

Science Long Term Map
National Curriculum & Threshold Concept Coverage

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| EYFS Development Matters | Purpose of study | |
| Subject Content | A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes. | |
| Early Learning Goal | KS1 National Curriculum | KS2 National Curriculum |
| Characteristics of effective learning: | Subject Content | Subject Content |
| <ul style="list-style-type: none"> Playing and exploring - children investigate and experience things, and 'have a go' Active learning - children concentrate and keep on trying if they encounter difficulties, and enjoy achievements Creating and thinking critically - children have and develop their own ideas, make links between ideas, and develop strategies for doing things | Pupils should be taught: | Pupils should be taught: |
| <p>Early Learning Goal</p> <p>ELG 14: The World:</p> <ul style="list-style-type: none"> To know about similarities and differences in relation to places, objects, materials and living things. To talk about the features of their own immediate environment and how environments might vary from one another. To make observations of animals and plants and explain why some things occur, and talk about changes | <ul style="list-style-type: none"> name and locate parts of the human body, including those related to the senses (year 1), and describe the importance of exercise, a balanced diet and hygiene for humans (year 2) describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults (year 2) describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants (year 2) identify whether things are alive, dead or have never lived (year 2) describe and compare the observable features of animals from a range of groups (year 1) group animals according to what they eat (year 1), describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships (year 2) describe seasonal changes (year 1) name different plants and animals and describe how they are suited to different habitats (year 2) distinguish objects from materials, describe their properties, identify and group everyday materials (year 1) and compare their suitability for different uses (year 2) | <ul style="list-style-type: none"> name and describe the functions of the main parts of the digestive [year 4], musculoskeletal [year 3] and circulatory systems [year 6]; and describe and compare different reproductive processes and life cycles in animals [year 5] describe the effects of diet, exercise, drugs and lifestyle on how the body functions [year 6] name, locate and describe the functions of the main parts of plants, including those involved in reproduction [year 5] and transporting water and nutrients [year 3] use the observable features of plants, animals and microorganisms to group, classify and identify them into broad groups, using keys or other methods [year 6] construct and interpret food chains [year 4] describe the requirements of plants for life and growth [year 3]; and explain how environmental changes may have an impact on living things [year 4] use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved [year 6]; and describe how fossils are formed [year 3] and provide evidence for evolution [year 6] group and identify materials [year 5], including rocks [year 3], in different ways according to their properties, based on first-hand observation; and justify the use of different everyday materials for different uses, based on their properties [year 5] describe the characteristics of different states of matter and group materials on this basis; and describe how materials change state at different temperatures, using this to explain everyday phenomena, including the water cycle [year 4] identify and describe what happens when dissolving occurs in everyday situations; and describe how to separate mixtures and solutions into their components [year 5] identify, with reasons, whether changes in materials are reversible or not [year 5] use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects [year 6], and the formation [year 3], shape [year 6] and size of shadows [year 3] use the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard [year 4] describe the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source [year 4] describe the effects of simple forces that involve contact (air and water resistance, friction) [year 5], that act at a distance (magnetic forces, including those between like and unlike magnetic poles) [year 3], and gravity [year 5] identify simple mechanisms, including levers, gears and pulleys, that increase the effect of a force [year 5] use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams [year 6] describe the shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system; and explain the apparent movement of the sun across the sky in terms of the Earth's rotation and that this results in day and night [year 5]. |

Science Threshold Concepts

These concepts are the 'big ideas' that shape pupil's thinking within the subject. The same threshold concepts are explored and revisited in each unit of work in every year group. This enables pupils to gradually increase their contextual knowledge and opens a door into a new way of thinking about something and therefore enhances the ability to master the subject.

Structures and function

Structures is anything composed of parts and their function is how/ why it works.

Cause and effect

Why something happens and what has happened as a result.

Variation, diversity and change

Similarities and differences between things and how they grow and change from one state to another.

Scientific processes and methods

The process of collecting, analysing, presenting and evaluating data.

Aspirations for the future

Pupils develop an understanding of how subjects and specific skills are linked to future jobs.

Here are some of the jobs you could aspire to do in the future as an Artist:

Researcher
Doctor
Nurse
Dentist
Pharmacist
Midwife
Engineer
Botanist

| Year Group | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|--------------------------|--|---|---|---|---|--|
| Year 1 | Animals including humans Seasonal changes - Autumn | Animals including humans | Everyday materials Seasonal changes - Winter | Plants Seasonal changes - Spring | Everyday materials | Seasonal changes Seasonal changes - Summer |
| | NC: To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. NC: To observe changes across the 4 seasons NC: To observe and describe weather associated with the seasons and how day length varies | NC: To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. NC: To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) NC: To identify and name a variety of common animals that are carnivores, herbivores and omnivores | NC: To distinguish between an object and the material from which it is made NC: To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock NC: To observe changes across the 4 seasons NC: To observe and describe weather associated with the seasons and how day length varies | NC: To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees NC: To identify and describe the basic structure of a variety of common flowering plants, including trees NC: To observe changes across the 4 seasons NC: To observe and describe weather associated with the seasons and how day length varies | NC: To describe the simple physical properties of a variety of everyday materials NC: To compare and group together a variety of everyday materials on the basis of their simple physical properties | NC: To observe changes across the 4 seasons NC: To observe and describe weather associated with the seasons and how day length varies |
| Threshold Concept | Structure and function – Identify and name body parts Cause and effect – Effect of autumn on animals, plants and weather Variation, diversity and change – Variation in humans / seasonal changes Scientific processes and methods – record sunset and recognise patterns (observation over time) – explore using the senses | Structure and function – identify and name animal body parts Variation, diversity and change – know invertebrates from each of animal groups Scientific processes and methods – identify and classify animals - research | Cause and effect – Effect of winter on animals, plants and weather Variation, diversity and change – identification of everyday materials Scientific processes and methods – record the temperature using a thermometer and observe changes | Structure and function – plant parts Variation, diversity and change – identification of different types of flowering plants Cause and effect – Effect of spring on animals, plants and weather Scientific processes and methods – identifying plants and drawing labelled diagrams – measure rainfall (observation over time) | Variation, diversity and change - exploring a variety of properties of everyday materials Scientific processes and methods – comparing and grouping materials in different ways (comparative test) | Cause and effect – Effect of summer on animals, plants and weather Variation, diversity and change – Look at changes over the year to the weather, animals, plants and daylight hours. Scientific processes and methods – using data to answer questions and see patterns |
| Year 2 | Animals including humans | Living things and their habitats | Using everyday materials | Plants | Living things and their habitats | Using everyday materials |
| | NC: To find out about and describe the basic needs of animals, including humans, for survival (water, food and air) NC: To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene NC: To notice that animals, including humans, have offspring which grow into adults | NC: To explore and compare the differences between things that are living, dead, and things that have never been alive NC: To identify and name a variety of plants and animals in their habitats, including microhabitats | NC: To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses | NC: To observe and describe how seeds and bulbs grow into mature plants NC: To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy | NC: To 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 NC: To 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. | NC: To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching |
| Threshold Concept | Cause and effect – To know the effects on the body where a human lacks access to their basic needs. Variation, diversity and change – Looking at animals and their offspring and looking for similarities and differences Scientific processes and methods – measure using a stopwatch | Structure and function – Identify and describe different habitats and animals that live within them. Variation, diversity and change – diversity within a habitat and variation between habitats. Scientific processes and methods – comparisons and observations. - research | Cause and effect – The effect of different properties of everyday materials. Variation, diversity and change – Explore the properties of everyday materials Scientific processes and methods – group materials- Investigate whether materials are waterproof (fair test) | Structure and function – Explore seeds and bulbs Variation, diversity and change – observe changes in bulbs and seeds as they grow Scientific processes and methods – investigate a plants need for water, light, and a suitable temperature (observation over time) | Cause and effect – Explain how habitats provide for the basic needs of different animals and plants Variation, diversity and change – Explore the variations between habitats Scientific processes and methods – Create food chains - research | Cause and effect – The effect on material where they are manipulated. Variation, diversity and change – look at the difference between materials and how they can be manipulated. Scientific processes and methods – sort materials using a Venn diagram and carol diagram — Investigate the strength and size of magnets (Pattern seeking) |

| Year Group | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|--------------------------|---|--|---|---|---|--|
| Year 3 | Animals including humans | Rocks | Light | Plants | Plants | Forces and magnets |
| | <p>NC: To identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</p> <p>NC: To identify that humans and some other animals have skeletons and muscles for support, protection and movement</p> | <p>NC: To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>NC: To describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> <p>NC: To recognise that soils are made from rocks and organic matter</p> | <p>NC: To recognise that they need light in order to see things and that dark is the absence of light</p> <p>NC: To notice that light is reflected from surfaces</p> <p>NC: To recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>NC: To recognise that shadows are formed when the light from a light source is blocked by an opaque object</p> <p>NC: To find patterns in the way that the size of shadows change</p> | <p>NC: To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>NC: To explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.</p> <p>NC: To investigate the way in which water is transported within plants</p> <p>NC: To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p> | <p>NC: To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>NC: To explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</p> | <p>NC: To compare how things move on different surfaces</p> <p>NC: To notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>NC: To observe how magnets attract or repel each other and attract some materials and not others</p> <p>NC: To compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>NC: To describe magnets as having 2 poles</p> <p>NC: To predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p> |
| Threshold Concept | <p>Structure and function – bones, skeletons and muscles</p> <p>Cause and effect – the effects of too much or too little nutrients</p> <p>-The effect of different foods on the body</p> <p>Scientific processes and methods – Set up a practical enquiry about muscles -Research vitamins and the food that contain them</p> | <p>Structure and function – the structure of soil</p> <p>Variation, diversity and change – name the 3 different types of rocks - Describe how animals can turn into fossils</p> <p>Scientific processes and methods – compare and group rocks -Research the work of Mary Anning</p> | <p>Cause and effect – the absence of light is dark</p> <p>-Shadows are formed where a light source is blocked</p> <p>-Eyes can be damaged by looking at the sun</p> <p>Scientific processes and methods - investigate light sources and shadow size (fair test)</p> | <p>Structure and function – The function of plant parts</p> <p>Cause and effect – Life cycle of a flowering plant</p> <p>Scientific processes and methods – investigate how water is transported in plants (observation over time)</p> | <p>Structure and function – the functions of different plant parts</p> <p>Cause and effect – the effects of water, light, space, nutrients and air on plant growth</p> <p>Variation, diversity and change – the variation of a plants needs depending upon variety</p> <p>Scientific processes and methods – classify plants using many criteria</p> | <p>Cause and effect – exploring the effects of friction – explore the effect of magnets and their poles</p> <p>Scientific processes and methods – Does magnet size affect the strength of the magnet? (pattern seeking)</p> |
| Year 4 | Animals including humans | Sound | Living things and their habitats | Living things and their habitats | State of matter | Electricity |
| | <p>NC: To describe the simple functions of the basic parts of the digestive system in humans</p> <p>NC: To identify the different types of teeth in humans and their simple functions</p> <p>NC: To construct and interpret a variety of food chains, identifying producers, predators and prey</p> | <p>NC: To identify how sounds are made, associating some of them with something vibrating</p> <p>NC: To recognise that vibrations from sounds travel through a medium to the ear</p> <p>NC: To find patterns between the pitch of a sound and features of the object that produced it</p> <p>NC: To find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>NC: To recognise that sounds get fainter as the distance from the sound source increases</p> | <p>NC: To recognise that living things can be grouped in a variety of ways</p> <p>NC: To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> | <p>NC: To recognise that environments can change and that this can sometimes pose dangers to living things</p> | <p>NC: To compare and group materials together, according to whether they are solids, liquids or gases</p> <p>NC: To observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>NC: To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> | <p>NC: To identify common appliances that run on electricity</p> <p>NC: To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>NC: To 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</p> <p>NC: To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>NC: To recognise some common conductors and insulators, and associate metals with being good conductors</p> |
| Threshold Concept | <p>Structure and function – the digestive system and teeth- Construct food chains</p> <p>Cause and effect – looking at the effect of sugar on teeth</p> <p>Scientific processes and methods – Teeth investigation (observation over time)</p> <p>– Research Lord Lister the discovered antiseptic (born in Newham)</p> | <p>Structure and function – the ear</p> <p>Cause and effect – exploring pitch, volume and strength of sound</p> <p>Scientific processes and methods – Identifying patterns in volume and the strength of vibrations</p> <p>– investigate distance and sound (pattern seeking)</p> | <p>Variation, diversity and change – differences and similarities in animals and plants</p> <p>Scientific processes and methods – classifying living things using classification keys</p> | <p>Cause and effect – The impact of environmental and climate change on living things</p> <p>Variation, diversity and change – how environmental change affects living things</p> <p>Scientific processes and methods – research environmental changes – plan how to make a positive change to a small local area considering the impact on people and other living things. (identify and classifying)</p> | <p>Cause and effect – the water cycle and evaporation and condensation</p> <p>Variation, diversity and change – how water changes state</p> <p>Scientific processes and methods – compare and group – observation - How does the mass of a block of ice affect how long it takes to melt? (fair test)</p> | <p>Structure and function – components of a circuit</p> <p>Cause and effect – identifying a complete and incomplete circuit</p> <p>Scientific processes and methods – How has electricity changed the way we live? (research) – scientific diagrams</p> <p>– Investigate good and bad conductors (switches) (fair test)</p> |

| Year Group | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|-------------------|---|---|--|---|--|--|
| Year 5 | Properties and changes of materials -grouping and separating matters | Properties and changes of materials - types of change | Forces | Living things and their habitats | Animals including humans | Earth and space |
| | <p>NC: To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets</p> <p>NC: To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>NC: To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> | <p>NC: To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>NC: To demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>NC: To explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p> | <p>NC: To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>NC: To identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>NC: To recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p> | <p>NC: To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>NC: To describe the life process of reproduction in some plants and animals</p> | <p>NC: To describe the changes as humans develop to old age</p> | <p>NC: To describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>NC: To describe the movement of the moon relative to the Earth</p> <p>NC: To describe the sun, Earth and moon as approximately spherical bodies</p> <p>NC: To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p> |
| Threshold Concept | <p>Cause and effect – separation of mixtures</p> <p>Variation, diversity and change – similarities and differences of materials</p> <p>Scientific processes and methods - group materials according to their properties (classification)</p> <p>– How does a nail in salt water change over time? (observation over time)</p> <p>– What material is the best insulator? (fair test)</p> <p>– investigate separating mixtures using sieving, magnets, filtering and evaporation (comparative test)</p> | <p>Cause and effect – effect of liquid on some materials</p> <p>Variation, diversity and change – reversible and irreversible changes</p> <p>Scientific processes and methods – How does a sugar cube in water change over time? (observation over time)</p> <p>- Is the solid soluble in water? (fair test)</p> | <p>Structure and function – mechanisms and their functions</p> <p>Cause and effect – the effect of mechanisms – the effect of forces on moving objects and those at rest</p> <p>Scientific processes and methods – How does the surface area of a parachute affect the time it takes to reach the floor? (fair test)</p> <p>- Research the work of Isaac Newton</p> | <p>Structure and function – plant parts</p> <p>Variation, diversity and change– sexual reproduction in flowering plants</p> <p>- asexual reproduction in plants</p> <p>Scientific processes and methods – dissect and label a flower</p> <p>- Research and compare life cycles of mammals and birds, and insects and amphibians</p> | <p>Structure and function – How the body changes with age</p> <p>Cause and effect – The effects of aging</p> <p>Variation, diversity and change – changes in humans over time</p> <p>Scientific processes and methods – identification of the life stages of humans (classification)</p> <p>– Is there a pattern between gestation time and the size of the mammal? (pattern seeking)</p> | <p>Structure and function – solar system</p> <p>Cause and effect – the rotation of the Earth and day and night.</p> <p>Scientific processes and methods – Is there a pattern between the size of a planet and its rotation? (pattern seeking)</p> <p>- Research the planets in our solar system</p> |
| | Year 6 | Animals including humans | Living things and their habitats | Light | Animals including humans | Evolution and inheritance |
| | <p>NC: To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>NC: To describe the ways in which nutrients and water are transported within animals, including humans</p> | <p>NC: To 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</p> <p>NC: To give reasons for classifying plants and animals based on specific characteristics</p> | <p>NC: To recognise that light appears to travel in straight lines</p> <p>NC: To 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</p> <p>NC: To 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</p> <p>NC: To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p> | <p>NC: To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> | <p>NC: To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>NC: To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>NC: To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> | <p>NC: To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>NC: To compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches</p> <p>NC: To use recognised symbols when representing a simple circuit in a diagram</p> |
| Threshold Concept | <p>Structure and function – the structure and function of the circulatory system</p> <p>Scientific processes and methods – observation of a dissection of a heart</p> <p>- Diagram of the circulatory system</p> | <p>Variation, diversity and change – Use a classification system to identify living things including microorganisms, plants and animals</p> <p>Scientific processes and methods – Investigate micro-organisms (fair test)</p> <p>– Linnaeus classification systems</p> | <p>Structure and function – The eye</p> <p>Cause and effect – Describe how we see – the shape of an object relates to the shape of the object</p> <p>Scientific processes and methods – How do shadows change over the day? (observation over time)</p> | <p>Structure and function – relate to all structures looked at during KS2.</p> <p>Cause and effect – The effects on the body of different lifestyles</p> <p>Scientific processes and methods - Are breathing rate and heat rate linked? (pattern seeking)</p> | <p>Cause and effect - Adaptation to suit the environment</p> <p>Variation, diversity and change – evolution - offspring</p> <p>Scientific processes and methods – Research what happened when Charles Darwin visited the Galapagos islands</p> <p>– look at fossils to find out about the past (research)</p> | <p>Structure and function –components of circuits</p> <p>Cause and effect – compare the brightness of bulbs, loudness of buzzers, number of cells used and length of the wires</p> <p>Scientific processes and methods – Research the work of Michael Faraday</p> <p>– Investigate the brightness of bulbs with differing number of cells. (Comparison test)</p> |