Science Scheme of Work & Skills and Knowledge Progression

Key Stage 1 and Key Stage 2

The INTENT of our Science Curriculum

Science Statement of Intent

"Children and scientists share an outlook on life. 'If I do this, what will happen?' is both the motto of the child at play and the defining refrain of the physical scientist. ... The unfamiliar and the strange - these are the domain of all children and scientists."- James Gleick

At St Meryl we aim to equip children with the knowledge and skills they will need for life-long learning as well as harnessing their natural curiosity.

Science is an integral part of our curriculum. We know that the world our children will be living and working within will need young minds who are adaptable, logical, methodical and creative; all key skills developed in primary Science and beyond. It is also crucial they have a key understanding of the world they exist in, how it and living things work and the forces that act upon and within it. Children are natural scientists and often thrive when they can post questions and find their own answers.

We aim to ensure we harness children's natural curiosity and awe and wonder at the world around them, inspire them to ask further questions and assist them to find their own answers.

We know that our children come to us from a range of backgrounds and we want to ensure that ALL of them get to experience the world around them beyond their own homes. This is why we build in trips to Zoos, museums and invite visitors in as well as richly resourced lessons. These experiences inspire curiosity.
Some of our children start school with poorer speech and language skills and so this curriculum has been planned carefully to provide many opportunities for pupils to talk about their learning and their work.
We are committed at St Meryl to teaching both skills and knowledge as believe both are important. So we provide children with a range of experiences to observe, research and investigate themselves in different ways with high quality modelling of what these skills look like and experiences where children can gain new knowledge through discovery. What we teach children in Science has been carefully planned, structured and sequenced to provide a clear progression of skills and knowledge that builds upon what has been taught before. There are clear, agreed expectations for end of year and key stage points.
Wherever possible we make good links with other curriculum areas, particularly maths, design technology and computing whilst respecting the integrity of Science as its own subject.

Aims of

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

National Curriculum Programmes of Study:

KS1	**Working scientifically** 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: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment

	• performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions
Year 1	**Plants** Pupils should 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 **Animals, including humans** Pupils should 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) identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense **Everyday materials** Pupils should 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 **Seasonal changes** Pupils should be taught to: observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies
Year 2	**Living things and their habitats** Pupils should 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 **Plants** Pupils should be taught to: 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 **Animals, including humans** Pupils should be taught to: 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 **Uses of everyday materials** Pupils should be taught to: 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
KS2 Y3&4	**Working scientifically** 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: asking relevant questions and using different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

	using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions identifying differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings.
Year 3	**Plants** Pupils should be taught to: identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal **Animals, including humans** Pupils should 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 **Rocks** Pupils should 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 **Light** Pupils should 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 **Forces and magnets** 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
Year 4	**Living things and their habitats** Pupils should be taught to: recognise that living things can be grouped in a variety of ways explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment recognise that environments can change and that this can sometimes pose dangers to living things **Animals, including humans** Pupils should be taught to: 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 **States of matter** Pupils should 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 **Sound** Pupils should 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

	Electricity Pupils should be taught to: identify common appliances that run on electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors
KS2 Y5&6	Working scientifically 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: planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using test results to make predictions to set up further comparative and fair tests reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations identifying scientific evidence that has been used to support or refute ideas or arguments
Year 5	**Living things and their habitats** Pupils should be taught to: 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 **Animals, including humans** Pupils should be taught to: describe the changes as humans develop to old age **Properties and changes of materials**

	Pupils should be taught to: compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of 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 **Earth and space** Pupils should 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 **Forces** Pupils should 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
Year 6	**Living things and their habitats** Pupils should 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 **Animals including humans** Pupils should 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 **Evolution and inheritance** Pupils should 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 **Light** Pupils should 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 **Electricity** Pupils should be taught to: 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

Implementation: St Meryl School Science Scheme of Work and Planning

Brief:

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
YEAR 1	Seasons autumn	Materials Seasons – winter	Humans as animals	Seasons – spring	Plants	Seasons – summer
YEAR 2	Living things and their habitats	Everyday materials	Plants	Animals including humans	Animals including humans	Healthy living and survival
YEAR 3	Light	Forces and magnets	Rocks	Plants	Animals including humans	
YEAR 4	States of matter	Sound	Electricity	Animals including humans	Animals including humans	Living things and their habitats
YEAR 5	Materials	Forces	Earth and space	Living things and their habitats	Animals including humans	All living things Puberty
YEAR 6	Light	Living things and their habitats	Animals – heart and circulation	Electricity	Animals – evolution	Animals – reproduction

Science Progression of Skills and Knowledge

YEAR 1	
Skills	**Subject Area: Skills – Ideas and questions** -asks relevant questions and using different types of scientific enquiries to answer them - recognises scientific and technical developments that help us **Skills - Planning** - performs simple tests or follows teachers' instructions - experiences different types of science enquiry - with guidance, suggests what they will do - with guidance, identifies things to measure or observe that are relevant to the question - uses resources provided or chosen from a limited range - uses simple measurements and equipment to gather data -suggests why a test is unfair **Skills - Observing and presenting evidence** - observes closely (including changes over time), using simple equipment - makes measurements using non-standard units -uses simple secondary sources to find answers, e.g. books, videos, photographs or people -gathers and records simple data to help in answering questions with support, prepares simple tables to record data -with help, records their findings in a range of ways, e.g. simple tables, diagrams, pictograms, sorting circles, bar charts and templates - talks about their findings using everyday terms, text scaffolds or simple scientific language **Skills – Considering and evaluation of evidence** - uses simple observable features to compare objects, materials and living things - identifies and classifies (decides how to sort and group objects) - with guidance, begins to notice changes, patterns (i.e. cause and effect) and relationships (i.e. how one variable affects another) - uses comparative language to describe changes, patterns and relationships.

	-talks about what they have found out and how they found it out - uses their observations and ideas to suggest answers to questions -with support, suggests whether or not what happened was what they expected - with support, suggests different ways they could have done things
Knowledge	Subject Area: Knowledge Plants KS1 - 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 the growth of flowers or vegetables that they have planted. - Observe plants and animals in their natural habitat. - observe changes across the four seasons - observe and describe weather associated with the seasons and how day length varies. **Knowledge –Animals Including Humans** - 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) - identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **Knowledge – Materials** - 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. - Know that it is not safe to look directly at the Sun, even when wearing dark glasses. **Subject Area: Light** - Know that it is not safe to look directly at the Sun, even when wearing dark glasses.
YEAR 2	
Skills	**Subject Area: Skills – Ideas and questions** -asks relevant questions and using different types of scientific enquiries to answer them - recognises scientific and technical developments that help us **Skills - Planning** - performs simple tests or follows teachers' instructions - experiences different types of science enquiry

	- with guidance, suggests what they will do - with guidance, identifies things to measure or observe that are relevant to the question - uses resources provided or chosen from a limited range - uses simple measurements and equipment to gather data -suggests why a test is unfair **Skills - Observing and presenting evidence** - observes closely (including changes over time), using simple equipment - makes measurements using non-standard units -uses simple secondary sources to find answers, e.g. books, videos, photographs or people -gathers and records simple data to help in answering questions with support, prepares simple tables to record data -with help, records their findings in a range of ways, e.g. simple tables, diagrams, pictograms, sorting circles, bar charts and templates - talks about their findings using everyday terms, text scaffolds or simple scientific language **Skills – Considering and evaluation of evidence** - uses simple observable features to compare objects, materials and living things - identifies and classifies (decides how to sort and group objects) - with guidance, begins to notice changes, patterns (i.e. cause and effect) and relationships (i.e. how one variable affects another) - uses comparative language to describe changes, patterns and relationships. -talks about what they have found out and how they found it out - uses their observations and ideas to suggest answers to questions -with support, suggests whether or not what happened was what they expected - with support, suggests different ways they could have done things
Knowledge	**Subject Area: Knowledge Plants KS1** -Discuss that seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them. -find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. -It is once they have sprouted that they will need light to photosynthesize. -observe and describe how seeds and bulbs grow into mature plants. **Knowledge –Animals Including Humans** -identify and name a variety of plants and animals in their habitats, including micro-habitats. -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. -explore and compare the differences between things that are living, dead, and things that have never been alive.

	-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 should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. **Knowledge – Materials** -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. -know how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) -know also different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). -what properties of materials that make them suitable or unsuitable for particular purposes -think about unusual and creative uses for everyday materials. -Pupils might find out people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. **Subject Area: Light** - Know that it is not safe to look directly at the Sun, even when wearing dark glasses.
YEAR 3	
Skills	**Subject Area: Skills – Ideas and questions** -asks relevant questions and using different types of scientific enquiries to answer them -explains the purposes of a variety of scientific and technological developments **Subject Area: Skills - Planning** - sets up simple practical enquiries, comparative and fair tests begins to make their own decisions about the most appropriate type of scientific enquiry to answer questions -begins to make decisions about what observations to make and how long to make them for -begins to choose the type of simple equipment that might be used from a reasonable range -uses appropriate equipment and measurements with reasonable accuracy recognises when a simple fair test is needed - with help, decides how to set up a fair test and control variables **Skills - Observing and presenting evidence**

	makes systematic and careful observations -makes accurate measurements using standard units, using a range of equipment, e.g. data loggers and thermometers -recognises when and how secondary sources might help answer questions that cannot be answered through practical investigations -gathers and records data in a variety of ways to help in answering questions -prepares own format for recording data - makes decisions about how to record and analyse the data -records and presents findings using drawings, labelled diagrams, keys, tally charts, Carroll diagrams, Venn diagrams, bar charts and tables - reports on findings from enquiries, in simple scientific language, using oral and written explanations, displays or presentations of results and conclusions **Skills – Considering and evaluation of evidence** uses observable and other criteria to group, sort and classify in different ways (including simple keys and branching databases) -identifies differences, similarities or changes related to simple scientific ideas and processes - with help, looks for changes, patterns, and relationships in their data -with help, uses results to draw simple conclusions and answers questions using appropriate level of knowledge and their own experiences - uses straightforward scientific evidence to answer questions or to support their findings -uses relevant scientific language to discuss their ideas and communicate their findings - with support, uses results to suggest improvements to what they have done - with support, raise further questions (e.g. arising from the data) - with support, makes predictions for new values within or beyond the data collected
Knowledge	**Living Things and their habitats KS2** -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 explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. -identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. -They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. -Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens. -investigate the way in which water is transported within plants.

	Knowledge –Animals Including Humans -identify that humans and some other animals have skeletons and muscles for support, protection and movement. - know the main body parts associated with the skeleton and muscle - find out how different parts of the body have special functions. -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 **Knowledge – Rocks** -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. -Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment. **Subject Area: Light** -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 - look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. - find patterns in the way that the size of shadows change. **Forces and Magnets Knowledge** - 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. - explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).
YEAR 4	
Skills	**Subject Area: Skills – Ideas and questions** -asks relevant questions and using different types of scientific enquiries to answer them -explains the purposes of a variety of scientific and technological developments **Subject Area: Skills - Planning**

	- sets up simple practical enquiries, comparative and fair tests begins to make their own decisions about the most appropriate type of scientific enquiry to answer questions -begins to make decisions about what observations to make and how long to make them for -begins to choose the type of simple equipment that might be used from a reasonable range -uses appropriate equipment and measurements with reasonable accuracy recognises when a simple fair test is needed - with help, decides how to set up a fair test and control variables **Skills - Observing and presenting evidence** makes systematic and careful observations -makes accurate measurements using standard units, using a range of equipment, e.g. data loggers and thermometers -recognises when and how secondary sources might help answer questions that cannot be answered through practical investigations -gathers and records data in a variety of ways to help in answering questions -prepares own format for recording data - makes decisions about how to record and analyse the data -records and presents findings using drawings, labelled diagrams, keys, tally charts, Carroll diagrams, Venn diagrams, bar charts and tables - reports on findings from enquiries, in simple scientific language, using oral and written explanations, displays or presentations of results and conclusions **Skills – Considering and evaluation of evidence** uses observable and other criteria to group, sort and classify in different ways (including simple keys and branching databases) -identifies differences, similarities or changes related to simple scientific ideas and processes - with help, looks for changes, patterns, and relationships in their data -with help, uses results to draw simple conclusions and answers questions using appropriate level of knowledge and their own experiences - uses straightforward scientific evidence to answer questions or to support their findings -uses relevant scientific language to discuss their ideas and communicate their findings - with support, uses results to suggest improvements to what they have done - with support, raise further questions (e.g. arising from the data) - with support, makes predictions for new values within or beyond the data collected
Knowledge	**Living Things and their habitats KS2** -begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails

	and slugs, worms, spiders, and insects. -explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment - group a wide selection of living things that include animals and flowering plants and non-flowering plants. -identify how the habitat changes throughout the year. - use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. - explore examples of human impact (both positive and negative) on environments - recognise that environments can change and that this can sometimes pose dangers to living things **Knowledge –Animals Including Humans** - 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 -know the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine -explore questions that help them to understand their special functions. -construct and interpret a variety of food chains, identifying producers, predators and prey. **Knowledge – States of Matter** -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. - explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). -observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. Note: Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning. **Subject Area: Light** recognise that light from the sun can be dangerous and that there are ways to protect their eyes **Subject Area: Sound** -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. -explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways. **Subject Area: Electricity** -know how to take the necessary precautions for working safely with electricity. -identify common appliances that run on electricity -construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit -recognise some common conductors and insulators, and associate metals with being good conductors. - construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. -draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. Note: Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.
YEAR 5	
Skills	**Subject Area: Skills – Ideas and questions** - uses their scientific experiences to explore ideas and raise different types of questions -talks about how scientific ideas have developed over time - recognises the applications of specific scientific ideas **Skills – Planning** - selects and plans different types of scientific enquiries to answer questions -makes decisions about what observations to make, what measurements to use, how long to make them for and whether to repeat them -chooses the most appropriate equipment to make measurements -explains how to use the equipment accurately -recognises when and how to set up comparative and fair tests

	- recognises and controls variables where necessary (e.g. explains which variables need to be controlled and why) **Skills - Observing and presenting evidence** -makes systematic and careful observations -takes measurements, in standard units, using a range of scientific equipment, with increasing accuracy and precision -takes repeat readings when appropriate -recognises which secondary sources will be most useful to research their ideas - begins to separate opinion from fact -records data and results of increasing complexity -decides how to record data from a choice of familiar approaches -calculates mean value where appropriate -records and presents findings using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - reports on findings from enquiries, using relevant scientific language and conventions, in oral and written explanations such as displays and other presentations **Skills – Considering and evaluation of evidence** -uses and develops keys and other information records to identify, classify and describe living things and materials -identifies conclusions, causal relationships and explanations of results -identifies patterns that might be found in the natural environment -draws valid conclusions, explains and interprets the results (including the degree of trust) using scientific knowledge and understanding (e.g. recognises limitations of data) -identifies scientific evidence that has been used to support or refute ideas or arguments - uses relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas -makes practical suggestions about how their working method could be improved (e.g. sample size on reliability) -uses results to identify when further tests and observations might be needed -uses test results to make predictions and to set up further comparative and fair tests
Knowledge	**Living Things and their habitats KS2** - 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. -find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals - observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. - study and raise questions about their local environment throughout the year. - find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.

	Knowledge –Animals Including Humans -describe the changes as humans develop to old age. -learn about the changes experienced in puberty. -draw a timeline to indicate stages in the growth and development of humans. **Knowledge – Materials** - 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 - 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. - give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Pupils should build a more 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 in year 3 and about electricity in year 4. - recognise that melting and dissolving are different processes. - demonstrate that dissolving, mixing and changes of state are reversible changes -find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. - use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating **Subject Area: Light** recognise that light from the sun can be dangerous and that there are ways to protect their eyes **Forces and Magnets Knowledge** 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 -explore the effects of levers, pulleys and simple machines on movement. recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect -find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. **Subject Area: Earth And Space** -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. -use a model of the Sun and Earth that enables them to explain day and night. -know that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). -know that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). - find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses
YEAR 6	
Skills	**Subject Area: Skills – Ideas and questions** - uses their scientific experiences to explore ideas and raise different types of questions -talks about how scientific ideas have developed over time - recognises the applications of specific scientific ideas **Skills – Planning** - selects and plans different types of scientific enquiries to answer questions -makes decisions about what observations to make, what measurements to use, how long to make them for and whether to repeat them -chooses the most appropriate equipment to make measurements -explains how to use the equipment accurately -recognises when and how to set up comparative and fair tests - recognises and controls variables where necessary (e.g. explains which variables need to be controlled and why) **Skills - Observing and presenting evidence** -makes systematic and careful observations -takes measurements, in standard units, using a range of scientific equipment, with increasing accuracy and precision -takes repeat readings when appropriate -recognises which secondary sources will be most useful to research their ideas - begins to separate opinion from fact -records data and results of increasing complexity -decides how to record data from a choice of familiar approaches -calculates mean value where appropriate

	-records and presents findings using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs - reports on findings from enquiries, using relevant scientific language and conventions, in oral and written explanations such as displays and other presentations **Skills – Considering and evaluation of evidence** -uses and develops keys and other information records to identify, classify and describe living things and materials -identifies conclusions, causal relationships and explanations of results -identifies patterns that might be found in the natural environment -draws valid conclusions, explains and interprets the results (including the degree of trust) using scientific knowledge and understanding (e.g. recognises limitations of data) -identifies scientific evidence that has been used to support or refute ideas or arguments - uses relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas -makes practical suggestions about how their working method could be improved (e.g. sample size on reliability) -uses results to identify when further tests and observations might be needed -uses test results to make predictions and to set up further comparative and fair tests
Knowledge	**Living Things and their habitats KS2** - 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. - find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. **Knowledge –Animals Including Humans** - identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood -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. -describe the ways in which nutrients and water are transported within animals, including humans. -recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. **Subject Area: Light** 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 **Subject Area: Electricity** -know how to take the necessary precautions for working safely with electricity. - associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit - They should learn how to represent a simple circuit in a diagram using recognised symbols. -use recognised symbols when representing a simple circuit in a diagram. Note: Pupils are expected to learn only about series circuits, not parallel circuits. -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 **Subject Area: Evolution and inheritance** - recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago - find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. - 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.