

**SCIENCE KNOWLEDGE, SKILLS & UNDERSTANDING**

***Churchfield Primary School***

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**National Curriculum Content**

**Purpose of Study & Aims**

## 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.

## **Aims**

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.

**Key Stage 1**

The principle focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encourage to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be use of appropriate secondary sources, such as books, photographs and videos.

‘Working scientifically’ is described separately in the programme of study, but must **always** be taught through and clearly related to the teaching of substantive science content in the programme of study. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

**Lower Key Stage 2**

The principle focus of science teaching at lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

‘Working Scientifically’ is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

**Upper Key Stage 2**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observation changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Pupils should read, spell and pronounce scientific vocabulary correctly.

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| **YEAR 1 SCIENCE – Working Scientifically** | | | |
| **Observing Closely** | **Performing Tests** | **Identifying and Classifying** | **Recording Findings** |
| * Can they talk about what they ? * Can they use simple equipment to help them make observations? * Can they find out by watching, listening, tasting, smelling and touching? | * Can they perform a simple test? * Can they tell other people about what they have done? * Can they give a simple reason for their answers? | * Can they identify and classify things they observe? Can they think of some questions to ask? * Can they answer some scientific questions? * Can they give a simple reason for their answers? * Can they explain what they have found out? * Can they talk about similarities and differences? Can they explain what they have found out using scientific vocabulary? | * Can they show their work using pictures, labels and captions? * Can they record their finding using standard units? * Can they put some information in a chart or table? * Can they use ICT to show their working? * Can they make accurate measurements? |

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| **YEAR 1 SCIENCE – Living Processes and Living Things** | | | |
| **Animals, including humans** | | **Plants** | **Variation and Classification** |
| * Can they point out some of the differences between different animals? * Can they sort photographs of living things and non-living things? Can they classify common animals? (birds, fish, amphibians, reptiles, mammals, invertebrates) Can they describe how an animal is suited to its environment? * Can they begin to classify animals according to a number of given criteria? * Can they point out differences between living things and non-living things? | * Can they name the parts of the human body that they can see? * Can they identify the main parts of the human body and link them to their senses? * Can they name the parts of an animal’s body? * Can they name a range of domestic animals? * Can they classify animals by what they eat? (carnivore, herbivore, omnivore) * Can they compare the bodies of different animals? * Can they name some parts of the human body that cannot be seen? * Can they say why certain animals have certain characteristics? * Can they name a range of wild animals? | * Can they name the petals, stem, leaf and root of a plant? * Can they identify and name a range of common plants and trees? * Can they recognise deciduous and evergreen trees? * Can they describe the parts of a plant (roots, stem, leaves, flowers)? * Can they name the main parts of a flowering plant? | * Can they sort some plants by size? * Can they sort some animals by body covering, eg, scales, fur and skin? * Can they sort some plants by those that can be eaten and those that cannot? * Can they sort some animals on a simple branching diagram with features such as meat eaters and non meat eaters; swim and cannot swim? |

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| **YEAR 1 SCIENCE – Everyday Materials** |
| **Everyday Materials (classifying and grouping)** |
| * Can they describe materials using their senses? * Can they describe materials using their senses, using specific scientific words? * Can they explain what material objects are made from? * Can they explain why a material might be useful for a specific job? * Can they name some different materials? * Can they sort materials into groups by a given criteria? * Can they explain how solid shapes can be changed by squashing, bending, twisting and stretching? * Can they describe things that are similar and different between materials? * Can they explain what happens to certain materials when they are heated, eg, bread, ice, chocolate? * Can they explain what happens to certain materials when they are cooled, eg, jelly, heated chocolate? |

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| **YEAR 1 SCIENCE – Physical Processes** | |
| **Seasonal Changes** | **Our Physical World** |
| * Can they name the four seasons? * Can they describe the changes which happen in Spring? * Can they describe the changes which happen in Summer? * Can they describe the changes which happen in Autumn? * Can they describe the changes with happen in Winter? * Can they describe the different types of weather? * Can they state which types of weather are most likely to happen in each season? * Can they record and measure temperature and rainfall and link their findings to what they know about the seasons? | * Can they identify everyday appliances? * Can they recognize that electricity is an important source of light and how it helps us at home and at school? * Can they describe or show how to make something move, e.g. push and pull? * Do they know that the sun lights up the Earth? * Can they stay safe when observing the Sun? * Can they describe how the Sun moves across the sky? * Can they explain why they can’t see stars in the day time? |

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| **YEAR 2 SCIENCE – Working Scientifically** | | | |
| **Observing Closely** | **Performing Tests** | **Identifying and Classifying** | **Recording Findings** |
| * Can they use to help them answer questions? * Can they use some science words to describe what they have seen and measured? * Can they compare several things? * Can they suggest ways of finding out through listening, hearing, smelling, touching and tasting? | * Can they carry out a simple fair test? * Can they explain why it might not be fair to compare two things? * Can they say whether things happened as they expected? * Can they suggest how to find things out? * Can they use prompts to find things out? * Can they say whether things happened as they expected and if not why not? | * Can they organise things into groups? * Can they find simple patterns (or associations)? * Can they identify animals and plants by a specific criteria, eg, lay eggs or not; have feathers or not? * Can they suggest more than one way of groupings animals and plants and explain their reasons? | * Can they use (text, diagrams, pictures, charts, and tables) to record their observations? * Can they measure using? * Can they use information from books and online information to find things out? |

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| **YEAR 2 SCIENCE – Life Processes and Living Things** | | | |
| **All Living Things** | **Animals, including humans** | **Plants** | **Variation and Classification** |
| * Can they match certain living things to the habitats they are found in? * Can they explain the differences between living and non-living things? * Can they describe some of the life processes common to plants and animals, including humans? Can they decide whether something is living, dead or nonliving? * Can they describe how a habitat provides for the basic needs of things living there? * Can they describe a range of different habitats? * Can they describe how plants and animals are suited to their habitat? Can they name some characteristics of an animal that help it to live in a particular habitat? * Can they describe what animals need to survive and link this to their habitats? | * Can they describe what animals need to survive? * Can they explain that animals grow and reproduce? * Can they explain why animals have offspring? * Can they describe the life cycle of some living things? (e.g. egg, chick, chicken) * Can they explain the basic needs of animals, including humans? Can they describe why exercise and a balanced diet are important for humans? * Can they explain that animals reproduce in different ways? | * Can they describe what plants need to survive? * Can they describe how seeds and bulbs grow into plants? * Can they describe what a plant needs to grow and stay healthy? * Can they explain that plants grow and reproduce? * Can they describe what plants need to survive and link it to where they are found? * Can they explain that plants grow and reproduce in different ways? | * Can they sort living things into groups and say why they sorted them in that way? * Can they compare how plants grow in different conditions by making measurements? * Can they identify and compare a variety of plants and animals found in different habitats and microhabitats? * Can they collect weather data about a local habitat and use it to explain the plants and animals they will find there? * Can they explain how animals get their food and draw a simple food chain? * Can they classify living things into groups according to a range of criteria they have been given? |

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| **YEAR 2 SCIENCE – Materials and their Properties** | |
| **Classifying and Grouping Materials** | **Changing Materials** |
| * Can they distinguish between an object and the material from which it is made? * Can they identify and name a range of everyday materials? (wood, plastic, metal, water, rock) * Can they describe the simple physical properties of a variety of everyday materials? * Can they compare and classify a variety of materials based on their simple physical properties? * Can they describe the properties of different materials using words like, transparent or opaque, flexible, etc.? * Can they sort materials into groups and say why they have sorted them in that way? * Can they say which materials are natural and which are man-made? | * Can they explore how the shapes of solid objects can be changed? (squashing, bending, twisting, stretching) * Can they find out about people who developed useful new materials? (Dunlop, MacKintosh, MacAdam) * Can they identify and compare the uses of a range of everyday materials? (wood, metal, plastic, glass, brick/rock, paper/cardboard) Can they explain how things move on different surfaces? * Can they explain how materials are changed by heating and cooling? * Can they tell which materials cannot be changed back after being heated, cooled, bent, stretched or twisted? * Can they explain how materials are changed by bending, twisting and stretching? |

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| **YEAR 3 SCIENCE – Working Scientifically** | | |
| **Planning** | **Obtaining and Presenting Evidence** | **Considering Evidence and Evaluating** |
| * Can they use different ideas and suggest how to find something out? * Can they make and record a prediction before testing? * Can they plan a fair test and explain why it was fair? * Can they set up a simple fair test to make comparisons? * Can they explain why they need to collect information to answer a question? * Can they record and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables? | * Can they measure using different equipment and units of measure? * Can they record their observations in different ways? (labelled diagrams, charts etc) * Can they describe what they have found using scientific words? * Can they make accurate measurements using standard units? * Can they explain their findings in different ways (display, presentation, and writing)? * Can they use their findings to draw a simple conclusion? * Can they suggest improvements and predictions for further tests? | * Can they explain what they have found out and use their measurements to say whether it helps to answer their question? * Can they use a range of equipment (including a data-logger) in a simple test? * Can they suggest how to improve their work if they did it again? |

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| **YEAR 3 SCIENCE – Life Processes and Living Things** | |
| **Animals, including humans** | **Plants** |
| * Can they explain the importance of a nutritious balanced diet? * Can they describe how nutrients, water and oxygen are transported within animals and humans? * Can they describe and explain the skeletal system of a human? * Can they describe and explain the muscular system of a human? * Can they explain how the muscular and skeletal systems work together to create movement? * Can they classify living things and non-living things by a number of characteristics that they have thought of? * Can they explain how people, weather and the environment can affect living things? * Can they explain how certain living things depend on one another to survive? | * Can they identify and describe the functions of different parts of plants? (roots, stem, leaves and flowers) * Can they identify what a plants needs for life and growth? * Can they describe the ways in which nutrients, water and oxygen are transported within plants? * Can they explain how the needs and functions of plant parts vary from plant to plant e.g. insect and wind pollinated plants? * Can they investigate the way in which water is transported within plants? * Can they classify a range of common according to many criteria (environment found, size, climate required, etc.)? * Can they explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and speed dispersal? |

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| **YEAR 3 SCIENCE – Materials and their Properties** | |
| **Changing, classifying and grouping materials** | **Rocks** |
| * Can they sort the same group of materials in different ways? * Can they sort materials by a number of different criteria? * Can they suggest materials which could be used for specific jobs? * Can they set up a simple test to explore the differences between materials? * Can they set up a test to explore whether or not materials are attracted to magnets? * Can they set up a test to explore whether or not a material will float or sink? * Can they compare the properties of materials in different situations e.g. floating in salty water, magnetism in water? * Can they describe what it means to reverse a change? * Can they describe which changes can be reversed? * Can they describe which changes cannot be reversed? * Can they explain different ways that they can sort the same group of materials? * Can they sort materials by a number of different criteria and explain their reasons? * Can they explain why certain materials are used for specific jobs? | * Can they compare and group together different rocks based on their simple physical properties? * Can they describe and explain how different rocks can be useful to us? * Can they describe and explain the differences between sedimentary and igneous rocks, considering the way they are formed? * Can they describe how fossils are formed within sedimentary rock? Can they classify igneous and sedimentary rocks? * Can they begin to relate the properties of rocks with their uses? |

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| **YEAR 3 SCIENCE – Physical Processes** | |
| **Forces & Magnets** | **Light** |
| * Can they observe that magnetic forces can be transmitted without direct contact? * Can they talk about how some magnets attract or repel each other? * Can they classify which materials are attracted to magnets? * Can they describe the speed and direction of moving objects? * Can they investigate the strengths of different magnets and find fair ways to compare them? * Can they explain why an object will move faster if it is rolling down a hill or a slope? | * Can they explain the difference between transparent, translucent and opaque? * Can they compare the brightness and colour of lights? * Can they explain how bulbs work in an electrical circuit? * Can they explain what dark is using words like shadow? * Can they explain why lights need to be bright or dimmer according to need? * Can they make a bulb go on and off? * Can they say what happens to the electricity when more batteries are added? * Can they explain why their shadow changes when the light source is moved closer or further from the object? |

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| **YEAR 4 SCIENCE – Working Scientifically** | | |
| **Planning** | **Obtaining and Presenting Evidence** | **Considering Evidence and Evaluating** |
| * Can they set up a simple fair test to make comparisons? * Can they plan a fair test and isolate variables and explain why it was fair and explain which variables have been isolated? * Can they suggest improvements and predictions? * Can they decide which information needs to be collected and decide which the best way to collect it is? * Can they use their findings to draw a simple conclusion? * Can they plan and carry out an investigation by controlling variables fairly and accurately? * Can they use test results to make further predictions and set up further comparative tests? | * Can they take measurements using different equipment and units of measure and record what they have found in a range of ways? * Can they make accurate measurements using standard units? * Can they explain their findings in different ways (display, presentation, and writing)? * Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? | * Can they find any patterns in their evidence or measurements? * Can they make a prediction based on something they have found out? * Can they record and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables? Can they report findings from investigations through written explanations and conclusions? * Can they use a graph or diagram to answer scientific questions? |

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| **YEAR 4 SCIENCE – Life Processes and Living Things** | |
| **Animals, including humans** | **All Living Things** |
| * Can they identify and name the basic parts of the human digestive system? * Can they describe the function of the organs of the human digestive system? * Can they identify the simple function of different types of human teeth? * Can they compare the teeth of herbivores and carnivores? * Can they explain what a simple food chain shows? * Can they classify living things and non-living things by a number of characteristics that they have thought of? * Can they explain how people, weather and the environment can affect living things? * Can they explain how certain living things depend on one another to survive? | * Can they use a classification key to group a variety of living things? (plants, vertebrates, invertebrates) * Can they compare the classification of common plants and animals to living things found in other places? (under the sea, prehistoric) * Can they name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore) * Do they recognise that environments can change and this can sometimes pose a danger to living things? * Can they give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment? * Can they explore the work of pioneers in classification? (e.g. Carl Linnaeus) |

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| **YEAR 4 SCIENCE – Materials and their Properties** |
| **States of Matter** |
| * Can they compare and group materials based on their states of matter, ie, liquid, solid or gas? * Can they explain what happens to materials when they are heated or cooled? * Can they measure the temperature at which different materials change state? * Can they use measurements to explain changes to the state of water? * Can they explain the part that evaporation and condensation has in the water cycle? * Can they group and classify a variety of materials according to the impact of temperature on them? * Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line? * Can they relate temperature to change of state of materials? |

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| **YEAR 4 SCIENCE – Physical Processes** | |
| **Sound** | **Electricity** |
| * Can they describe a range of sounds and explain how they are made? * Can they compare sources of sound and explain how the sounds differ? * Can they explain how to change a sound (louder/softer)? * Can they describe and explain how a sound travels from a source to our ears? * Can they explain what happens to sound as it travels away from its source? * Can they explain how you could change the pitch of a sound? * Can they investigate how different materials can affect the pitch and volume of sounds? * Can they explain why sound gets fainter or louder according to the distance? * Can they explain how pitch and volume can be changed in a variety of ways? * Can they work out which materials give the best insulation for sound? | * Can they explain how electricity is useful to us? * Can they construct a simple circuit? * Can they explain what a conductor is and test materials for conductivity? * Can they explain closed and open circuits? * Can they construct a circuit with a switch? * Can they recognise some common conductors and insulators? Can they explain how a bulb might get lighter? * Can they recognise if all metals are conductors of electricity? * Can they work out which metals can be used to connect across a gap in a circuit? |

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| **YEAR 5 SCIENCE – Working Scientifically** | | |
| **Planning** | **Obtaining and Presenting Evidence** | **Considering Evidence and Evaluating** |
| * Can they plan and carry out an investigation by controlling variables fairly and accurately? * Can they make a prediction with reasons? * Can they use test results to make further predictions and set up further comparative tests? * Can they present a report of their findings through writing, display and presentation? Can they explore different ways to test an idea and choose the best way, and give reasons? * Can they vary one factor whilst keeping the others the same in an experiment? * Can they use information to help make a prediction? * Can they explain (in simple terms) a scientific idea and what evidence supports it? | * Can they take measurements using a range of scientific equipment with increasing accuracy and precision? * Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? * Can they decide which units of measurement they need to use? * Can they explain why a measurement needs to be repeated? | * Can they report findings from investigations through written explanations and conclusions? * Can they use a graph to answer scientific questions? * Can they find a pattern from their data and explain what it shows? * Can they link what they have found out to other science? * Can they suggest how to improve their work and say why they think this? |

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| **YEAR 5 SCIENCE – Life Processes and Living Things** | | | |
| **Animals, including humans** | | **All Living Things** | |
| * Can they create a timeline to indicate stages of growth in humans? * Can they explain what puberty is? * Can they create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies? | | * Can they describe and compare the life cycles of a range of animals, including humans, amphibians, insects and birds? * Can they describe the life cycles of common plants? * Can they describe and explain the process of respiration in humans and plants? * Can they talk with knowledge about birth, reproduction and death of familiar animals or plants? * Can they explore the work of well know naturalists? (David Attenborough and Jane Goodall) * Can they observe their local environment and draw conclusions about life-cycles? (for example, the vegetable garden or plants in a shrubbery) * Can they compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests? | |

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| **YEAR 5 SCIENCE – Materials and their Properties** |
| **Properties and changes to materials** |
| * Can they test and group materials based on scientific evidence? (hardness, solubility, transparency, conductivity, insulation, magnetism) * Can they explain the process of dissolving? * Can they recover a substance from a solution? * Can they decide how a mixture would best be separated? (filtering, sieving, evaporating) * Can they give reasons for the uses of everyday materials based on scientific evidence? * Can they show what they know about the properties of different materials? * Can they use their knowledge of materials to suggest ways to classify? (solids, liquids, gasses) * Can they describe changes using scientific words? (evaporation, condensation) * Can they use the terms ‘reversible’ and ‘irreversible’? * Can they describe methods for separating mixtures? (filtration, distillation) * Can they work out which materials are most effective for keeping us warm or for keeping something cold? |

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| **YEAR 5 SCIENCE – Physical Processes** | | |
| **Earth and Space** | **Magnetism** | **Forces** |
| * Can they identify and explain the movement of the Earth relative to the sun? * Can they explain how seasons and the associated weather is created? * Can they identify and explain the movement of the Moon relative to the Earth? * Can they explain the size, shape and position of the earth, sun and moon? * Can they explain how night and day are created and use diagrams to show this? * Can they explain how planets are linked to stars? * Can they compare the time of day at different places on the earth? * Can they create shadow clocks? * Can they begin to understand how older civilizations used the sun to create astronomical clocks? * Can they explore the work of some space pioneers? (Galileo, Copernicus, Neil Armstrong) | * Can they explain how the force of magnetism works? * Can they describe how magnetism is used in everyday objects? * Can they describe magnets as having two poles? * Can they make predictions associated with whether two magnets will attract or repel depending on which poles are facing? * Can they work out how magnets are useful in an everyday context? * Can they work out the link between magnets and the North and South poles? | * Can they explain what gravity is and its impact on our lives? * Can they explain why a wheeled object that is initially pushed will slow down and stop? * Can they explain the impact of friction on a moving object? * Can they explain the effect of drag force on moving objects? * Can they explain how force and motion can be transferred through gears, pulleys, levers and springs? * Can they describe and explain how motion is affected by forces? (including gravitational attractions, magnetic attraction and friction) Can they design very effective parachutes? Can they work out how water can cause resistance to floating objects? |

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| **YEAR 6 SCIENCE – Working Scientifically** | | | | | |
| **Planning** | | **Obtaining and Presenting Evidence** | | **Considering Evidence and Evaluating** | |
| * Can they explore different ways to test an idea and choose the best way, and give reasons? * Can they vary one factor whilst keeping the others the same in an experiment? * Can they explain why they do this? * Can they plan and carry out an investigation by controlling variables fairly and accurately? Can they make a prediction with reasons? * Can they use information to help make a prediction? * Can they use test results to make further predictions and set up further comparative tests? * Can they explain (in simple terms) a scientific idea and what evidence supports it? * Can they present a report of their findings through writing, display and presentation? Can they choose the best way to answer a question? * Can they use information from different sources to answer a question and plan an investigation? * Can they make a prediction which links with other scientific knowledge? * Can they identify the key factors when planning a fair test? * Can they explain how a scientist has used their scientific understanding plus good ideas to have a breakthrough | | * Can they explain why they have chosen specific equipment? (including ICT based equipment) * Can they decide which units of measurement they need to use? * Can they explain why a measurement needs to be repeated? * Can they record their measurements in different ways? (including bar charts, tables and line graphs) * Can they take measurements using a range of scientific equipment with increasing accuracy and precision? * Can they plan in advance which equipment they will need and use it well? * Can they make precise measurements? * Can they collect information in different ways? * Can they record their measurements and observations systematically? * Can they explain qualitative and quantitative data? | | * Can they find a pattern from their data and explain what it shows? * Can they use a graph to answer scientific questions? * Can they link what they have found out to other science? * Can they suggest how to improve their work and say why they think this? * Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? * Can they report findings from investigations through written explanations and conclusions? * Can they draw conclusions from their work? * Can they link their conclusions to other scientific knowledge? * Can they explain how they could improve their way of working? | |
| **YEAR 6 SCIENCE – Life Processes and Living Things** | | | | | |
| **Evolution & Inheritance** | | **All Living Things** | | **Animals, including humans** | |
| * Can they give reasons for why living things produce offspring of the same kind? * Can they give reasons for why offspring are not identical with each other or with their parents? * Can they explain the process of evolution and describe the evidence for this? * Can they begin to appreciate that variation in offspring over time can make animals more or less able to survive in particular environments? * Can they talk about the life of Charles Darwin? * Can they explain how some living things adapt to survive in extreme conditions? * Can they analyse the advantages and disadvantages of specific adaptations, such as being on two rather than four feet? * Can they begin to understand what is meant by DNA? | | * Can they explain the classification of living things into broad groups based on common observable characteristics? (five kingdoms of all living things, vertebrates, mammals, marsupials) * Can they sub divide their original groupings and explain their divisions? * Can they group animals into vertebrates and invertebrates? * Can they explain why classification is important? * Can they readily group animals into reptiles, fish, amphibians, birds and mammals? | | * Can they identify and explain the function of the organs of the human circulatory system? (heart, blood vessels, blood, blood pressure, clotting) * Can they identify and explain the function of the organs of the human gaseous exchange system? (lungs, nose, throat, bronchi, bronchial tubes, diaphragm, ribs, breathing) * Can they name the major organs in the human body? * Can they locate the major human organs? Can they make a diagram that outlines the main parts of a body? * Can they explore the work of medical pioneers, for example, William Harvey and Galen and recognise how much we have learnt about our bodies? * Can they compare the organ systems of humans to other animals? * Can they make a diagram of the human body and explain how different parts work and depend on one another? | |

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| **YEAR 6 SCIENCE – Physical Processes** | |
| **Electricity** | **Light** |
| * Can they identify and name the basic parts of a simple electric series circuit? (cells, wires, bulbs, switches, buzzers) * Can they compare and give reasons for variation in how components function, including bulb brightness, buzzer volume and on/off position of switches? * Can they explain how to make changes in a circuit? * Can they explain the impact of changes in a circuit? * Can they explain the effect of changing the voltage of a battery? Can they make their own traffic light system or something similar? * Can they explain the danger of short circuits? * Can they explain what a fuse is? | * Can they explain how light travels? * Can they explain how the human eye sees objects? * Can they explain how different colours of light can be created? * Can they use and explain how simple optical instruments work? (periscope, telescope, binoculars, mirror, magnifying glass, Newton’s first reflecting telescope) * Can they explain changes linked to light (and sound)? * Can they use the ray model to explain the size of shadows? |

**Assessment Criteria**

The following criteria should be used as a ‘best fit’ model. Teachers should consider whether or not a pupil is working towards meeting the KPIs, has met the KPIs or is exceeding the KPIs.

It is critical that pupils have depth to their learning, and can apply the KPIs independently in a range of scenarios.

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| **SCIENCE ASSESSMENT KPIs** | | | | | | | | | | | |
| **As a Year 1 scientists…** | | | | | | | | | | | |
| **Working scientifically**  **(Y1 and Y2)**   * I know how to ask simple scientific questions. * I know how to use simple equipment to make observations. * I know how to carry out simple tests. * I know how to identify and classify things. * I know how to explain to others what I have found out. * I know how to use simple data to answer questions | **Biology**  Plants   * I know and name a variety of common wild and garden plants. * I know and name the petals, stem, leaves and root of a plant. * I know and name the roots, trunk, branches and leaves of a tree.   Animals, including humans   * I know and name a variety of animals including fish, amphibians, reptiles, birds and mammals. * I classify and know animals by what they eat (carnivore, herbivore and omnivore). * I know how to sort animals into categories (including fish, amphibians, reptiles, birds and mammals). * I know how to sort living and non-living things. * I know how to name the parts of the human body that I can see. * I know how to link the correct part of the human body to each sense. | | | **Chemistry**  Everyday materials   * I distinguish between an object and the material it is made from. * I know the materials that an object is made from. * I know the difference between wood, plastic, glass, metal, water and rock. * I know about the properties of everyday materials. * I group objects based on the materials they are made from. | | | | | **Physics**  Seasonal changes   * I observe and know about the changes in the seasons. * I name the seasons and know about the type of weather in each season. | | |
| **SCIENCE ASSESSMENT KPIs** | | | | | | | | | | | |
| **As a Year 2 scientists…** | | | | | | | | | | | |
| **Working scientifically**  **(Y1 and Y2)**   * I know how to ask simple scientific questions. * I know how to use simple equipment to make observations. * I know how to carry out simple tests. * I know how to identify and classify things. * I know how to explain to others what I have found out. * I know how to use simple data to answer questions | **Biology**  Living things and their habitats   * I identify things that are living, dead and never lived. * I know how a specific habitat provides for the basic needs of things living there (plants and animals). * I identify and name plants and animals in a range of habitats. * I match living things to their habitat. * I know how animals find their food. * I name some different sources of food for animals. * I know and can explain a simple food chain.   Plants   * I know how seeds and bulbs grow into plants. * I know what plants need in order to grow and stay healthy (water, light & suitable temperature).   Animals, including humans   * I know the basic stages in a life cycle for animals, including humans. * I know what animals and humans need to survive. * I know why exercise, a balanced diet and good hygiene are important for humans. | | | | **Chemistry**  Uses of everyday materials   * I identify and name a range of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard. * I know why a material might or might not be used for a specific job. * I know how materials can be changed by squashing, bending, twisting and stretching. | | | | | **Physics**  No content | |
| **SCIENCE ASSESSMENT KPIs** | | | | | | | | | | | |
| **As a Year 3 scientists…** | | | | | | | | | | | |
| **Working scientifically**  **(Y3 and Y4)**   * I know how to ask relevant scientific questions. * I know how to use observations and knowledge to answer scientific questions. * I know how to set up a simple enquiry to explore a scientific question. * I know how to set up a test to compare two things. * I know how to set up a fair test and explain why it is fair. * I make careful and accurate observations, including the use of standard units. * I know how to use equipment, including thermometers and data loggers to make measurements. * I gather, record, classify and present data in different ways to answer scientific questions. * I know how to use diagrams, keys, bar charts and tables; using scientific language. * I know how to use findings to report in different ways, including oral and written explanations, presentation. * I know how to draw conclusions and suggest improvements. * I know how to make a prediction with a reason. * I know how to identify differences, similarities and changes related to an enquiry. | | | **Biology**  Plants   * I know the function of different parts of flowing plants and trees. * I know what different plants need to help them survive. * I know how water is transported within plants. * I know the plant life cycle, especially the importance of flowers.   Animals, including humans   * I know about the importance of a nutritious, balanced diet. * I know how nutrients, water and oxygen are transported within animals and humans. * I know about the skeletal system of a human. * I know about the muscular system of a human. * I know about the purpose of the skeleton in humans and animals | | | **Chemistry**  Rocks   * I compare and group rocks based on their appearance and physical properties, giving a reason. * I know how fossils are formed. * I know how soil is made. * I know about and explain the difference between sedimentary, metamorphic and igneous rock. | | | **Physics**  Light   * I know what dark is (the absence of light). * I know that light is needed in order to see. * I know that light is reflected from a surface. * I know and demonstrate how a shadow is formed. * I explore shadow size and explain the changes. * I know the danger of direct sunlight and describe how to keep protected.   Forces and magnets   * I know about and describe how objects move on different surfaces. * I know how some forces require contact and some do not, giving examples. * I know about and explain how objects attract and repel in relation to objects and other magnets. * I predict whether objects will be magnetic and carry out an enquiry to test this out. * I know how magnets work. * I predict whether magnets will attract or repel and give a reason. | | |
| **SCIENCE ASSESSMENT KPIs** | | | | | | | | | | | |
| **As a Year 4 scientists…** | | | | | | | | | | | |
| **Working scientifically**  **(Y3 and Y4)**   * I know how to ask relevant scientific questions. * I know how to use observations and knowledge to answer scientific questions. * I know how to set up a simple enquiry to explore a scientific question. * I know how to set up a test to compare two things. * I know how to set up a fair test and explain why it is fair. * I make careful and accurate observations, including the use of standard units. * I know how to use equipment, including thermometers and data loggers to make measurements. * I gather, record, classify and present data in different ways to answer scientific questions. * I know how to use diagrams, keys, bar charts and tables; using scientific language. * I know how to use findings to report in different ways, including oral and written explanations, presentation. * I know how to draw conclusions and suggest improvements. * I know how to make a prediction with a reason. * I know how to identify differences, similarities and changes related to an enquiry. | | | **Biology**  Living things and their habitats   * I group living things in different ways. * I use classification keys to group, identify and name living things. * I create classification keys to group, identify and name living things (for others to use). * I know how changes to an environment could endanger living things.   Animals, including humans   * I identify and name the parts of the human digestive system. * I know the functions of the organs in the human digestive system. * I identify and know the different types of teeth in humans. * I know the functions of different human teeth. * I use food chains to identify producers, predators and prey. * I construct food chains to identify producers, predators and prey. | | | | **Chemistry**  States of matter   * I group materials based on their state of matter (solid, liquid, gas). * I know how some materials can change state. * I explore how materials change state. * I measure the temperature at which materials change state. * I know about the water cycle. * I know the part played by evaporation and condensation in the water cycle. | | **Physics**  Sound   * I know how sound is made. * I know how sound travels from a source to our ears. * I know how sounds are made, associating some of them with vibrating. * I know the correlation between pitch and the object producing a sound. * I know the correlation between the volume of a sound and the strength of the vibrations that produced it. * I know what happens to a sound as it travels away from its source.   Electricity   * I identify and name appliances that require electricity to function. * I construct a series circuit. * I identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers). * I know how to draw a circuit diagram. * I predict and test whether a lamp will light within a circuit. * I know the function of a switch in a circuit. * I know the difference between a conductor and an insulator; giving examples of each. | | |
| **SCIENCE ASSESSMENT KPIs** | | | | | | | | | | | |
| **As a Year 5 scientists…** | | | | | | | | | | | |
| **Working scientifically**  **(Y5 and Y6)**   * I know how to plan different types of scientific enquiry. * I know how to control variables in an enquiry. * I measure accurately and precisely using a range of equipment. * I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. * I use the outcome of test results to make predictions and set up a further comparative and fair tests. * I report findings from enquiries in a range of ways. * I know how to explain a conclusion from an enquiry. * I explain causal relationships in an enquiry. * I know how to relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory. * I read, spell and pronounce scientific vocabulary accurately. | **Biology**  Living things and their habitats   * I know the life cycle of different living things, e.g. mammal, amphibian, insect bird. * I know the differences between different life cycles. * I know the process of reproduction in plants. * I know the process of reproduction in animals.   Animals, including humans   * I create a timeline to indicate stages of growth in humans. | | | **Chemistry**  Properties and changes of materials   * I compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets). * I know how a material dissolves to form a solution; explaining the process of dissolving. * I know and show how to recover a substance from a solution. * I know how some materials can be separated. * I demonstrate how materials can be separated (e.g. through filtering, sieving and evaporating). * I know and can demonstrate that some changes are reversible and some are not. * I know how some changes result in the formation of a new material and that this is usually irreversible. * I know about reversible and irreversible changes. * I give evidenced reasons why materials should be used for specific purposes. | | | | | **Physics**  Earth and space   * I know about and explain the movement of the Earth and other planets relative to the Sun. * I know about and explain the movement of the Moon relative to the Earth. * I know and demonstrate how night and day are created. * I describe the Sun, Earth and Moon (using the term spherical).   Forces   * I know what gravity is and its impact on our lives. * I identify and know the effect of air resistance. * I identify and know the effect of water resistance. * I identify and know the effect of friction. * I explain how levers, pulleys and gears allow a smaller force to have a greater effect. | | |
| **SCIENCE ASSESSMENT KPIs** | | | | | | | | | | | |
| **As a Year 6 scientists…** | | | | | | | | | | | |
| **Working scientifically**  **(Y5 and Y6)**   * I know how to plan different types of scientific enquiry. * I know how to control variables in an enquiry. * I measure accurately and precisely using a range of equipment. * I know how to record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. * I use the outcome of test results to make predictions and set up a further comparative and fair tests. * I report findings from enquiries in a range of ways. * I know how to explain a conclusion from an enquiry. * I explain causal relationships in an enquiry. * I know how to relate the outcome from an enquiry to scientific knowledge in order to state whether evidence supports or refutes an argument or theory. * I read, spell and pronounce scientific vocabulary accurately. | **Biology**  Living things and their habitats   * I classify living things into broad groups according to observable characteristics and based on similarities & differences. * I know how living things have been classified. * I give reasons for classifying plants and animals in a specific way.   Animals, including humans   * I identify and name the main parts of the human circulatory system. * I know the function of the heart, blood vessels and blood. * I know the impact of diet, exercise, drugs and life style on health. * I know the ways in which nutrients and water are transported in animals, including humans.   Evolution and inheritance   * I know how the Earth and living things have changed over time. * I know how fossils can be used to find out about the past. * I know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents). * I know how animals and plants are adapted to suit their environment. * I link adaptation over time to evolution. * I know about evolution and can explain what it is. | | | | | | **Chemistry**  No content | | **Physics**  Light   * I know how light travels. * I know and demonstrate how we see objects. * I know why shadows have the same shape as the object that casts them. * I know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.   Electricity   * I know how the number & voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer. * I compare and give reasons for why components work and do not work in a circuit. * I draw circuit diagrams using correct symbols. | | |