Science – Skills Progression

Key Stage 1

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.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Science – Skills Progression

Year 1

Subject knowledge			
Plants	**Animals including Humans**	**Everyday Materials**	**Seasonal Changes**
Identify and name a variety of common and wild garden plants, including decidious and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants including trees.	Identify and name a variety of common animals including fish, amphibians, reptiles, 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. Identify, name and draw basic parts of the human body and say which part of the body is associated with each sense.	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.	Observe changes across the four seasons. Observe and describe the weather associated with seasons and how day length varies.

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Working Scientifically					
Explore / Observe	**Grouping, identifying and classifying**	**Questioning**	**Research**	**Presenting and interpreting results**	**Planning and Testing**
Use simple equipment that is provided, along with their senses, to explore and observe closely (i.e. magnifying glasses) Use their observations and ideas to answer simple questions Observe changes over time	Use simple scientific language Name the basic features of the object/material/living thing that is studied and compare Sort and group objects with help Communicate how things are the same/different.	Ask simple questions and recognise that they can be answered in different ways Link classroom Science to the outside world and real life situations	Use simple sources to find answers	Talk about what they have found out Talk about why something has happened Add annotations to drawings or photographs Complete a pre-constructed table/chart/graph Gather and record data to help answer questions	Discuss ways of setting up a test/investigation Carry out a simple test Measure using non-standard units (i.e. cardboard boxes)

Science – Skills Progression

Year 2

Subject knowledge			
Living things and their habitats	**Plants**	**Animals incl humans**	**Uses of everyday materials**
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 other animals , using the idea of a simple food chain, and identify and name different sources of food.	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.	Notice that animals, incl humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival. Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.	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 the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Working scientifically					
Explore / Observe	**Grouping, identifying and classifying**	**Questioning**	**Planning and testing**	**Research**	**Presenting and interpreting results**
Observe and describe simple processes and observations over time with some	Name and identify common examples, some more complex features and different	Raise own questions based on, or linked to things, that they	Carry out simple comparative tests following a method and taking measurements Make a simple prediction about	Use diagrams, photos, pictures to find things out.	Record data with some accuracy using a variety of tables and charts. With support, begin to notice

Science – Skills Progression

accuracy Use scientific language to talk about and record what they have noticed, making comparisons.	uses of something Sort and group objects, materials, living things according to their features.	have observed Begin to ask 'What if..?' questions with support Ask questions and think about how it might be answered	what might happen. Suggest a method for setting up a simple test.		patterns in their data. Talk about and describe their findings using scientific vocabulary. Give a logical reason why something has happened.

Science – Skills Progression

Lower Key Stage 2

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.

'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.

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Year 3

Subject knowledge				
Plants	**Animals incl humans**	**Rocks**	**Light**	**Forces and Magnets**
Identify and describe the functions of different parts of flowering plants: roots, stem, 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 role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	Identify that animals, including humans, need the right types and amounts of nutrition, that they cannot make their own food and they get nutrition from what they eat. Identify that humans and some animals have skeletons and muscles for support, protection and movement	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 sedimentary rock. Recognise that soils are made from rocks and organic matter.	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 Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the size of shadows change.	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.

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Working scientifically						
Explore / Observe.	**Grouping and classifying**	**Questioning**	**Research**	**Using equipment and measures**	**Planning and testing**	**Presenting and interpreting results**
Observe carefully and record changes /stages over time Observe and record relationships between strcuture and function.	Decide ways and give reasons for sorting/ grouping/ classifying/ identifying. Compare and contrast, considering the relationships between different things	Ask and answer own questions which are relevant Begin to understand that some questions can be tested in the classroom and some can't	Find things out using a range of secondary sources.	Collect data from observations/ measurements, using notes, tables. Take accurate measurements using standard (whole) units Use a range of equipment accurately to improve detail of measurements, including thermometers and data loggers	Become more independent in setting up simple practical enquiries including comparative and fair tests Make predictions based upon everyday experience	With support, present findings in a variety of ways. Tables, charts, keys, annotated drawings, explanations, displays, presentations. Use their results to say whether it met their predictions With help, notice changes and patterns in their data Use evidence /results to draw a simple conclusion to answer the original question using scientific language Report on findings using oral and written methods of communication

Science – Skills Progression

Year 4

Subject knowledge				
Living things and their habitats	**Animals, including humans**	**States of matter**	**Sound**	**Electricity**
Recognise that living things can be grouped in different 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.	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.	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 measure or research the temperature at which this happens in degrees Celsius. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between 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.	Identify common appliances that run on electricity. Construct a simple series electrical circuit, identify and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple circuit, based on whether or ot the lamp is part of a complete lop 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. Recognise some common conductors and insulators, and associate metals with being good conductors.

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Working scientifically						
Explore / Observe.	**Grouping and classifying**	**Questioning**	**Research**	**Using equipment and measures**	**Planning and testing**	**Presenting and interpreting results**
Make systematic and careful observations and record changes/stages over time accurately. Observe and record relationships between structure and function or between different parts of processes.	Use guides of simple keys to classify/ identify animals, flowering and non flowering plants. Record similarities/ differences / changes and begin to give reasons for these	Ask/raise own relevant questions with increasing confidence identifying whether it can be explored, observed, tested or investigated further.	Make decisions about which information to use from a wide range of sources. Make decisions about how to present their research	Begin to identify what data to collect, how long to make them for, what equipment to use etc. Learn how to use a data logger and measure using standard units. Use a range of equipment to make accurate measurements, including thermometers and data loggers	Carry out a simple fair test with increasing confidence. Make some of the planning decisions about what to change, measure, observe and explain why chosen this.	Record findings using scientific language and vocabulary in the form of oral and written explanations, annotated drawings, tables, bar charts, presentations, displays. Notice and find patterns in their observations and data. E.g. describe the effect something has on something else. Summarise findings in a conclusion making links to evidence gathered. Use results to suggest improvements, new questions and or predictions for setting up further tests. Record both orally and written throughout year.

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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 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.

Pupils should read, spell and pronounce scientific vocabulary correctly.

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Year 5

Subject knowledge				
Living Things and their habitats	**Animals including humans**	**Properties and changes of materials**	**Earth and Space**	**Forces**
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animals.	Describe the changes as humans develop to old age.	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. To use 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,	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 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.	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 smaller force to have a greater effect.

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		for the particular uses of everyday materials, including metals, wood, plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new material, and that this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda.		

Working scientifically						
Explore / Observe.	**Grouping and classifying**	**Questioning**	**Research**	**Using equipment and measures**	**Planning and testing**	**Presenting and interpreting results**
Evaluate observations and suggest a further test, another question, make a prediction	Suggest reasons for similarities and differences Decide on the equipment, source of info, test to help identify or classify.	Ask own scientific questions taking some ownership for finding out the	Find out how scientific ideas have changed / developed over time,	Choose the most approriate equipment to make accurate measurements with increasing accuracy	Carry out fair tests and other investigations with increasing independence Make decisions	Present their findings using different medium and for a range of audiences and purposes. Record data of increasing complexity using tables,

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Use scientific terminology to explain their observations inlcuding those which are more abstract.		answers Refine a question so it can be tested	explaining their findings using scientific vocabulary.	and precision Make own decisions about what, how long, for, how often to make observations/ measurements	about which variables to change, measure and keep the same.	graphs, classification keys, models, scientific diagrams. Describe straightforward results linking cause and effect (er words / more) Comment on results saying whether it supports the initial prediction and saying why it happened. Compare results with others and recognise how repeated readings can improve reliability.

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Year 6

Subject knowledge				
Living things in the habitats	**Animals including humans**	**Evolution and Inheritance**	**Light**	**Electricity**
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 characteristcs.	Identify and name the main parts of the human ciculatory 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.	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. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	Recognise and 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	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in their 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

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			light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	switches. Use recognised symbols when representing a simple circuit in a diagram.

Working scientifically						
Explore / Observe.	**Grouping and classifying**	**Questioning**	**Research**	**Using equipment and measures**	**Planning and testing**	**Presenting and interpreting results**
Use correct scientific knowledge to identify changes that have occurred over time (evolution) and how changes have impacted the world. Observations should be accurate, detailed, systematic and should cover a range of complex and abstract features.	Construct a classification key / branching database using more than 2 items Compare and contrast things beyond their locality and discuss advantages / disadvantages of the similarities and differences.	Recognise scientific questions which do not have definite answers. Independently ask a variety of scientific questions and decide the type of enquiry needed to answer them.	Research how scientific ideas have developed over time and had an impact on our lives.	Decide whether to repeat any readings and justify the reason for doing so. Make own decisions about what equiment to use and select that which is fit for purpose so measurements are accurate and precise.	Predict what a graph might look like before collecting results. Identify variables to change, measure and keep the same in order for a test to be fair.	Articulate understanding of the concept using scientific language and terminology when describing ideas, observations or findings. Identify patterns in results collected and describe them using change and measure variables. Identify patterns in results collected and describe them using change and measure variables. Describe how to improve

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						planning to produce more reliable results.