

Long Term Plan—a cross-curricular, spiral approach for EYFS and KS1, with discrete units in KS2. Chemistry units are marked blue, biology units are marked green and physics units are marked light orange.

| | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|-----------------|---|--|---|---|--|---|--|
| Autumn 1 | Ourselves and Colours <ul style="list-style-type: none"> Senses, keeping healthy; Mixing colours, experimenting with light | Toys <ul style="list-style-type: none"> Ourselves—senses and body parts Seasonal Changes—exploring Autumn. | Our Capital City <ul style="list-style-type: none"> Plant bulbs and observe. What animals live in an urban habitat? Everyday materials—Paddington's coat. | Stone Age <ul style="list-style-type: none"> Rocks and Soils | Rotten Romans <ul style="list-style-type: none"> Teeth and Digestion | Ancient Greece <ul style="list-style-type: none"> Forces | Behind the Bombs <ul style="list-style-type: none"> Light |
| Autumn 2 | Families and Celebrations <ul style="list-style-type: none"> Observing candles (Diwali) and other light sources; Healthy party food; How we grow; Experiments with balloons; Seasons. | Toys <ul style="list-style-type: none"> Uses of everyday materials Planting seeds and beginning to understand plants. | Real Life Superheroes <ul style="list-style-type: none"> Need for exercise and healthy diet. Everyday materials—bending, squashing. Real life superhero inventors. | Stone Age <ul style="list-style-type: none"> Rocks and Soils | Rotten Romans <ul style="list-style-type: none"> Plants | The Earth in Space <ul style="list-style-type: none"> Earth and Space | Behind the Bombs <ul style="list-style-type: none"> Electricity |
| Spring 1 | Nursery Rhymes <ul style="list-style-type: none"> Opportunities for comparative tests for a range of materials; Plants and animals | Antarctica <ul style="list-style-type: none"> Animals—naming common animals and labelling. Seasonal changes—Spring | Pirates of the Caribbean <ul style="list-style-type: none"> Living, dead, never lived. Observe planted daffodils; Warm habitats. | Ancient Egypt <ul style="list-style-type: none"> Skeletons and Muscles | Africa <ul style="list-style-type: none"> Sound | The Vikings <ul style="list-style-type: none"> Everyday materials | Natural Disasters <ul style="list-style-type: none"> Classification |
| Spring 2 | Animals <ul style="list-style-type: none"> Where do animals live? Names of animals; What animals eat; How animals grow. | Dinosaurs <ul style="list-style-type: none"> Animals—carnivores, herbivores, omnivores. Planting seeds. | Pirates of the Caribbean <ul style="list-style-type: none"> Plants—more planting from seeds What do plants need to grow and stay healthy? | Ancient Egypt <ul style="list-style-type: none"> Light | Africa <ul style="list-style-type: none"> Electricity | Rainforests <ul style="list-style-type: none"> Life Cycles | Natural Disasters <ul style="list-style-type: none"> Evolution and Inheritance |
| Summer 1 | Traditional Tales <ul style="list-style-type: none"> Opportunities for comparative tests for a range of materials; Plants and animals investigations; Floating and sinking—gingerbread man. | Meriden Village <ul style="list-style-type: none"> Exploring local wildlife and plant life. Observing seasonal changes around Meriden—summer. | Blue Planet II <ul style="list-style-type: none"> More habitats—including sea habitats—and simple food chains. | The UK in the World <ul style="list-style-type: none"> Forces and Magnets | Smashing Saxons <ul style="list-style-type: none"> Classification | The Tudors <ul style="list-style-type: none"> Consolidate | The Mayans <ul style="list-style-type: none"> Heart, lungs and blood |
| Summer 2 | Holidays <ul style="list-style-type: none"> Opportunities for comparative tests for a range of materials—what makes the best...; Plants and animals in different places; How do things move? Melting ice creams. | The Enchanted Forest <ul style="list-style-type: none"> Uses of everyday materials—link to story. Consolidate plant and animal objectives. | Blue Planet II <ul style="list-style-type: none"> Consolidate all objectives. | Rivers and Mountains <ul style="list-style-type: none"> States of Matter | Smashing Saxons <ul style="list-style-type: none"> Consolidate | The Tudors <ul style="list-style-type: none"> Human life cycle | The Mayans <ul style="list-style-type: none"> Consolidation |



Science Progression of Knowledge and Skills

Progression of content knowledge— National Curriculum statements from other units are in **blue**.

| Topic | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | KS3 |
|----------------------------------|--|---|--|--|---|---|--|--|
| BIOLOGY | | | | | | | | |
| Plants | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | 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. | 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. | | 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. 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. | Describe the life process of reproduction in some plants and animals. | 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. | 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 | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | 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. 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). Observe changes across the four seasons. | 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. | | 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. | 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. | 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. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. | 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 | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe. | 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. | 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. | 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. | 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. | 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. Describe the life process of reproduction in some plants and animals. | 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. Give reasons for classifying plants and animals based on specific characteristics. | 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. |



Progression of content knowledge— National Curriculum statements from other units are in **blue**.

| Topic | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | KS3 |
|---------------------------|--|---|---|--|---|---|--|--|
| Evolution and Inheritance | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | | 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. Notice that animals, including humans, have offspring which grow into adults. | Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | Recognise that environments can change and that this can sometimes pose dangers to living things. | Describe the life process of reproduction in some plants and animals. | 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. | 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. |
| CHEMISTRY | | | | | | | | |
| Materials | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | 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. | 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. | 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. 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. 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. | Recognise some common conductors and insulators, and associate metals with being good conductors. | 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. | | 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 | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | 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. | Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. | 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. | | | Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. | The composition of the Earth. The structure of the Earth. The rock cycle and the formation of igneous, sedimentary and metamorphic rocks. |

Progression of content knowledge—National Curriculum statements from other units are in **blue**.

| Topic | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | KS3 |
|----------------|--|---|--|---|--------|--|---|--|
| PHYSICS | | | | | | | | |
| Light | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Describe the simple physical properties of a variety of everyday materials. | | 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. | | 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. | 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. | 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 | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | | Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. | 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. | | 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. | | 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 Newton's, measurements of stretch or compression as force is changed. |
| Sound | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. | | 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. | | | | 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. |

Progression of content knowledge—National Curriculum statements from other units are in **blue**.

| Topic | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | KS3 |
|------------------|--|---|--------|---|--|--|--|--|
| Electricity | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | | | | 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. | | 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. | 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 | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. | | | | 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. | | 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. |
| Seasonal Changes | Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. | Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. | | Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. | | Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. | | The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. |

Science Progression of Knowledge and Skills



Progression of Scientific Skills— EYFS statements are taken from the Development Matters document. National Curriculum statements are in **blue**. Extra detail and guidance in black.

Children should become increasingly **autonomous, systematic** and **accurate**. They should increasingly draw on **scientific ideas** in their predictions and explanations.
Children should move from the **familiar** to the **unfamiliar**, the **simple** to the **more complex**, from the **concrete** to the **abstract**.

| Topic | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | KS3 |
|-------------------------|---|--|--------|---|--------|---|--------|--|
| Asking Questions | Show curiosity about objects, events and people Questions why things happen Comments and asks questions about aspects of their familiar world such as the place they live or the natural world Knows that information can be retrieved from books and computers. | Asking simple questions and recognising that they can be answered in different ways While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions. The children answer questions developed with the teacher often through a scenario. The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. | | Asking relevant questions and using different types of scientific enquiries to answer them. The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions. The children answer questions posed by the teacher. Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question. | | Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. Given a wide range of resources, the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work. | | Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience. |
| Setting up tests | Take a risk, engage in new experiences and learn by trial and error. Find ways to solve problems/find new ways to do things/test their ideas They take account of one another's ideas about how to organise their activity Chooses the resources they need for their chosen activities Shows understanding of the need for safety when tackling new challenges, and considers and manages some risks. | Performing simple tests The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time. Identifying and classifying Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing. | | Setting up simple practical enquiries, comparative and fair tests The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher. They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking. | | Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample. | | Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate. Evaluate risks. Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility. |
| Observing and Measuring | Engage in open-ended activity Develop ideas of grouping, sequences, cause and effect. Know about similarities and differences in relation to places, objects, materials and living things Closely observes what animals, people and vehicles do Uses senses to explore the world around them Handle equipment and tools effectively Use everyday language related to time | Observing closely, using simple equipment Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. They begin to take measurements, initially by comparisons, then using non-standard units. | | Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. The children make systematic and careful observations. They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. | | Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value). | | Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety. Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature. Make and record observations and measurements using a range of methods for different investigations. Present observations and data using appropriate methods, including tables and graphs. |
| Recording Data | Create simple representations of events, people and objects. | Gathering and recording data to help in answering questions The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing. They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs. They classify using simple prepared tables and sorting rings. | | Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams. Children are supported to present the same data in different ways in order to help with answering the question. | | Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. Children present the same data in different ways in order to help with answering the question. | | Apply sampling techniques. Apply mathematical concepts and calculate results. Use and derive simple equations and carry out appropriate calculations. Undertake basic data analysis including simple statistical techniques. |

Science Progression of Knowledge and Skills



Progression of Scientific Skills—EYFS statements are taken from the Development Matters document. National Curriculum statements are in **blue**. Extra detail and guidance in black.

| Topic | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | KS3 |
|-------------------------------------|---|--|--------|--|--------|--|--------|--|
| Interpreting and Communicating Data | <p>Makes links and notices patterns in their experience</p> <p>Answer how and why questions about their experiences</p> <p>Make observations animals and plants and explain why some things occur, and talk about changes.</p> <p>Develop their own narratives and explanations by connecting ideas or events.</p> <p>Builds up vocabulary that reflects the breadth of their experience.</p> | <p>Using their observations and ideas to suggest answers to questions</p> <p>Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.</p> <p>Using their observations and ideas to suggest answers to questions</p> <p>The children recognise ‘biggest and smallest’, ‘best and worst’ etc. from their data.</p> | | <p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Children answer their own and others’ questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.</p> <p>Identifying differences, similarities or changes related to simple scientific ideas and processes</p> <p>Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.</p> <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>They draw conclusions based on their evidence and current subject knowledge.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</p> <p>They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.</p> | | <p>Identifying scientific evidence that has been used to support or refute ideas or arguments</p> <p>Children answer their own and others’ questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer.</p> <p>They talk about how their scientific ideas change due to new evidence that they have gathered.</p> <p>They talk about how new discoveries change scientific understanding.</p> <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge.</p> <p>They communicate their findings to an audience using relevant scientific language and illustrations.</p> | | <p>Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions.</p> <p>Present reasoned explanations, including explaining data in relation to predictions and hypotheses.</p> <p>Evaluate data, showing awareness of potential sources of random and systematic error.</p> |
| Evaluating | | | | <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.</p> | | <p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p> <p>They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used.</p> <p>They identify any limitations that reduce the trust they have in their data.</p> | | <p>Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review.</p> <p>Evaluate the reliability of methods and suggest possible improvements.</p> <p>Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility.</p> <p>Identify further questions from their results.</p> |
| Making Predictions | <p>Children suggest answers to ‘What would happen if..?’ questions based on their existing knowledge and patterns they have observed through first-hand, practical activities.</p> | <p>Children suggest what might happen in different situations, with support from the teacher, based on first-hand experiences and patterns they have seen emerging from their scientific enquiries.</p> | | <p>Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</p> <p>Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface.</p> <p>Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry.</p> | | <p>Using test results to make predictions to set up further comparative and fair tests</p> <p>Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.</p> | | <p>Make predictions using scientific knowledge and understanding.</p> |



Progression within the 5 enquiry types

| Topic | Examples | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|-----------------------------|--|---|--|---|---|--------|--------|--------|
| Observing over time | How far will this snail travel in 5 minutes? How do different trees change over autumn, winter, spring, summer? How does bread change as it goes mouldy? How long will a lump of ice take to melt? What happens to the ice as it melts? How does cheese change as we heat it? How will our shadows change over the course of a day? How does the temperature change over the day/week/month/year? How does the light level in the room change over the day? | Children show curiosity about how things change. They can answer questions about changes with help. They talk about their ideas to find out how things change. They use all of their senses to observe changes. They look closely at how things change. They can make simple records of how things change (with help as required). They use simple equipment to observe and record changes. They can talk about what they have done and what they have noticed. | Children ask questions about how and why things change. They can identify changes to observe and measure, and suggest how to do it. Children use non-standard units and simple equipment to record changes. They record in words and pictures, or in simple prepared formats such as tables and charts. Children can identify simple changes and talk about them. They can sequence the changes. They begin to use scientific language to talk about changes. They can discuss if the changes were what they expected. | Children talk about things changing and recognise when questions can be answered by observing over time. They decide what observations to make, how often and what equipment to use. Children use a range of equipment to collect data using standard measures. They make records using tables and bar charts. Children begin to use and interpret graphs produced by data loggers, such as Google Science Journal. Children draw simple conclusions from the changes they observed. They talk about changes using some scientific language. They suggest improvements to the ways they have observed. | Children decide when observing changes over time will help to answer their questions. They decide how detailed their observations need to be, and what equipment to use, to make their measurements as accurate as possible. Children use equipment accurately without support. They record data appropriately and present data in line graphs. They interpret changes in the data. They recognise the effect of changing the time and number of observations. Children draw valid conclusions from data about changes. They recognise the significance of things changing over time. They talk about and explain changes using scientific knowledge and understanding. They evaluate how well they observed over time. | | | |
| Identifying and Classifying | How can we identify what’s alive and not alive? Are all worms the same? We’ve collected lots of fallen leaves.- How can we sort them out? How can we sort items for recycling? Can we sort moving toys by how they are powered? We’ve had a power cut. Which things in the kitchen will still work? How can we identify and sort different samples of soil? | Children are curious about similarities and differences. With help, they can ask questions about similarities and differences. They talk about their ideas for sorting or matching things. They use their senses to sort and match things. They match things that are the same. They find things that are similar or different. They sort or group things in their own ways. they use simple equipment to sort things (hoops, boxes, etc.) They talk about how they sorted things and matched things. | Children ask questions about how and why things are similar or different. They decide what to observe to identify or sort things. Children make comparisons between simple features of objects, materials or living things. They record their observations in words or pictures or simple tables. Children sort objects by observable and behavioural features. They record their sorting in sorting circles or tables. Children identify similarities and differences and talk about them. They begin to use scientific language to talk about how things are similar or different. Children try to use their records to help them sort or identify other things. | Children talk about what criteria they will use to sort and classify things. They decide what equipment to use to identify and classify things. They talk about things that can be grouped and recognise when questions can be answered by sorting and classifying. Children carry out simple tests to sort and classify according to properties or behaviour. They use Carroll diagrams, Venn diagrams and more complex tables to sort things. They use simple keys and branching databases to identify things. They make simple branching databases (keys) for things that have clear differences. Children draw simple conclusions about things they have sorted and classified. They talk about the similarities and differences they identified using some scientific language. They suggest improvements to the way they sort and identify things. | Children decide when identifying and classifying will be helpful to answer their questions. They decide what equipment, tests and secondary sources of information to use to identify and classify things. Children use a series of tests to sort and classify materials. They use secondary sources to identify and classify things. They make their own keys and branching databases with four or more items. They use more than one piece of evidence to identify and classify things. Children draw valid conclusions when sorting and classifying. They recognise the significance of sorting and classifying. They talk about and explain what they have done using scientific knowledge. They evaluate how well their keys worked. | | | |
| Pattern Seeking | Do birds with the same types of beaks eat the same kind of food? Do different insects prefer different kinds of flowers? Do the tallest people have the strongest grip? How many winds of the elastic band make our bottle roller go 1 metre? 2 metres? 3 metres? When are the wettest/windiest seasons? Is there a link between the amount of noise and the locations around school? | Children are curious about patterns. With help, they ask questions about patterns. They can talk about their ideas for finding out about patterns. Children use their senses to look closely for patterns. They observe more than one thing at a time. They make simple records of what they notice, with help when required. Children talk about what they have done and patterns they have noticed. | Children ask questions about how things are linked. With help, they can decide what patterns to observe and measure and suggest how to do it. Children use non-standard units and simple equipment to record events that might be related. Children record in words or pictures, or in simple prepared formats such as tables, tally charts and maps. Children identify simple patterns and talk about them. They make links between two sets of observations. They begin to use scientific language to talk about the patterns. They can talk about whether the pattern they see was expected. | Children talk about what patterns might be found and recognise when questions can be investigated by pattern seeking. They decide on sets of data to collect, what observations to make and what equipment to use. Children use a range of equipment to collect data using standard measures. They make records using tables, bar charts or simple scatter graphs. They begin to use and interpret data collected through data loggers. Children draw conclusions about simple patterns between two sets of data. Children talk about patterns using some scientific language. Children suggest improvements to the way they looked for patterns. | Children recognise when variables cannot be controlled and decide when pattern seeking will help to answer their questions. They decide how detailed their data needs to be, and which equipment to use, to make their measurements as accurate as possible. Children use equipment accurately to collect observations. They record data appropriately and accurately. They present data in scatter graphs and frequency charts. Children recognise patterns in their results. They recognise the effect of sample size on reliability. Children draw valid conclusions from data about patterns and recognise their limitations. They recognise the significance of relationships between sets of data. They talk about and explain cause and effect patterns using scientific knowledge and understanding. Children evaluate how well they looked for patterns. | | | |

Progression within the 5 enquiry types

| Topic | Examples | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|----------|---|--|---|--|--|--------|--------|--------|
| Research | Are zoos a good thing? How have animals adapted over time? Why did our flowers wilt? How are different types of flour made? Why do sweat? How do athletes train? How are candles made? Why don’t cranes fall over? How did the Egyptians move heavy rocks to build the pyramids? When is a helicopter more useful than a plane? Why? | Children are curious about things in their surroundings. With help, they ask questions that can be answered using secondary sources. Children listen carefully. They know that information in books and in electronic media can be used to answer questions. They find pictures of things. They talk to people about what they do and how things work. Children talk about what they have found out. | Children ask questions about how things are and the way they work. With help, they make suggestions about how to find things out. They use simple books and electronic media to find things out. They ask questions to find out what people do and how things work. They record in words and pictures what they find out. Children begin to use scientific language to talk about what they found out. They talk about whether the information source was useful. They give an opinion about some things they found out. | Children talk about how things are and the way they work and recognise when questions can be answered by research using secondary sources. Children use information sources to find the information they need. They can use someone else’s data. They can record what they find out in their own words. Children can present the information in different ways. Children draw conclusions from what they find out from different sources. They talk about what the information and data means using scientific language. They suggest ways to improve how they find out and use information. | Children decide when research using secondary sources will help to answer their questions. They decide which sources of information might answer their questions. Children use relevant information and data from a range of secondary sources. Children recognise how data has been obtained. They start to notice when information and data is biased or when it is based on opinions rather than facts. Children present their findings in suitable formats. Children draw valid conclusions from their research. They talk about and explain their research using scientific knowledge and understanding. They evaluate how well their research has answered their questions. They recognise that some scientific questions may not have been answered definitively. | | | |
| | Do woodlice move more in light or dark conditions? Will seeds germinate in oily or salty water? How does changing the amount of water make a difference to how well the plants grow? What difference does the type of soap make? Do small bubbles travel faster? Which of our shoes has the best grip? Which type of sunglasses block the light the best? | Children are curious about things behave. With help, they ask questions about things they can test. They talk about their ideas for testing how things behave. Children use their senses to look closely at how things behave. They carry out simple tests. They make simple records of what they notice (with help where necessary). They use simple equipment to observe and record. Children talk about what they have done and what they have noticed. They talk about whether something makes a difference. | Children ask why and how questions. They make comparisons about how things behave. With help, they notice links between cause and effect. With help, they identify simple variables to change and measure. They plan simple comparative tests. Children use non-standard units and simple equipment to record data. They record in words, or pictures, or in simple prepared formats such as tables and tally charts. Children talk about their data. They use comparative data to rank materials or objects. They use simple scientific language to describe simple causal relationships. With help, they can say if their test was fair. They say if the relationship was what they expected. | Children talk about links between cause and effect and (with help) pose a fair test question. They help to plan a comparative or fair test. They decide what data to collect. They decide what equipment to use and how to make observations. Children use a range of equipment to collect data using standard measures. They make records using tables and bar charts. They begin to use and interpret data collected through data loggers. Children draw simple conclusions from their comparative and fair tests. They talk about, and explain, simple causal relationships using some scientific language. They suggest ways that they can improve their fair tests. | Children recognise when variables need to be controlled and decide when a comparative or fair test is the best way to answer their question. They plan a comparative or fair test, selecting variables to measure, change and keep the same. They decide what equipment to use to make their own measurements as accurate as possible. Children use equipment accurately to collect observations. They record data appropriately and accurately. They present data in line graphs. They identify causal relationships. Children draw valid conclusions, based on the data. They recognise the significance of the results of comparative and fair tests. They talk about and explain causal relationships using scientific knowledge and understanding. They evaluate the effectiveness of their comparative and fair testing, recognising variables that were difficult to control. | | | |