'Love one another as Jesus loved us' (John 13 v 34-35)

Science at St Mary's CE Primary School

Science Curriculum Rationale

At St Mary's CE we are scientists! We want the children at our school to love science and we aim to provide the children with the science knowledge and investigational skills that they need to equip them with the knowledge required to understand the uses of science today and for the future. We want our children to have high aspirations, be ambitious, naturally curious about the world around them and grow up wanting to be astronauts, nurses, doctors, forensic scientists, meteorologists, zoologists, pharmacists and environmentalists. Our vision at St Mary's CE Primary School is to encourage and nurture the growth of every individual and their uniqueness, so that all flourish and become all that they can be and all that God made them to be.

The science curriculum has been carefully designed and sequenced so that our children develop their science capital. Our children don't have many opportunities to explore concepts out of school and therefore we have designed our science curriculum to foster a sense of awe and wonder. We are committed to providing a stimulating, engaging and challenging learning environment that provides first-hand experiences and that allows the children to become creative, critical thinkers. We want our children to remember their science lessons in our school and embrace the science opportunities they are presented with! Annually, children in Year 2 hatch their very own chicks. They have the opportunity to learn about the life cycle of a chicken, take responsibility for looking after and caring for these living animals and take great delight in watching how these animals change over time and the antics that they get up to! Bringing science alive is important at St Mary's CE Primary School.

Curriculum Intent

The science curriculum is ambitious and allows our children to become independent and resilient – like all curriculum areas. The science curriculum promotes curiosity and a love and thirst for learning
We want to equip our children with all the statutory requirements of the science National Curriculum and also prepare them for the opportunities, responsibilities and experiences in the next stage of their education and beyond. We want our children to learn from other cultures, respect diversity, co-operate with one another and appreciate what they have. We achieve this by providing a strong SMSC curriculum, with British Values and our core values placed at the heart of everything we do. This often feeds into the science curriculum. We also celebrate innovation, encourage children to be inquisitive and respect the ideas of others when making suggestions for how to proceed with scientific investigations and when making predictions. Each year group has been assigned inspirational local, national or international scientists from the fields of Biology, Physics or Chemistry and have the opportunity to find out about significant scientists such as Thomas Edison, Mary Anning and Brian Cox. Our children are inspired by these scientists in their fields and as a result these often provide pupils with an insight into potential career opportunities.

We enrich their time in our school with memorable, unforgettable experiences and provide opportunities, which are normally out of reach, to engage and intrigue our children. For example, children have had the opportunity to watch an amazing travelling science show where they looked at ways to change materials to produce unexpected effects, explored and tested the properties of materials in unusual and astounding ways and enjoyed taking part in interactive experiments to answer questions such as 'How many people

can fit through a sheet of paper?' 'Why is it not a good idea to bring your packed lunch to school in a paper bag?' and 'Can we make a piece of tissue so strong that no one can rip it?' We firmly believe that it is not just about what happens in the classroom, it is about the benefit we offer to really inspire our children. As well as going on science-based trips such as to Manchester Science and Industry Museum and Martin Mere, we also make much use of our school grounds and the local environment to support and enrich learning.

We want our children to know the scientific knowledge and skills within each curriculum topic that we teach to aid their knowledge about key areas of Scientific Enquiry, Life Processes and Living Things, Materials and their Properties, and Physical Processes through a variety of teaching and learning strategies. We want our children to understand that science is the study of the physical world, involving a collection of facts from observations, physical experiments and working scientifically from which they form ideas of their world. We provide opportunities for children to actively learn and the curriculum has a heavy emphasis on investigation where children can make predictions, observations, carry out fair testing and evaluations using a range of methods to communicate their scientific knowledge and present this in a systematic and scientific manner. For example, in Year 4 investigating how different thickness of elastic bands or length of straws can affect pitch. We ensure that children build on their skills to build arguments, explain concepts confidently and continue to ask questions about their surroundings.

Curriculum Implementation

The Science subject leader is responsible for the curriculum design, delivery and impact in this subject. This includes regularly meeting with Governors to review and quality assure the science subject areas to ensure that it is being implemented well and that coverage, breadth and balance is adequate. We do not follow any science schemes of work but have devised our own curriculum based upon the 2014 Primary National Curriculum in England and have devised our progression map of science and skills to ensure that it is developing the knowledge for each year group. Teachers plan lessons for their class using our progression of knowledge and skills document, which incorporates Working Scientifically. Knowledge mats show clear content of the topic -biology, chemistry or physics. They show the progression of the topic identifying progressive knowledge and understanding, skills and vocabulary. The science curriculum is designed to recognise children's prior learning and we build on knowledge and skills from previous year groups. Children are provided with knowledge mats to aid their learning about the topic. We ensure that teachers have the same expectations during Science lessons that they would have when teaching English or Mathematics and that any mathematical task is pitched at an age appropriate level to ensure sufficient challenge.

We have just completed a second review of the science curriculum and this will become an annual task. In this second review, the science curriculum has been carefully revisited to ensure there is a clear sequence of topics taught within year groups (for example swapping the teaching of forces and Earth and space in Year 5 so that pupils have an understanding of gravity first to aid their understanding of why planets orbit the Sun and the Moon orbits the Earth in their next topic) a clear progression of knowledge and vocabulary, embedding key aspects of learning as aspects are revisited. For example, the way materials is taught in our school ensures that it is revisited in each phase. In KS1, the children tackle 'Everyday Materials' where they look at the practical uses of everyday materials. In lower KS2, Year 4 explore 'States of Matter' and look at solids, liquids and gases, changes of state, evaporation, condensation and the water cycle. In upper KS2, Year 5 the children study 'Materials – Properties and Changes' where they examine changes to materials that create new materials that are usually not reversible. We have included significant scientists from a range of cultures and localities. The medium term plans are under review to ensure that the progression document is clearly reflected in the sequence of learning within any given topic. The assessment points and milestones are being defined and developed to reflect the key learning required in each year group. This will ensure the way science is taught throughout our school, follows a consistent structure.

With the reviewed curriculum children explore and practise their investigative skills involved in the topic, predicting and carrying out investigations to answer scientific questions about the world around them. Science subject specific characteristics, which we expect the children to demonstrate underpin science activities. These characteristics are:

- develop a sense of excitement and curiosity about natural phenomena and ask questions about what they notice
- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- understand the nature, processes and methods of science through different types of scientific enquiries that helps them answer scientific questions
- be equipped with the scientific knowledge required to understand the uses of science, today and for the future
- be familiar with and use technical terminology accurately and precisely
- apply their knowledge of maths to collecting, presenting and analysing data
- plan different types of scientific enquiry questions and control variables
- take measurements using a range of scientific equipment with increasing accuracy
- record data of results with increasing complexity, using diagrams, charts & tables
- use test results to make predictions to set up further comparative and fair tests
- report and present findings from enquiries, including conclusions
- identify scientific evidence that has been used to support or refute ideas or arguments

Subject Leads have devised whole school subject long-term curriculum plans, which identify when the different subjects and topics will be taught across the school and across the academic year. All subjects are taught discretely but staff make meaningful links across subjects where appropriate. They link prior knowledge to new learning to deepen children's learning. For example, in Year 4 when the pupils explore 'identify the part played by evaporation and condensation in the water cycle' they are building upon the knowledge and understanding taught in Year 3 when they studied the water cycle as part of their 'Rivers' topic in geography. Our children are taught to make links between knowledge they learn in different contexts.

Medium term plans have been developed and continue to be refined to show the sequence of lessons taught within each topic. These set out the learning challenges for each lesson and closely reference the key learning, vocabulary and progression document and identify engaging activities and resources which will be used to achieve them.

We encourage staff to teach a weekly science lesson. This helps to ensure sufficient time is allocated to science and that scientific subject matter can be revisited frequently. We believe that by constructing our curriculum this way, we improve the potential for our children to retain what they have been taught, to alter their long-term memory and thus improve the rates of progress they make.

Curriculum Impact

We use both formative and summative assessment information in every science lesson. Staff use this information to inform their short-term planning and support. This helps us provide the best possible support for all of our children, including the more able. The National Curriculum programmes of study have been broken down further in Key Stage 2 and these are mapped out in the science progression document and are used as assessment points. This ensures that knowledge and skills in science are progressive and build year on year.

Our aim is for staff to use science formative assessment methods to systematically assess what the children know as the topic progresses and inform their future planning. This formative assessment is then

used in conjunction with summative assessment judgements at the end of each topic. These summative assessment materials are currently under review.

Assessment information in science is collected on the electronic tracker at the end of each topic and an overall science assessment is made at the end of each academic year. This data is analysed as part of our monitoring cycle. This process provides an accurate and comprehensive understanding of the quality of education in science. A comprehensive monitoring cycle is developed at the beginning of each academic year. This identifies when monitoring is undertaken. Monitoring in science includes: book scrutinies, lesson observations and/or learning walks, pupil voice and parental view. All of this information is gathered and reviewed. It is used to inform further curriculum developments and provision is adapted accordingly.

At St Mary's CE Primary School,

we are

Scientists!

Science programmes of study:

Key Stages 1 and 2

Purpose of study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider

school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

School curriculum

The programmes of study for science are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage if appropriate. All schools are also required to set out their school curriculum for science on a year-by-year basis and make this information available online.

Attainment targets

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

Key stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

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

Key stage 1 programme of study –

Years 1 and 2

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 programme of study

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 programme of study

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

Lower key stage 2 – Years 3 and 4

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. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge.

Lower key stage 2 programme of study

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 programme of study

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
- identify the different types of teeth in humans and their simple functions

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 programme of study

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:

- 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

Upper key stage 2 – Years 5 and 6

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study, but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Upper key stage 2 programme of study

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 programme of study

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
- describe the simple functions of the basic parts of the digestive system in humans

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 programme of study

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