



Sir Edmund Hillary Primary School Science Curriculum

Aims

The National Curriculum for Science aims to ensure that all pupils:

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

Intent - *What are we trying to achieve for our children in Science?*

- We want our children to be inquisitive and passionate about science.
- We want our children to be investigative scientists.
- We want our children to revisit and build on their scientific knowledge, as well as have a better conceptual understanding of science's application in the real world (especially with regards to issues of sustainability).
- Develop the disciplinary skills needed to ensure that their substantive knowledge is learned scientifically.
- Procedural knowledge will be at the heart of our curriculum and every lesson will allow pupils to 'Work Scientifically'.
- We aim to embed the use of reading and literacy skills into our delivery of science.
- Knowledge will be linked, both within science and across the wider curriculum (especially with Geography and Mathematics) to strengthen and deepen children's understanding of the sciences.
- We strive to ensure children receive high quality science lessons by monitoring and supporting teachers with their own subject knowledge.
- We want children to use reasoning and critical thinking vocabulary as well as questioning, clarifying and justifying ideas to develop their communication skills.

Implementation - *How is the curriculum delivered?*

Following the 'Development Matters' guidance in EYFS, our Nursery and Reception children gain an 'Understanding of the World: People, Culture and Communities; Past & Present, The Natural World' and come into KS1 with the foundations laid for Science. At Sir Edmund Hillary, we implement a Science curriculum that;



Sir Edmund Hillary Primary School Science Curriculum

- meets the objectives outlined in the National Curriculum, organised in this statement to show how each theme within the Early Years Foundation Stage & National Curriculum progresses through school.
- is sequenced throughout the whole school, with three distinct milestones of KS1, LKS2 and UKS2 on a Cycle A/B structure because of the nature of the Mixed Year group classes. At KS1, the units repeat each year with greater depth & additional content expected for Y2 children.
- is delivered on a weekly timetable. As such, approximately 55 hours of Science is taught each academic year
- has key progressive, 'Working Scientifically' skills embedded into each lesson (*teachers will need to plan using the Working Scientifically Document alongside the Progression in Measures document to ensure the appropriate expectations are met in each lesson*)
- provides opportunities for retrieval practice of prior knowledge and vocabulary to ensure children are learning the whole curriculum
- provides layers of support for learners, through questioning and varied methods of recording
- is enhanced by experiences, trips, visiting experts and fieldwork where appropriate

Impact - What difference is the curriculum making? How do you know whether pupils know what you think they know?

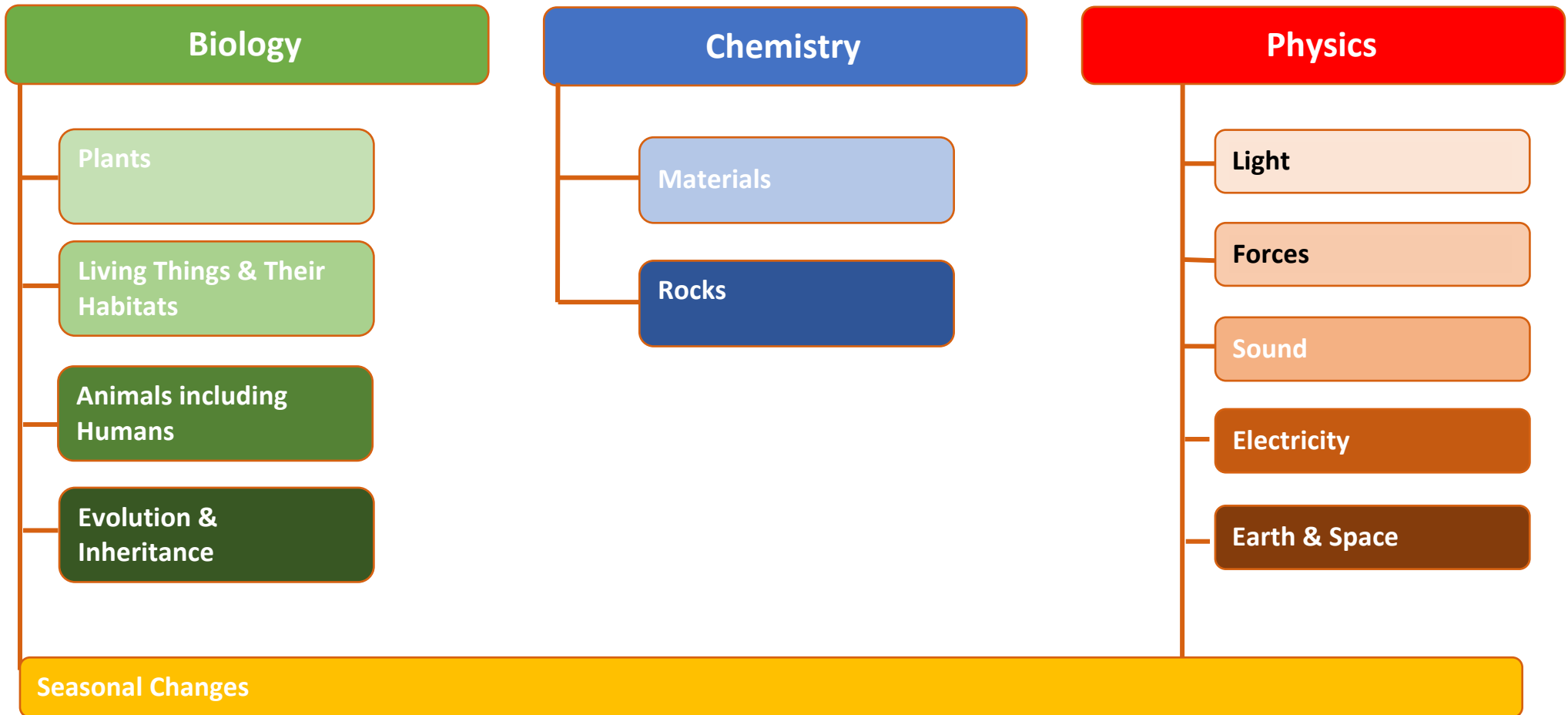
Our Science Curriculum is well thought out and planned to demonstrate progression. Children's knowledge and skills will develop progressively as they move through the school, not only developing a deep knowledge of themselves and the way their world around them functions. Children will become more analytical and improved critical thinkers. We measure the impact of our science curriculum using the following measures:

- Evidence from children's books will show a broad and balanced Science curriculum, demonstrating appropriate pitch and challenge.
- Standards in Science will be high and will match standards in other subjects such as English and Maths.
- Our Long-Term Plan (LTP) will show a clear progression of knowledge and skills that builds on Foundation Stage Learning and then across Key Stage 1 and 2 building on prior knowledge
- Pupil discussion about their learning shows that children understand Science as a discipline and know more and remember more about the Science taught
- End point assessments within each unit show how much children have learned within that part of the curriculum
- Termly teacher judgements (because this is a Core National Curriculum Subject) track progress and inform subsequent planning



Sir Edmund Hillary Primary School Science Curriculum

Subject Structure



Working Scientifically

Scientific ways of working: Classifying, Observing Over Time, Pattern Seeking, Comparative / Fair Testing, Researching



Sir Edmund Hillary Primary School Science Curriculum

Early Years Foundation Stage & National Curriculum Progressions in Substantive Knowledge *items in red are from other EYFS/ NC Science Domains*

Plants	Nurs	<ul style="list-style-type: none"> Explore natural materials, indoors and outside.
	F1	<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.
	F2	<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)
	Y1	<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.
	Y2	<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)
	Y3	<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.
	Y4	<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)
	Y5	<ul style="list-style-type: none"> Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
	Y6	<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)
	KS3	<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.



Sir Edmund Hillary Primary School Science Curriculum

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Living Things & their Habitats	Nurs	<ul style="list-style-type: none"> Explore natural materials, indoors and outside.
	F1	<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.
	F2	<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.
	Y1	<ul style="list-style-type: none"> <li style="color: red;">Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) <li style="color: red;">Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) <li style="color: red;">Identify & name a variety of common animals including fish, amphibians, reptiles, birds & mammals. (Y1 - Animals including humans) <li style="color: red;">Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans) <li style="color: red;">Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 - Animals, including humans) <li style="color: red;">Observe changes across the four seasons. (Y1 - Seasonal change)
	Y2	<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. <li style="color: red;">Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals including humans)
	Y3	<ul style="list-style-type: none"> <li style="color: red;">Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation & seed dispersal. (Y3 Plants)
	Y4	<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. <li style="color: red;">Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans)
	Y5	<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.
	Y6	<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. Give reasons for classifying plants and animals based on specific characteristics. <li style="color: red;">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) <li style="color: red;">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)



Sir Edmund Hillary Primary School Science Curriculum

KS3

- *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.*



Sir Edmund Hillary Primary School Science Curriculum

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Animals including Humans	Nurs	<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.
	F1	<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.
	F2	<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.
	Y1	<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.
	Y2	<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. <li style="color: red;">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)
	Y3	<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.
	Y4	<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.
	Y5	<ul style="list-style-type: none"> Describe the changes as humans develop to old age. <li style="color: red;">Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) <li style="color: red;">Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
Y6	<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) 	



Sir Edmund Hillary Primary School Science Curriculum

KS3

- *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.*



Sir Edmund Hillary Primary School Science Curriculum

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Evolution & inheritances	Nurs	<ul style="list-style-type: none"> • Make connections between the features of their family and other families. • Notice differences between people.
	F1	<ul style="list-style-type: none"> • Begin to understand the need to respect & care for the natural environment & all living things. (Nursery - Living things & their habitats)
	F2	<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)
	Y1	
	Y2	<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)
	Y3	<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 & seed dispersal. (Y3 Plants)
	Y4	<ul style="list-style-type: none"> • Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things & their habitats)
	Y5	<ul style="list-style-type: none"> • Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)
	Y6	<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.
	KS3	<ul style="list-style-type: none"> • <i>Heredity as the process by which genetic information is transmitted from one generation to the next.</i> • <i>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.</i> • <i>The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection.</i> • <i>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.</i>

Seasonal Change	Nurs	
	F1	<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)
	F2	<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.
	Y1	<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.
	Y2	
	Y3	<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)
	Y4	
	Y5	<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 & space)
	Y6	
	KS3	<ul style="list-style-type: none"> • <i>The seasons and the Earth's tilt, day length at different times of year, in different hemispheres.</i>



Sir Edmund Hillary Primary School Science Curriculum

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Materials	Nurs	<ul style="list-style-type: none"> Explore materials with different properties. Explore natural materials, indoors and outside.
	F1	<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.
	F2	<ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside.
	Y1	<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.
	Y2	<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.
	Y3	<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)
	Y4	<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)
	Y5	<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 & gases to decide how mixtures might be separated, incl through filtering, sieving & evaporating. Give reasons, based on evidence from comparative & fair tests, for particular uses of everyday materials, incl metals, wood & 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.
	Y6	<ul style="list-style-type: none">
	KS3	<ul style="list-style-type: none"> <i>Chemical reactions as the rearrangement of atoms.</i> <i>Representing chemical reactions using formulae and using equations.</i> <i>Combustion, thermal decomposition, oxidation and displacement reactions.</i> <i>Defining acids and alkalis in terms of neutralisation reactions.</i> <i>The pH scale for measuring acidity/alkalinity; and indicators.</i>



Sir Edmund Hillary Primary School Science Curriculum

Early Years Foundation Stage & National Curriculum Progressions in Substantive Knowledge items in red are from other EYFS/ NC Science Domains

Rocks	Nurs	<ul style="list-style-type: none"> Explore materials with different properties. Explore natural materials, indoors and outside.
	F1	<ul style="list-style-type: none"> <li style="color: red;">Use all their senses in hands-on exploration of natural materials. (Nursery – Living things and their habitats) <li style="color: red;">Explore collections of materials with similar and/or different properties. (Nursery – Living things and their habitats)
	F2	<ul style="list-style-type: none"> <li style="color: red;">Explore the natural world around them. (Reception – Living things and their habitats) <li style="color: red;">Describe what they see, hear and feel whilst outside. (Reception – Living things and their habitats)
	Y1	<ul style="list-style-type: none"> <li style="color: red;">Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) <li style="color: red;">Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) <li style="color: red;">Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) <li style="color: red;">Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)
	Y2	<ul style="list-style-type: none"> <li style="color: red;">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)
	Y3	<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.
	Y4	<ul style="list-style-type: none">
	Y5	<ul style="list-style-type: none">
	Y6	<ul style="list-style-type: none"> <li style="color: red;">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)
	KS3	<ul style="list-style-type: none"> <i>The composition of the Earth.</i> <i>The structure of the Earth.</i> <i>The rock cycle and the formation of igneous, sedimentary and metamorphic rocks.</i>



Sir Edmund Hillary Primary School Science Curriculum

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Light	Nurs	<ul style="list-style-type: none"> Repeat actions that have an effect.
	F1	<ul style="list-style-type: none"> Explore how things work. Talk about the differences in materials and changes they notice.
	F2	<ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside.
	Y1	<ul style="list-style-type: none"> <li style="color: red;">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) <li style="color: red;">Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)
	Y2	<ul style="list-style-type: none">
	Y3	<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.
	Y4	<ul style="list-style-type: none">
	Y5	<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)
	Y6	<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.
KS3	<ul style="list-style-type: none"> <i>The similarities and differences between light waves and waves in matter.</i> <i>Light waves travelling through a vacuum; speed of light.</i> <i>The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface.</i> <i>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.</i> <i>Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras.</i> <i>Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection.</i> 	



Sir Edmund Hillary Primary School Science Curriculum

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Forces	Nurs	<ul style="list-style-type: none"> Repeat actions that have an effect.
	F1	<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.
	F2	<ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside.
	Y1	<ul style="list-style-type: none">
	Y2	<ul style="list-style-type: none"> <li style="color: red;">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)
	Y3	<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.
	Y4	<ul style="list-style-type: none">
	Y5	<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.
	Y6	<ul style="list-style-type: none">
	KS3	<ul style="list-style-type: none"> <i>Magnetic fields by plotting with compass, representation by field lines.</i> <i>Earth's magnetism, compass and navigation.</i> <i>Forces as pushes or pulls, arising from the interaction between two objects.</i> <i>Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.</i> <i>Moment as the turning effect of a force.</i> <i>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.</i> <i>Forces measured in Newtons, measurements of stretch or compression as force is changed.</i>



Sir Edmund Hillary Primary School Science Curriculum

Early Years Foundation Stage & National Curriculum Progressions in Substantive Knowledge *items in red are from other EYFS/ NC Science Domains*

Sound	Nurs	<ul style="list-style-type: none"> Repeat actions that have an effect.
	F1	<ul style="list-style-type: none"> Explore how things work.
	F2	<ul style="list-style-type: none"> Describe what they see, hear and feel whilst outside.
	Y1	<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)
	Y2	<ul style="list-style-type: none">
	Y3	<ul style="list-style-type: none">
	Y4	<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
	Y5	<ul style="list-style-type: none">
	Y6	<ul style="list-style-type: none">
	KS3	<ul style="list-style-type: none"> <i>Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition.</i> <i>Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound.</i> <i>Sound needs a medium to travel, the speed of sound in air, in water, in solids.</i> <i>Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal.</i> <i>Auditory range of humans and animals.</i> <i>Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound.</i> <i>Waves transferring information for conversion to electrical signals by microphone.</i>



Sir Edmund Hillary Primary School Science Curriculum

Early Years Foundation Stage & National Curriculum Progressions in Substantive Knowledge *items in red are from other EYFS/ NC Science Domains*

Electricity	Nurs	<ul style="list-style-type: none"> Repeat actions that have an effect.
	F1	<ul style="list-style-type: none"> Explore how things work.
	F2	<ul style="list-style-type: none">
	Y1	<ul style="list-style-type: none">
	Y2	<ul style="list-style-type: none">
	Y3	<ul style="list-style-type: none">
	Y4	<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.
	Y5	<ul style="list-style-type: none">
	Y6	<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.
	KS3	<ul style="list-style-type: none"> <i>Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge.</i> <i>Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current.</i> <i>Differences in resistance between conducting and insulating components (quantitative).</i> <i>Static electricity.</i>



Sir Edmund Hillary Primary School Science Curriculum

Early Years Foundation Stage & National Curriculum Progressions in Substantive Knowledge *items in red are from other EYFS/ NC Science Domains*

Earth and Space	Nurs	<ul style="list-style-type: none"> Explore and respond to different natural phenomena in their setting and on trips.
	F1	<ul style="list-style-type: none">
	F2	<ul style="list-style-type: none"> Explore the natural world around them. Describe what they see, hear and feel whilst outside
	Y1	<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)
	Y2	<ul style="list-style-type: none">
	Y3	<ul style="list-style-type: none">
	Y4	<ul style="list-style-type: none">
	Y5	<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.
	Y6	<ul style="list-style-type: none">
	KS3	<ul style="list-style-type: none"> <i>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).</i> <i>Our Sun as a star, other stars in our galaxy, other galaxies.</i> <i>The seasons and the Earth’s tilt, day length at different times of year, in different hemispheres.</i> <i>The light year as a unit of astronomical distance.</i>



Sir Edmund Hillary Primary School Science Curriculum



Working Scientifically – Learning Progression								
	Key Areas	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Exploring and Questioning	Questioning	Know that a question is a phrase/sentence which asks for information.	Know that questions can be asked to gather information to support understanding.	Know that specifically there are scientific questions and that there is more than one way of finding the answer.	Know that questions can be asked and answered by carrying out a scientific enquiry.	Know that relevant scientific questions need to be asked and answered through different types of scientific enquiries.	Know that questions can be or might need to be refined through the scientific process.	Know that precision is achieved through refinement of both questioning and of control of the variables in a scientific enquiry.
		Explore 'What if ' questions through play	Ask 'why' questions	Ask 'why' and 'what if ' questions.	Use knowledge and understanding to ask 'why' and 'what if ' questions.	Use knowledge and understanding to ask questions.	Use knowledge and understanding to ask questions about my observations	Use knowledge and understanding to challenge scientific ideas and concepts.
	Exploring	With support, describe what is happening using words or actions.	Describe what is happening using words.	Describe and recall what I have observed	Describe simple scientific models and diagrams .	Describe and explain scientific models / diagrams .	Use knowledge and understanding to describe and explain scientific models / diagrams.	Begin to use scientific models/ diagrams to explain new events (linking prior knowledge).
	Diagrams	Match a picture to the correct label	Use a word bank to match a label to the	Label a simple diagram using	Label and annotate a diagram with	Draw , label and annotate my own	Draw, label and annotate my own	Draw, label , annotate and explain my own



Sir Edmund Hillary Primary School Science Curriculum

			correct part of an image	scientific words.	scientific information	diagram with given scientific information	diagram with selected scientific information.	diagrams using scientific information
	Secondary sources	Recall some simple scientific terms.	Begin to select some facts to use in an answer.	Select relevant scientific facts to use in an answer.	Link relevant scientific facts together in an answer	Use scientific facts to create an argument	Select and prioritise scientific facts to create an argument	Present a clear and logical argument using scientific facts.
Experimenting and investigating	Predicting/ Hypothesising	Suggest what might be 'best' or 'worst'	Suggest what might happen	Use own knowledge to suggest what might happen in an investigation .	Predict cause and effect (causal predictions)	Predict a trend (relationship prediction)	Use knowledge and understanding to justify my prediction.	Use knowledge and understanding to generate a testable hypothesis.
	Observing	Know that looking carefully at something provides more information about it.	Know that there are different ways to observe things closely.	Know that an appropriate choice of simple equipment will make observations more effective in the gathering of information.	Know that careful observations can form part of scientific enquiry Know that data can be collected from observations and measurements	Know that the quality of systematic observations in scientific enquiry is affected by how accurately equipment is used to gather data.	Know that specialised equipment can be used to observe and measure more accurately. Know that repeating an observation or measurement may provide more accurate information.	Know that the level of accuracy and precision will determine the success of scientific enquiry. Know that repeating an observation or measurement and taking an average may provide more accurate information.
	Measuring (See Progression	To measure using comparison. E.g. heavier and lighter , taller or	To measure using non-standard units of measure. E.g. Hand spans	To begin to use standardised units of measure with	Measure and record to the nearest unit	To begin to measure and record using decimal notation.	Measure and record using decimal notation to two	Measure and record using decimal notation to three decimal



Sir Edmund Hillary Primary School Science Curriculum

	in measure doc)	shorter , more or less		increased accuracy			decimal places if necessary.	places if necessary.
	Testing	Know that the information needed to answer a question, sometimes needs to be checked to make sure it is correct. Know that a test is a way of used to check something.	Know that a test is a procedure which can be used to check the accuracy of the information used to answer questions.	Know that there are different ways to perform a test including the use of simple equipment.	Know that the process used to carry out a scientific enquiry must be fair.	Know that if the procedure used in the scientific enquiry is not fair then the information gathered is unreliable.	Know that the outcome of a fair test can inform and shape further scientific enquiries.	Know that the outcomes from fair tests supports factual understanding of a scientific enquiry which may differ from opinion.
Classification	Identifying (& Classifying)	Know that it is possible to recognise something by its features.	Know that by comparing common features, it is possible to group and sort objects, materials or living things.	Know that sorting and grouping by features and characteristics can be refined to give more accurate and detailed identification (for example, tree/oak tree/deciduous)	Know that information collected during a simple scientific enquiry can be used to inform identification and classification.	Know that accurate identification and classification can be used to answer questions in a simple scientific enquiry.	Know that identification and classification can involve the organisation of a substantial amount of information and there are agreed methods for doing this. (e.g. key, graphs)	Know that the success of more complex scientific enquiries requires appropriate selection of the most effective method of classifying information.
		With support, name objects scientifically.	Accurately name a range of things related to Science	Identify and name simple scientific things , ideas and processes.	Identify and name scientific things , ideas and processes.	Identify and describe changes in scientific processes.	Use knowledge and understanding to help identify unknown scientific	Use knowledge , understanding and secondary resources to identify unknown



Sir Edmund Hillary Primary School Science Curriculum

							things, ideas and processes.	scientific things, ideas and processes.
		Use given instructions sort	Sort using simple yes/no statements	Follow and complete simple classification keys with obvious differences.	Construct a simple classification key using given information	Construct a simple classification key	Construct a complex classification key	Construct and explain a complex classification key.
			Sort into two categories using hoops / circles.	Sort using venn diagrams	Sort using basic venn and carroll diagrams with given labels	Sort using venn and carroll diagrams with own labels	Sort using a range of appropriate diagrams .	Choose and use appropriate diagrams to sort data, results and information.
Interpreting and Recording Data	Collecting	Know that information can be collected and shared with others.	Know that there are many ways to collect and record information and that this can be used by others.	Know that recorded data can be used to find answers to questions.	Know that recorded data is an important part of a scientific enquiry as it can be used draw conclusions.	Know that inaccurately recorded data can mislead and lead to incorrect conclusions.	Know that filtering data is an important step when drawing conclusions so that only the most relevant information is used.	Know that accurate data can be a powerful tool when supporting or refuting scientific ideas/arguments.
	Tables	Use simple tables to record in pictures	Use simple tables to record in pictures and words	Use simple , given tables to tally and record totals	Use a frame to record a table of results	Construct a simple table to compare cause and effect.	Use a frame to constrict a graph and scale one axis.	Accurately construct and scale a graph



Sir Edmund Hillary Primary School Science Curriculum

	Graphs	Use prepared pictograms to record my observations	Use a frame to add pictograms and block charts	Construct simple pictograms and block charts	With support, use axes to construct a bar chart.	Accurately and independently construct a bar chart	With support, use a frame to construct a graph and scale one axis.	Accurately construct and scale a graph
		Add data to pictograms	Add blocks to a given chart	Use a scale on a block chart to add the correct blocks.	Draw bars on a given bar chart	Plot co-ordinates in the first quadrant	Join plotted co-ordinates with straight lines	Plot mean values and draw trend lines for linear data.
Making Conclusions	Patterns and relationships	Children can say what their information shows.	Children can answer their questions using some of the information they have gathered.	Children begin to use their data to draw conclusions	Children can draw conclusions which are consistent with their data and any other evidence gathered	Children can use their data to create conclusions using comparative adjectives. E.g. The higher the voltage, the brighter the bulb.	Children can identify how their own data and conclusions differs from information they have gained from secondary sources.	Children understand how conclusions can change in light of new data. Children can discuss how their own data supports or refutes conclusions drawn by secondary sources.
		Recognise simple patterns	Recognise, create and describe simple patterns.	Describe simple patterns in data and charts	Describe simple patterns in data, charts, and graphs.	Describe patterns, trends and relationship in data, charts and graphs.	Describe and compare patterns, trends and relationships in data, charts and graphs.	Describe and compare changing patterns, trends and relationships in data, charts and graphs.



Sir Edmund Hillary Primary School Science Curriculum

		Use 'more' or 'less' to compare observations	Use 'more' or 'less' to compare observations and numbers.	Identify differences in set of data.	Identify and explain differences in sets of data.	Identify and explain differences in sets of repeated data.	Identify and explain differences in sets or repeated data and identify anomalies.	Identify and explain, using margin of error, differences in sets of repeated data and identify anomalies.
	Concluding	Comment on changes that I observe during an activity.	Describe the changes that are happening.	After an activity, recall and describe the changes that have happened.	Describe my results linking cause and effect.	Describe trends and begin to use scientific observations to explain.	Use data in my conclusion and use science to explain.	Use primary and secondary data and ideas when concluding
		Begin to talk about what we did.	Explain what we did.	Explore different ways to do things.	Identify weaknesses in my methods.	Identify weaknesses in my methods and suggest improvements.	Identify how limitations in my methods might affect the results and suggest improvements.	Identify limitations in my methods and use my results data to justify improvements.



Sir Edmund Hillary Primary School Science Curriculum

Long Term Plan for National Curriculum Coverage

	KS1 a	KS1 b	Y3/4 a	Y3/4b	Y5/6 a	Y5/6b
Aut 1	Y1 Everyday Mats Identify, materials properties, compare & Group Y2 Suitability of materials / changes	Y1 Everyday Mats Identify, materials properties, compare & Group Y2 Suitability of materials / changes	Light	States of Matter Grouping classifying Solids Liquids Gasses Comparing Rocks fossils soils	Earth & Space Puberty	Light Puberty
Aut 2	Y1 Everyday Mats Identify, materials properties, compare & Group Y2 Suitability / changes Seasonal Changes	Y1 Everyday Mats Identify, materials properties, compare & Group Y2 Suitability / changes Seasonal Changes	States of Matter Grouping classifying Solids Liquids Gasses Melting Freezing	Forces- magnets Friction	Forces Gravity Water & Air resistance Friction	Properties of Materials Dissolving & Separating
Spr 1	Animals inc Humans Identify & name Mammals Fish etc Body Parts Pond Context	Animals inc Humans Identify & name Mammals Fish etc Body Parts Farmyard Context	States of Matter Evaporation Condensation	Sound	Electricity Changes in materials Testing everyday material	Living Things Habitats classification of plants & micro-organisms
Spr 2	Y1Plants Common plants Basic structures Trees Y2 Plants Seeds, Bulbs, conditions for growth Woodland Context Seasonal Changes	Y1Plants Common plants Basic structures Trees Y2 Plants Seeds, Bulbs, conditions for growth Garden Context	Animals inc Humans Nutrition, Musculo Skeletal system, teeth	Animals in Humans Nutrition, digestion	Animals inc Humans Lifecycle of amphibian, insect, bird, human	Animals inc Humans Circulatory system, Transportation, healthy lifestyle
Sum1	Y2 Living Things, Habitats, basic needs Carnivore, herbivore Omnivore Simple food chains Coastal Context	Y2 Living Things, Habitats, basic needs Carnivore, herbivore Omnivore Simple food chains Ocean Context	Living Things Classification of animals to now include vertebrate, Invertebrate	Electricity	Animals inc Humans Lifecycle Reproduction in animals & Plants	Animals inc Humans Lifecycle Reproduction in animals
Sum2	Animals inc Humans Babies. Growth basic survival needs, exercise healthy lifestyle Seasonal Changes	Animals inc Humans Babies. Growth basic survival needs, exercise healthy lifestyle Seasonal Changes	Animals in Humans Food Chains, producer, predator prey	Plants Parts of plant, conditions for growth, water transport, pollination – seed dispersal	Forces: Levers Pulleys gears	Evolution



Sir Edmund Hillary Primary School Science Curriculum

