>With support, begin to look for changes, patterns, similarities and differences in their results in order to draw simple conclusions using age-appropriate scientific language.</p> <p>With support, begin to identify new questions arising from the results and make new predictions.</p>	<p>Use results to draw simple conclusions, suggest improvements and raise further questions</p> <p>Use straightforward scientific evidence to answer questions or to support their findings using age-appropriate scientific language.</p> <p>See patterns in results; begin to say what has been found out, linking cause and effect to develop simple conclusions. using age-appropriate scientific language.</p> <p>With support, begin to identify new questions arising from the results, make new predictions and suggest ways of improving what they have already done.</p>	<p>Draw conclusions, including any causal relationships and scientific explanations and set up further linked investigations</p> <p>Identify scientific evidence to support or refute ideas or arguments.</p> <p>Draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings.</p> <p>Use their findings to identify when further tests and observations are needed.</p>	<p>Draw conclusions, including any causal relationships and scientific explanations of and degree of trust in results and set up further linked comparative and fair tests</p> <p>Identify and explain the scientific evidence to support or refute ideas or arguments.</p> <p>Draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings including an analysis of the degree of trust in their findings.</p> <p>Use their findings to identify when further comparative, fair tests and observations are needed.</p>

Progression of Working Scientifically Skills: Science

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Identifying & Classifying	They are beginning to sort items using their senses	Use their observations to identify & classify.	Use given criteria to identify and classify.	Identify and classify in different ways.	With support, use similarities and differences in order to group and identify.	Use similarities and differences in order to group and identify.	Independently, use similarities and differences in order to group and identify.
	Use all their senses in hands-on exploration.	Make careful observations to identify features and notice changes.	Sort and classify things according to given criteria.	Record classifications using Venn diagrams, Carroll diagrams, tables etc.	Begin to identify similarities/ differences/ changes when talking about scientific processes.	Accurately, identify similarities/ differences/ changes when talking about scientific processes and materials.	Independently, identify similarities/ differences/ changes when talking about scientific processes and living things.
	Explore collections of materials with similar and/or different properties.	Sort and group living things or materials using similarities and differences.	Classify items using simple prepared tables and sorting rings.	Compare, classify and group items using Scientific criteria (e.g. magnetic, not magnetic).	Use and begin to create simple keys.		Use and develop keys to identify, classify and describe living things.
	They can sort items by simple observable features.	Use simple charts to identify unknown animals and plants. Begin to identify and describe how they group items.	Describe the characteristics they used to identify a living thing.	Independently, classify and group in different ways.			Identify and explain patterns seen in the natural environment.

Progression of Working Scientifically Skills: Science

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Recording and Presenting	<p>Begin to record and present</p> <p>To draw pictures (of plants and animals)</p> <p>To create group/class block graphs to record votes/findings</p> <p>To present what they found out orally</p>	<p>With support, record and present simple findings and ideas</p> <p>To begin to draw diagrams and label</p> <p>To draw pictures (or take photographs) over a period of time</p> <p>To present grouping in a simple format</p> <p>To begin to complete simple tally tables, block graphs and pictograms</p> <p>To present findings orally.</p>	<p>Record and present simple findings and ideas</p> <p>To draw diagrams, using observations, and label parts, including over a period of time</p> <p>To present grouping in a given format</p> <p>To complete simple tally tables, block graphs and pictograms with a simple scale</p> <p>To present findings orally, with simple scientific language, and visually.</p>	<p>With support, record and present results and ideas</p> <p>To produce detailed labelled diagrams using observations, including over a period of time</p> <p>To begin to present results by creating or completing Venn and Carroll diagrams, tally, columned tables and simple bar charts, using scales</p> <p>To present results orally, visually or in written form with support, using simple scientific language</p>	<p>Record and present results and ideas</p> <p>To produce detailed labelled diagrams using observations, including over a period of time</p> <p>To present results by creating or completing Venn and Carroll diagrams, simple keys, tally, columned tables and simple bar charts, using scales</p> <p>To present results orally, visually or in written form, using key vocabulary and scientific language</p>	<p>With support, record and present data and ideas in detail</p> <p>To produce detailed labelled diagrams using observations, including over a period of time</p> <p>To present data by creating Venn and Carroll diagrams, keys, columned tables, scatter graphs, bar charts and line graphs, using appropriate scales</p> <p>To present results orally, visually and in written form, using key vocabulary and scientific language</p>	<p>Independently, record and present data and ideas in detail</p> <p>To independently produce detailed and accurate labelled diagrams using observations, including over a period of time</p> <p>To choose the most appropriate form to present data: Venn and Carroll diagrams, keys, columned tables, scatter graphs, bar charts and line graphs, using appropriate scales</p> <p>To present results orally, visually and in written form, using relevant key vocabulary and scientific language</p>

YEAR 1: END POINTS

Year 1				
Biology			Chemistry	Physics
Animals, including Humans	Animals, including Humans	Plants	Everyday Materials	Seasonal Change
<ul style="list-style-type: none"> Name common animals Carnivores, etc 	<ul style="list-style-type: none"> Human body and senses 	<ul style="list-style-type: none"> Common plants Plant structure 	<ul style="list-style-type: none"> Properties of materials Grouping materials 	<ul style="list-style-type: none"> The four seasons Seasonal weather
<ul style="list-style-type: none"> Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds Know and classify animals by what they eat (carnivore, herbivore and omnivore) Know how to sort by living and non living things 	<ul style="list-style-type: none"> Know the name of parts of the human body that can be seen 	<ul style="list-style-type: none"> Know and name a variety of common wild and garden plants Know and name the petals, stem, leaves and root of a plant Know and name the roots, trunk, branches and leaves of a tree 	<ul style="list-style-type: none"> Know the name of the materials an object is made from Know about the properties of everyday materials 	<ul style="list-style-type: none"> Name the seasons and know about the type of weather in each season

Year 1
Working Scientifically
<ul style="list-style-type: none"> Ask questions such as: <ul style="list-style-type: none"> Why are flowers different colours? Why do some animals eat meat and others do not?
<ul style="list-style-type: none"> Set up a test to see which materials keeps things warmest, know if the test has been successful and can say what has been learned
<ul style="list-style-type: none"> Explain to someone what has been learned from an investigation they have been involved with and draw conclusions from the answers to the questions asked
<ul style="list-style-type: none"> Measures (within Year 1 mathematical limits) to help find out more about the investigations undertaken

YEAR 2: END POINTS

Year 2				
Biology			Chemistry	
All living things and their habitats	Animals, including Humans	Plants	Everyday Materials	
<ul style="list-style-type: none"> Alive or dead Habitats Adaptations Food chains 	<ul style="list-style-type: none"> Animal reproduction Healthy living Basic needs 	<ul style="list-style-type: none"> Plant and seed growth Plant reproduction Keeping plants healthy 	<ul style="list-style-type: none"> Identify different materials Name everyday materials Properties of materials 	<ul style="list-style-type: none"> Compare the use of different materials Compare movement on different surfaces
<ul style="list-style-type: none"> Classify things by living, dead or never lived Know how a specific habitat provides for the basic needs of things living there (plants and animals) Match living things to their habitat Name some different sources of food for animals Know about and explain a simple food chain 	<ul style="list-style-type: none"> Know the basic stages in a life cycle for animals, (including humans) Know why exercise, a balanced diet and good hygiene are important for humans 	<ul style="list-style-type: none"> Know and explain how seeds and bulbs grow into plants Know what plants need in order to grow and stay healthy (water, light & suitable temperature) 	<ul style="list-style-type: none"> Know how materials can be changed by squashing, bending, twisting and stretching 	<ul style="list-style-type: none"> Know why a material might or might not be used for a specific job

Year 2
Working Scientifically
<ul style="list-style-type: none"> Ask questions such as: <ul style="list-style-type: none"> Why do some trees lose their leaves in Autumn and others do not? How long are roots of tall trees? Why do some animals have underground habitats?
<ul style="list-style-type: none"> Use equipment such as thermometers and rain gauges to help observe changes to local environment as the year progresses
<ul style="list-style-type: none"> Use microscopes to find out more about small creatures and plants
<ul style="list-style-type: none"> Know how to set up a fair test and do so when finding out about how seeds grow best
<ul style="list-style-type: none"> Classify or group things according to a given criteria, e.g. deciduous and coniferous trees
<ul style="list-style-type: none"> Draw conclusions from fair tests and explain what has been found out
<ul style="list-style-type: none"> Use measures (within Year 2 mathematical limits) to help find out more about the investigations they are engaged with

YEAR 3: END POINTS

Year 3					
Biology			Chemistry	Physics	
Animals, including humans	Plants	Plants	Rocks	Forces	Light
<ul style="list-style-type: none"> Skeleton and muscles Nutrition Exercise and health 	<ul style="list-style-type: none"> Plant life Basic structure and functions 	<ul style="list-style-type: none"> Life cycle Water transportation 	<ul style="list-style-type: none"> Fossil formation Compare and group rocks Soil 	<ul style="list-style-type: none"> Different Forces Magnets 	<ul style="list-style-type: none"> Reflections Shadows
<ul style="list-style-type: none"> Know about the importance of a nutritious, balanced diet Know how nutrients, water and oxygen are transported within animals and humans Know about the skeletal and muscular system of a human 	<ul style="list-style-type: none"> Know the function of different parts of flowering plants and trees 	<ul style="list-style-type: none"> Know how water is transported within plants Know the plant life cycle, especially the importance of flowers 	<ul style="list-style-type: none"> Compare and group rocks based on their appearance and physical properties, giving reasons Know how soil is made and how fossils are formed Know about and explain the difference between sedimentary, metamorphic and igneous rock 	<ul style="list-style-type: none"> Know about and describe how objects move on different surfaces Know how a simple pulley works and use to on to lift an object Know how some forces require contact and some do not, giving examples Know about and explain how magnets attract and repel. Predict whether magnets will attract or repel and give a reason 	<ul style="list-style-type: none"> Know that dark is the absence of light Know that light is needed in order to see and is reflected from a surface Know and demonstrate how a shadow is formed and explain how a shadow changes shape Know about the danger of direct sunlight and describe how to keep protected

YEAR 4: END POINTS

Year 4				
Biology		Chemistry	Physics	
Animals, including humans	All living things and their habitats	States of Matter	Electricity	Sound
<ul style="list-style-type: none"> Digestive system Teeth Food chains 	<ul style="list-style-type: none"> Grouping living things Classification keys Adaptation of living things 	<ul style="list-style-type: none"> Compare and group materials Solids, liquids and gases Changing state Water cycle 	<ul style="list-style-type: none"> Uses of electricity Simple circuits and switches Conductors and insulators 	<ul style="list-style-type: none"> How sounds are made Sound vibrations Pitch and Volume
<ul style="list-style-type: none"> Identify and name the parts of the human digestive system Know the functions of the organs in the human digestive system Identify and know the different types of human teeth Know the functions of different human teeth Use and construct food chains to identify producers, predators and prey 	<ul style="list-style-type: none"> Use classification keys to group, identify and name living things Know how changes to an environment could endanger living things Group materials based on their state of matter (solid, liquid, gas) 	<ul style="list-style-type: none"> Know the temperature at which materials change state Know about and explore how some materials can change state Know the part played by evaporation and condensation in the water cycle 	<ul style="list-style-type: none"> Identify and name appliances that require electricity to function Construct a series circuit Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) Predict and test whether a lamp will light within a circuit Know the function of a switch Know the difference between a conductor and an insulator; giving examples of each 	<ul style="list-style-type: none"> Know how sound is made, associating some of them with vibrating Know how sound travels from a source to our ears Know the correlation between pitch and the object producing a sound Know the correlation between the volume of a sound and the strength of the vibrations that produced it Know what happens to a sound as it travels away from its source

Year 3	
Working Scientifically	
<ul style="list-style-type: none"> Ask questions such as: <ul style="list-style-type: none"> Why does the moon appear as different shapes in the night sky? Why do shadows change during the day? Where does a fossil come from? 	<ul style="list-style-type: none"> Use a thermometer to measure temperature and know there are two main scales used to measure temperature
<ul style="list-style-type: none"> Observe at what time of day a shadow is likely to be at its longest and shortest 	<ul style="list-style-type: none"> Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
<ul style="list-style-type: none"> Observe which type of plants grow in different places e.g. bluebells in woodland, roses in domestic gardens, etc. 	<ul style="list-style-type: none"> Group information according to common factors e.g. plants that grow in woodlands or plants that grow in gardens
<ul style="list-style-type: none"> Use research to find out how reflection can help us see things that are around the corner 	<ul style="list-style-type: none"> Use bar charts and other statistical tables (in line with Year 3 mathematics statistics) to record findings
<ul style="list-style-type: none"> Use research to find out what the main differences are between sedimentary and igneous rocks 	<ul style="list-style-type: none"> Know how to use a key to help understand information presented on a chart
<ul style="list-style-type: none"> Test to see which type of soil is most suitable when growing two similar plants 	<ul style="list-style-type: none"> Be confident to stand in front of others and explain what has been found out, for example about how the moon changes shape
<ul style="list-style-type: none"> Test to see if their right hand is as efficient as their left hand 	<ul style="list-style-type: none"> Present findings using written explanations and include diagrams when needed
<ul style="list-style-type: none"> Set up a fair test with different variables e.g. the best conditions for a plant to grow 	<ul style="list-style-type: none"> Make sense of findings and draw conclusions which help them to understand more about scientific information
<ul style="list-style-type: none"> Explain to a partner why a test is a fair one e.g. lifting weights with right and left hand, etc. 	<ul style="list-style-type: none"> Amend predictions according to findings
<ul style="list-style-type: none"> Measure carefully (taking account of mathematical knowledge up to Year 3) and add to scientific learning 	<ul style="list-style-type: none"> Be prepared to change ideas as a result of what has been found out during a scientific enquiry

Year 4	
Working Scientifically	
<ul style="list-style-type: none"> Ask questions such as: <ul style="list-style-type: none"> Why are steam and ice the same thing? Why is the liver important in the digestive systems? What do we mean by 'pitch' when it comes to sound? 	<ul style="list-style-type: none"> Gather and record information using a chart, matrix or tally chart, depending on what is most sensible
<ul style="list-style-type: none"> Use research to find out how much time it takes to digest most of our food 	<ul style="list-style-type: none"> Group information according to common factors e.g. materials that make good conductors or insulators
<ul style="list-style-type: none"> Use research to find out which materials make effective conductors and insulators of electricity 	<ul style="list-style-type: none"> Use bar charts and other statistical tables (in line with Year 4 mathematics statistics) to record findings
<ul style="list-style-type: none"> Carry out tests to see, for example, which of two instruments make the highest or lowest sounds and to see if a glass of ice weighs the same as a glass of water 	<ul style="list-style-type: none"> Present findings using written explanations and include diagrams, when needed
<ul style="list-style-type: none"> Set up a fair test with more than one variable e.g. using different materials to cut out sound 	<ul style="list-style-type: none"> Write up findings using a planning, doing and evaluating process
<ul style="list-style-type: none"> Explain to others why a test that has been set up is a fair one e.g. discover how fast ice melts in different temperatures 	<ul style="list-style-type: none"> Make sense of findings and draw conclusions which helps them understand more about the scientific information that has been learned
<ul style="list-style-type: none"> Measure carefully (taking account of mathematical knowledge up to Year 4) and add to scientific learning 	<ul style="list-style-type: none"> When making predictions there are plausible reasons as to why they have done so
<ul style="list-style-type: none"> Use a data logger to check on the time it takes ice to melt to water in different temperatures 	<ul style="list-style-type: none"> Able to amend predictions according to findings
<ul style="list-style-type: none"> Use a thermometer to measure temperature and know there are two main scales used to measure temperature 	<ul style="list-style-type: none"> Prepared to change ideas as a result of what has been found out during a scientific enquiry

YEAR 5: END POINTS

Year 5				
Biology		Chemistry	Physics	
All living things and their habitats	Animals, including humans	Properties and changes in materials	Forces	Earth and Space
<ul style="list-style-type: none"> Life cycles – plants and animals Reproductive processes Famous naturalists 	<ul style="list-style-type: none"> Changes as humans develop from birth to old age 	<ul style="list-style-type: none"> Compare properties of everyday materials Soluble/dissolving Reversible and irreversible substances 	<ul style="list-style-type: none"> Gravity Friction Forces and motion of mechanical devices 	<ul style="list-style-type: none"> Movement of the Earth and the planets Movement of the Moon Night and day
<ul style="list-style-type: none"> Know the life cycle of different living things e.g. mammal, amphibian, insect and bird Know the differences between different life cycles Know the process of reproduction in plants Know the process of reproduction in animals 	<ul style="list-style-type: none"> Create a timeline to indicate stages of growth in humans 	<ul style="list-style-type: none"> Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets Know and explain how a material dissolves to form a solution Know and show how to recover a substance from a solution Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) Know and demonstrate that some changes are reversible and some are not Know how some changes result in the formation of a new material and that this is usually irreversible 	<ul style="list-style-type: none"> Know what gravity is and its impact on our lives Identify and know the effect of air and water resistance Identify and know the effect of friction Explain how levers, pulleys and gears allow a smaller force to have a greater effect 	<ul style="list-style-type: none"> Know about and explain the movement of the Earth and other planets relative to the Sun Know about and explain the movement of the Moon relative to the Earth Know and demonstrate how night and day are created Describe the Sun, Earth and Moon (using the term spherical)

YEAR 6: END POINTS

Year 6				
Biology			Physics	
Animals, including humans	All living things and their habitats	Evolution and Inheritance	Electricity	Light
<ul style="list-style-type: none"> The circulatory system Water transportation Impact of exercise on body 	<ul style="list-style-type: none"> Classification of living things and the reasons for it 	<ul style="list-style-type: none"> Identical and non-identical offspring Fossil evidence and evolution Adaptation and evolution 	<ul style="list-style-type: none"> Electrical components Simple circuits Fuses and voltage 	<ul style="list-style-type: none"> How light travels Reflection Ray models of light
<ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system Know the function of the heart, blood vessels and blood Know the impact of diet, exercise, drugs and lifestyle on health Know the ways in which nutrients and water are transported in animals, including humans 	<ul style="list-style-type: none"> Classify living things into broad groups according to observable characteristics and based on similarities and differences Know how living things have been classified Give reasons for classifying plants and animals in a specific way 	<ul style="list-style-type: none"> Know how the Earth and living things have changed over time Know how fossils can be used to find out about the past Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) Know how animals and plants are adapted to suit their environment Link adaptation over time to evolution Know about evolution and can explain what it is 	<ul style="list-style-type: none"> Compare and give reasons for why components work and do not work in a circuit Draw circuit diagrams using correct symbols Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer 	<ul style="list-style-type: none"> Know how light travels Know and demonstrate how we see objects Know why shadows have the same shape as the object that casts them Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

Year 5	
Working Scientifically	
<input type="checkbox"/> Set up an investigation when it is appropriate e.g. finding out which materials dissolve or not	<input type="checkbox"/> Able to present information related to scientific enquiries in a range of ways including using IT such as power-point and iMovie
<input type="checkbox"/> Set up a fair test when needed e.g. which surfaces create most friction?	<input type="checkbox"/> Use diagrams, as and when necessary, to support writing
<input type="checkbox"/> Set up an enquiry based investigation e.g. find out what adults / children can do now that they couldn't when a baby	<input type="checkbox"/> Is evaluative when explaining findings from scientific enquiry
<input type="checkbox"/> Know what the variables are in a given enquiry and can isolate each one when investigating e.g. finding out how effective parachutes are when made with different materials	<input type="checkbox"/> Clear about what has been found out from recent enquiry and can relate this to other enquiries, where appropriate
<input type="checkbox"/> Use all measurements as set out in Year 5 mathematics (measurement), including capacity and mass	<input type="checkbox"/> Their explanations set out clearly why something has happened and its possible impact on other things
<input type="checkbox"/> Use other scientific instruments as needed e.g. thermometer, rain gauge, spring scales (for measuring Newtons)	<input type="checkbox"/> Able to give an example of something focused on when supporting a scientific theory e.g. how much easier it is to lift a heavy object using pulleys
<input type="checkbox"/> Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs	<input type="checkbox"/> Keep an on-going record of new scientific words that they have come across for the first time
<input type="checkbox"/> Make predictions based on information gleaned from investigations	<input type="checkbox"/> Able to relate causal relationships when, for example, studying life cycles
<input type="checkbox"/> Create new investigations which take account of what has been learned previously	<input type="checkbox"/> Frequently carry out research when investigating a scientific principle or theory

Year 6	
Working Scientifically	
<input type="checkbox"/> Know which type of investigation is needed to suit particular scientific enquiry e.g. looking at the relationship between pulse and exercise	<input type="checkbox"/> Use a range of written methods to report findings, including focusing on the planning, doing and evaluating phases
<input type="checkbox"/> Set up a fair test when needed e.g. does light travel in straight lines?	<input type="checkbox"/> Clear about what has been found out from their enquiry and can relate this to others in class
<input type="checkbox"/> Know how to set up an enquiry based investigation e.g. what is the relationship between oxygen and blood?	<input type="checkbox"/> Explanations set out clearly why something has happened and its possible impact on other things
<input type="checkbox"/> Know what the variables are in a given enquiry and can isolate each one when investigating	<input type="checkbox"/> Aware of the need to support conclusions with evidence
<input type="checkbox"/> Justify which variable has been isolated in scientific investigation	<input type="checkbox"/> Keep an on-going record of new scientific words that they have come across for the first time and use these regularly in future scientific write ups
<input type="checkbox"/> Use all measurements as set out in Year 6 mathematics (measurement), including capacity, mass, ratio and proportion	<input type="checkbox"/> Use diagrams, as and when necessary, to support writing and be confident enough to present findings orally in front of the class
<input type="checkbox"/> Able to record data and present them in a range of ways including diagrams, labels, classification keys, tables, scatter graphs and bar and line graphs	<input type="checkbox"/> Able to give an example of something they have focused on when supporting a scientific theory e.g. classifying vertebrate and invertebrate creatures or why certain creatures choose their unique habitats
<input type="checkbox"/> Make accurate predictions based on information gleaned from their investigations and create new investigations as a result	<input type="checkbox"/> Frequently carry out research when investigating a scientific principle or theory
<input type="checkbox"/> Able to present information related to scientific enquiries in a range of ways including using IT such as power-point, animato and iMovie	