Science Curriculum Long Term Coverage

Progression map	
Scientific enquiry	**Year 1 and 2:** pupils will: Use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • Ask simple questions and recognising that they can be answered in different ways • Perform simple tests • Observe closely, using simple equipment • Gather and recording data to help in answering questions • Identify and classify data • Use their observations and ideas to suggest answers to questions **Year 3 and 4:** pupils will: Use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • Ask relevant questions and using different types of scientific enquiries to answer them • Set up simple practical enquiries, comparative and fair tests • Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gather, record, classify and present data in a variety of ways to help in answering questions • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Identify differences, similarities or changes related to simple scientific ideas and processes • Use straightforward scientific evidence to answer questions or to support their findings • Use results to draw simple conclusions, make predictions for new values and suggest improvements and raise further questions • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions **Year 5 and 6:** pupils will: Use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Identify scientific evidence that has been used to support or refute ideas or arguments • Use test results to make predictions to set up further comparative and fair tests • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

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Year 1 & 2	Autumn	Spring	Summer
Cycle A	**Everyday Materials** 	**Humans** 	**Animals** 
Skills and Knowledge ***National Curriculum Statement***	**Chemistry** Pupils will be taught to: • 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 • 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 Pupils might work scientifically by: • comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); • observing closely, identifying and classifying the uses of different materials, and recording their observations.	**Biology** Pupils will be taught to: • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • 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 Pupils might work scientifically by: • observing, through video or first-hand observation and measurement, how different animals, including humans, grow; • asking questions about what things animals need for survival and what humans need to stay healthy; • suggesting ways to find answers to their questions	**Biology** Pupils will be taught to: • 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 (fish, amphibians, reptiles, birds and mammals including pets) • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) Pupils might work scientifically by: • observing, through video or first-hand observation and measurement, how different animals, including humans, grow; • asking questions about what things animals need for survival and what humans need to stay healthy; suggesting ways to find answers to their questions

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Years 1 & 2	Autumn	Spring	Summer
Cycle B	**Seasonal Changes** 	**Plants** 	**Living Things and Their Habitats** 
Skills and Knowledge ***National Curriculum Statement***	**Physics** Pupils will be taught to: • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies Pupils might work scientifically by: • making tables and charts about the weather; • making displays of what happens in the world around them, including day length, as the seasons change.	**Biology** Pupils will be taught to: • 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 • 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 Pupils might work scientifically by: • observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; • setting up a comparative test to show that plants need light and water to stay healthy.	**Biology** Pupils will be taught to: • 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 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 Pupils might work scientifically by: • sorting/classifying according to whether things are living, dead or were never alive, recording their findings using charts. They should describe how they decided where to place things, exploring questions like: 'Is a flame alive? Is a deciduous tree dead in winter?' • They could construct a simple food chain that includes humans (eg, grass, cow, human). They could describe the conditions in different habitats and microhabitats • find out how the conditions affect the number and type(s) of plants and animals that live there.

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Year 3 & 4	Autumn	Spring	Summer
Cycle A	**Animals, including Humans** 	**Rocks** 	**Sound** 
Skills and Knowledge ***National Curriculum Statement***	**Biology** Pupils will be taught to: • 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 **Progression from KS1:** Pupils should continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. Pupils might work scientifically by: • identifying and grouping animals with and without skeletons and observing and comparing their movement; • exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy, and design meals based on what they find out.	**Chemistry** Pupils will be taught to: • 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 Pupils might work scientifically by: • observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; • using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. • explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.	**Physics** Pupils will be taught to: • 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 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 Pupils might work scientifically by: • finding patterns in sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. • make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. • make and play their own instruments by using what they have found out about pitch and volume.

Science Curriculum Long Term Coverage

Years 3 & 4	Autumn	Spring	Summer
Cycle B	**States of Matter** 	**Light** 	**Forces and Magnets** 
Skills and Knowledge ***National Curriculum Statement***	**Chemistry** Pupils will be taught to: • 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 (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature Pupils might work scientifically by: • grouping and classifying a variety of different materials; • exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. • observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.	**Physics** Pupils will be taught to: • 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 an opaque object • find patterns in the way that the size of shadows change Pupils might work scientifically by: • looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.	**Physics** Pupils will be taught to: • compare how things move on different surfaces • notice that some forces need contact between 2 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 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing Pupils might work scientifically by: • raise questions and carrying out tests to find out how far things move on different surfaces, and gathering and recording data to find answers to their questions; • sort materials into magnetic or not; • look for patterns in the way that magnets behave in relation to each other and what might affect this, eg, the strength of the magnet or which pole faces another; • identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

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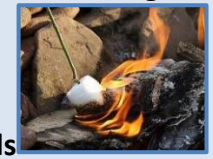
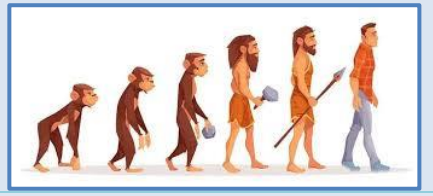
Year 5 & 6	Autumn		Spring	Summer
Cycle A	**Properties and changes of materials** 	**Forces** 	**Earth and Space** 	**Evolution and Inheritance** 
Skills and Knowledge ***National Curriculum Statement***	**Chemistry** Pupils will be taught to: • compare and group together everyday materials based on their 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 uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes	**Physics** Pupils will be taught to: • 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 Pupils might work scientifically by: • exploring falling paper cones or cupcake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. • They might explore resistance in water by making and testing boats of different shapes.	**Physics** Pupils will be taught to: • 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 Pupils might work scientifically by: • comparing the time of day at different places on the Earth through internet links and direct communication; • creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; • finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	**Biology** Pupils will be taught to: • 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 **Progression from LKS2:** Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by

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	• 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 **Progression from LKS2:** Pupils build a systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism and electricity in year 3/4. They should explore reversible changes, including evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. Pupils might work scientifically by: • carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it	• They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.		considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might work scientifically by: • observing and raising questions about local animals and how they are adapted to their environment; • comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. • They might analyse the advantages and disadvantages of specific adaptations, such as being on 2 feet rather than 4, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

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	melting, or for making blackout curtains?' • They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. • They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials			

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Years 5 & 6	Autumn	Spring	Summer
Cycle B	**Living Things and their Habitats** 	**Light** 	**Electricity** 	**Animals, including Humans** 
Skills and Knowledge *National Curriculum Statement*	**Biology** Pupils will be taught to: • 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 **Progression from LKS2:** Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct	**Physics** Pupils will be taught to: • 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 **Progressions from LKS2:** Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources,	**Physics** Pupils will be taught to: • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • recognise that a switch opens and closes a circuit and associate this with whether a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors • 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	**Biology** Pupils will be taught to: • 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 **Progression from LKS2:** Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies

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	observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils might work scientifically by: • using classification systems and keys to identify some animals and plants in the immediate environment. • They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.	reflection and shadows. They should talk about what happens and make predictions. Pupils might work scientifically by: • deciding where to place rear-view mirrors on cars; • designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. • They might investigate the relationship between light sources, objects and shadows by using shadow puppets. • They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water, and coloured filters (they do not need to explain why these phenomena occur).	Pupils might work scientifically by: • observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.	might be damaged – including how some drugs and other substances can be harmful to the human body. Pupils might work scientifically by: • exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.