Nailsworth C of E Primary School

Together, inspired by the challenge…

Science

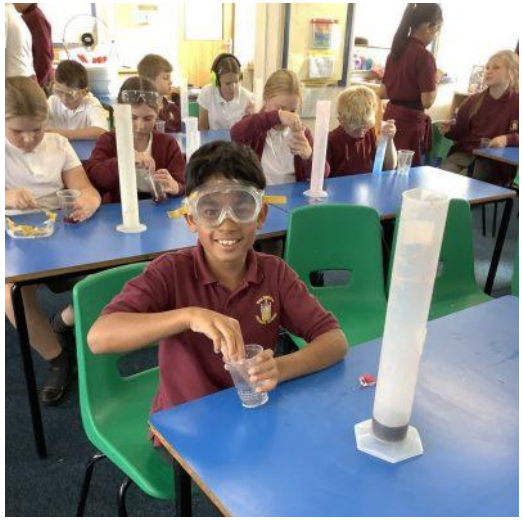
Science Curriculum Progression Map

Intent

Our ambitious science curriculum develops our children's understanding of the world around them. The three specific disciplines of biology, chemistry and physics provide a structure by which children can understand the global nature of our world. Our science curriculum is based on the requirements of the national curriculum:

National Curriculum Science Programme of Study

Knowledge and skills: both the science knowledge and scientific enquiry skills are utilised. Scientific enquiry skills run through each topic and are revisited and developed throughout their time at school, so that our children can use equipment, conduct experiments, build arguments and explain concepts. Children build upon their knowledge by making links to prior learning thereby embedding it into the long-term memory. Alongside this, children are taught explicit scientific vocabulary.



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Implementation

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	**Plants**	**Plants**	**Plants**	**Animals including humans**	**Animals including humans**	**Animals including humans**
• Plant seeds and care for growing plants • Understand the key features of the life cycle of a plant • Developing an understanding of growth, decay and changes over time • Begin to group plants/animals • Begin to understand the need to respect and care for the • natural environment and all living things.	• Describe the basic needs of plants for survival and the impact of changing these. • Identify the main changes as seeds and bulbs grow into mature plants • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Identify and describe the structure of different parts of flowering plants as well as 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 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.	• 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. • Pupils might work scientifically by: comparing the teeth of carnivores and herbivores and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.	• describe the changes as humans develop to old age • Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.	• 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 • Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

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EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals including humans	**Animals including humans**	**Animals including humans**	**Animals including humans**	**Everyday materials** **Seasonal changes** **Living things and their habitats**	**Everyday materials**	**Living things and their habitats**
• Understand the life cycle of a human • Begin to group animals	• 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 • Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs,	• 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 • Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food. • name and describe the functions of the main parts of the musculoskeletal system. • Pupils might work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow;	• 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. • Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons.	• 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 • using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.	**Everyday matierals** • 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	• 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 • Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.

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EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal changes • Explore, observe and understand some important processes and changes in the natural world around them, including the seasons • Begin to explore recording changes e.g. weather/seasonal changes	describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells. **Everyday materials** • 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	asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions. **Everyday materials** • 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	They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy, and design meals based on what they find out. **Everyday materials** **Seasonal changes** **Living things & their habitats** **Electricity** **Rocks** • 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	**Electricity** • 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	reversible, including changes associated with burning and the action of acid on bicarbonate of soda. **Seasonal changes** **Living things and their habitats** • 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 • observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world. • Asking pertinent questions and suggesting reasons for similarities and differences. Observe changes in an animal over a period of time. Comparing how different animals reproduce and grow.	**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

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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Seasonal changes • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies • Pupils might work scientifically by: making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change. for the basic needs of different kinds of animals and plants, and how they depend on each other.	**Seasonal changes** **Living things and their habitats** • 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 • 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	**States of matter** **Sound** **Earth and Space** **Forces (and magnets)** • compare how things move on different surfaces • notice that some forces need contact between 2 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 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing	**Rocks** **States of matter** • 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.	**Electricity** **Rocks** **States of matter** **Sound** **Earth and Space** • 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.	**Evolution and Inheritance** • 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.

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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Electricity **Rocks** **States of matter** **Sound** **Earth and Space** **Forces** **Evolution and Inheritance** **Light**	**Electricity** **Rocks** **States of matter** **Sound** **Earth and Space** **Forces** **Evolution and Inheritance** **Light**	**Evolution & Inheritance** **Light** • 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	**Sound** • 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.	**Forces** **Evolution & Inheritance** **Light** • 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 • Exploring falling paper cones or cupcake cases and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.	**Light** • 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

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Impact

By the time the children leave year 6, they should have:

Working Scientifically:

- Can understand and use scientific vocabulary.
- Ask their own questions about the scientific phenomena that they are studying and select appropriate ways to answer these questions.
- Investigate their own questions; recognising and controlling variables to ensure a fair test.
- Are curious and able to notice patterns, group and classify as well as using a wide range of secondary sources to find out more information.
- Can make predictions based on their current understanding of scientific phenomena.
- Are able to use a range of scientific equipment to take accurate and precise measurements and readings; with repeat readings where appropriate.
- Are able to record their results in a variety of ways such as through the use of scientific diagrams, classification keys, tables and graphs.
- Can describe and evaluate their own and others' scientific ideas.
- Are able to draw conclusions, explain and evaluate their methods and findings after investigations; communicating these in a variety of ways.
- Can ask further questions that could be investigated based on their data and investigations.

Knowledge:

- Know there are different types of forces and how they affect the way things move.
- Understand how electrical circuits work; recognising symbols and drawing simple circuit diagrams.
- Know about how and why we see objects and hear sounds. They understand what a shadow and that dark is the absence of light. They know that light travels in straight lines and that sound travels through a medium to the ear.
- Understand the processes of reproduction and photosynthesis, explaining their importance to life in the world.
- Name a variety of plants and animals in different habitats and can classify these plants and animals in different ways. They understand basic evolution and inheritance and how plants and animals have changed and adapted to their surroundings.
- Can explain the functions of organs and systems within the human body.
- Can name materials, understand how their properties affect their uses and investigate how materials can be changed. They know what makes a good insulator and conductor.
- Know how rocks and fossils are formed.
- Can understand, and explain the importance of, the water cycle.
- Can understand how solids, liquids and gases are formed through heating and cooling. They understand that some changes are reversible, and some are not.
- Can describe the movement of the Earth, and other planets, relative to the Sun in the solar system. They understand that this is what gives us night, day and different seasons throughout the year.