



Science Knowledge and Skills

| Core Skills: | | | |
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| Active Learning | Basic Skills | Creative Thinking | |
| <ul style="list-style-type: none"> • To seek out and enjoy challenges • To collaborate with others • To show commitment and perseverance • Assess themselves and others | <ul style="list-style-type: none"> • To speak clearly and convey ideas confidently • To read and communicate ideas in writing efficiently & effectively • To calculate efficiently and apply skills to solve problems • To use new technologies confidently and purposefully | <ul style="list-style-type: none"> • To ask questions to extend thinking • To generate ideas and explore possibilities • To overcome barriers by trying out alternatives • To connect ideas and experiences in inventive ways | |
| Year 1 | | | |
| Biology | Chemistry | Physics | Working Scientifically |
| <p><u>Animals including Humans</u></p> <ul style="list-style-type: none"> • Identify and name a variety of common animals including fish, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, reptiles, birds and mammals, including pets). • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. | <p><u>Everyday Materials</u></p> <ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. • Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple physical properties. | <p><u>Seasonal Changes</u></p> <ul style="list-style-type: none"> • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. | <p><u>Multi-structural</u></p> <ul style="list-style-type: none"> • Begin to ask questions to clarify thinking about why something happens • Begin to describe observations using some basic scientific vocabulary • Observe aspects of science and begin to identify simple patterns <p><u>Relational</u></p> <ul style="list-style-type: none"> • Begin to categorise ideas or statements into things that can be investigated and things that can't (Introduce terms enquiry and investigation) • Begin to apply simple measuring equipment to record observations in an investigation (can be non-standard units) • Begin to use previous knowledge to predict the outcome of a simple scientific investigation |

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| <p><u>Plants</u></p> <ul style="list-style-type: none">• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.• Identify and describe the basic structure of a variety of common flowering plants, including trees. | | | <ul style="list-style-type: none">• Begin to summarise their observations using some basic scientific language <p><u>Extended Abstract</u></p> <ul style="list-style-type: none">• Begin to use observations and basic research to develop a response to an enquiry question• Begin to develop ways to collect and record data• Reflect on what they have observed and begin to give explanations using a developing range of scientific vocabulary.• Begin to generate simple conclusions based on observations and investigations |
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| Year 2 | | | |
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| Biology | Chemistry | Physics | Working Scientifically |
| <p><u>All Living Things and Their Habitats</u></p> <ul style="list-style-type: none"> • Explore and compare the differences between things that are living, dead and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including micro habitats. • Describe how animals obtain their food from plants and to other animals, using the idea of a simple food chain, and identify and name different sources of food. | <p><u>Everyday Materials</u></p> <ul style="list-style-type: none"> • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. | | <p><u>Multi-structural</u></p> <ul style="list-style-type: none"> • Ask questions to clarify thinking about why something happens and offer suggestions as to how we might find out. • Describe observations using some scientific vocabulary • Observe aspects of science and identify simple patterns within the results. <p><u>Relational</u></p> <ul style="list-style-type: none"> • Categorise ideas or statements into things that can be tested and things that can't (Which would form the basis for an enquiry? Which could be an investigation?) • Apply a range of simple measuring equipment to record observations in an investigation (standard units) • Use previous knowledge to predict the outcome of simple scientific investigations • Summarise their observations and explain whether it was what they expected <p><u>Extended Abstract</u></p> |
| <p><u>Animals including Humans</u></p> <ul style="list-style-type: none"> • Notice that animals, including humans, have offspring which grow into adults. • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene. | | | |

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| <p>Plants</p> <ul style="list-style-type: none">• Observe and describe how seeds and bulbs grow into mature plants.• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. | | | <ul style="list-style-type: none">• Use observations and basic research to develop a response to an enquiry question• Develop simple ways to collect and record data• Reflect on what they have observed and begin to give explanations using a range of scientific vocabulary.• Generate simple conclusions based on observations and investigations |
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| Year 3 | | | |
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| Biology | Chemistry | Physics | Working Scientifically |
| <p><u>Animals including Humans</u></p> <ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement. | <p><u>Rocks</u></p> <ul style="list-style-type: none"> Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter. | <p><u>Forces</u></p> <ul style="list-style-type: none"> Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing. <p><u>Light</u></p> <ul style="list-style-type: none"> Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. | <p><u>Multi-structural</u></p> <ul style="list-style-type: none"> Respond to scientific enquiry questions and begin to describe how we might find out more Begin to apply simple comparative and fair tests, observing changes over time Begin to identify the best way to observe changes and make measurements <p><u>Relational</u></p> <ul style="list-style-type: none"> Begin to combine observations, basic research and simple testing or demonstrations to form answers to enquiry questions Begin to outline simple practical investigations that represent a fair test by identifying the variable that will change (Introduce term ‘variable’) Begin to predict outcomes using prior knowledge and compare with observed results. Begin to analyse a range of results and identify patterns <p><u>Extended Abstract</u></p> <ul style="list-style-type: none"> Begin to create enquiry questions that build on prior knowledge and allow further exploration Begin to generate a question that includes the variable we will change and the thing we will measure Begin to validate predictions based on results and their scientific knowledge and understanding |
| <p><u>Plants</u></p> <ul style="list-style-type: none"> Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including | | | |

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| <p>pollination, seed formation and seed dispersal.</p> | | <ul style="list-style-type: none">• Recognise that shadows are formed when the light from a light source is blocked by an opaque object.• Find patterns in the way that the size of shadows changes. | <ul style="list-style-type: none">• Begin to reflect on results and consider some ways of increasing the accuracy and reliability of measurements |
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| Year 4 | | | |
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| Biology | Chemistry | Physics | Working Scientifically |
| <p><u>All Living Things and Their Habitats</u></p> <ul style="list-style-type: none">• Recognise that living things can be grouped in a variety of ways.• Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.• Recognise that environments can change and that this can sometimes pose dangers to living things. | <p><u>States of Matter</u></p> <ul style="list-style-type: none">• Compare and group materials together, according to whether they are solids, liquids or gases.• Observe that some materials change state when they are heated or cooled, and measured or research the temperature at which this happens in degrees Celsius (°C).• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | <p><u>Electricity</u></p> <ul style="list-style-type: none">• Identify common appliances that run on electricity.• Construct a simple series electrical circuit, identifying and naming its basic parts: cells, wires, bulbs, switches and buzzers.• Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. | <p><u>Multi-structural</u></p> <ul style="list-style-type: none">• Respond to scientific enquiry questions and describe how we might find out more• Apply simple comparative and fair tests, observing changes over time• Identify the best way to observe changes and make accurate measurements <p><u>Relational</u></p> <ul style="list-style-type: none">• Combine observations, basic research and simple testing or demonstrations to form answers to enquiry questions• Outline simple practical investigations that represent a fair test by identifying |

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| <p><u>Animals including Humans</u></p> <ul style="list-style-type: none">• Describe the simple functions of the basic parts of the digestive system in humans.• Identify the different types of teeth in humans and their simple functions.• Construct and interpret a variety of food chains, identifying producers, predators and prey. | | <ul style="list-style-type: none">• Recognise some common conductors and insulators, and associate metals with being good conductors. <p><u>Sound</u></p> <ul style="list-style-type: none">• Identify how sounds are made associate some of them with something vibrating.• Recognise that vibrations from sounds travel through a medium to the ear.• Find patterns between the pitch of a sound and features of the object that produced it.• Find patterns between the volume of a sound and the strength of the vibrations that produced it.• Recognise that sounds get fainter as the distance from the sound source increases. | <p>the variable that will change (introduce the term 'Independent variable')</p> <ul style="list-style-type: none">• Predict outcomes using prior knowledge and compare with observed results.• Analyse a range of results and identify patterns <p><u>Extended Abstract</u></p> <ul style="list-style-type: none">• Create enquiry questions that build on prior knowledge and allow further exploration• Generate a question that includes the variable we will change (independent variable) and the thing we will measure (introduce term 'dependent' variable)• Validate predictions based on results and their scientific knowledge and understanding• Reflect on results and consider some ways of increasing the accuracy and reliability of measurements |
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| Year 5 | | | |
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| Biology | Chemistry | Physics | Working Scientifically |
| <p><u>All Living Things and Their Habitats</u></p> <ul style="list-style-type: none"> Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life processes of reproduction in some plants and animals. | <p><u>Properties and Changes to Materials</u></p> <ul style="list-style-type: none"> Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials. Including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of | <p><u>Forces</u></p> <ul style="list-style-type: none"> Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. <p><u>Earth and Space</u></p> <ul style="list-style-type: none"> Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. | <p><u>Multi-structural</u></p> <ul style="list-style-type: none"> Examine a range of different aspects of science, and suggest enquiry questions that identify further areas to be explored Begin to plan different types of scientific investigations and describe the variable that will change (Independent variable), the variable that will be measured (dependent variable), and the variables that will be kept the same. Begin to identify appropriate measuring equipment and make accurate and precise measurements (N, g, kg, mm, cm, mins, seconds, ml, L etc.) <p><u>Relational</u></p> <ul style="list-style-type: none"> Plan and carry out range of scientific enquiries that begin to combine detailed observation, research and testing Plan different types of scientific investigations, explain the variables that will remain constant, and begin to outline the impact this will have on the investigation. Analyse aspects of science, recognise relationships and begin to ask questions and explore their own ideas. Begin to make their own decisions about what observations to make, and outline the measurements that will be made, how long to make them for and whether they should be repeated. <p><u>Extended Abstract</u></p> <ul style="list-style-type: none"> Begin to generate a range of questions (including both enquiry and investigative) that demonstrate an understanding of the functions, relationships and interactions of different scientific processes. |
| <p><u>Animals including Humans</u></p> <ul style="list-style-type: none"> Describe the changes as humans develop to old age. | | | |

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| | <p>new materials, and this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.</p> | | <ul style="list-style-type: none">• Plan different types of scientific investigations and begin to reflect on the range of factors that impact on reliability.• Begin to evaluate measurements and reflect on possible reasons for anomalous data or results that do not appear to fit the pattern. |
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| Year 6 | | | |
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| Biology | Chemistry | Physics | Working Scientifically |
| <p><u>All Living Things and Their Habitats</u></p> <ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics. | | <p><u>Electricity</u></p> <ul style="list-style-type: none"> Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram. <p><u>Light</u></p> <ul style="list-style-type: none"> Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. | <p><u>Multi-structural</u></p> <ul style="list-style-type: none"> Examine a range of different aspects of science, and suggest enquiry questions that identify further areas to be explored Plan different types of scientific investigations and describe the variable that will change (Independent variable), the variable that will be measured (dependent variable), and the variables that will be kept the same. Identify appropriate measuring equipment and make accurate and precise measurements (N, g, kg, mm, cm, mins, seconds, ml, L etc.) <p><u>Relational</u></p> <ul style="list-style-type: none"> Plan and carry out range of scientific enquiries that combine detailed observation, research and testing Plan different types of scientific investigations, explain the variables that will remain constant, and outline the impact this will have on the investigation. Analyse a range of different aspects of science, recognise relationships and ask questions to clarify understanding Make their own decisions about what observations to make, and outline the measurements that will be made, how long to make them for and whether they should be repeated. <p><u>Extended Abstract</u></p> <ul style="list-style-type: none"> Generate and explore a range of questions (including both enquiry and investigative) that demonstrate an understanding of the functions, relationships and interactions of different scientific processes. Plan different types of scientific investigations and reflect on the range of factors that impact on reliability. |
| <p><u>Animals including Humans</u></p> <ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans. <p><u>Evolution to Inheritance</u></p> <ul style="list-style-type: none"> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. | | | |

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| <ul style="list-style-type: none">• Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. | | | <ul style="list-style-type: none">• Evaluate measurements and reflect on possible reasons for anomalous data or results that do not appear to fit the pattern. |
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