

Miers Court Primary School

Science

At Miers Court Primary School, we believe that all children are scientists in their own right. The study of **science** at our school involves children exploring and acquiring a knowledge of the world around them, and how the world works. We aim to create **scientists** that are curious about the world around them, with a questioning mind and a hunger to explore and discover.

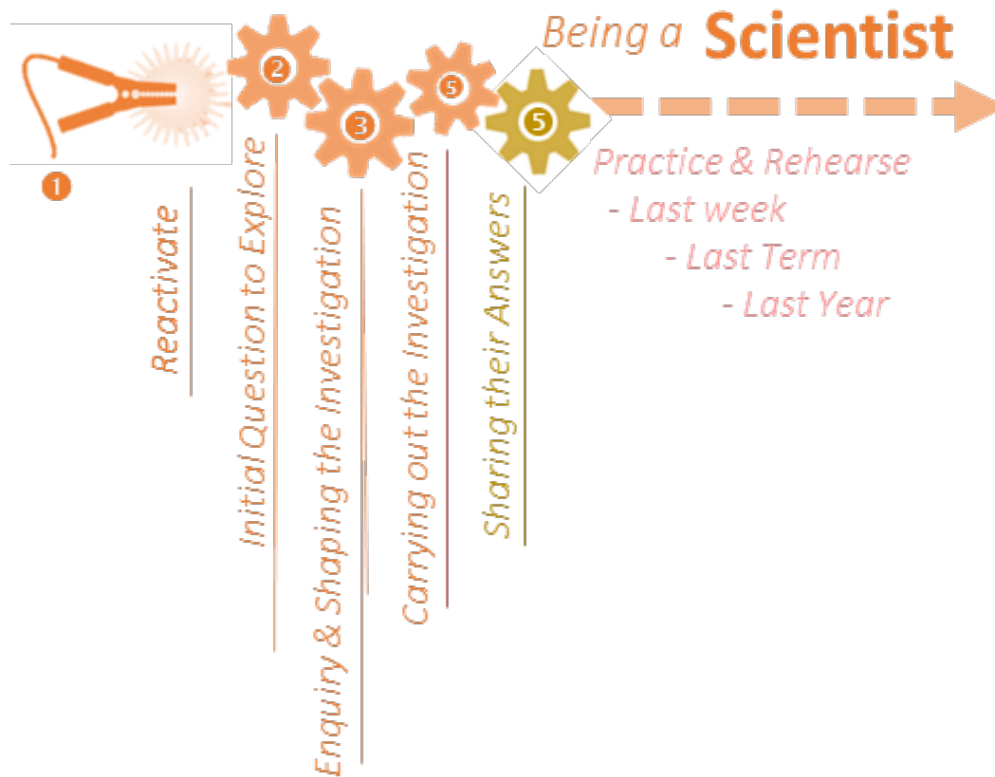
We encourage children to look for links and connections with their learning, between different aspects of **science** enabling them to understand how processes are invariably linked and can have varying effects upon our lives and our understanding of the world we live on.

Shining Bright, Aiming High

Our Miers Court curriculum underpins our school values in the follow way:

Self-belief	Pupil recognise that science is something they can be successful in.
Togetherness	We want pupils to work collaboratively in investigating & exploring the world around them.
Ambition	We want to inspire our pupils to see science outside out school and even possible career choices.
Resilience	They develop the patience and understanding to explore through repetition and experimentation.
Success	Pupils are able to demonstrate their understanding and explain key scientific concepts.

How Do We Teach **Science**?



We have the scheme '*Switched On Science*' which supports teacher's subject knowledge and scaffolds the learning.

Science is taught once a week in all classes.

The Teaching of Science follows a specific routemap which builds up the knowledge of their unit in small steps.

Science 'Route-map'

1. Re-Activating

The unit will begin with the children activating prior knowledge. This is the annotation of prior knowledge onto their knowledge mat. As well as this, each lesson will include an assessment question based on the prior learning from previous lessons within the unit to reactivate and to embed learning.

'[Explorify](#)' is used as a starter activity to generate discussion and engage the children in using their working scientifically skills. This is often open ended and not with a 'correct' answer, but favours analysis, explanation and reasoning.

2. Scientists in action

The unit will start with the pupils exploring a famous scientist in the fields which they are studying. This will give the pupils an understanding of the real-world applications and the importance which science has in life.

3. Initial Question to Explore

The pupils will be given an enquiry question to explore. All lessons will be based around this question. They will be given the opportunity to use their knowledge in finding the answers to their question.

4. Enquiry and Shaping the Investigation

The pupils will be taught how to shape an investigation to the enquiry question. They will be taught which type of enquiry they can carry out to find data to answer this. Each type of enquiry is different, and the investigation will be suited to finding the answers to the initial question.

5. Carrying out the Investigation

As the pupils carry out the investigation, the staff will encourage the pupils to make notes and record their work in a variety of different ways and collect the evidence for their enquiry in an appropriate format. This does not always need to be writing due to the pupil's abilities in English - it can be diagrams, pictures, photographs etc.

6. Evaluating their findings

At the end of the investigation, the children should be able to explain their findings and use their evidence to provide an appropriate answer to the enquiry questions. There may be more than one answer, and sometimes further questions may be brought up and used for future learning.

How Do We Teach **Working Scientifically**?



Asking Questions



Making Predictions



Setting up tests



Observing & Measuring



Recording Data



Analysing Data



Sharing their answers

Working Scientifically

Science is a large subject area which draws on other subject areas as well as developing its own subject specific skills.

Throughout all of these, the children will be learning how to be a scientist and how to work scientifically.

There are seven key scientific skills which we develop in the children. These cross through all year groups and strands of science.

How do we support pupils in **Science**?

Cognition and Learning

Subject Challenges

Age appropriate content for all children in the science lessons

Gaps in knowledge and understanding in science due to (Covid19)

Accessing learning due to poor literacy skills

Children may struggle to remember information/facts/previous learning in science

Provision for SEND

Using personal stories to understand different contexts
1:1 session
Use of books/stories

Ensure previous years science learning objectives are covered

Key words displayed
Use of shorter/less complex sentences in resources given
Writing frames where possible

Lots of retrieval opportunities and reinforcement in science lessons
Clear differentiation
Apply new vocab into lots of different contexts - pre teaching vocab
Physical warm ups to recall previous learning

Communication and Interaction

Subject Challenges

Children may struggle to communicate and express opinions in science

Language difficulties may make chn unable to access their science learning

Provision for SEND

Visual cues
Visual words/ phrases
Minimise background noise
Child to face T to support lip reading
Write new vocabulary down
Dual coding
Language Buddies

Lots of reinforcement
Lots of repetition
Scaffold observational skills through careful questioning
Use of simple instructions
Step by step instructions
Careful and appropriate modelling to support understanding
Visual aids and dual coding
Video's of examples and practice

Physical and sensory

Subject Challenges

Children with visual impairment may find it difficult to see images shown during the science lessons.

Recording information may be difficult from a scientific investigation.

Children with fine motor difficulties may find it difficult to use specific Science equipment

Children who might not be able to touch or handle equipment

Provision for SEND

Ensure images are enlarged and accessible

Ensure chn are close to whiteboard/ sources

Provide additional ways to record e.g. video, drawings, verbal explanation

EYFS tools that may be larger to use
Working in groups to support
Pencil grips and tripod pencils
Use of ICT to support access

Addressing individual needs on a school trip to ensure full access eg breaks for walking etc

Social Emotional and Mental Health

Subject Challenges

Chn may become frustrated/withdraw/ aggressive when work is challenging

Children's mental health and wellbeing may impact on their ability to access their learning

Provision for SEND

Ensure instructions are clear
Children provided with a role which may not involve active participation
Use of ICT to support access
Providing appropriate resources so that children can access the lesson eg fiddle toy
Providing a safe space for the children within the lesson if needed- breakout spaces

Teach with empathy and understand
Ensure children have opportunities to have sensory breaks etc from their work
Consider cognitive overload and children's ability to manage this

Ensuring that parents are aware of curriculum and can support in science.

How is **Science** Sequenced Over The Year?

These strands are delivered in the following terms: The sequence of teaching Science is connected to the termly topic where possible.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
R	What makes me special? Explore collections of materials with similar/ different properties. Explores how materials behave (floating, melting, magnetic, etc.).	What's going on? Can understand the effect of the changing seasons. Describe what they see, hear and feel while outside	Who can tell a story? Uses simple descriptive language. Represents ideas through talk, drawing, or play.	What is in my garden? Showing care and concern for living things and the environment. Children ask questions about things they have observed.	How can I look after myself? Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time'	What is out there? Shows curiosity and asks simple "why/what if?" questions. Makes simple predictions during play. Tries out ideas to see what happens. Talks about what they observed.
1	Celebrations Animals including humans Everyday materials Plants	Plants and animals where we live Plants Seasonal change	Polar places Animals including Humans	Who am I? Animals including humans	On safari Animals including humans Plants Seasonal change	Holiday All strands.
	Rose-Marie Pangborn	Joseph Banks	Eddy Carmack	Linda Buck	Steve Irwin	Charles Goodyear
2	Our local environment Living things and their habitats Plants	Squash, bend twist and stretch Uses of everyday materials	Young gardeners Plants	Healthy me Animals including humans Uses of everyday materials	Materials monster Uses of everyday materials	Little masterchefs All strands



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	Sir David Attenborough	Alfred Nobel	Ynes Mexia	Louis Pasteur	Gretchen Kalojni	John Yudkin
3	Forces and magnets Forces	Rocks, soils and fossils Rocks and soils	Light and shadows Light	Food and our bodies Animals including humans	How does your garden grow? Plants	The nappy challenge All strands
	Michael Faraday	Mary Anning	Thomas Young	Donald Johnson	Katherine Esau	Marion Donovan
4	Teeth and eating Animals including humans	Living things Living things and their habitats	What's that sound? Sound	Looking at states States of matter	Power it up Electricity	The big build All strands
	William Beaumont	Evelyn Cheesman	Heinrich Hertz	Pierre Perrault	Thomas Edison	Santiago Calatrava
5	Growing up and growing old Animals including humans	Let's get moving Forces and motion	Out of this world Earth and space	Material world Properties and changes of materials	Circle of life Living things and their habitats	Amazing changes All strands
	Jean Purdy	Isaac Newton	Galileo Galilei / Stephen Hawking	Marie Curie	Jane Goodall	Lise Meitner
6	Healthy bodies Animals including humans	Evolution and inheritance Evolution	Classifying living things Living things and their habitats	Electricity Electricity	Light Light	The Titanic All strands
	William Harvey	Charles Darwin	Carl Linnaeus	Nikola Tesla	Maria Telkes	Thomas Andrews

What Are The End Points For Each Year In Science?

	Working Scientifically	Biology	Chemistry	Physics
R	<p>R.1 Ask questions to find out more and to check what has been said to them.</p> <p>R.2 Articulate their ideas and thoughts in well-formed sentences</p> <p>R.3 Use talk to help work out problems and organise thinking and activities.</p> <p>R.4 Use new vocabulary in different contexts</p> <p>R.5 Discuss what they can see happening during an investigation.</p> <p>R.6 Use talk to explain how things work and why they might happen.</p> <p>R.7 Describe events in some detail.</p>	<p><i>Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - toothbrushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian.</i></p> <p><i>Explore the natural world around them. Recognise some environments that are different to the one in which they live. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.</i></p>	<p><i>Explore and identify simple changes. Discuss how and why things change. Understand some important processes and changes in the natural world around them and changing states of matter.</i></p>	<p><i>Describe what they see, hear and feel while they are outside. Understand the effect of changing seasons on the natural world around them. Understand some important processes and changes in the natural world around them, including the seasons.</i></p>
1	<p>1.1 Ask simple questions and try to give an answer to it.</p> <p>1.2 Make simple suggestions as to the outcome of an investigation. e.g. I think ...</p> <p>1.4 Perform simple tests with support and guidance.</p> <p>1.5 Observe closely, using simple equipment.</p> <p>1.6 Gather and record data in groups to help in answering questions.</p> <p>1.7 Identify and classify using a range of simple data.</p> <p>1.8 Use observations and ideas to suggest simple answers to questions.</p> <p>1.9 Discuss what has happened in an investigation and why they think this is.</p>	<p>1.10 Plants <i>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</i></p> <p>1.11 Animals, including Humans <i>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. Say which part of the body is associated with each sense. Identify, name, draw and label the basic parts of the human body. Describe and compare the structure of a variety of common animals.</i></p>	<p>1.12 Everyday materials <i>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. Describe the simple properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple properties.</i></p>	<p>1.13 Seasonal Change <i>Identify how the weather changes with the seasons throughout the year. Explain the seasonal changes that occur around them. Understand why different organisms can be found at differing times throughout the year.</i></p>



2	<p>2.1 Ask simple questions and recognise that they can be answered in different ways.</p> <p>2.2 Make appropriate suggestions as to the outcome of an investigation. e.g. I think because....</p> <p>2.3 Perform simple tests with growing independence.</p> <p>2.4 Observe closely, using simple equipment.</p> <p>2.5 Take measurements with some accuracy, including both standard and non-standard units.</p> <p>2.6 Gather and record data with greater independence to help in answering questions.</p> <p>2.7 Identify and classify using a range of relevant data.</p> <p>2.8 Use observations and ideas to suggest answers to questions.</p> <p>2.9 Discuss what has happened in an investigation and why they think this is, using evidence where appropriate.</p>	<p>2.11 Plants <i>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.</i></p> <p>2.12 Animals including humans <i>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Find out about and describe the basic needs of humans for survival (water, food and air). Describe the importance for humans of eating the right amounts of different types of food, and hygiene.</i></p> <p>2.13 Living Things and habitats <i>Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including micro-habitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food</i></p>	<p>2.14 Uses of Everyday Materials <i>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.</i></p>	
3	<p>3.1 Ask appropriate questions and use different types of scientific enquiries to answer them.</p>	<p>3.13 Plants <i>Identify and describe the functions of different parts of flowering plants: roots, stem / trunk, leaves and flowers.</i></p>	<p>3.15 Rocks and soils <i>Compare and group together different kinds of rocks on the basis of their appearance and simple</i></p>	<p>3.16 Light and shadows <i>Recognise that we need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces.</i></p>

	<p>3.2 Use existing knowledge to make simple predictions regarding the outcome of an investigation.</p> <p>3.3 Following an investigation, make predictions for new values.</p> <p>3.4 Set up simple practical enquiries, comparative and fair tests.</p> <p>3.5 Make careful observations.</p> <p>3.6 Where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>3.7 Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.</p> <p>3.8 Gather, record and present data in a variety of ways to help in answering questions.</p> <p>3.9 Identify differences, similarities or changes related to simple scientific ideas and processes with some support.</p> <p>3.10 Report on findings from enquiries, including oral and written explanations.</p> <p>3.11 Use results to draw simple conclusions.</p> <p>3.12 Use straightforward scientific evidence to answer questions or support their findings.</p>	<p><i>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.</i></p> <p>3.14 Animals including humans <i>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.</i></p>	<p><i>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.</i></p> <p><i>Recognise that light from the Sun can be dangerous and that there are ways to protect the eyes. Recognise that shadows are formed when the light from a light source is blocked by a solid object. Find patterns in the way that the sizes of shadows change.</i></p> <p>3.17 Forces and magnets <i>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.</i></p>
<p>4</p>	<p>4.1 Ask relevant questions and use different types of scientific enquiries to answer them.</p> <p>4.2 Use existing knowledge to make predictions regarding the outcome of an investigation.</p> <p>4.3 Following an investigation, make predictions for new values, suggest improvements and raise further questions.</p>	<p>4.13 Animals, including humans <i>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.</i></p> <p>4.14 Living things and their habitats <i>Recognise that living things can be</i></p>	<p>4.15 State of Matter <i>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</i></p> <p>4.16 Electricity <i>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</i></p>

	<p>4.4 Set up more detailed practical enquiries, comparative and fair tests.</p> <p>4.5 Make systematic and careful observations.</p> <p>4.6 Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>4.7 Record findings using appropriate scientific language, drawings, labelled diagrams, keys, bar charts and tables.</p> <p>4.8 Gather, record, classify and present data in an appropriate format to answer questions.</p> <p>4.9 Identify differences, similarities or changes related to scientific ideas and processes with greater independence.</p> <p>4.10 Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>4.11 Use results to draw conclusions.</p> <p>4.12 Use scientific evidence to answer questions to support their findings.</p>	<p><i>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.</i></p>	<p><i>water cycle and associate the rate of evaporation with temperature</i></p>	<p><i>a lamp lights in a simple series circuit. Recognise some common conductors and insulators and associate metals with being good conductors</i></p> <p>4.17 Sound</p> <p><i>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.</i></p>
5	<p>5.1 Ask increasingly challenging questions and recognise that they can be answered in different ways.</p> <p>5.2 Use existing and prior knowledge to make informed predictions regarding the outcome of an investigation.</p> <p>5.3 Plan different types of scientific enquiries to answer an increasing variety of questions.</p> <p>5.4 Take measurements, using a range of scientific equipment, with increasing</p>	<p>5.9 Animals, including humans <i>Describe the changes as humans develop to old age.</i></p> <p>5.10 Living things and their habitats <i>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.</i></p>	<p>5.11 Properties of materials <i>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</i></p>	<p>5.12 Earth & 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.</p> <p>5.13 Forces <i>Explain that unsupported objects fall towards the Earth because of the force of gravity</i></p>

	<p>accuracy, taking repeat readings where appropriate.</p> <p>5.5 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.</p> <p>5.6 Use test results to make informed predictions to set up further comparative and fair tests.</p> <p>5.7 Report and present findings from enquiries, including conclusions, causal relationships and explanations in oral and written forms such as displays and other presentations.</p> <p>5.8 Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>		<p><i>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.</i></p>	<p><i>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.</i></p>
6	<p>6.1 Ask insightful questions and recognise that they can be answered in different ways.</p> <p>6.2 Use existing and prior knowledge to make justified predictions regarding the outcome of an investigation.</p> <p>6.3 Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>6.4 Take measurements, using a range of scientific equipment, with accuracy and precision, taking repeat readings to confirm findings.</p> <p>6.5 Record data and results of all types using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.</p> <p>6.6 Use test results to make justified predictions to set up further comparative and fair tests.</p> <p>6.7 Report and present findings from enquiries, including conclusions,</p>	<p>6.9 Animals, including humans <i>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.</i></p> <p>6.10 Living things and their habitats <i>Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.</i></p> <p>6.11 Evolution and inheritance <i>Recognise that living things have changed over time and that fossils</i></p>		<p>6.12 Electricity 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.</p> <p>6.13 Light <i>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.</i></p>



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causal relationships and explanations and degree of trust in results, in oral and written forms such as displays and other presentations.

6.8 Identifying and explaining scientific evidence that has been used to support or refute ideas or arguments.

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