All Saints C of E (VA) Primary School, Datchworth

# Science Skills Progression

**All Saints Primary School**

## School Aims

At All Saints Primary School, Datchworth, we recognise the importance of science in every aspect of daily life. As one of the core subjects taught in primary schools, we give the teaching and learning of science the prominence it requires.
We aim to increase pupils' knowledge and understanding of our world, and to develop scientific skills as a process of enquiry. We promote a natural curiosity and respect for living organisms and the physical environment, as well as providing opportunities for critical evaluation of evidence.
We aim to equip the children with the scientific knowledge required to understand the uses and implications of science in their everyday life, today and for the future and to use a range of methods to communicate their scientific information and present it in a systematic, scientific manner.
We aim to develop safe working practises and a respect for the materials and equipment that the children handle with regard to their own, and other children's safety.
Enhancements such as British Science week, specialist visitors, workshops, links with other establishments and educational visits all engage pupils and expand their scientific learning.
With all of the above, we aim to equip the children with the necessary substantive and disciplinary knowledge needed to become effective scientists using their own ideas, some higher-level thinking and their own, innate curiosity.

## Links to other subjects / curriculum areas:

- English – Speaking & Listening, reading and writing
- Art & D&T – topic-related artwork/ projects
- Maths – measurement, statistics, calculations
- History – link to famous scientists
- Computing – using IT and computer software to explore and research topics.
- Music – songs to support learning e.g.' vocabulary

## National Curriculum

The national curriculum for Science aims to ensure that all pupils:

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

## Links to learning in EYFS

Science at Foundation Stage is covered in the 'Understanding the World' area of the EYFS Curriculum. It is introduced indirectly through activities that encourage every child to explore, problem solve, observe, predict, think, make decisions and talk about the world around them.

# Science Skills Progression

| | Rec | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| **Plants** | Make observations of plants<br>Know some names of plants, trees and flowers<br>Be able to name and describe some different plants, trees and flowers.<br>Show some care for their world around them. | Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.<br>Identify and describe the basic structure of a variety of common flowering plants.<br>Identify and name the roots, trunk, branches and leaves of trees. | Observe and describe how seeds and bulbs grow into mature plants.<br>Find out and describe how plants need water, light and warmth to grow and stay healthy. | Identify and describe the functions of different parts of the flowering plant: roots, stem/trunk/leaves and flowers.<br>Explore the part flowers play in a flowering plants life cycle, including pollination, seed formation and seed dispersal.<br>Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary between plants.<br>Know the way in which water is transported between plants. | | | |
| **Animals including humans** | Be able to identify different parts of their body.<br>Have some understanding of healthy food and | Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. | Know that animals, including humans, have offspring, which grow into adults.<br>Know the basic stages in a life | Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own | Describe the simple functions of the basic parts of the digestive system in humans.<br>Identify the different types of | Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood | Describe the changes as humans develop to old age.<br>Know how puberty relates to growing from childhood to |

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| | the need for variety in their diets.<br>Be able to show care and concern for living things.<br>Know the effects exercise has on their bodies.<br>Have some understanding of growth and change.<br>Can talk about things they have observed including animals. | Identify and name a variety of common animals that are carnivores, herbivores and omnivores. | cycle for animals, including humans.<br>Find out and describe the basic needs of animals, including humans, for survival (water, food and air).<br>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. | food; they get their nutrition from what they eat.<br>Know how nutrients, water and oxygen are transported within animals and humans.<br>Know about the importance of a nutritious, balanced diet.<br>Identify that humans and some other animals have skeletons and muscles for support, protection and movement: | teeth in humans and their simple functions.<br>Construct and interpret a variety of food chains, identifying producers, predators and prey. | vessels and blood.<br>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.<br>Describe the ways in which nutrients and water are transported within animals, including humans. | adulthood, about the reproductive organs and process, how babies are conceived and born and how they need to be cared for. |
| **Living things and their habitats** | Comments and questions about the place they live or the natural world.<br>Shows care and concern for living things and the environment.<br>Can talk about things they have observed such as plants and animals.<br>Notices features of objects in their environment.<br>Comments and asks questions about their familiar world. | | Explore and compare the difference 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.<br>Identify and name a variety of plants and animals in their habitats, | | Recognise that living things can be grouped in a variety of ways.<br>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.<br>Recognise that environments can change and that this can sometimes pose danger to living things. | Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird.<br>Know the process of reproduction in plants.<br>Know the process of reproduction in animals. | Classify living things into broad groups according to observable characteristics and based on similarities and differences.<br>Give reasons for classifying plants and animals based on specific characteristics.<br><br>Know about evolution and can explain what it is.<br>Know how fossils can be used to find out about the past.<br>Recognise that living things produce offspring of the same kind, but normally |

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| | | | including micro habitats.<br>Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name the different sources of food | | | | offspring vary and are not identical to their parents<br>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution-<br>recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago |
| **Materials** | Be able to ask questions about the place they live.<br>Talk about why things happen and how things work.<br>Discuss the things they have observed such as natural and found objects.<br>Manipulates materials to achieve a planned effect. | Distinguish between and object and the material from which it is made.<br>Identify and name a variety of everyday materials, including wood, metal, plastic, glass, water and rock.<br>Describe the simple physical properties of a variety of everyday materials.<br>Compare and group together a variety of everyday materials based on their simple 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.<br>Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching | Compare and group together different kinds of rocks based on their appearance and simple physical properties<br>Describe in simple terms how fossils are formed when things that have lived are trapped within rock<br>Recognise that soils are made from rocks and organic matter | Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.<br>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.<br>Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.<br>Use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. | |

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| | | | | | | Compare and group together everyday materials based on their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Carry out comparative and fair tests, for the uses of everyday materials, including wood, metals 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 this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda. | |
| **Light and sound** | Develop an understanding of change.<br>Observe and explain why certain things may occur | Observe changes across the four seasons.<br>Observe and describe weather associated with | | Recognise that they need light in order to see things and that dark is the absence of light.<br>Notice that light is | Know how sound is made associating some of them with vibrating. | | Recognise that light appears to travel in straight lines.<br>Use the idea that light travels in |

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| | (e.g. leaves falling off trees, weather changes).<br>Look closely at similarities, differences, patterns and change.<br>Comment and ask questions about the place they live or the natural world. | the seasons and how day length varies. | | reflected from surfaces.<br>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.<br>Recognise that shadows are formed when the light from a light source is blocked by a solid object.<br>Find patterns in the way that the sizes of shadows change. | Know what happens to a sound as it travels from its source to our ears.<br>Know the correlation between the volume of a sound and the strength of the vibrations that produced it.<br>Know how sound travels from a source to our ears.<br>Know the correlation between pitch and the object producing a sound. | | straight lines to explain that objects are seen because they give out or reflect light into the eye.<br>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.<br>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.<br>Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc. |
| **Forces** | Observe and describe movements that they make and that objects make. | | | Compare how things move on different surfaces.<br>Know how a simple pulley works and use making lifting an object simpler<br>Notice that some forces need contact between two objects, but magnetic forces can act at a distance. | | Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.<br>Describe the movement of the Moon relative to the Earth.<br>Describe the Sun, Earth and Moon as approximately spherical bodies. | Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.<br>Identify the effects of air resistance, water resistance |

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| | | | | Observe how magnets attract and repel each other and attract some materials and not others.<br>Compare and group together a variety of everyday materials based on whether they are attracted to a magnet and identify some magnetic materials.<br>Describe magnets as having two poles.<br>Predict whether two magnets with attract or repel each other, depending on which poles are facing. | | Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. | and friction, which act between moving surfaces.<br>Recognise that some mechanisms, including levers, pulleys, and gears, allow a smaller force to have a greater effect. |
| **Electricity** | Begin to have some understanding that objects need electricity to work.<br>Begin to understand that a switch will turn something on or off. | | | | Identify common appliances that run on electricity.<br>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.<br>Identify whether a lamp will light in a simple series circuit, based on whether the lamp is part of a complete loop with a battery. | | Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.<br>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.<br>Use recognised symbols when |

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| | | | | | Recognise that a switch opens and closes the circuit and associate this with whether a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.<br>Know the difference between a conductor and an insulator, giving examples of each.<br>Understand the need for safety when using electricity. | | representing a simple circuit in a diagram. |
| **<u>PLAN</u>**<br><br>**Ask questions, make predictions, decide on the method and equipment** | Listen attentively and respond to what they hear with relevant questions. | Ask simple questions and recognise that they can be answered in different ways.<br>. | | Ask relevant questions and use different types of scientific enquiries to answer them Set up simple practical enquiries, comparative and fair tests. | | Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. | |
| **<u>DO</u>**<br><br>**Carry out an enquiry using equipment** | Show an ability to follow instructions involving several ideas or actions<br>Be confident to try new activitie<br>Use a range of small tools…<br>Safely use and explore a variety of | Observe closely, using simple equipment.<br>Perform simple tests.<br>Identify and classify. | | Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers | | Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. | |

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| | materials, tools and techniques. | | | |
| **RECORD**<br><br>**Use drawings, tables or graphs to note observations and measurements** | Explore the natural world around them, making observations and drawing pictures of animals and plants. | Gather and record data to help in answering questions. | Gather, record, classify and present data in a variety of ways to help in answering questions.<br>Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. | Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. |
| **REVIEW**<br><br>**Interpret, communicate and evaluate results** | Participate in discussions, offering their own ideas, using recently introduced vocabulary.<br>Offer explanations for why things might happen.<br>Express their ideas and feelings about their experiences<br>Know some similarities and differences, drawing on their experiences | Use their observations and ideas to suggest answers to questions. | Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.<br>Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.<br>Identify differences, similarities or changes related to simple scientific ideas and processes.<br>Use straightforward scientific evidence to answer questions or to support their findings. | Use test results to make predictions to set up further comparative and fair tests.<br>Report and present 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.<br>Identify scientific evidence that has been used to support or refute ideas or arguments. |