

SCIENCE CURRICULUM STATEMENT

Being a scientist at St George's Primary School means;

- 1. Developing Curiosity:** Being curious about the world around us and discovering new knowledge. We will do this by:
 - Performing simple tests
 - Researching using secondary sources
 - Asking and answering questions
- 2. Learning about important:**
 - Scientists
 - STEM careers
 - Enquiry types and skills
 - Scientific knowledge
 - Scientific resources and how to use them
 - Science events and how they affect the wider world around us.
 - Scientific vocabulary
- 3. Being investigative.** Science involves a lot of enquiry and application of scientific discipline to be accurate. We will do this by:
 - asking questions
 - making predictions
 - setting up tests
 - observing and measuring
 - recording data
 - interpreting and communicating results
 - evaluating
- 4. Being knowledgeable about science.** By the time we leave school, we should:
 - Have a body of knowledge about core scientific concepts.
 - Use and understand a range of scientific vocabulary.
 - Have knowledge about some famous scientists and their impact.
 - Understand key principles of biology, chemistry and physics
 - Able to communicate key processes and principles involved with working scientifically

We will teach our children to describe science as:

EYFS	Enquiring and understanding the world around them.
KS1	Enquiring and discovering scientific skills and promoting a love of questioning.
Years 3 and 4	Investigating and exploring scientific questioning and beginning to plan simple practical enquiries that can be applied to the real world.
Years 5 and 6	Assessing and analysing scientific enquiry which promotes an independent desire for further discovery.

We ask key scientific questions to develop understanding of science and how it affects our world, such as;

- How do we measure changes in light, sound, absorption etc?
- How does the weight of food change as it dries?
- How do our shadows change over the course of a day?
- Is there a relationship between the size of the leaves on the tree and the amount of daylight underneath?
- Does seed size affect plant height?
- What is the effect of...?
- Through what material does sound travel the best?
- Does changing the height of a ramp affect how far a car will travel?

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Essentials and Desirable Aspects of Science 2021-22

Each year we will review our essentials and desirable aspects of teaching to ensure that we are securing consistent high-quality learning across the school.

Essentials in Science	Desirable in Science
<ul style="list-style-type: none"> Ensure that key knowledge, vocabulary, learning intentions and success criteria have been quality assured before teaching starts. 	<ul style="list-style-type: none"> Shared planning details resources, activities and sequences for the learning journey over the unit of work.
<ul style="list-style-type: none"> Working scientifically opportunities are well planned in each lesson. These skills are built progressively throughout the year. 	<ul style="list-style-type: none"> Science skills are well thought out and delivered in a sequence which makes effective cross-curricular links. Science skills are progressive throughout each year, building on children's prior knowledge and understanding.
<ul style="list-style-type: none"> Ensure that all topics make emphasis of cultural capital and enrichment with: <ol style="list-style-type: none"> VR opportunities identified. Topic books available for all pupils Lessons, that are well planned and resourced, so there is enough equipment and resources for all children 	<ul style="list-style-type: none"> Explored use of trips/visitors for enrichment. Learn about careers linked to STEM subjects
<ul style="list-style-type: none"> All topics start off using prior learning. Active Learn film clips and activities are used to reactivate previous learning. 	<ul style="list-style-type: none"> Children can access their prior learning in their science books. Teachers use mini quizzes, posters, models, images and knowledge mats to enhance prior learning.
<ul style="list-style-type: none"> All planning identifies expectations for SEND support and recording so children can access and communicate their learning in history. Might include use of pre-teaching, accessible resources, recordings, annotated images, typed work etc. Do not want differentiated curriculum. 	<ul style="list-style-type: none"> Resources used to promote discussion before the lesson (previous day).
<ul style="list-style-type: none"> All lessons start with oral practise of taught vocabulary/concepts to reinforce working memory. Children must be able to articulate their learning. 	<ul style="list-style-type: none"> These are reinforced on Seesaw or Google Classroom.
<ul style="list-style-type: none"> Learning is assessed in all lessons using formative assessment, review of oral feedback, multiple choice quizzes etc. 	<ul style="list-style-type: none"> Constructive self and peer assessment is used to motivate pupils to identify their areas for improvement.
<ul style="list-style-type: none"> All topics have identified opportunities to enhance learning with links and resources on See-Saw and Google Classroom (beyond curriculum learning). This could include pre-teaching or additional learning using Active learn, remote lessons (STEM) or Oak Academy lessons. 	<ul style="list-style-type: none"> Specific opportunities for home learning promoted. Should enable peer feedback/celebration on see-saw, google classroom for learning beyond taught curriculum (videos, power-points, podcast clips etc).

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Helping SEND Children Access Science

We have the highest ambitions for all pupils. Children with SEND needs must be supported to develop their scientific knowledge and skills.

Accessing Science	Recording Science
Use of pre teaching to allow children to access vocabulary and scientific concepts. Supported with ongoing resources such as vocabulary cards, knowledge mats etc.	Use word processors and other writing aids to help children record and capture their learning. Use I-Pads to record pupil voice and ideas. Use collaborative activities so children learn from their peers.
Grouping pupils with care. Evidence shows that manageable mixed-ability grouping or pairing is effective except when carefully planned for a particular purpose such as QFT (pre teaching, feedback etc).	Ensure that as part of QFT. Children are supported to be secure in recording and communicating learning in the lesson. Immediate feedback (in the lesson) has a significant impact on all pupils but especially SEND pupils.
Support above with access to high quality visual resources to: <ul style="list-style-type: none"> ● Summarise key ideas. ● Show patterns in charts/timelines etc. ● Storyboard to sequence events eg stages in flower pollination 	Adapting tasks. For example: <ul style="list-style-type: none"> ● Annotating documents rather than writing an extensive report, so their focus is on scientific understanding. Link to use of writing/oracy scaffolds and stem sentences. <p><i>– This tells me... – In this picture I can see... – This suggests... – I think it was made/drawn/ written in... because... – It is different to ... - I know this because ...</i></p> <ul style="list-style-type: none"> ● Capture their notes observations using digital images. Add voice recording. <p>Could collate this learning on See-Saw/google classroom so it is not lost.</p>
Encourage use of accessible digital resources including audio clips, video links, large print texts etc. Good idea to have key resources on See-Saw and Google Classroom so children can revisit them to aid processing.	
Ensure that children have time to revisit prior learning before lessons starts. Help to reduce the reliance on memory by using digital images of previous learning, encourage them to look at their book or resources on google classroom. Help strengthen working memory. Encouraged to communicate this using oracy techniques.	Avoid time being wasted on unnecessary tasks that will distract from core learning. Examples for some children include: <ul style="list-style-type: none"> ● Writing long titles (never ask any child to write out success criteria). ● Cutting out and sticking in sheets.
Heavily emphasise use of learning intentions and success criteria to specific instructions so there is a clarity and guidance to learning. <ul style="list-style-type: none"> ● May reduce instructions/number of success criteria steps. ● May chunk learning into manageable and achievable steps. 	Highlight important instructions and give more time to carry out the task or focus on part of the task.

Cross Curricular Links

RESPECT Framework	We want our study of science to develop empathy and awareness about the interdependence/impact of humans on the environment and how this affects habitats communities.
Oracy	Our children should use science as an opportunity to develop their vocabulary, ask questions; present information orally about their learning; undertake discussions, have debates, record podcasts etc.
Writing	Record their findings and understanding of science through a range of written outcomes including reports, fact files, knowledge mats, labelled diagrams etc.
Reading	Our children will access a wide range of literature in science. This will include information texts; reports and fact sheets; information on computers and the internet. Children will be encouraged to read beyond the curriculum with a high-quality range of texts.

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Humanities	Our children will start to understand how science has evolved and has enabled scientists to have a greater understanding of the world around them and how things work. Climate change, coastal erosion, land use and over finishing has had an impact on our planet. Science and engineering highlight the progressive changes in civilizations and their legacy on our world.
Creative Arts	Our children should make careful observations, sketches and label diagrams to record their scientific knowledge. Perform and express their understanding through dance e.g. plastic pollution dance.
STEM	Our children will design and make a variety of products using a range of materials to produce a given item for a purpose. They use a wide range of technology to support their scientific investigation skills and further understanding through research.
SMSC	At St George's we should use Science as an opportunity to voice opinions, ideas, thoughts and feelings to a wider audience about the world around them.
Computing	We will also be using online digital skills to organise learning beyond the classroom in See-Saw and Google classroom.

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• Science in National Curriculum

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

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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.

Schools are not required by law to teach the content indicated as being 'non-statutory'.

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:

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- 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

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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

Rocks

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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:

- 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:

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- 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

Properties and changes of materials

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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:

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- 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