St Michael's C.E Primary School

Science Curriculum 2024-2025

Science is the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment.
Intent - At St Michael's, Science promotes and implements a range of knowledge, skills and understanding of nature, processes, and methods of scientific enquiry. We challenge all pupils to question their ideas and create a safe and fair environment to encourage this.
A Scientist at St Michaels works accurately and precisely. They are curious and ask questions to explore and test predictions and theories. Biology - is the Science of life and living organisms. Chemistry - is a branch of science that studies what everything is made of and how it works. Physics - is a branch of science that helps is understand how objects, forces and energy all interact.

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Spirituality Across the Curriculum

Our definition of spirituality at St Michael's CE Primary School:

To talk about spirituality is to talk about something which is ***beyond words.***
Spirituality is linked to big ***questions*** *about the* ***meaning and purpose of life;*** *it includes ideas* ***relating to oneself, others, the natural world and the transcendent.***
We refer to this as:
The stillness of the mind
The settling of the soul
The uplifting of the spirit
Being at one in the world and finding meaning and purpose in life.
For some, but not all, this will be experienced, expressed or explained through faith or belief.

When discussing this with our pupils, we refer to spirituality as:

The way WOWS, OWS and NOWS shape me into the person that I am and will become.

Spiritual development contains many facets and it is concerned with a number of areas of an individual's life. Therefore, when developing spirituality in pupils and adults, we, in line with our distinctively Christian vision and our school's definition for spirituality, look at four key areas: self, others, transcendence (beyond), and nature.

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Spirituality Opportunities

Self

Opportunities

- After experiments, hold discussions about the wonder of scientific discovery. Ask pupils how these experiences make them feel and what questions they have about the world.
- Discuss how our senses help us experience the world and connect with others, fostering gratitude and awareness.
- Opportunity to explore personal faith and how this reflects on their scientific views.
- To love and respect our own bodies and have an understanding of how our bodies are unique.
- Facilitate discussions about the vastness of the universe and what it means to be part of something so large. Prompt pupils to think about their place in the universe and what they find awe-inspiring about it.
- Discuss the concept of growth and change, relating it to personal experiences. Ask pupils to reflect on their own growth and the changes they have experienced in their lives.
- Encourage pupils to think about their responsibilities towards the environment. Discuss the idea of stewardship and how caring for the Earth can be seen as a spiritual practice.
- Discuss the interconnectedness of body, mind, and spirit. Encourage pupils to reflect on what it means to be healthy and how they can care for themselves holistically.

Potential Question Prompts

- How does this work?
- Why has this happened?
- How are you unique?
- How can you make a difference in the world?
- How does understanding the human body and mind help you appreciate your own existence?
- How can learning about genetics and heredity influence your sense of identity and purpose?

Others

Opportunities

- To care for habitats to reinforce the understanding of unity and interconnectedness. Children feel part of a larger whole, fostering a sense of belonging and purpose.
- Taking responsibility of the environment is a way of fulfilling our responsibilities towards others and future generations, producing a stillness of the mind.
- To explore significant people and the wows in their field.
- Encourage pupils to reflect on teamwork and collaboration. Discuss the importance of listening to different viewpoints and how working together can lead to better outcomes.
- Facilitate discussions on how science can address social issues and improve lives. Encourage pupils to think about their role in advocating for others and promoting equity.

Potential Question Prompts

- Why should we care for habitats?
- What are the wows and ows in the stories behind the significant people you study?
- How can scientific advancements in medicine and technology improve the well-being of others?
- What role does empathy play in scientific research and healthcare?
- How can understanding ecosystems and biodiversity help us work together to protect our planet?

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Transcendence

Opportunities

- Opportunity to explore how living organisms adapt to their ecosystems.
- How each organism plays a role, connecting to the idea of 'being at one in the world'.
- Having a sense of how states of matter impact the world around us.
- Opportunity to be grateful for the world around us.
- Encourage pupils to reflect on the vastness of the universe and their connection to it. Discuss questions like, "What do you feel when you look at the night sky?" or "How does understanding the universe change your perspective on life?"
- Discuss the themes of transformation and renewal. Ask pupils to reflect on their own experiences of change and growth, and how these experiences connect them to the larger cycle of life.
- Discuss the importance of caring for the Earth and how this reflects a commitment to future generations. Encourage pupils to think about how their actions can lead to positive change in the world.

Potential Question Prompts

- How do living organisms survive?
- How do living organisms adapt to their surroundings?
- I wonder how animals survive?
- What would happen if there was no water to evaporate?
- How do scientific discoveries about the universe expand our understanding of the divine or the transcendent?
- What are the similarities and differences between scientific and spiritual explanations of the origins of life?
- How can studying the vastness of space inspire a sense of wonder and connection to something greater than ourselves?

Nature

Opportunities

- Appreciating the beauty in nature and understand the differences and similarities in plants and eco-systems and how they are interconnected.
- Discuss the idea that all living things are part of a better system and depend on each other fostering a sense of connection to the natural world.
- Appreciating the natural world around us and how the time taken to produce the natural elements of the world.
- Organising trips to learn about ecosystems, observe wildlife, and understand biodiversity. These experiences can inspire a sense of awe and interconnectedness with the natural world.
- Taking time to appreciate the natural world.
- Grow plants under different conditions to study the factors that affect growth, such as light, water, and soil type. Reflect on the miracle of growth and the spiritual lessons of nurturing and patience.
- Keep journals to record observations of seasonal changes in the local environment. Reflect on the spiritual significance of seasons and cycles in nature.

Potential Question Prompts

- What are the differences and similarities in plants and eco-systems?
- How are the living things dependent on each other?
- How does learning about the natural world enhance your appreciation for the environment?
- What spiritual lessons can we draw from the cycles and systems observed in nature?
- How can scientific knowledge about climate change motivate us to take better care of our planet?

St Michael's CE Primary Science Curriculum 2024-2025

St Michael's C.E. Primary School

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Animals Including Humans What body parts make me, me? Key Scientist: Marie Daly	Seasonal Changes How can you identify the different seasons?	Materials Why do we use different materials for different things? Key Scientist: Albert Einstein	Seasonal Changes How can you identify the different seasons?	Plants and Trees How can you identify different plants and trees?	Animals Including Humans How can you identify and group a variety of common animals? Seasonal Changes How can you identify the different seasons? Key Scientist: David Attenbourough
Year 2	Properties of Materials How are materials chosen in design? Key Scientist: Marie Curie		Living Things and their Habitat How are animals suited to their environment? Key Scientist: Charles Henry Turner		Animals including Humans How do the basic needs of animals help them to survive? Key Scientist: Jane Goodall	Plants What do plants need to grow?
Year 3	Rocks and Soils What's the difference between rocks and soils? Key Scientist: Anjana Khatwa	Forces and Magnets Can you describe how objects can be affected by contact and non-contact forces? Key Scientist: William Gilbert		Animals Including Humans Why is it important for humans to have a skeletal system? Key Scientist: Adelle Davis	Light What is the connection between light and shadows and how do they affect each other? Key Scientist: Percy Shaw	Plants Why is water an important factor of a plant cycle? Key Scientist: George Washington Carver
Year 4	Living Things and their Habitats How do environments change and why can this endanger living things? Key Scientist: Rachel Carson	Electricity Does everything shiny conduct electricity? Key Scientist: Lewis Latimer	Sound What is sound and how is it produced? Key Scientist: Aristotle		States of Matter Can any material be classified as a solid, liquid or gas? Key Scientist: David Farenheit	Animals Including Humans Why are food chains important? Key Scientist: William Beaumont
Year 5	Earth and Space How is the position and movement of the earth responsible for day, night and years? Key Scientist: Galileo/Copernicus and Ptolemy Stephen Hawking Mae Jamison	Living Things and their Habitats Are all animal life cycles the same? Key Scientist: Jane Goodall	Forces How are objects affected by contact and non-contact forces? Key Scientist: Isaac Newton		Properties of Materials Do the physical properties of materials determine their uses? Key Scientist: Spencer Silver	Animals Including Humans Why do humans change as they develop to old age? Key Scientist: Virgin Apagar
Year 6	Light What is the connection between light and shadows and how they affect each other? Key Scientist: Ibn al-Haytham (Alhazen) Ibn Sahl -	Evolution and Inheritance and their Habitat Does survival of the fittest always mean the species are competing against one another? Key Scientist: Charles Darwin Mary Anning		Animals including Humans Can each body system work independently from one another? Key Scientist: Daniel Hale William	Living Things How do we know that life goes through a cycle if we all die in the end? Key Scientist: Carl Linneaus	Electricity Will the components in a circuit always have the same effect? Key Scientist: Mildred Dresselhaus

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Early Years Foundation Stage – Related to Science

Understanding the World

ELG: The Natural World

- Explore the natural world around them, making observations and drawing pictures of animals and plants.
- 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.
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

National Curriculum – Science

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.

National Curriculum – 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.

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National Curriculum – Lower Key stage 2 – Year 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.

National Curriculum – Upper Key stage 2 – Year 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.

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Milestones for Science

Year 1

Animals including Humans – My body
What body parts make me, me?

Knowledge

- I can spot and name a variety of common animals that are carnivores, herbivores and omnivores.
- I can describe and compare the structure of a variety of common animals.
- I can name, draw and label the basic parts of the human body and say which part of the body is to do with each sense.

Skills:

- I can explore the world around me and raise my own questions.
- I can use scientific practical activities to experience a variety of scientific enquiry and questioning.
- I can ask people questions and use simple secondary equipment to find answers.
- I can communicate what I have discovered using simple scientific language.

Materials
Why do we use different materials for different things?

Knowledge

- I can tell the difference between an object and the material from which it is made.
- I can name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.
- I can describe some everyday materials.
- I can make groups of materials based on what they are like.

Skills:

- I can perform simple tests to explore questions.
- I can use scientific practical activities to experience a variety of scientific enquiry and questioning.
- I can sort and group simple features of objects and materials, observing changes over time.
  - I can use the language of time to describe and compare changes over time. For example – quicker / slower / earlier / later.
- I can communicate what I have discovered using simple scientific language.
- I can record simple data.

I can record the number of instances in a simple table.

- I can predict.
- I can conclude an experiment.
- I can start to understand the importance of fair testing. .

Plants and Trees
How can you identify different plants and trees?

Knowledge

- I can name some common wild and garden plants, including deciduous and evergreen trees.
- I can name and describe the basic structure of a variety of common flowering plants, including trees.

Skills:

- I can work scientifically by observing closely to compare and contrast.
- I can explore the world around me and raise my own questions.
- I can sort and group simple features of living things, observing changes over time.
  - I can use the language of time to describe and compare changes over time. For example – before / after / next / first / today / yesterday / tomorrow / morning / afternoon / evening.
- I can ask people questions.
- I can communicate what I have discovered using simple scientific language.
- I can predict.
- I can record simple data.
  - I can record the number of instances in a simple table.
- I can conclude an experiment.
- I can start to understand the importance of fair testing.

Animals including Humans – Mammals
How can you identify and group a variety of common animals?

Knowledge

- I can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
- I can identify and name a variety of common animals that are carnivores, herbivores and omnivores.

Skills:

- I can identify and classify into different classification of groups.
- I can communicate what I have discovered using simple scientific language.
- I can use my observations and ideas to suggest answers to questions.
- I can explore my local environment to answer questions about animals in their habitat.

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Seasonal Changes – How can you identify the different seasons?

Knowledge

- I can explain changes through autumn, winter, spring and summer.
- I can describe the weather in autumn, winter, spring and summer and that the days get longer and shorter.

Skills:

- I can predict.
- I can record data.
- I can conclude an experiment.
- I can start to understand the importance of fair testing.
- I can observe and communicate the changes in the weather and the seasons.
- I can create charts and tables to present my findings.
- I can identify and classify seasons and the weather.
- I can use scientific practical activities to experience a variety of scientific enquiry and questioning..
- I can communicate what I have discovered using simple scientific language

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Year 2

Properties of Materials How are materials chosen in design?	Living Things and their Habitats How are animals suited to their environment?	Animals including Humans How do the basic needs of animals help them to survive?	Plants What do plants need to grow?
Knowledge . • I can say why I would choose a material for a particular job. • I can explain how objects made from some materials can be changed by squashing and bending. Skills • I can ask questions and know they can be answered in different ways. • I can watch closely using equipment. • I can start to understand the importance of fair testing. • I can perform simple tests. -I can make simple predictions. • I can name and group. • I can ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantities. • I can use my observations and ideas to suggest answers to questions. • I can ask people questions and use simple secondary equipment to find answers. - I can conclude an experiment. • I can ask and answer questions about totalling and comparing categorical data.	Knowledge • I can explain the differences between things that are living, dead and things that have never been alive. • I can explain that most living things live in habitats which suit them and depend on each other. • I can name some plants and animals in their habitats including micro-habitats. • I can explain how animals get their food from plants and other animals using a simple food chain Skills • I can ask questions and know they can be answered in different ways. • I can name and group. • I can ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantities. • I can use my observations and ideas to suggest answers to questions.	Knowledge • I can explain that animals, including humans, have babies which grow into adults. • I can explain the needs of animals, including humans, for survival. • I can explain the importance of exercise, eating healthily and keeping clean. Skills -I can create tables and charts to display information. • I can interpret and construct simple pictograms, tally charts, block diagrams and simple tables. • I can name and group. • I can ask people questions and use simple secondary equipment to find answers. • I can ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantities.	Knowledge • I can explain how seeds and bulbs grow into plants. • I can describe how plants need water, light and a suitable temperature to grow and stay healthy. Skills -I can use the local environment to observe. -I can make simple predictions. -I can observe and record with some accuracy. - • I can interpret and construct simple pictograms, tally charts, block diagrams and simple tables. • I can ask questions and know they can be answered in different ways. • I can start to understand the importance of fair testing • I can ask and answer questions about totalling and comparing categorical data. • I can watch closely using equipment. • I can use scientific practical activities to experience a variety of scientific enquiry and questioning. • I can name and group. • I can ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantities. • I can use my observations and ideas to suggest answers to questions. - I can conclude an experiment.

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Year 3

Rocks and Soils
What is the difference between rocks and soils?

Knowledge

- I can explain that soils are made from rocks and organic matter.
- I can describe simply how fossils are formed when things that have lived are trapped within rock.
- I know that rocks can be grouped by their physical properties.

Skills:

- I can examine and conduct practical experiments on various types of rocks to group them on the basis of their appearance and simple physical properties
- I can ask questions and use different types of scientific enquiry to answer them.
- I can set up simple practical enquiries, comparative and fair tests.
- I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- I can summarise my findings and write a conclusion using scientific language
  - I can interpret and present data using bar charts, pictograms and tables.

I can interpret data presented in many contexts

Forces and Magnets
How can objects be affected by contact and non-contact forces?

Knowledge

- I know that things move differently on different surfaces.
- I know some forces need contact between two objects, but magnetic forces can act at a distance.
- I know how magnets attract or repel each other and attract some materials and not others.
- I can describe magnets as having two poles.
- I can name some magnetic materials
- I can explain when two magnets will attract and when they will repel.
- I can group materials based on whether they are attracted to a magnet.

Skills:

- I can compare and group some materials on the basis of whether or not they are attracted to a magnet
- I can predict whether two magnets will attract or repel each other, depending on which poles are facing
- I can summarise my findings and write a conclusion using scientific language.
- I can ask questions and use different types of scientific enquiries to answer them.
- I can set up simple practical enquiries, comparative and fair tests.
- I can make observations and take measurements using standard units, using a range of equipment, including thermometers and data loggers.
- I can gather, record, classify and present data in a variety of ways to help with answering questions.

I can interpret and present data using bar charts, pictograms and tables.
I can interpret data presented in many contexts.

- I can report on findings from enquiries, including spoken and written explanations, displays or presentations of results and conclusions.

I can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
-I can explain differences, similarities or changes related to simple scientific ideas and processes.
- I can use straightforward scientific evidence to answer questions or to support my findings.

Animals including Humans
Why is important for humans to have a skeletal system?

Knowledge

- I can explain why humans and some other animals have skeletons and muscles.
- I know 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.

Skills:

- I can ask questions and use different types of scientific enquiries to answer them.
- I can gather, record, classify and present data in a variety of ways to help with answering questions.
- I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
  - I can interpret and present data using bar charts, pictograms and tables.
  - I can interpret data presented in many contexts.

Light
What is the connection between light and shadows and how do they affect each other?

Knowledge

- I know that light is reflected from surfaces.
- I can explain that I need light in order to see things and that dark is the absence of light.
- I can explain that light from the sun can be dangerous and that there are ways to protect eyes.
- I know how shadows are formed when the light from a light source is blocked by a solid object.
- I know that there are patterns in the way that the size of shadows change.

Skills:

- I can ask questions and use different types of scientific enquiries to answer them.
- I can set up simple practical enquiries, comparative and fair tests.
- I can make observations and take measurements using standard units, using a range of equipment, including thermometers and data loggers.
- I can gather, record, classify and present data in a variety of ways to help with answering questions.
  - I can interpret and present data using bar charts, pictograms and tables.
  - I can interpret data presented in many contexts.

-I can explain differences, similarities or changes related to simple scientific ideas and processes.
-I can summarise my findings and write a conclusion using scientific language

Plants
Why is water an important factor of a plant cycle?

Knowledge

.- I can explain what different parts of flowering plants do.
- I know the requirements of plants for life and growth and how they vary from plant to plant.
- I know the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Skills:

- I can investigate the way in which water is transported within plants.
- I can ask questions and use different types of scientific enquiries to answer them.
- I can set up simple practical enquiries, comparative and fair tests.
- I can make observations and take measurements using standard units, using a range of equipment, including thermometers and data loggers.
- I can gather, record, classify and present data in a variety of ways to help with answering questions.
- I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
  - I can interpret and present data using bar charts, pictograms and tables.
  - I can interpret data presented in many contexts.
- I can report on findings from enquiries, including spoken and written explanations, displays or presentations of results and conclusions.
- I can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
-I can explain differences, similarities or changes related to simple scientific ideas and processes.
- I can use straightforward scientific evidence to answer questions or to support my findings.

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Year 4

Living Things and their Habitats
How do environments change why can this endanger living things?

Knowledge

- I can show that living things can be grouped together in various ways.
- I can explore and use classification keys to help group, identify and name a variety of living things.
- I can explain that environments can change and that this sometimes means that living things are put in danger

Skills:

-I can explain differences, similarities or changes related to simple scientific ideas and processes.
- I can use straightforward scientific evidence to answer questions or to support my findings.

Electricity
Does everything shiny conduct electricity?

Knowledge

- I can talk about common appliances that run on electricity.

I know the scientific symbols for parts of a circuit.
- I can explain that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
- I know that some materials are conductors and some are insulators, and can explain that metals are good conductors.

Skills:

- I can construct and draw with labels a simple series electrical circuit which includes cells, wires, bulbs, switches and buzzers.
- I can predict if a lamp will light or not in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. -

I can ask questions and use different types of scientific enquiries to answer them.
- I can set up simple practical enquiries, comparative and fair tests.
- I can gather, record, classify and present data in a variety of ways to help with answering questions.
- I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.
- I can report on findings from enquiries, including spoken and written explanations, displays or presentations of results and conclusions.

I can summarise my findings and write a conclusion using scientific language.

- I can interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

-I can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Sound
What is sound and how is it produced?

Knowledge

- I can explain how sounds are made, and show that some of them are linked to vibrations.
- I can explain that vibrations from sounds travel through a medium to the ear.
- I can find patterns between the pitch of a sound and features of the object that produced it.
- I can show that there is a pattern between the volume of a sound and the strength of the vibrations that produced it.
- I can show that sounds get fainter as the distance from the sound source increases

Skills:

- I can ask questions and use different types of scientific enquiries to answer them.
- I can make observations and take measurements using standard units, using a range of equipment, including thermometers and data loggers.
- I can set up simple practical enquiries, comparative and fair tests.
- I can gather, record, classify and present data in a variety of ways to help with answering questions.
- I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

I can summarise my findings and write a conclusion using scientific language.

- I can interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

States of Matter
Can any material be classified as a solid, liquid or gas?

Knowledge

- I know which materials are solids, liquids or gases, including tricky ones like gels, foams, mists and pastes.
- I can explain that some materials change state when they are heated or cooled.
- I can correctly talk about the part played by evaporation and condensation in the water cycle, and understand the link between the rate of evaporation and temperature.

Skills:

-I can investigate materials that change state and and measure or research the temperature at which this happens in degrees Celsius (°C).

I can ask questions and use different types of scientific enquiries to answer them.
- I can set up simple practical enquiries, comparative and fair tests.
- I can gather, record, classify and present data in a variety of ways to help with answering questions.
- I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

- I can interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

- I can report on findings from enquiries, including spoken and written explanations, displays or presentations of results and conclusions.

I can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

-I can explain differences, similarities or changes related to simple scientific ideas and processes.

Animals including Humans
What are food chains important?

Knowledge

.- I can explain some parts of the digestive system in humans.
- I can explain the different types of teeth in humans and what they do.
- I can describe and explain a variety of food chains, naming producers, predators and prey

Skills:

-I can explain differences, similarities or changes related to simple scientific ideas and processes.
- I can use straightforward scientific evidence to answer questions or to support my findings.

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Year 5

Earth and Space
How is the position and movement of the Earth responsible for day, night and years?

Knowledge

- I can describe the movement of the Earth, and other planets, relative to the Sun in the solar system.
- I can describe the movement of the Moon relative to the Earth.
- I can describe the Sun, Earth and Moon as approximately spherical bodies.
- I can explain day and night, and the apparent movement of the sun across the sky, using the idea of the Earth's rotation.

Skills:

- I can record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- I can summarise my findings and write a conclusion using precise language and comparative adjectives
I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs, where more than one set of data is represented
- I can identify scientific evidence that has been used to support or refute ideas or arguments.

Living Things and their Habitats
Are all animal life cycles the same?

Knowledge

- I can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
- I can describe how some animals and plants reproduce.

Skills:

- I can talk about and present findings from enquiries, including conclusions, causal relationships and explanations of how reliable the information is.
- I can identify scientific evidence that has been used to support or refute ideas or arguments.

Forces
How are objects affected by contact and non-contact forces?

Knowledge

- I can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- I can demonstrate the effects of air resistance, water resistance and friction, that act between moving surfaces.
- I can show that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Skills:

- I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- I can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- I can record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
    - I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs, where more than one set of data is represented.

- I can use test results to make predictions to set up further comparative and fair tests.

Properties and Changes of Materials
Do the physical properties of materials determine their uses?

Knowledge

- I can 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
- I can explain that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.
- I can use knowledge of solids, liquids and gases to decide how mixtures might be separated, including by filtering, sieving and evaporating.
- I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
- I can demonstrate that dissolving, mixing and changes of state are reversible changes.
- I can 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.

Skills:

- I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- I can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
- I can record data and results of increasing complexity, using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- I can summarise my findings and write a conclusion using precise language and comparative adjectives .
I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs, where more than one set of data is represented.
- I can use test results to make predictions to set up further comparative and fair tests.

Animals Including Humans
Why do humans change as they develop to old age?

Knowledge

- I can describe the changes as humans develop to old age.

Skills:

- I can talk about and present findings from enquiries, including conclusions, causal relationships and explanations of how reliable the information is.
- I can identify scientific evidence that has been used to support or refute ideas or arguments.
- I can summarise my findings and write a conclusion using precise language and comparative adjectives.

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Year 6

Light

What is the connection between light and shadows and how they affect each other?

Knowledge

•I can explain that the kinds of living things that live on the earth now are different from those that inhabited the Earth millions of years ago and that fossils provide this information.
• I can explain that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
• I can give examples of how animals and plants are adapted to suit their environment in different ways and can explain that adaptation may lead to evolution.

Skills:

• I can record complex data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs where more than one set of data is represented.
- I can interpret and construct pie charts and line graphs and use these to solve problems.

• I can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
– I can summarise my findings and write a conclusion using precise language and comparative adjectives.
• I can identify scientific evidence that has been used to support or refute ideas or argument

Evolution and Inheritance

Does survival of the fittest always mean the species are competing against one another?

Knowledge

• I can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
• I can recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions.
• I can describe the ways in which nutrients and water are transported within animals, including humans.

Skills:

• I can record complex data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs where more than one set of data is represented.
- I can interpret and construct pie charts and line graphs and use these to solve problems.

• I can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
• I can identify scientific evidence that has been used to support or refute ideas or argument.

Animals Including Humans

Can each body system work independently from one another?

Knowledge

• I know that light appears to travel in straight lines.
• I can 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.
• I ca 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.
• I can explain that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Skills:

• I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
• I can take accurate measurements, using a range of scientific equipment, taking repeat readings when appropriate.
– I can summarise my findings and write a conclusion using precise language and comparative adjectives.
• I can record complex data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs where more than one set of data is represented.
- I can interpret and construct pie charts and line graphs and use these to solve problems.

• I can use test results to make predictions to set up further comparative and fair tests.

Living Things and their Habitats

How do we know that life goes through a cycle if we all die in the end?

Knowledge

• I can give reasons for classifying plants and animals based on specific characteristics.
• I can describe how plants, animals and micro-organisms are classified into broad groups according to common observable characteristics and based on similarities and differences.
–I understand the work of Carl Linneus

Skills:

• I can record complex data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
• I can report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
- I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs where more than one set of data is represented.
- I can interpret and construct pie charts and line graphs and use these to solve problems.

• I can identify scientific evidence that has been used to support or refute ideas or argument.

Electricity

Will the components in a circuit always have the same effect?

Knowledge

• I can show that the brightness of a lamp or the volume of a buzzer depends on the number and voltage of cells used in the circuit.
• I can 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.
• I can draw a diagram using recognised symbols to represent a simple circuit.

Skills:

• I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
• I can take accurate measurements, using a range of scientific equipment, taking repeat readings when appropriate.
• I can record complex data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
- I can interpret discrete and continuous data using appropriate graphical methods, including compound bar charts and time graphs where more than one set of data is represented.
- I can interpret and construct pie charts and line graphs and use these to solve problems.

• I can use test results to make predictions to set up further comparative and fair tests.

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Knowledge Organiser Progression in Scientific Vocabulary

Year 1	Animals including Humans Amphibians, birds, fish, mammals, reptiles, identify, sort, group, omnivore, carnivore, herbivore, diet, senses, sight, hearing, touch, taste, smell.	Materials Glass, metal, rock, plastic, wood, transparent, opaque, materials, stiff, soft, shiny, rough, bendy, stretchy, absorbent, water, smooth, waterproof, dull, hard.	Plants and Trees Wild plants, garden plants, weed, deciduous, evergreen, cedar, horse chestnut, oak, roots, stem, leaves, flowers, petals, fruit, seed, bulb, grow, insects, birds, water, sunlight, petals, soil, plants.	Seasonal Changes Seasons, autumn, winter, spring, summer, weather, daylight, months, hours, trees, leaves, temperature, daytimes, colder, warmer, changes.	
Year 2	Animals including Humans Offspring, grow, adults, survival, water, food, air, exercise, hygiene, nutrition, reproduce, egg, chick, chicken, caterpillar, pupa, butterfly, spawn, tadpole, frog, lamb, sheet, baby, toddler, child, teenager, adult.	Properties of Materials Materials, suitability, properties, behaves, purpose, squash, bend, twist, stretch, properties, wood, glass, plastic, metal, paper, cardboard, fabric, rubber, waterproof, transparent, hard, smooth, strong, weak, flexible, hard-wearing, absorbent, opaque.	Plants Germination, water, swells, plant, sprout, shoots, upwards, sunlight, seed dispersal, parent plant, wind, animals, dies, seed, bean, leaves, flowers, fruit, water, germinate, temperature, nutrition.	Living Things and their Habitat Life processes, living, move, breathe, sense, grow, babies, waste, energy, living, life processes, dead, never living, metal, plastic, rock, food chain, depend, food sources, is eaten by, habitat, microhabitat, depend, survive, alive, woodland, urban, coastal, rainforest, artic, desert, ocean, river, mountain, short grass, flowers, inside rotting wood, under leaves, in and on soil.	
Year 3	Animals Including Humans Healthy, good condition, physical condition, mental condition, nutrients, substances, living things, alive, healthy, energy, strength, move, grow, saturated fats, fats, unhealthy, healthy, unsaturated fats, vitamins, minerals, carbohydrates, protein, fibre, fats, vitamins, minerals, water, vertebrate, invertebrate, muscles, tendons, joints, bones, movements, protection, support, skeleton, skeletal muscles, contract, relax, endoskeleton, exoskeleton, hydrostatic skeleton, skull, clavicle, ribcage, vertebra column, ulna, radius, scapula, humerus, pelvis, femur, tibia, fibula.	Rocks and Soils Igneous rock, magma, lava, sedimentary rock, layers, sediment, metamorphic rock, pressure, heat, molten, underground, natural, solid, water, wind, permeable, liquid, impermeable, obsidian, chalk, marble, brick, granite, sandstone, quartzite, concrete, basalt, limestone, slate, coade stone, density, fossilisation, palaeontology, fossils, erosion, permeates, erodes, minerals, air, water, organic matter, topsoil, subsoil, bedrock.	Plants Roots, stem, leaves, flowers, nutrients, petals, stem, pollinators, evaporation, liquid, gas, water transport, evaporates, evaporation, stuck, light, air, grow, fertilisation, stamen, carpel (pistil), sepal, pollination, germination, seed dispersal, anther, filament, stamen, sepal, ovule, ovary, style, stigma, carpel, seed formation, shaking, dropping, carrying, eating, bursting.	Light Light travel, wave, light source, dark, reflection, process, surface, reflect, bounce, reflective, ray, light rays, beams, mirrors, smooth, shiny, flat, surface, rough, uneven, surface, eye, pupil, retina, shadow, opaque, translucent, transparent, shadow, midday, sunset.	Forces and Magnets Forces, friction, surface, layers, pushes, pulls, roughness, surface, grass, gravel, sand, road, motion, movement, ,magnet, magnetic, magnetic field, poles, repel, attract.
Year 4	Electricity Electricity, generate, produce, renewable, non-renewable, appliances, battery, energy, generate, lightening, static electricity, natural, coal, oil, fossil fuels, soar panels, nuclear energy, plug, circuit, flow, wire, buzzer, bulbs.	States of Matter Solids, liquids, gases, water vapour, evaporates, water vapour, boiling, melting, freezing, temperatures, structure, condense, precipitation, condensation, evaporation, surface, weather.	Sound Vibration, sound wave, volume, amplitude, pitch, low sound, high sound, loud, quiet, lower pitch, higher pitch, high note, low note, ear, particles, distance, soundproof.	Animals including Humans Digest, oesophagus, stomach, small intestine, large intestine, rectum, human teeth, functions, incisors, canine, molar, premolar, mouth, tongue, salivary gland, liver, gall bladder, duodenum.	Living Things and their Habitats Environment, flowering, non-flowering, plants, animals, vertebrate, dangers, fish, amphibians, reptiles, birds, mammals, invertebrates, snails, slugs, worms, spiders, insects, plants, flowering plants, non-flowing plants, mosses, ferns, nature

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	switches, power supply, positive, negative, insulator, conductor, electric current.		absorb sound, vacuum, eardrum, waves, gas particles, solid particles.	pancreas, anus, animal teeth, eating, herbivore, carnivore, omnivore, food chain, flow of energy, producer, prey, predator, primary consumer, secondary consumer, tertiary consumer, tooth decay, sugary food an drink, brushing, fluoride toothpaste, dentist.	reserves, ecologically planned parks, garden ponds, population, development, litter, deforestation.
Year 5	Properties and Changes of Materials Properties, hardness, solubility, transparency, electrical conductor, thermal conductor, response to magnets, dissolve, solution, separate, separating, solids, liquids, gases, evaporating, reversible changes, dissolving, mixing, evaporation, filtering, sieving, melting, irreversible, new material, burning, rusting, magnetism, electricity, chemists, quantitative, measurements, conductivity, insulation, chemical, Properties and Changes of Materials.	Forces Pushes., pulls., gravity, mass., earth's gravitational pull, weight, moon, solar system, weight, kilograms., friction, air resistance, water resistance, buoyancy, streamlined, mechanism, upthrust, pulleys., gears., cogs., levers.	Living Things and their Habitats Asexual reproduction, fertilise, gestation, pregnancy, life cycle, metamorphosis, pollination, reproduction, sexual reproduction, humans, amphibians, butterflies, birds, male and female sex cells, beating heart, sperm, male sex cell, female sex cell, born, fertilise.	Earth and Space Earth, Sun, Moon, planets, star, solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, dwarf planet, movement, rotate, orbit, axis., celestial body, spherical, sphere, day, night, light, heat, eclipse, satellite, universe, solar, astronomer, Alhazen, Copernicus., shadow clock, sundial.	Animals Including Humans Human, development, baby, toddler, child, teenager, adult, puberty, gestation, length, mass, grows, grow, growing, human life cycle, changing, conceive, female egg, embryo, growth, nutrients, 9 months, growth, developing.
Year 6	Living Things and their Habitat Characteristics, classify, taxonomist, key, appearances, groups., warm blooded, bacteria, microorganism, microscope, species., reproduce, fertile, mould, yeast, dust mites., plants, phytoplankton, penicillium, virus., food poisoning, Domain: Eukarya, Kingdon: Animalia, Phylum: Chordata, Class: Mammalia, Order: Carnivora, Family: Canidae, Genis: Canis, Species: Lupus.	Light Light source, reflection, incident ray, reflected ray, the law of reflection, light waves, sunlight, light ray, incidence, incident ray, angle of incidence, light travels, vacuum, airless space, eyes, beams of light, refraction, visible spectrum, prism, shadow, transparent, translucent, opaque, light bends, travelling.	Animals including Humans Circulatory system, heart, blood vessels., oxygenated blood, deoxygenated blood, veins., arteries., transporting, oxygen, transferred, capillaries., heart, body, pump., exchange, water, nutrients., carbon dioxide, chambers., drug, alcohol, plasma, red blood cells. White blood cells., platelets., infection, negative effects, water, protein, gases., nutrients., waste products, exercise, muscles., circulation, brain chemicals., bones., illness.	Electricity Circuit, symbol, cell/battery, current, amps, voltage, resistance, electrons, indicator, lamp/bulb, lighting, wire, motor, buzzer, switch open, switch closed, brighter, louder, components.	Evolution and Inheritance Offspring, inheritance, variations., characteristics., adaptations., habitat, environment, inherited traits., evolution, natural selection, fossil, adaptive traits.

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