# Science Curriculum
## Year 3 and 4 – Cycle B

**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.

**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.

**Scientific knowledge and conceptual understanding**

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

**Attainment targets** - By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

| Key Stage 1 | Lower Key Stage 2 | Upper Key Stage 2 |
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| The principal 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 encouraged 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 some 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. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1. | The principal focus of science teaching in 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.<br>'Working scientifically' must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge. | 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 observing 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. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read, spell and pronounce scientific vocabulary correctly. |
| **Working Scientifically - The nature, processes and methods of science**<br>'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control. | | |
| During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:<br>♣ asking simple questions and recognising that they can be answered in different ways<br>♣ observing closely, using simple equipment<br>♣ performing simple tests<br>♣ identifying and classifying<br>♣ using their observations and ideas to suggest answers to questions<br>♣ gathering and recording data to help in answering questions. | During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:<br>♣ asking relevant questions and using different types of scientific enquiries to answer them<br>♣ setting up simple practical enquiries, comparative and fair tests<br>♣ making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers<br>♣ gathering, recording, classifying and presenting data in a variety of ways to help in answering questions<br>♣ recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables<br>♣ reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions<br>♣ using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions<br>♣ identifying differences, similarities or changes related to simple scientific ideas and processes<br>♣ using straightforward scientific evidence to answer questions or to support their findings. | During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:<br>♣ planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br>♣ taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate<br>♣ recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs<br>♣ using test results to make predictions to set up further comparative and fair tests<br>♣ reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations<br>♣ identifying scientific evidence that has been used to support or refute ideas or arguments |

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| **Plants**<br>Pupils should be taught to:<br>♣ identify and name a variety of common wild and garden plants, including deciduous and of a variety of common flowering plants, including trees.<br>Pupils should be taught to:<br>♣ observe and describe how seeds and bulbs grow into mature plants<br>♣ find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. | **Plants**<br>Pupils should be taught to:<br>♣ identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers<br>♣ 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<br>♣ investigate the way in which water is transported within plants<br>♣ explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | |
| **Animals including Humans**<br>Pupils should be taught to:<br>♣ identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals<br>♣ identify and name a variety of common animals that are carnivores, herbivores and omnivores<br>♣ describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)<br>♣ identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.<br>Pupils should be taught to:<br>♣ notice that animals, including humans, have offspring which grow into adults<br>♣ find out about and describe the basic needs of animals, including humans, for survival (water, food and air)<br>♣ describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. | **Animals including Humans**<br>Pupils should be taught to:<br>♣ 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<br>♣ identify that humans and some other animals have skeletons and muscles for support, protection and movement.<br>Pupils should be taught to:<br>♣ describe the simple functions of the basic parts of the digestive system in humans<br>♣ identify the different types of teeth in humans and their simple functions<br>♣ construct and interpret a variety of food chains, identifying producers, predators and prey. | **Animals including Humans**<br>Pupils should be taught to:<br>♣ describe the changes as humans develop to old age.<br>Pupils should be taught to:<br>♣ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood<br>♣ recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function<br>♣ describe the ways in which nutrients and water are transported within animals, including humans. |
| **Everyday Materials**<br>Pupils should be taught to:<br>♣ distinguish between an object and the material from which it is made<br>♣ identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock<br>♣ describe the simple physical properties of a variety of everyday materials<br>♣ compare and group together a variety of everyday materials on the basis of their simple physical properties. | **Rocks**<br>Pupils should be taught to:<br>♣ compare and group together different kinds of rocks on the basis of their appearance and simple physical properties<br>♣ describe in simple terms how fossils are formed when things that have lived are trapped within rock<br>♣ recognise that soils are made from rocks and organic matter. | **Properties and changes of Materials**<br>Pupils should be taught to:<br>♣ 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<br>♣ know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution<br>♣ use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating ♣ give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic<br>♣ demonstrate that dissolving, mixing and changes of state are reversible changes<br>♣ 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. |
| **Uses of Everyday Materials**<br>Pupils should be taught to:<br>♣ identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses<br>♣ find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. | **Light**<br>Pupils should be taught to:<br>♣ recognise that they need light in order to see things and that dark is the absence of light<br>♣ notice that light is reflected from surfaces<br>♣ recognise that light from the sun can be dangerous and that there are ways to protect their eyes<br>♣ recognise that shadows are formed when the light from a light source is blocked by an opaque object<br>♣ find patterns in the way that the size of shadows change. | **Light**<br>Pupils should be taught to:<br>♣ recognise that light appears to travel in straight lines<br>♣ 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<br>♣ explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes<br>♣ use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. |
| **Seasonal Changes**<br>Pupils should be taught to:<br>♣ observe changes across the four seasons<br>♣ observe and describe weather associated with the seasons and how day length varies. | **Forces and Magnets**<br>Pupils should be taught to:<br>♣ compare how things move on different surfaces<br>♣ notice that some forces need contact between two objects, but magnetic forces can act at a distance<br>♣ observe how magnets attract or repel each other and attract some materials and not others | **Earth and Space**<br>Pupils should be taught to:<br>♣ describe the movement of the Earth, and other planets, relative to the Sun in the solar system<br>♣ describe the movement of the Moon relative to the Earth |

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| | ♣ 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<br>♣ describe magnets as having two poles<br>♣ predict whether two magnets will attract or repel each other, depending on which poles are facing. | ♣ 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. |
| **Living Things and their habitats**<br>Pupils should be taught to:<br>♣ explore and compare the differences between things that are living, dead, and things that have never been alive<br>♣ identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other<br>♣ identify and name a variety of plants and animals in their habitats, including microhabitats♣ describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. | **Living Things and their habitats**<br>Pupils should be taught to:<br>♣ recognise that living things can be grouped in a variety of ways<br>♣ explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment<br>♣ recognise that environments can change and that this can sometimes pose dangers to living things. | **Living Things and their habitats**<br>Pupils should be taught to:<br>♣ describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird<br>♣ describe the life process of reproduction in some plants and animals.<br>Pupils should be taught to:<br>♣ describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals<br>♣ give reasons for classifying plants and animals based on specific characteristics. |
| | **States of matter**<br>Pupils should be taught to:<br>♣ compare and group materials together, according to whether they are solids, liquids or gases<br>♣ 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)<br>♣ identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | **Forces:**<br>Pupils should be taught to:<br>♣ explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object<br>♣ identify the effects of air resistance, water resistance and friction, that act between moving surfaces<br>♣ recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. |
| | **Sound**<br>Pupils should be taught to:<br>♣ identify how sounds are made, associating some of them with something vibrating<br>♣ recognise that vibrations from sounds travel through a medium to the ear<br>♣ find patterns between the pitch of a sound and features of the object that produced it<br>♣ find patterns between the volume of a sound and the strength of the vibrations that produced it<br>♣ recognise that sounds get fainter as the distance from the sound source increases. | **Evolution and Inheritance**<br>Pupils should be taught to:<br>♣ recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago<br>♣ recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents<br>♣ identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution |
| | **Electricity**<br>Pupils should be taught to:<br>♣ identify common appliances that run on electricity<br>♣ construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers<br>♣ identify whether 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<br>♣ recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit<br>♣ recognise some common conductors and insulators, and associate metals with being good conductors. | **Electricity**<br>Pupils should be taught to:<br>♣ associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit<br>♣ compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches<br>♣ use recognised symbols when representing a simple circuit in a diagram. |
| **Non- Negotiables** | | |
| W1: Ask relevant questions. W2: Set up simple, practical enquiries and comparative and fair tests. W3: Make accurate measurements using standard units, using a range of equipment, e.g. thermometers and data loggers. W4: Gather, record, classify and present data in a variety of ways to help in answering questions.<br>W5: Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables. W6: Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. W7: Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests. W8: Identify differences, similarities or changes related to simple, scientific ideas and processes. W9: Use straightforward, scientific evidence to answer questions or to support their findings.<br>**Vocabulary:** Investigation, enquiry, what to change, what we used, what we did, what we found out Investigation, enquiry, prediction, variable, dependent variable, independent variable, constant, patterns, equipment, apparatus, method, results, conclusion | | |

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| | **Why is sound made and how do we hear it?**<br>Sound | **How do our bodies function?**<br>Animals including humans – Skeletal muscular and digestive systems | **What happens if the temperature of material is changed?**<br>States of matter | **How does the surface effect an object movement?**<br>Forces – Movement between surfaces | **How does the light switch on?**<br>Electricity | **How do plants get all they need to survive?**<br>Plants – growth and water transportation |
| | **Sound and Hearing**<br>P12: Identify how sounds are made, associating some of them with something vibrating.<br>P13: Recognise that vibrations from sounds travel through a medium to the ear. | **<u>Animals, including humans</u>**<br>B7: Identify that humans and some animals have skeletons and muscles for support, protection and movement.<br><br>B8: Describe the simple functions of the basic parts of the digestive system. | **States of Matter**<br>C5: Compare and group materials together, according to whether they are solids, liquids or gases.<br>C6: Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics.<br>C7: Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | **Investigating movements and forces**<br>P1: Compare how things move on different surfaces.<br>P2: Notice that some forces need contact between two objects, but magnetic forces can act at a distance. | **<u>Understand Electrical Circuits</u>**<br>P14: Identify common appliances that run on electricity.<br>P15: Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.<br>P16: 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.<br>P17: Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.<br>P18: Recognise some common conductors and insulators, and associate metals with being good conductors. | B2: 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.<br>B3: Investigate the way in which water is transported within plants. |
| **Resources** | Range of instruments to demonstrate i.e. different sized recorder, glockenspiel notes, tuning forks of differing sizes, various instruments, bowls of water, | Skeleton example, material to make model of muscles in an arm, | Bottles with lids, sponges, containers of water, electronic scales, bottles of water, balloons, cooking equipment, milk, white and dark chocolate, warm water, timers, foil trays, evaporation, | Force meters, picture cards to identify forces, arrows, | Batteries, bulbs/buzzers, wires, motors, examples of circuit diagrams, Variety of materials to test (e.g. a rubber, paperclips, pencil, teaspoon, coin, paper, teabag, pen, etc, Variety of materials to construct switches (e.g. pins, paper clips, butterfly clips, card, sticky tape, etc.) | |
| **Vocabula** | Volume, vibration, sound wave, loud, soft, high pitch, low pitch, tone, speaker, (amplitude, frequency) | Skeleton, vertebrate, invertebrate, muscle, tendon, movement, protection, support, digestive system, oesophagus, throat, stomach, small intestine, large intestine. | Solid, liquid, gas, temperature, heating, freezing point, boiling point, particles, evaporation, condensation, thermometer, thermal insulation | Force, push, pull, contact, variable, control, independent variable, dependent variable, fair test | Cells (batteries) wires, switches, circuit, series (parallel, buzzers, bulbs, Mains electricity insulators, conductors | Air, light, water, nutrients, soil, roots, plants, life process, respiration, growth, movement, secretion, reproduction, sensitivity, nutrition |
| **Flashback** | • **Most plants need sunlight, water, air warmth and nutrients to grow.**<br>• **The main parts of a plant: roots, stem, leaves, flower, seed.**<br>• **Plants begin life as a seed, they then germinate, grow roots into the soil. The stem grows towards the sunlight and eventually produces a flower.** | • **Sounds are made when objects or material vibrate.**<br>• **Sound vibrations can travel through solid liquid and gas.**<br>• **Human ears detect the vibrations which is what allows us to hear.** | • **Sounds may need reducing to avoid distractions, for safety or to help us sleep.**<br>• **The key function of the skeleton is to support the structure of an animal and help it move.**<br>• **The names of key bones in the body.** | • **The key parts of the digestive system are the mouth, oesophagus, stomach, pancreas, liver, small intestine, large intestine.**<br>• **The key functions of each of the parts.**<br>• **The particle structure of solid, liquid and gases.** | • **The melting and freezing points of a range of substances.**<br>• **The stages of the water cycle including evaporation and condensation.**<br>• **A force is a push or a pull the causes an object to change speed or direction.** | • **The greater the friction the more an object is slowed down.**<br>• **Some forces such as magnetism do not require contact.**<br>• **The components and the purpose of these in a circuit. Including, wires, bulb, switches, buzzers, motors and batteries.** |
| **Lesson 1** | **WALT: know that sounds are made when objects and materials vibrate**<br><br>**Activities:** Children will learn about how sounds are created, then explore the way sounds are produced by a variety of instruments or resonant objects.<br>**Children will know:**<br><br>• that sounds are made when objects or materials vibrate<br>• how to make careful observations<br>• how to draw conclusions from their observations | **WALT: know the key purpose of the human skeleton.**<br><br>**Activities:** Children will begin to explore the purpose of the skeleton for support, protection, and movement. They can then label key bones in the human body and describe the purpose of different skeletal bones.<br><br>**Children will know:**<br><br>• the key functions of the skeleton.<br>• the name of key bones in the human body.<br>• the functions of specific bones. | **WALT: compare and group materials together according to whether they are solids or liquids.**<br>**Activities:** Challenge your class to define what solids and liquids are and sort materials into groups based on their state. Children will discuss the different items that may not seem to fit and look closely at how they're made up including pourable solids such as rice or sand. Alternatively, explore and make observations of non-Newtonian fluids as you make slime together<br>**Children will know:**<br>• a definition of solid and liquid<br>• how to sort objects into solids and liquids, giving reasons why. | **WALT: know what a force is and the effect it causes.**<br>**Activities:** Children to explore and investigate how things move and the types of forces that can act an objects. They should write their observations and any further questions that they wish to find out.<br>**Children will know:**<br>• what a force is<br>• Some forces they have observed<br>• how to ask further relevant questions. | **WALT: know what a circuit is and their different components**<br>**Activities:** Children will recap prior knowledge regarding circuits, then learn about their main components and construct simple circuits, recognising similarities and differences in working circuits.<br><br>**Children will know:**<br>• the purpose of different components in a circuit<br>• that a complete circuit is needed for a device to work<br>• why some circuits will work and others will not depending | **WALT: know the processes that indicate plants are living things**<br><br>**Activities:** Children to recognise and explore the 7 life processes of both plants and animals focussing particularly on recognising these in a range of different plants.<br><br>**Children will know:**<br>• that plants are living things.<br>• the 7 life processes.<br>• how plants demonstrate each of these processes. |

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| | | | | | on how the components have been put together | |
| **Lesson 2** | **WALT**: investigate whether sounds can travel through different materials.<br><br>**Activities:** Children will learn about how sounds travel through different materials. They will give reasons why they think some materials will transmit sound better/ worse than others, then investigate.<br>**Children will know:**<br>• that vibrations from sound sources travel through different materials to the ear<br>• sound can travel through solids, liquids and gases<br>• that some materials allow sound to pass through them more easily than others | **WALT: sort animals based on their skeleton type and recognise the advantages of each.**<br><br>**Activities:** Look at pictures of a range of animal skeletons. What is the same, what is different? Children to classify and group animals based on if they are vertebrate or invertebrate and look at the advantages and disadvantages of each type of skeleton.<br>**Children will know:**<br>• that most animals have a skeleton to help support their structure and help them move<br>• that animals with a backbone are called vertebrates and animals that do not are called invertebrates.<br>• how to classify and sort animals into three groups.<br>• advantages of each type. | **WALT: know and explore the properties of gases**<br>**Activities:** Take a look at the third state that a material can be in and explore if gases have mass. Look at the different ways that gases are used in everyday life and how their different properties make them useful for different purposes.<br>**Children will know:**<br><br>• the name of some of the properties of gases<br>• the definition of a gas | **WALT: know how the force of friction impacts on an object**<br>**Activities:** Children to plan an investigation to measure how a car travels on different surfaces introducing the idea of friction. Do they think the surface will change the speed? They should consider the variable they will measure, change and keep the same. They should plan the apparatus they will use, draw a diagram and write a prediction based on what they already know from their exploration in the previous lesson<br>**Children will know:**<br>• that friction is force that acts between moving surfaces.<br>• which variables to keep the same and which to change. | **WALT: investigate the differences between mains and battery powered circuits.**<br>**Activities:** Children will learn about electrical safety, and why some appliances are mains powered rather than battery powered. They will then either identify a variety of electrical appliances, or create electrical safety posters.<br>**Children will know:**<br>• that working with electricity can be dangerous<br>• devices that are powered by mains electricity and devices that are powered by batteries<br>• that it is safe to carry out experiments with batteries but not with mains electricity | **WALT: plan and set up a comparative and fair test.**<br>**Activities:**<br>Children will plan an investigation around the topic question. They should share their predictions and also further questions such as 'do all plants need the same things to survive?' As a class you will plan an investigation to test what plants need to survive and whether different plants are effected in the same way. This can be done by setting up plants removing one of the potential requirements for each. This can be repeated with a range of different plants species, under the same conditions.<br>The children should set up this investigation ensuring only one variable is changed each time and everything else is kept the same.<br><br>**Children will know:**<br>• how to ask relevant questions.<br>• how to make predictions based on what they already know.<br>• how to set up a fair and comparative test. |
| **Lesson 3** | **WALT: explore the relationship between pitch and volume**<br><br>**Activities:**<br>Children will explore ways in which sounds change as you move further away from its source. They will suggest reasons for their findings.<br><br>**Children will know:**<br><br>that sounds get fainter as the distance from the sound source increases<br><br>how to draw conclusions and describe what they have found out | **WALT: know how muscles support our skeleton in movement**<br><br>**Activities:** Explore how the names of key muscles in the body and the concept they work in pairs to make the skeleton move. Complete some active drills so that children can feel these muscles working. Children should also consider the difference between voluntary and involuntary muscles – categorising and grouping these.<br><br>**Children will know:**<br>• that muscles are attached to the skeleton and help it to move.<br>• that muscles work in pairs.<br>• the difference between voluntary and involuntary muscle movements. | **WALT: observe that materials change state when they are heated or cooled.**<br><br>**Activities:** In this lesson the children will take a closer look at the particles in solids, liquids and gases and how they behave in these states. They will then use this knowledge to describe what happens when solids and liquids freeze and melt.<br><br>**Children will know:**<br><br>• the difference between the particles in solids, liquids and gases<br>• that melting is the process of a sold turning to a liquid.<br>• that freezing is the process of a liquid turning to a solid. | **WALT: conduct a practical enquiry, take accurate measurements and record the results.**<br><br>**Activities:** Based on the investigation planned in the previous lesson, conduct the investigation and record results in a table. The children might use stop watches or a data logger to keep a record of their results. Evaluate what they could have improved about their experiment.<br>**Children will know:**<br>• how to investigate fairly based on their plan.<br>• to use equipment to take accurate measurements.<br>• how to record information in a table.<br>• how to draw conclusions and give simple explanations for their results. | **WALT: know some common conductors and insulators, and associate metals with being good conductors.**<br>**Activities:** Children will learn about insulators and conductors, then either investigate the conductivity of a range of materials, or create models to show how circuits work (or not, if they have insulators in them).<br><br>**Children will know:**<br>• how to construct a circuit to test which materials allow electricity to pass through<br>• that with some materials the bulb did not light because they are insulators, so circuit was not complete<br>• which materials are conductors and which are insulators | **WALT: use simple scientific vocabulary and drawings to record results.**<br><br>**Activities:**<br>Over the coming weeks children should keep a diary about the growth of the plants they can use drawings or notes, they should also track the time since it was planted.<br><br>**Children will know:**<br><br>• plants need water, light, warmth and soil to grow<br>• how to record their observations using drawing and simple scientific vocabulary.<br>• how to take their observations at appropriate intervals. |

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| **Lesson 4** | **WALT: Identify and describe how our ears help us to hear.**<br><br>**Activities:** To use what they know about the world to ask and answer questions about the hearing of humans and other animals. To understand that sound travels slower than light.<br><br>**Children will know:**<br><br>• some of the workings of the human ear.<br>• some of the ways we try to reduce the sounds that we hear.<br>• that we hear because sound waves (vibrations) enter our ears.<br>• why we see lightning before we hear thunder | **WALT: know the functions of the digestive system.**<br><br>**Activities:** Children to complete an investigation to model how the digestive works and its primary function of digesting food.<br><br>**Children will know:**<br><br>• the key functions of the digestive system.<br>• how to create a scientific model to represent an idea.<br>• how to use a scientific model to support their explanations. | **WALT: research the temperature in degrees Celsius (°C) at which materials change state**<br><br>**Activities:** This lesson challenges your class to research the melting points of different materials. They can use the internet to find the melting points of materials such as gallium, olive oil and gold. Alternatively, have your class design and reflect on an investigation about the melting points of different chocolate.<br><br>**Children will know:**<br><br>• that different materials have different freezing/melting points.<br>• know the melting points of different materials • Children evaluate an experiment's fairness and suggest improvements | **WALT: draw conclusions and report on findings using oral and written explanations.**<br>**Activities:** Children should draw conclusions from their results collected in the previous lesson. They need to present these in a clear written explanation using key scientific language. They may also suggest further questions that they have based on their results. For example 'What surface material would cause the least amount of friction?'<br>**Children will know:**<br>• the greater the friction the more an object is slowed down.<br>• how to draw simple conclusions from their results.<br>• how to ask further scientific questions based on their results. | **WALT: investigate the purposes of conducting and insulating materials.**<br>**Activities:** Children will consider reasons why conductors and insulators are used in different ways inside and outside electrical appliances.<br><br>**Children will know:**<br><br>• some conductors and insulators<br>• how appliances and devices use plastic as an insulator<br>• that insulators are used as a safety measure | **WALT: draw conclusions and present these appropriately.**<br><br>**Activities:**<br>Once the children have watched the growth of the plants over a number of weeks then they should draw simple conclusions from their findings about what plants need to grow and the effect of missing certain elements. They should also comment on how different plants are affected in different ways.<br><br>**Children will know:**<br><br>• plants need water, light, warmth and soil to grow<br>• how to present their results in appropriate ways (Written or oral explanations) |
| **Lesson 5** | **WALT: investigate sound-proofing materials by planning and conducting a fair test, considering all the variables and how to record the results**<br><br>**Activities:** In mixed ability groups challenge children to decide how they could find out which material from the range provided would be best for muffling a sound. They first jot down their ideas on the group ideas sheet. Move between the groups and assess progress so far. Talk to groups and individuals. Ask: *How will you make the test fair? What will you use as a sound source? Which one factor will you vary, e.g. the material, the number of layers of the material, the area of the material? What do you think will be the best and why?* (Prediction). Individually, chn record their planning using simple scientific vocabulary (and drawings), and their prediction before | **WALT: describe the main functions of the digestive system using key scientific vocabulary.**<br><br>**Activities:** Children to complete a flow chart/pictorial diagram/ written piece to describe the functions of the digestive system using the correct terminology for each of the body parts.<br><br>**Children will know:**<br><br>• the key functions of the digestive system.<br>• how to use drawings to support their explanations of the digestive system.<br>• how to use correct scientific terminology to describe the process of the digestive system. | **WALT: know the process of evaporation.**<br><br>**Activities:** In this lesson the children will be asked to focus on the process of a liquid turning into a gas. They will think about the everyday examples of evaporation including puddles 'disappearing' throughout the day as well as the cooling effects of sweat on our skin. They will discuss the differences between evaporating and boiling as well as highlighting the boiling point of water. They are challenged to conduct an investigation into the rates of evaporation and how heat and air can affect them.<br><br>**Children will know:**<br><br>• the process of evaporation<br>• specific examples of water evaporating | **WALT: conduct further tests and investigations based on questions raised.**<br><br>**Activities:** The children will now independently plan and investigate a new question based on what they found out. This could be does the object that is moving effect how quickly it stops? Does water effect how an object moves? Are objects harder to move on different surfaces.<br><br>**Children will know:**<br><br>• which variable to change and which to keep the same.<br>• how to select appropriate equipment<br>• how to record results in a table. | **WALT: use knowledge of conductors and insulators to create switches to complete a circuit.**<br>**Activities:** Children will learn about, design and test a variety of switch designs.<br><br>**Children will know:**<br><br>• that a switch can be used to make or break a circuit to turn a device on or off<br>• how to create a working switch<br>• how their switches work | **WALT: explore and investigate how water is transported through plants.**<br><br>**Activities:** Children should observe or conduct an investigation which models how water travels through the plant. They could use food colouring to help observe the movement of the water in the plant.<br><br>**Children will know:**<br><br>• that water travels from the roots, up the stem and into the leaves and the flower<br>• how to use observations to draw conclusions. |

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| | carrying out the investigation. Then record their findings and their conclusions.<br><br>**Children will know:**<br><br>• reasons needed to reduce sounds and reasons for not reducing sounds<br>• how to work in a group to plan an investigation that will find out which material will best reduce sound<br>• the different variables of their test and plan how to ensure their investigation is fair<br>• how to record the results of the investigation and use the results to draw a conclusion.<br>(This investigation will span lesson 5/6) | **WALT: report on findings using oral or written explanations.**<br><br>**Activities:** Children to write a report/film an explanation for the question 'How do our bodies function.' They could choose one aspect to write in detail about or give an overview of all the areas studied this term. They should use clear explanations throughout and use the correct scientific terminology.<br><br>**Children will know:**<br><br>• the key functions of the digestive system.<br>• the key functions of the skeleton and specific bones.<br>• how to write clear explanations using scientific terminology. | **WALT: know the process of condensation.**<br><br>**Activities:** In this lesson the children will look at the opposite process to evaporation: condensation. They will think about what causes water to condense and look at some examples of this. They are then challenged to recreate a situation where they can see water condensing, including its use in a solar still to remove the salt from sea water.<br><br>**Children will know:**<br><br>• the name of each of the ways a material can change state<br>• what condensation is and when it happens | **WALT: explore different ways that forces can act on an object.**<br>**Activities:** Get children to explore different types of forces and what is causing the object to move. They need to consider what is similar about these forces and what is different. Do ou need to make contact with the object for it to move? Are there any examples where this is not true (Ensure there are some magnets for children to use as well)<br>Children to sort examples of objects moving due to force when contact is made and when contact is not made.<br>**Children will know:**<br>• that a force is a push or a pull.<br>• that sometimes contact needs to be made between objects for a force to occur.<br>• that other forces do not require contact (magnetism, gravity.) | **WALT: plan and carry out an experiment to see how to change the brightness of a bulb**<br>**Activities:** Children will suggest ways in which a bulb in a circuit could be made to glow brighter or dimmer, then plan experiments where they may explore their ideas.<br><br>**Children will know:**<br><br>• how to alter the brightness of a bulb<br>• how to plan and carry out an experiment, changing one factor at a time<br>• how to draw conclusions from their investigations | **WALT: scientific evidence to answer questions and support ideas.**<br><br>**Activities:** Once the investigation is complete they should use the evidence to answer the question about how water travels through the plant and the evidence for this.<br><br>**Children will know:**<br>• how their observations support the scientific idea.<br>• that water travels from the roots, up the stem and into the leaves and the flower. |
| **Lesson 6** | | | **WALT: identify the part played by evaporation and condensation in the water cycle.**<br>**Activities:** This final lesson draws upon the children's learning of evaporation and condensation to describe the water cycle. They will look at four simplified steps of the water cycle and how these processes play a part.<br>**Children will know:**<br>• what the water cycle is<br>• the name of the different stages of the water cycle<br>• that evaporation and condensation are processes that can be reversed | | | |
| **Key knowledge** | **Children will know:**<br><br>Sounds are made when objects or material vibrate<br><br>Sound vibrations can travel through solid liquid and gas<br><br>Human ears detect the vibrations which is what allows us to hear.<br><br>Sounds may need reducing to avoid distractions, for safety or to help us sleep. | **Children will know:**<br><br>The key function of the skeleton is to support the structure of an animal and help it move.<br><br>The names of key bones in the body.<br><br>The key parts of the digestive system are the mouth, oesophagus, stomach, pancreas, liver, small intestine, large intestine.<br><br>The key functions of each of the parts. | **Children will know:**<br><br>The particle structure of solid, liquid and gases.<br><br>The melting and freezing points of a range of substances.<br><br>The stages of the water cycle including evaporation and condensation. | **Children will know:**<br><br>A force is a push or a pull the causes an object to change speed or direction.<br><br>The greater the friction the more an object is slowed down.<br><br>Some forces such as magnetism do not require contact. | **Children will know:**<br><br>The components and the purpose of these in a circuit. Including, wires, bulb, switches, buzzers, motors and batteries.<br><br>That conductors let electricity pass through, and insulators prevent electricity from moving through.<br><br>The dangers of electricity and how insulators can protect it. | **Children will know:**<br><br>The 7 life processes exhibited by plants.<br><br>Plants need water, sunlight, warmth, nutrients from soil and room to go.<br><br>Water travels from the roots up tubes (Xylem) in the stem. |