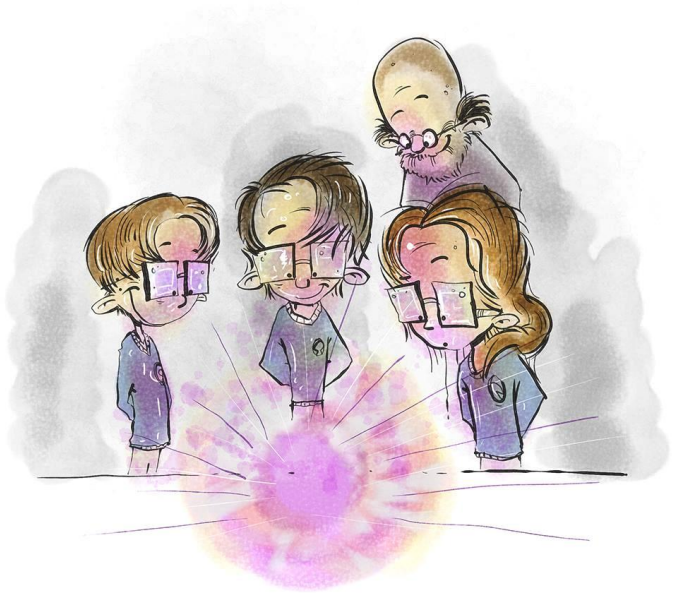
SCIENCE Curriculum



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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. Substantive and disciplinary knowledge is formatively assessed throughout each topic as children carry out investigations. Progress and end of topic tests are given at the end of each unit from Year 2 onwards. Year 1 are assessed using composite tasks, or a test is orally administered to the children. Composite tasks are optional for other year groups and can be used if time allows, or more assessment is needed.
- 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.
- Whenever possible, teachers should use scientific language in their lessons and encourage pupils to do the same.

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

Year 1	**Animals including humans:** How are humans and animals different and the same? • 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 **Seasonal changes:** What are the seasons and how are they different? • Observe changes across the 4 seasons	**Everyday materials:** Are all materials the same? • Distinguish between and 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 **Seasonal changes:** What are the seasons and how are they different? • Observe changes across the 4 seasons • Observe and describe weather associated with the seasons and how day length varies	**Plants:** How do plants grow? • 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 **Seasonal changes:** What are the seasons and how are they different? • Observe changes across the 4 seasons • Observe and describe weather associated with the seasons and how day length varies

	• Observe and describe weather associated with the seasons and how day length varies		
	Composite Task *Sort pictures of animals into different groups and explain why they have made these choices, Take photographs for Big Book with children's comments.* *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.*	**Composite Task** *Label a picture or diagram of an object made of different materials and describe the properties of some of these materials.* *Seasons – add appropriately to tree. Record children's ideas about what they can see.*	**Composite Task** *Make a plant out of playdough or other materials – coloured paper. Talk about the different parts that make up the structure.* *Seasons – add appropriately to tree. Record children's ideas about what they can see.*
Year 2	**Materials:** 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	**Plants:** • 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 **Living things and their Habitats:** Where do plants and animals live and how do they survive? • 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	**Animals including humans:** • 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

		• 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	
	Composite Task *In science it is anticipated that substantive and disciplinary knowledge will be applied through the various investigations carried out in each topic.* *Progress and topic tests should be attempted from Year 2 onwards. Additional composite tasks are therefore optional if time allows, or more assessment is needed.*	**Composite Task -optional** *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.* *And/or – growing maze in box.*	**Composite Task -optional** *Choose and do three exercises. Consider the effect of exercise on their bodies and discussed why it is important for humans to exercise.*

Curriculum Overview Key Stage 2

Year 3	**Forces/Magnets** Are all metals magnetic? • Compare how things move on different surfaces • Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance	**Rocks & Fossils** What do rocks tell us? • 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	**Plants** How do plants survive? • 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

	• Observe how magnets attract or repel each other and attract some materials but not others • 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 **Light** Why can't we see in the dark? • Recognise that they need light in order to see things and that dark is the absence of light • Notice that light is reflected form 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		soil, and room to grow) and how they vary from plant to plant • Identify the way in which water is transported within plants • Explore the part that flowers play in the life cycle **Animals including humans** Why do animals need food? • 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

	Composite Task -optional *Forces - challenge the children to design their own experiment to test which magnets are the strongest – follow the TAPS assessment lesson.* *Light – design and make sunglasses (show understanding of transparent/translucent and opaque materials)*	**Composite Task -optional** *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.*	**Composite Task -optional** *Make a model of the muscles in the arm.*
Year 4	**Sound** Why do some noises sound different to others? • 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 **States of Matter** How do some materials change state?	**Electricity** How does a circuit work? • 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	**Animals including humans:** • 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 **Classification:** What is the difference between a shark and a deer? • 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

	• 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 • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature		sometimes pose dangers to living things
	Composite Task -optional *Sound – make musical instrument and investigate changing pitch – sound sandwich, guitar and shoebox etc.* *And/or hydrophone* *States of Matter – Research and produce poster of melting points of different substances.*	**Composite Task -optional** *Make a scribbling machine.* *https://www.teachengineering.org/sprinkles/view/cub_lightyourway*	**Composite Task -optional** *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.* *Chocolate art.* *Melting Ice People.*

Year 5	**Earth & Space** Why is it important for everyday life that we understand about the movement of the earth? • 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 **Forces** How has our knowledge of forces influenced everyday life? • 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 levels, pulleys and gears, allow a smaller force to have a greater effect	**Properties & Changes of Materials** What makes a material? • 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 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 **Living things & their Habitats** How are all living things similar and different? • 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	**Animals including humans** Why do we need to keep our bodies healthy? • Describe the changes as humans develop to old age
	Composite Task -optional	**Composite Task -optional**	**Composite Task -optional**

	Earth & Space: Moon Hotel *Forces: Design and build a marble run.*	*Design your own smart material – what properties does it have. Design a product that uses thermochromic materials.* *Breed some ladybirds: https://www.greengardener.co.uk/product/ladybird-breeding-kit/* *Build a habitat for a ladybird: https://www.greengardener.co.uk/product/ladybird-house/*	*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 born a certain size and shape, and then they stay like this until they finally die.* *Create a poster to explain the changes.*
Year 6	**Light** How does light help us see? • 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 of 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 **Electricity** How does a switch make a room bright? • Associate the brightness of a lamp or the volume of a buzzer with the	**Living things & their Habitats** • 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 **Evolution & Inheritance** Why are humans so diverse? • 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 mead to evolution	**Animals including humans** • 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

	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		
	Composite Task -optional *Light: Make a kaleidoscope* *Electricity: Use knowledge of circuits to make a device such as a burglar alarm.*	**Composite Task -optional** *Living Things & Their Habitats: Design a Zoo layout, thinking about how animals are grouped together.* *Evolution: Design your own animal – show how it has adapted to its environment.*	**Composite Task -optional** *Make a simple model heart.*

Progression in knowledge

National Curriculum statements in red are from other linked topics.

Plants

Birth to three	• Explore natural materials, indoors and outside.
Nursery	• 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	• 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	• 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	• 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	• 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	• 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	• Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
Year 6	• 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	• 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	• Explore natural materials, indoors and outside.
Nursery	• 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	• 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	• 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	• 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	• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)
Year 4	• 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	• 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	• 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	• 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	• Explore natural materials, indoors and outside. • Make connections between the features of their family and other families. • Notice differences between people.
Nursery	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• Make connections between the features of their family and other families. • Notice differences between people.
Nursery	• Begin to understand the need to respect and care for the natural environment and all living things. (Nursery – Living things and their habitats)
Reception	• Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats)
Year 1	
Year 2	• 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	• 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	• Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)
Year 5	• Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)
Year 6	• 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	• 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	•
Nursery	• Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants & Animals, excluding humans)
Reception	• 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	• Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies.
Year 2	
Year 3	• Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)
Year 4	
Year 5	• 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	• The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.

Materials

Birth to three	• Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	• 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	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	• 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	• 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	• 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	• 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	• 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	• 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	• Explore materials with different properties. • Explore natural materials, indoors and outside.
Nursery	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• Repeat actions that have an effect.
Nursery	• Explore how things work. • Talk about the differences in materials and changes they notice.
Reception	• Describe what they see, hear and feel whilst outside.
Year 1	• 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	• 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	• 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	• 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	• 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	• Repeat actions that have an effect.
Nursery	• Explore how things work. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice.
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	
Year 2	• 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	• 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	• 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	• 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	• Repeat actions that have an effect.
Nursery	• Explore how things work.
Reception	• Describe what they see, hear and feel whilst outside.
Year 1	• 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	• 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	• 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	• Repeat actions that have an effect.
Nursery	• Explore how things work.
Reception	
Year 1	
Year 2	
Year 3	
Year 4	• 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	• 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	• 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	• Explore and respond to different natural phenomena in their setting and on trips.
Nursery	
Reception	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside.
Year 1	• 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	• 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	• 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	**They are beginning to ask a range of questions.** They can answer how or why questions about their environment. They can answer how and why questions about their experiences They can ask appropriate questions about what they have heard.	**Ask some simple questions using everyday language and begin to use some simple scientific words.** Begin to recognise that questions can be answered in different ways such as: observing changes over time, grouping and classifying and simple tests. With support, use observations and ideas to suggest answers to questions.	**Ask simple questions using everyday language and year 2 scientific language.** 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. Use observations and ideas to suggest answers to questions.	**Begin to ask some relevant questions using scientific language.** 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.	**Ask a range of relevant questions using scientific language.** 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.	**Begin to ask some significant scientific questions based on scientific concepts.** 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.	**Ask a range of significant scientific questions based on scientific concepts.** 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.

Progression of Working Scientifically Skills: Science

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

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

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 all their senses in hands-on exploration. Explore collections of materials with similar and/or different properties. They can sort items by simple observable features.	**Use their observations to identify & classify.** Make careful observations to identify features and notice changes. Sort and group living things or materials using similarities and differences. Use simple charts to identify unknown animals and plants. Begin to identify and describe how they group items.	**Use given criteria to identify and classify.** Sort and classify things according to given criteria. Classify items using simple prepared tables and sorting rings. Describe the characteristics they used to identify a living thing.	**Identify and classify in different ways.** Record classifications using Venn diagrams, Carroll diagrams, tables etc. Compare, classify and group items using Scientific criteria (e.g. magnetic, not magnetic). Independently, classify and group in different ways.	**With support, use similarities and differences in order to group and identify.** Begin to identify similarities/ differences/ changes when talking about scientific processes. Use and begin to create simple keys.	**Use similarities and differences in order to group and identify.** Accurately, identify similarities/ differences/ changes when talking about scientific processes and materials.	**Independently, use similarities and differences in order to group and identify.** Independently, identify similarities/ differences/ changes when talking about scientific processes and living things. Use and develop keys to identify, classify and describe living things. 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	**Begin to record and present** To draw pictures (of plants and animals) To create group/class block graphs to record votes/findings To present what they found out orally	**With support, record and present simple findings and ideas** To begin to draw diagrams and label To draw pictures (or take photographs) over a period of time To present grouping in a simple format To begin to complete simple tally tables, block graphs and pictograms To present findings orally.	**Record and present simple findings and ideas** To draw diagrams, using observations, and label parts, including over a period of time To present grouping in a given format To complete simple tally tables, block graphs and pictograms with a simple scale To present findings orally, with simple scientific language, and visually.	**With support, record and present results and ideas** To produce detailed labelled diagrams using observations, including over a period of time To begin to present results by creating or completing Venn and Carroll diagrams, tally, columned tables and simple bar charts, using scales To present results orally, visually or in written form with support, using simple scientific language	**Record and present results and ideas** To produce detailed labelled diagrams using observations, including over a period of time To present results by creating or completing Venn and Carroll diagrams, simple keys, tally, columned tables and simple bar charts, using scales To present results orally, visually or in written form, using key vocabulary and scientific language	**With support, record and present data and ideas in detail** To produce detailed labelled diagrams using observations, including over a period of time To present data by creating Venn and Carroll diagrams, keys, columned tables, scatter graphs, bar charts and line graphs, using appropriate scales To present results orally, visually and in written form, using key vocabulary and scientific language	**Independently, record and present data and ideas in detail** To independently produce detailed and accurate labelled diagrams using observations, including over a period of time 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 To present results orally, visually and in written form, using relevant key vocabulary and scientific language

END POINTS

Animals, including humans - Biology

EYFS

Recognise animals, including humans and how to care for them

- To know animals, need to be cared for
- To make observations of common animals
- To know how to describe myself (hair, eyes, skin)
- To name and describe people in my family and community
- To know ways to look after myself (wash hands, teeth, toilet hygiene, keeping warm)

Year 1

Identify and compare a variety of common animals and their structures

- To name a variety of animals (fish, amphibians, reptiles, birds and mammals)
- To understand the terms carnivores, herbivores & omnivores
- To name animals that are carnivores, herbivores & omnivores
- To compare the structures of a variety of common animals (e.g. wings, ears, tails)
- To know the basic parts of the human body, including the parts responsible for the 5 senses

Year 2

Understand how animals, including humans grow into healthy adults

- To understand the term offspring
- To know offspring grow into adults
- To know that some offspring don't look like their adult
- To know that animals, including animals need water, food & air to survive
- To know to grow into a healthy adult the importance of exercise, healthy eating and hygiene

Year 3

Understand the function of a skeleton and muscles

- To know the names of some bones (skull, spine, ribs)
- To know the purpose of the skeleton and muscles – movement, protection, support

Understand the importance of nutrition for animals, including humans

To know animals do not make their own food

- To know the nutrients found in food: carbohydrates, protein, vitamins, minerals, fats, sugars, fibre
- To know a balance of nutrients is needed to stay healthy

Year 4

Understand the journey of food through the human body

- To know the 4 types of teeth and their functions – Incisors for cutting, canines for tearing, molars and premolars for chewing
- To identify the key stages of digestion – teeth & saliva, oesophagus, stomach, small intestine, large intestine & rectum

To understand food chains

- To know the terms producer, prey, predator
- To construct a food chain using the correct terminology

Year 5

Understand how humans develop to old age

- To know the stages of the human life cycle
- To identify specific steps in each stage (baby – crawling, teenage – puberty)

Year 6

Understand the importance of a healthy circulatory system

- To know the main parts of the circulatory system and their function (heart, blood vessels and blood)
- To know that water and nutrients are transported in the blood
- To understand the effect of lifestyle choices (diet, exercise, drugs) on your circulatory system

Plants - Biology

EYFS

Understand what a plant is:

- To make observations of familiar plants
- To know plants, need to be cared for
- To name and describe some plants
- To draw pictures of plants

Year 1

Identify, name and describe a variety of plants:

- To name some garden plants
- To name some wild plants
- To understand the term evergreen
- To label a plant: roots, stem (trunk), petals or flowers

Year 2

Know how to grow a healthy plant:

- To know a plant starts as a seed or a bulb
- To observe and describe how seeds and bulbs grow.
- To know that plants need water, light and warmth to grow and stay healthy.

Year 3

Know the functions of different parts of flowering plants

- To explain the function of the roots, stem/trunk, leaves & flowers
- To know the requirements plants, need to grow: air, light, water, nutrients from soil and room to grow
- To know that different plants require different amounts of air
- To know that water travels from the soil, to the roots to the stem and the
- To understand the term pollination (using male and female parts)
- To know 3 forms of seed dispersal – wind, animal, water (river/stream/canal)

Living things and their habitats - Biology

EYFS

To know what a habitat is

- To know that a habitat is a home for animals and plants
- To explore a variety of habitats (woodland, pond, park, under a log)
- To build a home for an animal (bug hotel etc)

Year 2

To understand the importance of a habitat

- To compare things that are living, dead and never been alive
- To name a variety of plants/animals suited to a habitat/microhabitat (movement, finding food)
- To understand that habitats provide shelter, food & water for animals & plants
- To understand that plants/animals within a habitat depend on each other
- To construct a simple food chain starting with a plant

Year 4

To classify living things and understand how habitats can change

- To know how to group living things in a variety of ways (key features)
- To use a classification key
- To know some positive ways humans can impact a habitat (e.g. nature reserves)
- To know some negative ways habitats can be humans or nature can impact a habitat (e.g. littering, deforestation)

Year 5

Understand the lifecycles of a variety of plants & animals

- To know the terms sexual and asexual reproduction
- To know how plants, reproduce sexually (through pollination)
- To know how plants, reproduce asexually (through bulbs, tubers, runners, plantlets)
- To know how different animals, reproduce sexually
- To compare the life cycles of different animals (mammals, insects, birds, amphibians, reptiles)

Year 6

To classify living things based on specific and common characteristics

- To know that living things can be grouped into plants, animals and micro-organisms
- To understand the terms vertebrate and invertebrates
- To know animals can be grouped into vertebrates and invertebrates
- To know the common characteristics of the vertebrates' group - fish, amphibians, reptiles, birds, mammals
- To know that invertebrates can be grouped into insects, spiders, snails and worms
- To know plants can be grouped into flowering and non-flowering

Evolution & Inheritance

Describe how living things have adapted and evolved over time.

- I can define the terms evolution and inheritance.
- I know that fossils provide information about living things that inhabited the Earth millions of years ago.
- I recognise that living things have adapted and evolved over time to survive within the environment.
- I understand that organisms reproduce and offspring inherit similar characteristics.
- I know that variation exists within a population and between offspring of some plants.

Materials - Chemistry

EYFS

To begin to name and recognise simple properties of materials in their environment.

- I can name the material I am using to make a model and begin to identify a key property the material has.
- I can reuse materials and talk about what can be recycled.
- I can test a material to see if they are suitable e.g. is this bridge strong enough for the Billy Goats Gruff.
- I can take photos or draw pictures to record how materials change.

Y1 Everyday Materials

To identify, group and describe everyday materials using their properties.

- I know how to group every day materials into metals, rock, fabrics, wood, plastic and glass.
- I know how to distinguish between an object and the material it is made from. (This is a table it is made of wood, this is a window it is made of glass, etc)
- I know how to sort and compare everyday materials using **hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through.**

Y2 Uses of everyday materials

To compare materials suitability for different uses.

To recognise that some materials can change shape by applying a force.

- To understand why a material is suitable or not suitable for a specific purpose using the vocabulary, **opaque, transparent and translucent, reflective, non-reflective, flexible, rigid.**
- To label a picture or diagram of an object made from a combination of different materials describing their properties. e.g. house is made from bricks, slate, glass because …
- To understand what properties a suitable material needs to have.
- To know how the shape of a material can be changed in a variety of ways - **squashing, bending, twisting and stretching.**

Y3 Rocks

To identify and compare rocks, fossils and soils.

- To know that rock is a naturally occurring material.
- To know the name of some types of rock including **marble, chalk, granite, sandstone, slate.**
- To know examples of **igneous** (granite), **sedimentary** (sandstone, chalk) and **metamorphic** (slate marble) rock.
- To understand the vocabulary of (grain, crystals, layers, hard, soft, texture, absorb water) to describe the observable features of the named rocks.
- To understand how a fossil is formed.
- To understand that soils are a mixture of rocks and living/dead matter.

Y4 States of matter

To recognise that materials can change state by heating and cooling.

- To understand materials can be grouped into solids, liquids and gases.
- To understand how heating causes solids to melt into liquids and liquids to evaporate into gases.
- To understand how cooling causes gases to condense into liquids and liquids to freeze into solids.
- To know melting point of water is 0°C and the boiling point is 100°C.
- To know that the higher the temperature the faster the rate of evaporation.
- To understand how condensation and evaporation occur within the water cycle.

Y5 Properties of Materials

To justify materials suitability for different uses.

To identify that changes can be reversible or irreversible.

- To know how to group everyday materials based upon properties including their hardness, solubility, transparency, conductivity *(electrical and thermal), and response to magnets. (Electricity covered in Year 4 and magnets covered in Y3)*
- To know that some materials will dissolve in liquid to form a solution, these are **soluble** and solids that do not dissolve are **insoluble**.
- To understand why a material is suitable or not suitable for a specific purpose based upon its physical properties.
- To understand when some materials are mixed, they can be separated by sieving, filtering, evaporating or by magnetic properties. These changes are reversible.

- To understand that when some materials are mixed a chemical reaction can create a change of state or a new material. These changes are **irreversible** e.g. burning and rusting.
- To understand that heating can sometimes cause materials to change permanently. When this happens, a new substance is made.

Light - Physics

EYFS

To understand the term shadow

- To know what a shadow looks like.
- To know that we see shadows on a sunny day.
- To know shadows changes during the day.

Year 3

To understand light is an energy that can be manipulated.

- To understand darkness is the absence of light.
- To know how we see objects in light.
- To understand that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses.
- To know the terms transparent, translucent and opaque
- To understand how shadows are formed
- To understand how shadows, change size.

Year 6

To understand that light travels in straight lines and to know how we see objects.

- To understand that animals see light sources when light travels from the source into their eyes.
- To understand that animals see objects when light is reflected off that object and enters their eyes.
- To know that light reflects off all objects (unless they are black). Non-shiny surfaces scatter the light so we don't see the beam.
- To know that light travels in straight lines, called rays or beams of light

Seasonal Changes - Physics

EYFS

To recognise the changes in the natural world around them.

- To understand the differences between day and night.
- To know that there are changes in the natural world around them inc. seasons

Year 1

To understand that we experience four seasons.

- To know different types of weather.
- To know the names of the four seasons.
- To understand the differences in the local environment inc living things, throughout the year
- To understand how things in my life change during the seasons. i.e. the clothes I wear, the activities I do etc.

Forces & Magnets - Physics

EYFS

To recognise the everyday use of simple forces.

- To understand that movement changes as a result of pushing and pulling an object
- To know that different objects can float or sink.

Year 3

To know that forces are a push or a pull in a direction and understand magnetism.

- To know examples of forces in everyday life
- To understand that objects can move differently on different surfaces
- To know that magnets have two poles which attract and repel
- To understand that not all metals are magnetic/attracted to a magnet

Year 5

To know that there are different types of forces and understand their different effects

- To understand that air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way.
- To know that friction is a force against motion caused by two surfaces rubbing against each other.
- To understand that some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move.
- To know that some objects/animals are streamlined to minimise the effects of air/water resistance.

Sound - Physics

EYFS

To recognise the term sound

- To know and name the sounds I hear.
- To understand the source of sounds.
- To know how I make different sounds.

Year 4

To know that sound is a vibration which travels through a medium to the ear.

- To understand that sound is a type of energy created by vibrations; the louder the sound, the bigger the vibration.
- To understand that sound travels from its source in all directions and we hear it when it travels to our ears.
- To know that sound travel can be blocked.
- To know that sound moves through all materials by making them vibrate; changing the way an object vibrates changes its sound.
- To know that sound volume changes dependant on the distant from the sound source
- To know that faster vibrations (higher frequencies) produce higher pitched sounds

Electricity - Physics

Year 4

To know how a simple electric circuit works

- To know that electricity is a form of energy.
- To understand that a source of electricity (mains or battery) is needed for electrical devices to work.
- To know that electricity sources push electricity round a circuit.
- To understand a complete circuit is needed for electricity to flow and devices to work.
- To understand that some materials allow electricity to flow easily and these are called conductors.
- To know that materials that don't allow electricity to flow easily are called insulators.

Year 6

To know and understand that the amount of voltage in a circuit can affect the output of a component inc brightness, volume and speed.

- To know that batteries/cells are a store of energy and this energy pushes electricity around the circuit.
- To know that battery/cell energy is measured in voltage.
- To understand that when the battery's/cell's energy is gone it stops pushing. (Voltage measures the 'push.')
- To know the symbols for: lamp, wire, buzzer, cell, battery, motor, switch (open), switch (closed).
- To understand that a series circuit will not work if a lamp is broken or a wire is disconnected.
- To understand how to vary the output of a component e.g. bulb, buzzer, motor

Earth & Space - Physics

EYFS

To recognise the changes in the natural world around them.

- To understand the key features that identify the Sun, the Moon and the stars through observation.
- To know the differences between day and night.

Year 5

To know and understand the movement of the Earth, Moon and other planets in the Solar System.

- To know the approximate shape of the Sun, Earth and Moon – Spherical
- To understand the movement of planets in the Solar System
- To know how the Earth and Moon moves.
- To understand why we have day and night.
- To know the moon has different phases.