Science

Progression of Skills Milestones

Skills	EYFS	Milestone 1 (End of KS1 – Years 1-2)	Milestone 2 (End of LKS2 – Years 3-4)	Milestone 3 (End of UKS2 – Years 5-6)
Scientific Knowledge and Understanding Plants	• To know the name for the basic plant parts (leaves, flowers, stem and roots.) • To know the names of some familiar flowering plants (e.g. daisy, rose, sunflower, daffodil). • To know plants are alive. To know that seeds need water to grow. • To know that seeds grow into plants if taken care of.	• To know a variety of common plants, and how they differ. • To know that deciduous trees lose their leaves seasonally, but evergreen trees do not. • To know the basic structure (including leaves, flowers (blossom), fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees. • To know that seeds and bulbs grow into seedlings by producing roots and shoots. • To know that seedlings grow into mature plants by developing parts such as roots, stems, leaves and flowers.	• To understand the functions of the basic parts of a plant and the relationship between structure and function. • To know that water is transported within a plant from the root, through the stem, to the leaves. • To know that plants need water, light, air, nutrients and a suitable temperature for growth and health. • To understand that the needs for growth and health vary from plant to plant.	

		• know that seeds need water and warmth to germinate. • To know that plants need water, light and a suitable temperature for growth and health		
Scientific Knowledge and Understanding Animals including Humans	• To know the names of familiar animals (e.g. farm animals, pets and animals seen in storybooks.) • To know the main body parts of common animals (number of legs, wings, fur, tail). To know that animals, including humans use their senses to explore the world. • To know that animals need food.	• Identify and classify common animals, including fish, amphibians, reptiles, birds and mammals. • Know the main body parts of animals and key parts of the human body. • Understand the five senses and know which body parts are associated with each sense. • Classify animals by diet, including carnivores, herbivores and omnivores, and give examples. • Understand that living things grow and change, and that animals have offspring that develop into adults. • Recognise that offspring resemble their parents and know stages in some animal life cycles.	• Understand that animals can be grouped by the presence of a skeleton, and that skeletons provide support, protection and enable movement, working with muscles to allow the body to move. • Know the main bones in the human body. • Understand that animals, including humans, need the right types and amounts of nutrition to survive, and that humans must obtain nutrients from food. • Know the main nutrient groups and their basic functions and understand that a balanced diet includes all nutrient groups. • Describe the diets of different animals. • Know the main organs of the human digestive system and their basic functions and identify the different	• Describe the human life cycle, including stages of growth and development from baby to old age, and understand the changes that occur during puberty in boys and girls. • Know that gestation periods vary between different mammals. • Understand the main parts of the circulatory system (heart, blood vessels and blood) and how they work together to transport oxygen and nutrients around the body. • Know that the heart pumps blood, blood vessels carry it and blood transports vital substances. • Understand that organ systems work together to keep the body functioning. • Understand how diet, exercise, drugs and lifestyle

		• Know that animals, including humans, need food, water and air to survive. • Understand the importance of exercise, a balanced diet and hygiene for maintaining human health.	types of human teeth and their roles. • Understand how teeth can be damaged and how to care for them through good hygiene and healthy choices. • Describe how the teeth of carnivores and herbivores are adapted to their diets. • Understand the roles of predators and prey. • Know that producers make their own food and that food chains begin with producers followed by consumers, showing the transfer of energy.	affect how the body functions. • Know that heart rate is the number of heartbeats per minute and that exercise increases heart rate.

Scientific Knowledge and Understanding Living things and their habitats	• Understand that plants and animals are living things that move, grow and need food. • Know the difference between living and non-living things. • Know that some animals hibernate or store food in winter. • Identify and name familiar animals (e.g. pets, farm animals and those in stories). • Identify and name some familiar flowering plants (e.g. daisy, rose, sunflower, daffodil). • Understand that plants and animals live in a range of different habitats. • Identify and name different places where animals live, including habitats found on the school site.	• To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition. • To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes. • To know a variety of plants and animals and describe some differences. • To name a variety of habitats, including woodland, ocean, rainforest and seashore. To know that a habitat is the environment where an animal or plant lives/ grows, because it provides what they need to survive. To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter). To know that living things depend upon each other (e.g. for food, shelter.) To understand that a food	• To know that living things can be grouped in different ways. To know that a classification key can be used to group and identify plants and animals. • To know that vertebrates are animals which have a backbone and invertebrates are animals which do not have a backbone. • To know that plants can be grouped into flowering or non-flowering varieties. • To know that flowering plants include grasses and non-flowering plants includes ferns and mosses. • To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish. • To know that invertebrate groups include snails, slugs, worms, spiders and insects. • To know that habitats can change throughout the year and this can be dangerous for living things. • To know that humans can have both a positive and	• Know that an organism is an individual living thing and that micro-organisms are extremely small living things not usually visible to the naked eye. • Understand the key characteristics of major vertebrate groups and commonly found invertebrates. • Understand that life cycles show how plants and animals grow, develop and reproduce, and that reproduction is necessary for the survival of a species. • Know that sexual reproduction involves two parents, while asexual reproduction involves one parent, and that plants and animals can reproduce in different ways. • Understand that living things have changed over time and that fossils provide evidence of organisms that lived millions of years ago. • Know that offspring inherit characteristics from their parents but also show variation. • Understand that variation can affect survival and that

		chain can be used to show how animals obtain food from eating either plants and/or other animals	negative impact on the environment.	plants and animals adapt to their environments over long periods through the process of evolution.
Scientific Knowledge and Understanding Materials	• To know objects float or sink. • To know some objects move when pushed or pulled. • To know some objects freeze or melt.	• Understand that objects are things or items, and that materials are what objects are made from. • Identify and name a range of everyday materials (e.g. wood, plastic, glass, metal, water and rock). • Know that a property describes how a material behaves or what it is like and use properties to describe and group materials. • Explain why particular materials are chosen for specific uses, including that one material can be used for different purposes and different materials can serve the same purpose. • Recognise that some materials are unsuitable for certain uses and explain why. • Understand that forces such as pushes and pulls	• Know that rocks can be grouped and identified by their appearance and properties (e.g. colour, texture, hardness and permeability), including the presence of grains, crystals or fossils. • Understand that soils are made from rocks and organic matter, and that the properties of rocks influence how they are used. • Know that fossils form from the remains of living things and that rocks change over time through processes such as weathering and erosion. • Understand that substances exist as solids, liquids and gases, and know the basic properties of each state. • Know that heating and cooling can cause changes of state, including melting, freezing, evaporation and condensation.	• Describe and compare a wide range of materials using properties such as hardness, solubility, transparency, conductivity and magnetism. • Understand that some substances dissolve in liquids to form solutions, and know that factors such as temperature and stirring affect how quickly dissolving occurs. • Recognise that dissolving, mixing and changes of state are reversible changes. • Know that mixtures can be separated using processes such as sieving, filtering and evaporation. • Understand that some changes form new materials and are usually irreversible (e.g. burning, rusting or chemical reactions).

		can change the shape of solid objects. • Know that solid objects can be squashed, bent, twisted or stretched, and that different materials require different amounts of force to change shape.	• Know that water can exist in all three states, with a melting point of 0°C and a boiling point of 100°C. • Understand that water moves around the Earth in a continuous process called the water cycle, including evaporation, condensation and precipitation. • Know that higher temperatures increase the rate of evaporation.	
Scientific Knowledge and Understanding Energy - Light	• To know day is light because the sun is in the sky. • To know night is dark because the sun is not in the sky. • To know that shadows are created when something blocks the light.	N/A	• To know that light travels from a source (e.g. the Sun, light bulbs and torches). • To know that light is needed to see things and that dark is the absence of light. • To know that light from the Sun can be dangerous and how to protect their eyes. • To know that all materials reflect light. • To know that shadows are formed when the light from a light source is blocked by an opaque object.	• To know that light travels in a straight line from a light source. • To understand that luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye. • To know that shiny surfaces reflect light uniformly. • To know that when light is reflected off a surface, its direction changes. To know that mirrors and periscopes work using reflection of light on smooth surfaces. • To understand why shadows have the same shape as the objects that cast them as a

			• To know that shadows change as a result of different factors: - Changing the position of the light source. - Changing the distances between the light source, object and surface. • To know that shadows change position and length throughout the day as the Sun changes position in the sky.	result of light travelling in straight lines. • To understand relationships between light sources, objects and shadows. • To understand how and why the distance between the object and the screen affects the size of the shadow. • To understand how the angle of a reflected ray is affected by the angle of the incoming ray on a smooth surface.
Scientific Knowledge and Understanding Energy - Sound	• To know about differences in sounds.	N/A	• To understand that sound is a result of vibrations. • To know that vibrations from sounds travel through mediums to the ear. • To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds. • To know that different materials provide different amounts of insulation against sound. • To know a variety of ways to change the pitch or volume of a sound.	N/A

			• To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds. • To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds. • To know that sounds get fainter as the distance from the sound source increases.	
Scientific Knowledge and Understanding Energy - Electricity	N/A	N/A	• Understand that electrical appliances require a power source, such as batteries or mains electricity. • Know that a complete circuit is needed for electricity to flow and identify the main components of a simple series circuit. • Understand how switches control circuits, with open switches breaking the circuit and closed switches completing it. • Know how to work safely with electricity.	• Identify a wider range of components in a series circuit, including buzzers and motors. • Understand and use standard circuit diagram conventions, including recognised symbols and straight-line connections. • Know that voltage in a circuit can be varied and understand how changes in voltage affect components such as bulb brightness or buzzer volume.

			• Understand that some materials are electrical conductors (e.g. metals) and allow electricity to pass through them, while others are insulators (e.g. plastic, wood) and do not. • Know why metals are used for wires and why plastic is used to cover cables. • Understand how changes in a circuit, such as the number of bulbs, can affect brightness.	
Scientific Knowledge and Understanding Forces, Earth and Space	• Know that the weather changes throughout the year and be able to identify and compare common weather types (e.g. rain, sun, snow and wind). • Recognise the four seasons and describe typical signs of each, including changes in trees and plants. • Understand that some animals hibernate or store food during winter.	• Know the names and order of the four seasons (spring, summer, autumn and winter) and describe typical weather associated with each in the UK. • Understand that day length changes across the seasons, with longer daylight hours in summer and fewer in winter. • Know that it is unsafe to look directly at the Sun.	• Know that forces can be contact forces (acting when surfaces touch) or non-contact forces (acting at a distance), such as magnetism. • Identify examples of contact forces, including friction and air or water resistance, and understand how they affect movement. • Know that friction acts between surfaces to slow objects down, and that rougher surfaces create more friction than smoother ones. • Understand that larger surface areas increase air or water resistance.	• Know that the Sun is a star at the centre of the solar system and that the Sun, Earth and Moon are approximately spherical. • Know the names, order and relative positions of the planets and other main celestial bodies in the solar system. • Understand that planets orbit the Sun and that moons are celestial bodies that orbit planets, including examples from beyond Earth. • Know that the Moon orbits the Earth. • Understand that the Earth's tilt and orbit around the Sun cause the seasons.

			• Know that magnets have north and south poles, that opposite poles attract and like poles repel, and that magnetic forces act without contact. • Identify magnetic materials (e.g. iron and nickel) and understand how they respond to magnets. • Recognise different types of magnets (e.g. bar, horseshoe, button, ring), understand that magnet strength can vary and describe common uses of magnets.	• Understand that the Earth's rotation causes day and night and the apparent movement of the Sun across the sky. • Know that unsupported objects fall towards the Earth because of gravity. • Understand that friction, air resistance and water resistance act in the opposite direction to motion and affect how objects move. • Know that rougher surfaces create more friction than smoother surfaces, and that larger surface areas increase air or water resistance. • Understand that balanced forces do not change an object's motion, while unbalanced forces can change its speed, shape or direction. • Know that mechanisms such as levers, pulleys and gears allow a smaller force to have a greater effect.
Posing Questions	• Ask questions about the natural world with support.	• Explore the world around them and ask simple questions about what they notice.	• Ask further questions during an enquiry to deepen understanding. • Recognise what makes a question testable.	• Ask questions throughout the enquiry process. • Identify testable scientific questions. • Select appropriate enquiry methods to answer

		• Recognise that there are different ways to answer questions through different types of enquiry. • Respond to suggestions about how to investigate and answer questions.	• Understand that different types of enquiry are suited to different questions. • Suggest possible ways to investigate and answer scientific questions.	questions and explain their choices.
Planning	• Begin to share ideas and suggestions, when working practically.	• Recognise whether a test is fair. • Decide whether suggested observations are suitable, with support. • Sequence the steps of a simple method in the correct order.	• Select which variables will be changed, measured and controlled in an investigation, with growing independence. • Suggest appropriate observations and decide how long they should be carried out. • Plan a simple investigation verbally and in writing, including writing a clear step-by-step method. • Choose suitable simple equipment to support observations and measurements.	• Identify and justify which variables will be changed, measured and controlled in an investigation. • Decide and explain what observations to make and how long they should be carried out. • Write a detailed method that explains how control variables will be kept the same. • Plan for reliability by including repeated measurements or observations. • Select appropriate equipment for observations and measurements and justify their choices.
Predicting	• Begin to make guesses about what might happen.	• Suggest what might happen, often justifying with personal experience.	• Make predictions using scientific knowledge and personal experience, explaining reasoning clearly.	• Make increasingly scientific predictions using prior knowledge and relevant evidence.

			• Consider cause and effect when making predictions. • Predict trends by explaining how changes in one variable will affect another.	• Use appropriate scientific vocabulary to describe possible outcomes and explain reasoning. • Draw on connections between different scientific topics to support predictions.
Observing (qualitative data)	• Comment on what they see and hear in the natural world.	• Use their senses to describe, in simple terms, what they notice or what has changed.	• Use their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.	• Use their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.
Measuring (quantitative data)	N/A	• Measure and compare using non-standard and standard units. • Begin to read simple scales to measure and compare accurately. • Use simple measuring equipment to make approximate measurements.	• Measure and compare using standard units. • Use measuring equipment with increasing accuracy. • Read scales accurately, including those with unmarked intervals between numbers.	• Measure and compare using standard units with increasing precision, including the use of decimals. • Read and interpret a wide range of scales accurately, including those with unmarked intervals.
Researching	• Recognising that information can be found online and in books.	• Gather specific information from one simplified, specified source	• Gather specific information from a variety of sources.	• Gather answers to open-ended questions from a variety of sources
Recording (diagrams)	• Draw and label pictures of plants and animals.	• Draw and label simple diagrams.	• Draw simple scientific diagrams in 2D using clear line drawings. • Use some standard scientific symbols where appropriate.	• Draw scientific diagrams with increasing accuracy using a wider range of standard symbols. • Label diagrams using a broad range of appropriate scientific vocabulary.

			• Label diagrams using relevant scientific vocabulary.	• Annotate diagrams to explain concepts and communicate understanding.
Recording (tables)	• Recognise that tables can be used to record information.	• Use prepared tables to record results, including numerical data, simple observations and tally counts.	• Use tables to record results, including detailed observations and multiple columns. • Identify and add appropriate headings to tables. • Begin to design simple tables to record results independently.	• Design results tables independently, including appropriate headings and units. • Use tables that allow for repeat readings. • Consider variables when organising and presenting results. • Calculate the mean average from collected data.
Grouping and Classifying	• Group objects, plants and animals with support.	• Group items based on observable characteristics. • Organise questions to create a simple classification key.	• Group items using both observable characteristics and measurable properties. • Use and complete pre-prepared branching and numbered classification keys. • Select appropriate questions to support effective classification.	• Group and classify items in a wide range of contexts. • Organise and design the layout of numbered and branching classification keys. • Formulate appropriate and effective questions for classification.
Graphing	N/A	• Represent data using pictograms and block graphs.	• Represent data using bar charts. • Draw bars with greater accuracy. • Read the value of bars with greater accuracy.	• Represent data by using line graphs and scatter graphs. • Plot points with greater accuracy. • Read the value of plotted points with greater accuracy.

Analysing and drawing conclusions	• Describe their discoveries when working practically.	• Use results to answer simple questions. • Begin to recognise when results or observations do not match their predictions.	• Write conclusions that summarise findings using appropriate scientific vocabulary. • Suggest how one variable may have affected another and support ideas with results. • Identify data that does not fit a pattern (anomalous data). • Recognise when results differ from predictions. • Use identified patterns to make simple predictions about trends or new values.	• Write conclusions that summarise findings using increasingly precise scientific vocabulary. • Explain, with growing independence, how one variable may have affected another. • Use relevant data to support and justify relationships and conclusions. • Identify anomalies in repeat data and decide when results should be excluded. • Compare individual, class or model data with predictions and recognise when they do not match. • Use patterns in data to predict new values or trends.
Evaluating	N/A	N/A	• Identify parts of a method that could be improved and suggest possible changes. • Recognise which variables were difficult to control and explain how control could be improved. • Reflect on the reliability of results by considering anomalies and the quality of measurements and controls.	• Identify parts of a method that need changing and suggest specific improvements. • Recognise which variables were difficult to control and explain how control could be improved.

			• Suggest new questions that could extend or deepen the enquiry.	• Evaluate the trustworthiness of results by considering accuracy (e.g. human or equipment error), reliability (e.g. repeated results) and the reliability of information sources. • Pose new questions arising from the data to extend the enquiry. • Decide what additional data should be collected to further test relationships.
Science in Action	• To know some different job roles.	• To know about famous scientists throughout history. • To know about a range of jobs and careers that use scientific knowledge and methods. • To know about the work of modern-day scientists. • To know about science in the news and recent discoveries. • To know there are spiritual, moral, social and cultural links with Science.	• To know about the methods and equipment used by scientists throughout history and how these have led to modern methods. • To know how scientific knowledge has changed over time, leading to the current understanding of Science. • To know about current scientific research and what it aims to achieve in the future. • To know that collaboration and peer reviewing is essential for effective scientific progress.	• To know how scientific evidence is used to support or refute ideas or arguments. • To know that mistakes can lead to new discoveries.