



Skills & Knowledge progression: Science

| National Curriculum – Aims and purpose | School aims - skills, attitudes and knowledge that we would like all children to develop on their journey through the school |
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| <p>Purpose of study A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.</p> <p>Aims The national curriculum for science aims to ensure that all pupils:</p> <ul style="list-style-type: none"> • 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 | <p>We want our children to have an interest in science and how it impacts our daily lives. We want them to constantly be asking questions, both 'big' and 'small', as they seek to better understand the world they live in and the fundamental scientific laws that govern it. Moreover, we want to ensure that they understand the role that science (and scientists) has played in our past and how it will continue to play a vital role in our future, especially in the areas of healthcare and the environment.</p> <p>By the time that they leave education, we want all children to have become informed, curious, scientifically literate citizens, and our science curriculum is designed to build the broad foundations of that goal. During science lessons, we will ensure that children are given the opportunity to ask ambitious questions and then plan and conduct investigations with the aim of answering these questions. In Year 1 and 2 their natural curiosity should be encouraged, and they will be given the opportunity to talk about what they have found out. In Years 3 and 4, children will explore, talk about, test and develop ideas and begin to make some decisions about which types of scientific enquiry would be most effective. In Years 5 and 6, they will encounter more abstract ideas and begin to recognise that scientific knowledge changes and develops over time.</p> <p>Children will draw conclusions, use evidence to justify their ideas and use their understanding to explain their findings. It is key that knowledge content and practical skills are taught hand-in-hand, with children developing and building on their factual knowledge as they journey through the school, making links between topics applying skills and understanding from previous learning to new areas as they are met. As part of this it is also vital that they are exposed to and specifically taught the essential scientific vocabulary related to each topic in order to demonstrate their knowledge and understanding effectively.</p> <p>To support these aims, we use Developing Experts, an ambitious Science curriculum which is sequenced and mapped against the National Curriculum. It allows children to engage with a diverse range of scientific experts from universities and industry as well as learning about important scientists from history. Developing Experts has a strong focus on the rich vocabulary of science ensuring children are able to express themselves scientifically.</p> |

| Links to learning in EYFS: | Links to other subjects / curriculum areas: | Experiences every child should have: |
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| <p>Understanding the World</p> <ul style="list-style-type: none"> • Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world • Can talk about some of the things they have observed such as plants, animals, natural and found objects. • Talks about why things happen and how things work • Developing an understanding of growth, decay and changes over time • Shows care and concern for living things and the environment • Looks closely at similarities, differences, patterns and change | <ul style="list-style-type: none"> • Use of ICT to collect data, analyse results and present findings • History - the lives and impact of famous scientists from the past • Geography - animal habitats from around the world, weather systems, rock formation • Maths - Data handling • English - posing and writing questions, presenting findings both verbally and through written observations and conclusions • Art - using plants and animals in the local and wider environment as a starting point for art • DT - building structures using a variety of materials, selected for their properties and effectiveness | <ul style="list-style-type: none"> • Observing a range of plants and animals first-hand, in the local environment, parks, garden centres, zoos and other animal centres • Growing their own fruits and vegetables all the way through from seed to the plate • Creating electrical circuits and watching something they have constructed respond to their commands • Make things go 'bang', react vigorously and create new substances through chemical reactions • Be surprised by what happens and excited about what they discover when working practically • Make discoveries through trial and error - and not being afraid to get things wrong • Ask 'big questions' about life and the universe |

Skills Progression: Science



Developing Experts – Progression of Skills Document – Year 1

| | Year 1 Seasonal Changes | Year 1 Animals, including humans 1 – All about me | Year 1 Everyday Materials 1 – Exploring Everyday Materials | Year 1 Everyday Materials 2 – Building Unit | Year 1 Plants | Year 1 Animals, including humans 2 – All about animals |
|---|----------------------------|--|---|--|------------------|---|
| Asking simple questions and recognise that they can be answered in different ways | | | | | | |
| Observe closely, using simple equipment | | | | | | |
| Perform simple tests | | | | | | |
| Identify and classify | | | | | | |
| Using their observations and ideas to suggest answers to questions | | | | | | |
| Gather and record data to help in answering questions | | | | | | |

| | Year 2 Uses of everyday materials | Year 2 Living things and their habitats | Year 2 Living things and their habitats – Habitats around the world | Year 2 Animals, including humans 1 – Health and survival | Year 2 Animals, including humans 2 – Life cycles | Year 2 Plants |
|---|--------------------------------------|--|--|---|---|------------------|
| Asking simple questions and recognise that they can be answered in different ways | | | | | | |
| Observe closely, using simple equipment | | | | | | |
| Perform simple tests | | | | | | |
| Identify and classify | | | | | | |
| Using their observations and ideas to suggest answers to questions | | | | | | |
| Gather and record data to help in answering questions | | | | | | |

| | Year 3 Scientific Enquiry | Year 3 Animals, including humans | Year 3 Rocks | Year 3 Forces and magnets | Year 3 Plants | Year 3 Light |
|---|------------------------------|-------------------------------------|-----------------|------------------------------|------------------|-----------------|
| Ask relevant questions and using different types of scientific enquiries to answer them | | | | | | |
| Set up simple practical enquiries, comparative and fair tests | | | | | | |
| Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers | | | | | | |
| Gather, record, classify and present data in a variety of ways to help in answering questions | | | | | | |
| Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables | | | | | | |
| Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions | | | | | | |
| Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions | | | | | | |
| Identify differences, similarities or changes related to simple scientific ideas and processes | | | | | | |
| Use straightforward scientific evidence to answer questions or to support their findings | | | | | | |

| | Year 4 Animals, including humans | Year 4 Living things and their habitats | Year 4 Living things and their habitats - Conversation | Year 4 States of matter | Year 4 Sound | Year 4 Electricity |
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| Ask relevant questions and using different types of scientific enquiries to answer them | | | | | | |
| Set up simple practical enquiries, comparative and fair tests | | | | | | |
| Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers | | | | | | |
| Gather, record, classify and present data in a variety of ways to help in answering questions | | | | | | |
| Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables | | | | | | |
| Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions | | | | | | |
| Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions | | | | | | |
| Identify differences, similarities or changes related to simple scientific ideas and processes | | | | | | |
| Use straightforward scientific evidence to answer questions or to support their findings | | | | | | |

| | Year 5 Forces | Year 5 Properties of materials | Year 5 Changes of materials | Year 5 Animals, including humans | Year 5 Earth and space | Year 5 Living things and their habitats |
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| Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary | | | | | | |
| Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate | | | | | | |
| Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs | | | | | | |
| Use test results to make predictions to set up further comparative and fair tests | | | | | | |
| 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 | | | | | | |
| Identify scientific evidence that has been used to support or refute ideas or arguments | | | | | | |

| | Year 6 Electricity | Year 6 Light | Year 6 Animals, including humans | Year 6 Living things and their habitats | Year 6 Evolution and inheritance | Year 6 Looking after the environment |
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| Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary | | | | | | |
| Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate | | | | | | |
| Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs | | | | | | |
| Use test results to make predictions to set up further comparative and fair tests | | | | | | |
| 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 | | | | | | |
| Identify scientific evidence that has been used to support or refute ideas or arguments | | | | | | |

Knowledge Progression: Science



Developing Experts – Progression of Knowledge Document

| Unit | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 | YEAR 6 |
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| Animals, including humans | <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</p> <p>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> | <p>Notice that animals, including humans, have offspring which grow into adults</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p> | <p>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</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement</p> | <p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>Identify the different types of teeth in humans and their simple functions</p> <p>Construct and interpret a variety of food chains, identifying producers, predators and prey</p> | <p>Describe the changes as humans develop to old age</p> | <p>Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>Describe the ways in which nutrients and water are transported within animals, including humans</p> |
| Living things and their habitats | | <p>Explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>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,</p> | | <p>Recognise that living things can be grouped in a variety of ways</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>Recognise that environments can change and that this can sometimes</p> | <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>Describe the life process of reproduction in some plants and animals</p> | <p>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</p> <p>Give reasons for classifying plants and animals based on specific characteristics</p> |

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| Plants | | <p>and how they depend on each other</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats</p> <p>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</p> | | pose dangers to living things | | |
| | <p>Identify and name a variety of common and wild and garden plants, including deciduous and evergreen trees</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees</p> | <p>Observe and describe how seeds and bulbs into mature plants</p> <p>Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p> | <p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>Investigate the way in which water is transported within plants</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p> | | | |

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| Evolution and Inheritance | | | | | | <p>Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> |
| Materials | <p>Distinguish between an object and the material from which it is made</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock</p> <p>Describe the simple physical properties of a variety of everyday materials</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties</p> | <p>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> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p> | | | <p>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</p> <p>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including</p> | |

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| | | | | | <p>through filtering, sieving and evaporating</p> <p>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>Demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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> | |
| Seasonal changes | <p>Observe changes across the 4 seasons</p> <p>Observe and describe weather associated with the seasons and how day length varies</p> | | | | | |
| Rocks | | | <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock</p> | | | |

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| States of matter | | | Recognise that soils are made from rocks and organic matter | | | |
| | | | | <p>Compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> | | |
| Earth and space | | | | | <p>Describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>Describe the movement of the moon relative to the Earth</p> <p>Describe the sun, Earth and moon as approximately spherical bodies</p> <p>Use the idea of the Earth's rotation to explain day and</p> | |

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| Light | | | | | night and the apparent movement of the sun across the sky | |
| | | | <p>Recognise that they need light in order to see things and that dark is the absence of light</p> <p>Notice that light is reflected from surfaces</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object</p> <p>Find patterns in the way that the size of shadows change</p> | | | <p>Recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p> |
| Forces | | | <p>Compare how things move on different surfaces</p> <p>Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</p> <p>Observe how magnets attract or repel each other and attract some materials and not others</p> <p>Compare and group together a variety of</p> | | <p>Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>Recognise that some mechanisms including levers, pulleys and gears</p> | |

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| Electricity | | | <p>everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</p> <p>Describe magnets as having 2 poles</p> <p>Predict whether 2 magnets will attract or repel each other, depending on which poles are facing</p> | | allow a smaller force to have a greater effect | |
| | | | | <p>Identify common appliances that run on electricity</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>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</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductor</p> | | <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>Use recognised symbols when representing a simple circuit in a diagram</p> |

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| Sound | | | | <p>Identify how sounds are made, associating some of them with something vibrating</p> <p>Recognise that vibrations from sounds travel through a medium to the ear</p> <p>Find patterns between the pitch of a sound and features of the object that produced it</p> <p>Find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>Recognise that sounds get fainter as the distance from the sound source increases</p> | | |
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Science: Curriculum covered at Bayford Primary School

KS1 (Class 1 – Year 1 & 2) Rolling Programme

| Subject | Year A | | | Year B | | |
|----------------|---|--|--|--|--|---|
| | Autumn Term | Spring Term | Summer Term | Autumn Term | Spring Term | Summer Term |
| Science | <ul style="list-style-type: none"> Year 2 Living Things and their Habitat Year 1 Seasonal Changes | <ul style="list-style-type: none"> Year 1 Exploring Everyday Materials Year 2 Animals Including Humans – Life Cycles | <ul style="list-style-type: none"> Year 2 Living Things and their Habitats – Habitats from Around the World Year 1 Everyday Materials – Building (Three Little Pigs) | <ul style="list-style-type: none"> Year 1 Animals Including Humans – All About Animals Year 2 Uses of Everyday Materials | <ul style="list-style-type: none"> Year 2 Animals Including Humans 1 – Health and Survival Year 1 Plants | <ul style="list-style-type: none"> Year 2 Plants Year 1 Animals Including Humans 1 – All About Me |

Lower KS2 (Class 2 – Year 3 & 4) Rolling Programme

| Subject | Year A | | | Year B | | |
|---------|---|--|---|--|--|---|
| | Autumn Term | Spring Term | Summer Term | Autumn Term | Spring Term | Summer Term |
| Science | <ul style="list-style-type: none"> • Year 4 Electricity • Year 4 Living Things and their Habitats | <ul style="list-style-type: none"> • Year 3 Light • Year 4 Sound | <ul style="list-style-type: none"> • Year 4 States of Matter • Year 4 Living Things and their Habitats - Conservation | <ul style="list-style-type: none"> • Year 3 Scientific Enquiry • Year 3 Forces and Magnets | <ul style="list-style-type: none"> • Year 4 Animals Including Humans • Year 3 Animals Including Humans | <ul style="list-style-type: none"> • Year 3 Rocks • Year 3 Plants |

Upper KS2 (Class 3 – Years 5 & 6) Rolling Programme

| Subject | Year A | | | Year B | | |
|---------|--|--|---|---|---|--|
| | Autumn Term | Spring Term | Summer Term | Autumn Term | Spring Term | Summer Term |
| Science | <ul style="list-style-type: none"> • Year 6 Evolution and Inheritance • Year 6 Light | <ul style="list-style-type: none"> • Year 5 Forces • Year 5 Living Things and their Habitats | <ul style="list-style-type: none"> • Year 5 Changes of Materials • Year 5 Animals Including Humans (PSHE – Changing Me) | <ul style="list-style-type: none"> • Year 6 Living Things and their Habitats • Year 5 Earth and Space | <ul style="list-style-type: none"> • Year 6 Electricity • Year 6 Animals Including Humans | <ul style="list-style-type: none"> • Year 5 Properties of Materials • Year 6 Looking After Our Environment |