

About this document

This progression of skills demonstrates how we meet the requirements of the National Curriculum across our school. It shows how we cover all of the statutory requirements within our own curriculum and how it is tailored and specific to the needs and interests of our children.

In this document, enrichment activities such as trips, visits, local walks and engaging practical activities are highlighted in **yellow**. Key skills and learning objectives are in **bold**. Finally, key vertical (across year groups), horizontal (across subjects within a year group) and diagonal (across year groups and subjects) links are highlighted in **green**.

Key aims of the National Curriculum

- 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
- equip children with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Key Stage 1

Working Scientifically:

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

asking simple questions and recognising that they can be answered in different ways

- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

NC area	NC Content	Y1 Learning Journey
<u>Plants</u>	<ul style="list-style-type: none"> Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees Identify and describe the basic structure of a variety of common flowering plants, including trees. 	<p>Children will explore a range of common wild and garden plants, including deciduous and evergreen trees. Children will go on a nature walk around the park and observe the different plants using simple equipment (e.g. magnifying glass). Children will be able to classify the plants into different groups (evergreen and deciduous) Children will identify and name the different parts of plants within school grounds, both large and small.</p>
<u>Animals, including Humans</u>	<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 	<p>Children will have a first-hand encounter with a variety of animals, identifying and classifying the 5 animal groups according to their characteristics. They will ask questions about how animals get their energy from food and investigate how herbivores, carnivores and omnivores feed, comparing them with humans. Finally, children will compare the sensory organs of humans with those of other mammals, labelling and using correct terminology for body parts.</p>
<u>Everyday Materials</u>	<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. 	<p>Children will explore a range of objects and their sources, learning about their production process. Children will go on a hunt around the school to find different objects and identify and name the different materials they find, suggesting why they are suitable for the job. Children will be given a range of different objects to explore their properties, discussing what they might be used for. Children will compare and group the objects according to different physical properties e.g. flexible/rigid, hard/soft, smooth/rough. Children will discuss the suitability for materials to create their toy from the past.</p>
<u>Seasonal Changes</u>	<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 	<p>Throughout the year, children will use the local environment around the school to observe and record changes as the seasons change. They will observe how plants change, the wildlife they can see and record changes in temperature and weather. Children will create displays of art work based on the different seasons.</p>

NC area	NC Content	Y2 Learning Journey
<p><u>Living things and their habitats</u></p>	<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 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 micro-habitats • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify different sources of food. 	<p>Year 2 will begin by sorting and classifying things that are alive, things that are dead and things that have never been alive, discussing and identifying the characteristics and life processes of living things. They will observe and discuss how these differ in a variety of plants and animals asking and discussing the answers to questions like “do plants die in the winter?”. Children will define and discuss the meanings of “habitats” and “micro-habitat,” discussing how animals found in different habitats around the world are suited to places they live. They will explore the woodland area in school, observing and recording the numbers types of animals found in a variety microhabitats e.g. under decomposing wood, observing how they are adapted and researching their role in the ecology of these habitats.</p>
<p><u>Plants</u></p>	<ul style="list-style-type: none"> • Observe and describe how seeds and bulbs grow into mature plants • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<p>Children will identify the differences and similarities between plants and animals. Children walk around outside school gates where plants are growing and will be recording observations of the variety of plants in the local environment. They will perform simple tests by setting up a comparative test to understand what plants need to germinate and grow. Children will also make a prediction in regards to the different plants they have planted as a class (seed and bulb). To describe and explain how seeds and bulbs grow into mature plants by understanding the life cycle of plants. Children will be creating a growth bar chart using the information that they have collected as a class in their plant growth table.</p>
<p><u>Animals including humans</u></p>	<ul style="list-style-type: none"> • Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance of exercise, eating the right amounts of different types of food, and hygiene. 	<p>Recalling their work of life processes, children will explore the needs that animals, including humans, have for survival. They will ask questions about and discuss the importance of health, hygiene and exercise, linked to their work in PSHE, suggesting ways to find answers. Children will be introduced to, and will discuss, reproduction (not how it occurs) and growth as a life process. They will observe and record changes in animals as</p>

		they grow, using a range of sources.
<p><u>Uses of everyday materials</u></p>	<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. 	<p>Pupils will observe and identify a range of materials used around school and at home. They will discuss how materials can be used for more than one thing or how one thing can be made using different materials and suggest reasons for the suitability of certain materials. Pupils will investigate the processes of recycling and suggest why some materials are more sustainable than others and how some might be improved, e.g. food packaging. Finally, the class will research a ground-breaking discovery in material science such as aluminium production and will discuss why it has proved to be so important.</p>

Lower Key Stage 2

Working Scientifically:

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- 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
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their

NC area	NC Content	Y3 Learning Journey
<p><u>Plants</u></p>	<ul style="list-style-type: none"> • identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • 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. 	<p>Year 3 will begin by taking a close look at a range of flowering plants using apparatus. They will draw with increasing accuracy, label and describe the function of the roots, stem, leaves and flower using technical vocabulary.</p> <p>Pupils will ask scientific questions about the nutrition, and energy (including water) and reproduction (including seeds) within a plant, designing enquiries to answer them. They will observe, record and produce written explanations of their findings, supported by diagrams, charts and tables where necessary.</p>
<p><u>Animals, including humans</u></p>	<ul style="list-style-type: none"> • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement. 	<p>Recalling their work on classifying animals according to the 5 main groups, children will use a range of resources to observe, identify and classify vertebrates and invertebrates. They ask questions and suggest answers, using scientific language, about the importance of our skeleton and muscles, making links with what they know about health and nutrition. The class will identify and classify a range of animals according to their diet.</p>

		comparing them with their own diet. Finally, pupils will research a specific food group and create a presentation , explaining its significance.
<u>Rocks</u>	<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. 	To begin, year 3 will have some hands on experience with a variety of rocks and model-fossils, raising questions they will attempt to answer as they gain more knowledge. Using appropriate equipment, children will take a close look at the rock found around school and in local buildings . Through experimentation children will identify and classify properties of rocks e.g. hardness-scratch test, permeability testing . Pupils will research and discuss how different rock types or fossils are formed, developing an understanding of the long term processes involved.
<u>Light</u>	<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. 	Pupils will begin by discussing sources of light and exploring its behaviour by using mirrors and torches ask and answer questions e.g. <i>why can we see the moon?</i> Continuing to experiment with light's behaviour, they will form a hypothesis regarding the behaviour of shadows and find evidence through simple investigations, recording and explaining their findings. Pupils will observe and find patterns in the behaviour of light and shadows based on their investigations. Finally, the class will discuss the dangers of the sun and how/why sunglasses work.
<u>Forces and magnets</u>	<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. 	Through playing a variety of magnet games and toys , observing magnets around the school and discussing their own experiences, pupils will compare and contrast magnetism with other forces e.g. push/pull. Throughout the week, children will work together to find answers to questions they have posed such as which materials are attracted to magnets? They will find fair ways to compare, look for patterns and identify properties of magnets, recording and explaining their results.

NC area	NC Content	Y4 Learning Journey
<p><u>Living things and their habitats</u></p>	<ul style="list-style-type: none"> recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things 	<p>Building on their work in year 2, pupils will discuss the 7 characteristics of living things (MRS NERG) and to ask relevant questions e.g. <i>how do we know it is alive?</i> They will use classification keys to identify and name a variety of living things in their local environment, classifying and presenting the data in a range of ways. Pupils will closely observe and produce diagrams of an inveterate in their local environment, making notes about where it was found and how it is adapted to live there, using scientific evidence based on research to support their ideas. Finally, pupils will consider the threats to the local environment and how they could help provide habitats for local wildlife by building a bug hotel for example.</p>
<p><u>States of matter</u></p>	<ul style="list-style-type: none"> compare and group materials together, according to whether they are solids, liquids or gases observe that some materials change state when they are 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 	<p>Year 4 will begin to compare and group materials by setting up simple practical enquiries to answer questions using a range of solid and liquid materials. They will present their finding using scientific vocabulary. Pupils will explore the particulate structure of solids, liquids and gases. They will set up an enquiry to demonstrate their understanding, observing closely as water evaporates or ice melts, recording data using apparatus and reporting on their findings. Finally, pupils will reflect on their knowledge of the water cycle and explain it using scientific vocabulary. They will design an enquiry to answer a question e.g. <i>why does it rain?</i> and use their DT skills to build a model of the water cycle, using scientific evidence to answer questions.</p>
<p><u>Animals including humans</u></p>	<ul style="list-style-type: none"> 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 simple functions of the basic parts of the 	<p>The class will compare and contrast a variety of teeth from different animals, including humans, asking questions e.g. do these belong to a predator? and using scientific evidence to support their ideas. They will explore food chains and use scientific vocabulary to describe members</p>

	<p>digestive system in humans</p>	<p>of a food chain. Pupils will carry out a scientific enquiry and observe and investigate the effects of sugar on teeth recording their findings using diagrams. They will discuss the importance of good dental hygiene and ask questions to a dental professional about how they can do this. Pupils will try to find answers to the question ‘what happens to your food once you have swallowed it?’. They will research the parts of the digestive system and learn the scientific vocabulary associated with it. Children use diagrams and scientific vocabulary to describe the digestion process and present their knowledge using their art and DT skills.</p>
<p><u>Sound</u></p>	<ul style="list-style-type: none"> • identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases. 	<p>Through first hand experience with a range of instruments, children will explore and identify the way in which vibrations create sound. They will discuss and describe the way sound travels as waves and how pitch can affect the shape of the wave. Pupils will find patterns in the sounds that are made in a range of homemade ‘instruments’ such as milk bottles, recording and explaining their findings using charts and diagrams. Finally, pupils will design investigations around volume and distance recording and logging data and providing scientific explanations.</p>
<p><u>Electricity</u></p>	<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. 	<p>In this topic, pupils will begin by considering where electricity is used at home and in school, classifying objects accordingly (e.g. batteries, mains) and discussing electrical safety. The class will ask some simple questions about electricity and electrical circuits and use some initial play and experimentation to answer some. They will define and label components in a circuit and draw pictures (not diagrams) to represent circuits they create. Finally, pupils will design enquiries to investigate how bulbs can be made brighter and how insulators or conductors affect an electrical circuit, drawing conclusions and giving scientific explanations.</p>

Upper Key Stage 2

Working Scientifically:

During

years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- 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
- identifying scientific evidence that has been used to support or refute ideas or arguments

NC area	NC Content	Y5 Learning Journey
<p><u>Living things and their habitats</u></p>	<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. 	<p>Year 5 will begin by comparing and describing the life cycles of animals from different classifications, asking questions and suggesting answers. They will discuss and describe asexual and sexual reproduction in a variety of animals, classifying and grouping them accordingly. Using what they already know about the flora and fauna in various habitats around school, children will observe and record life-cycle changes throughout the year. They will link their work on conservation and the environment to research and present information about significant naturalists.</p>
<p><u>Animals, including humans</u></p>	<ul style="list-style-type: none"> • describe the changes as humans develop to old age. 	<p>Following on from their initial work into reproduction in their previous topic, children will chart the stages of gestation, comparing and contrasting them with other animals. They will find out and record the length and mass of a growing child. Children will continue to research and collect data as they describe the changes that happen from childhood to adulthood on a timeline. Finally, children will collect their knowledge and create a class non-fiction book, describing human development.</p>

Science Curriculum KS1 & KS2

<p><u>Properties and changes of materials</u></p>	<ul style="list-style-type: none"> • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • 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. 	<p>Year 5 will continue to build up their familiarity with everyday materials, exploring their properties and classifying them. Throughout the week they will devise and conduct investigations to explore processes which change the properties of materials. Pupils will ask and carry out tests to answer questions related to soluble solutions, separating solutions, oxidation and cooking, exploring how materials change and how some changes are irreversible. They will recognise and control variables, record data in tables and diagrams during their experiments, presenting their findings with explanations in a variety of ways.</p>
<p><u>Earth and space</u></p>	<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. 	<p>Year 5 will begin by presenting some basic ideas about the solar system by making models, researching and collating data about planets. They will explore the importance of the sun and how/why shadows change throughout the day. Children will take measurements of their shadows throughout the day, recording data in tables and graphs and will then design an inquiry to support their ideas about the sun and our shadows. They will research and present their findings on the phases of the moon, using a variety of resources to explain why the moon changes shape. Finally, pupils will research the life of a significant astronomer and trace the history of beliefs about space and the technology that has made our present knowledge possible.</p>

Science Curriculum KS1 & KS2

<p style="text-align: center;"><u>Forces</u></p>	<ul style="list-style-type: none"> explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 	<p>Continuing on from their work on space, year 5 will discuss why meteorites fall to earth and why objects float in space. They will discuss the works of Isaac Newton and use scientific evidence to define and describe the force of gravity. They will plan enquiries to answer questions about the forces acting in air resistance, pulleys, levers, gears and friction. Pupils will plan enquiries with variables, record data, make predictions and present their findings, answering questions about how and why objects respond to forces.</p>
<p>NC area</p>	<p>NC Content</p>	<p>Y6 Learning Journey</p>
<p style="text-align: center;"><u>Living things and their habitats</u></p>	<ul style="list-style-type: none"> describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals give reasons for classifying plants and animals based on specific characteristics. 	<p>In year 6, pupils will build on their knowledge of classifying living things researching the life scientific contributions of LInneaus and describing how living things are classified. Pupils will plan different types of scientific enquiries to answer questions on how to classify a variety of living things that they have found in the local environment. Children will then use classification keys to group living things by their characteristics then record data by creating their own including micro-organisms, plants and animals.</p>
<p style="text-align: center;"><u>Animals including humans</u></p>	<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. 	<p>Year 6 will build on their previous work on the skeleton, muscles, digestion and healthy living to explore how our circulatory system works, presenting and explaining their understanding in a class exhibition. They identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood, including how nutrients and water are transported. Pupils will work together to create informative presentations, using their writing and art skills combined with scientific explanations, to demonstrate their understanding.</p>
<p style="text-align: center;"><u>Evolution and inheritance</u></p>	<ul style="list-style-type: none"> recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago recognise that living things produce offspring of the 	<p>In this topic, pupils will begin by discussing the life of Charles Darwin and significance of the theories which have contributed to our modern understanding of evolution. They will extend their knowledge of reproduction by observing</p>

Science Curriculum KS1 & KS2

	<p>same kind, but normally offspring vary and are not identical to their parents</p> <ul style="list-style-type: none"> • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 	<p>and raising questions about some living things and their suitability to their environment e.g. giraffes or polar bears. They will research how they have changed over time, studying a range of resources and using scientific evidence to demonstrate that characteristics are passed from parents to offspring. Linked with their previous knowledge of wildlife in our local area, pupils will identify patterns in how animals and plants around school are adapted to their environment, presenting their findings. Finally, children will discover more about the life of Mary Anning and discuss how and why palaeontology helps us to understand more about evolution. They will examine a cladogram of human evolution, recognising that living things have changed over time.</p>
<p><u>Light</u></p>	<ul style="list-style-type: none"> • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. 	<p>Pupils will use their knowledge of light from year 3 to discuss sources of light, how it travels and shadow, building on this knowledge by using a visit from an optician to discover how the eye works. Throughout the week children will plan enquiries to test whether light travels in straight lines, that we can only see objects because they reflect the light from a source and to see how we can split light into its spectral colours.. They will recognise and control variables, take measurements and record data, make predictions and present their conclusions. Examples of these investigations might involve periscopes or shadow puppets.</p>

Electricity

- 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.

The class will begin by revisiting their knowledge of circuits from **year 4**. They will extend their skills by constructing simple circuits and **planning different types of scientific enquiries, recognising and controlling variables**, to **answer questions** such as *how can we make lights brighter?* Pupils will conduct their investigations, **recording data** using a range of methods and **presenting their conclusions using circuit diagrams**. Pupils will take part in **a challenge** to create burglar alarms in **DT**, **making predictions** about what their alarms will do. They will independently **report and present findings from enquiries, including conclusions, causal relationships and explanations in written forms**.