



SS Peter & Paul Curriculum Drivers

Cultural Heritage

The SS Peter & Paul community reflects the diverse multi-cultural make-up Birmingham, with many families tracing their cultural heritage to Ireland, the Caribbean, Poland and Eastern Europe and parts of Africa, amongst other places.

We strive to link our topic of famous scientists and inventors (taught in Years 1-6) to our multi-cultural community.

For example: Year 1 look at Mae Jemison who was an American engineer and the first black woman to travel into space. Year 3 look at the Polish physicist Marie Curie.

Aspirations

All Science content and topics are planned around the assumption that our pupils hold the ambition to study all three branches of science, biology, chemistry and physics, at secondary school and into further and higher education.

Our science curriculum is underpinned by knowledge that is pitched high, sequenced and taught in-depth. Our aim is to deepen pupil understanding and avoid simply teaching knowledge on a surface level.

Faith

As a Catholic school which is unashamedly proud of its Christian faith, our curriculum goes over and above the individual subjects and topics that we study. All work, every action, is placed in the context of growing in friendship with God, and all that we gain from this relationship. Links are made to our faith, specifically creation, through the topics of animals including humans taught in Years 1-6, living things and their habitats taught in Years 2, 4, 5, and 6, and plants taught in Years 1, 2 and 3.

Evolution is taught in Year 6 and Pope Francis said;

“The beginning of the world is not the work of chaos that owes its origin to something else, but it derives directly from a supreme principle that creates out of love,”

Pope Francis said. “The Big Bang, that today is considered to be the origin of the world, does not contradict the creative intervention of God; on the contrary, it requires it. Evolution in nature is not in contrast with the notion of [divine] creation because evolution requires the creation of the beings that evolve.”

Through their learning about famous scientists and inventors, we hope to inspire our young people to aspire to taking up vocations of a scientific nature.

Intent Statement

At SS Peter & Paul, we strive to promote the love of learning science and for children to understand and be curious about the science within their everyday lives. We promote the importance of an investigative approach through regular 'hands on' experiences wherever possible. It is our intention that by the end of each Key Stage, each child will have an understanding of a variety of scientific concepts and be able to confidently discuss them. We aim for all children to work scientifically during lessons and work collaboratively investigating different concepts and ideas.

We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes. We ensure that the 'Working Scientifically' skills are built-in to all lessons and developed throughout the school. Children are taught to use equipment, conduct experiments, build arguments and explain concepts confidently and continue to ask questions and be curious about their surroundings.

We put great emphasis on using technical vocabulary for each topic and for working scientifically. The progression of this vocabulary is evident as the children move from Key Stage 1 to Lower Key Stage 2 to Upper Key Stage 2.

We are exploring making links with STEM experts to provide pupils with opportunities to see their learning in a context. As a school, we are hoping to forge a relationship with nearby, Jaguar Land Rover. This relationship will build on the objective of raising the aspirations of our pupils and providing them with knowledge of a STEM career path.

Science Curriculum Implementation

Science is planned and arranged by the class teacher and, where possible, topics are chosen to link with other subjects in the curriculum. For example, in Year 3 Light is taught at the same time as the design technology unit— Light Up Signs. A whole afternoon per week is dedicated to science thus allowing teachers the time needed to achieve a greater depth of knowledge and understanding. It also allows the teacher time to ensure the children are working scientifically in every lesson, carrying out investigations, experiments and recording.

To ensure children make the necessary progress and are challenged appropriately, teachers plan enjoyable, engaging and inspiring practical activities that mean the children are working 'hands-on'; these lessons link science concepts to everyday life so the children can understand the world around them in a scientific way. In order to allow children to reach their full potential, we cover the objectives set out in the Programmes of Study in the National Curriculum. We mix the knowledge content and investigation skills needed to solve science problems and make decisions and predictions based on what they have learned. Our lessons also allow the children to practice their Maths and English whilst developing their reasoning and problem solving skills.




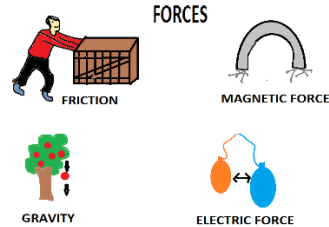












Assessment

An end of unit assessment will be executed both at the beginning and end of each topic. This will highlight the learning that has been achieved. Analysis of the start of unit assessment will inform class teachers of the areas that need greater focus.

The results will be recorded on the Science Tracker in the Science Assessment folder in the 'staff shared area' (R).

Topics

The following topics are taught in year groups as defined by The National Curriculum.

<p><u>Plants</u> Year 1 Year 2 Year 3</p> 	<p><u>Rocks</u> Year 3</p> 	<p><u>Animals, including Humans</u> Year 1 – Year 6 inclusive</p> 	<p><u>Forces and Magnets</u> Year 3 Year 5</p> 	<p><u>Materials and their Properties</u> Year 1 Year 2 Year 3</p> 
<p><u>States of Matter</u> Year 4 Year 5</p> <p>Solid Liquid Gas</p>    <p>KEEPS its shape TAKES the shape of its container FILLS its container</p>	<p><u>Seasonal Changes</u> Year 1</p> 	<p><u>Electricity</u> Year 4 Year 6</p> 	<p><u>Light</u> Year 3</p> 	<p><u>Earth & Space</u> Year 5</p> 
<p><u>Living things and their Habitats</u> Year 2 Year 4 Year 5 Year 6</p> 	<p><u>Evolution and Inheritance</u> Year 6</p> 	<p><u>Sound</u> Year 4</p> 	<p><u>Scientists and Inventors</u> Year 1 – Year 6 inclusive</p> 	

	Name of Scientist/Inventor	Nationality	Invention/Career/Discovery
Year 1	<ul style="list-style-type: none"> • Ole Kirk Christiansen • Mae Jemison • Tim Smit • Vets • Chester Greenwood • Linda Brown Buck 	<ul style="list-style-type: none"> • Danish • American • Dutch • American • American 	<ul style="list-style-type: none"> • Lego • First black female astronaut • Designed The Eden Project • Their work generally • Ear muffs • Odorant receptors
Year 2	<ul style="list-style-type: none"> • Jane Colden • Elizabeth Garrett Anderson • Louis Pasteur • Charles Macintosh • Rachel Carson • James Blyth 	<ul style="list-style-type: none"> • American • English • French • Scottish • American • Scottish 	<ul style="list-style-type: none"> • First Female American Botanist • First woman to qualify as a doctor in Great Britain • Discovered that micro-organisms cause disease • Mackintosh/mac • Studied ocean and environment. Discovered how harmful pesticides were to the environment • Wind turbine to provide electricity
Year 3	<ul style="list-style-type: none"> • Marie Curie • George Washington Carver • William Smith • Inge Lehmann • A group of scientists • A group of scientists 	<ul style="list-style-type: none"> • Polish • Black American • British • Danish • Global 	<ul style="list-style-type: none"> • Discovered polonium and radium; developed the use of x-rays • Invented 100 uses for peanuts and crop rotation • Discovered that the age of a rock can be determined by the fossil within it • Discovered the Earth's core • Invented electromagnets • Inventions and discoveries from around the world
Year 4	<ul style="list-style-type: none"> • Gerald Durrell • Maria Telkes • Garrett Morgan • Antoine Lavoisier & Joseph Priestly • Lord Kelvin • Thomas Edison 	<ul style="list-style-type: none"> • British • Hungarian • American • French & British • British • American 	<ul style="list-style-type: none"> • Worked on the conservation of Madagascar • Made discoveries about solar power • Black inventor of an improved sewing machine and traffic lights • Discovered oxygen • Invented the temperature scale and discovered • Various inventions. The most famous was improvements to the electric lightbulb
Year 5	<ul style="list-style-type: none"> • David Attenborough • Margaret Hamilton • Eva Crane • Stephanie Kwolek • Leonardo da Vinci • Various scientists 	<ul style="list-style-type: none"> • British • American • British • American • Italian 	<ul style="list-style-type: none"> • Wildlife film-maker and naturalist • Wrote the code for the computer to navigate the Apollo 11 spacecraft from Earth to the Moon • Researched the behaviour of bees • Invented Kevlar • Multi-skilled — engineer, inventor, sculptor, architect, scientist and painter • Theories about Stonehenge
Year 6	<ul style="list-style-type: none"> • Stephen Hawking • Libbie Hyman • Alexander Fleming • Marie Maynard Daly • Daniel Hale Williams • Steve Jobs 	<ul style="list-style-type: none"> • British • American • British • American • American • American 	<ul style="list-style-type: none"> • Theories about black holes • Classified vertebrates and invertebrates • Discovered penicillin • Black scientist who discovered the effects of different food on the body • First black person admitted to The American College of Surgeons. Performed the world's first successful open-heart surgery. • Invented Apple computer, iPhone, iPad and iPod

Subject	Autumn Term 01	Autumn Term 02	Spring Term 01	Spring Term 02	Summer 01	Summer 02
EYFS	<p>Continuous provision is at the heart of our learning in Reception. In Science we focus on our physical health and how to keep ourselves healthy. Vocabulary is key and we share new vocabulary within the class during carpet time and in continuous provision too. We use adults as a tool to further children’s learning and to develop with their interests. We have some focus Science activities that will support children’s independent learning. We ensure that we move with the children’s interests and that their learning and interests are at the fore-front of our curriculum. Communication is key and through continuous provision we allow the children to explore and communicate with their peers. Adults are used as a tool to support this further and to step in and develop learning. Here are some planned activities we will look at this year:</p> <p>Communication & Language</p> <ul style="list-style-type: none"> • Learn new vocabulary. • Ask questions to find out more and to check what has been said to them. • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen. • Use new vocabulary in different contexts. • Make comments about what they have heard and ask questions to clarify their understanding. <p>Personal Social & Emotional Development</p> <ul style="list-style-type: none"> • Know and talk about the different factors that support their overall health and wellbeing: regular physical activity, healthy eating, tooth brushing, sensible amounts of ‘screen time’, having a good sleep routine. • Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices. <p>Understanding the World</p> <ul style="list-style-type: none"> • Explore the natural world around them, making observations and drawing pictures of animals and plants. • Describe what they see, hear and feel while they are outside. • Recognise some environments that are different to the one in which they live. • 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 and changing states of matter. • 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. 					
KS1	<p>Key Stage 1 National Curriculum Working Scientifically</p> <p>During Year 1 & 2, pupils should be taught to use practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> • 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	Seasonal Changes (Autumn & Winter)	Animals (Including Humans)	Plants	Seasonal Changes (Spring & Summer)	Everyday Materials	Scientists & Inventors

Year 2	Uses of Everyday Materials	Animals (Including Humans)	Living things and their Habitats	Plants	Scientists & Inventors	
Lower KS2	<p>Lower Key Stage 2 National Curriculum Working Scientifically</p> <p>During Year 3 & 4, pupils should be taught to use practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> • 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	Rocks	Forces and Magnets	Light	Plants	Animals (Including Humans)	Scientists & Inventors
Year 4	Electricity	Sound	States of Matter	Animals (Including Humans)	Living things and their Habitats	Scientists & Inventors
Upper KS2	<p>Upper Key Stage 2 National Curriculum Working Scientifically</p> <p>During Year 5 & 6, pupils should be taught to use practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> • 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	Earth & Space	Forces	Living things and their Habitats	Animals (Including Humans)	Scientists & Inventors	Properties & Changes of Materials
Year 6	Evolution and Inheritance	Living things and their Habitats	Animals (Including Humans)	Light	Electricity	Scientists & Inventors

EARLY LEARNING GOALS RELEVANT TO SCIENCE

Understanding the World – 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.**

Children in our reception class are provided with a rich and balanced curriculum that allows them to observe the natural world both in and out of the classroom. For example, they observe first-hand the metamorphosis of a caterpillar to a butterfly. They engage in seasonal walks collecting items such as leaves, fir cones and conkers which then gives the opportunity for drawing, collage and discussion. They explore changing states of matter by observing what happens to ice in different situations. Science is taught through focused activities and in response to children's enquiry; for example, during Chinese New Year, a child noticed the reflection of a dragon on a window and picked up a piece of paper and began to trace around it. This initiated a class discussion on reflection.

Personal, Social and Emotional Development – Managing Self

- **Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.**

Children in our reception class are encouraged to care of their own personal hygiene in school. They are taught the importance of looking after their oral hygiene through diet and cleaning. They learn about healthy eating and have tasting sessions to try different foods. The children are encouraged to have the free fruit that is provided daily. They also take part in sampling Chinese food in celebration of Chinese New Year. The majority of the children in reception have school lunches; they always have the opportunity to choose and help themselves to items from a salad bar.

Communication and Language – Listening, Attention and Understanding

- **Make comments about what they have heard and ask questions to clarify their understanding.**

Children in our reception class are encouraged to have enquiring minds and all of their questions and comments are valued. They can understand 'why' questions, like: "Why do you think the caterpillar got so fat?". Appropriate scientific language is used in relation to the investigation such as: float, sink, melt and life cycle. They make simple predictions about what they think may happen.

WORKING SCIENTIFICALLY – PLAN (Asking Questions and Carrying Out Fair and Comparative Tests)

Key Stage 1

Asking simple questions and recognising that they can be answered in different ways.

Performing simple tests. Children can:

- explore the world around them, leading them to ask some simple scientific questions about how and why things happen;
- begin to recognise ways in which they might answer scientific questions;
- ask people questions and use simple secondary sources to find answers.

Our Key Stage 1 and 2 children use non-fiction, age appropriate, books to source information as well as online information through topic specific activities on Purple Mash. They build on the knowledge and activities from Foundation Stage.

Lower Key Stage 2

Asking relevant questions and using different types of scientific enquiries to answer them.

Children can:

- start to raise their own relevant questions about the world around them in response to a range of scientific experiences;
- start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions;
- recognise when a fair test is necessary;
- help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.

Upper Key Stage 2

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Using test results to make predictions to set up further comparative and fair tests. Children can:

- with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences;
- with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions;
- explore and talk about their ideas, raising different kinds of scientific questions;
- ask their own questions about scientific phenomena;
- select and plan the most appropriate type of scientific enquiry to use to answer scientific questions;
- make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them;
- plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary.

WORKING SCIENTIFICALLY – DO (Observing and Measuring Changes)

Key Stage 1

Observing closely, using simple equipment. Children can:

- observe the natural and humanly constructed world around them;
- observe changes over time;
- use simple measurements and equipment;
- make careful observations, sometimes using equipment to help them observe carefully; like magnifying glasses.
- carry out simple practical tests, using simple equipment;
- experience different types of scientific enquiries, including practical activities;
- talk about the aim of scientific tests they are working on;
- use simple features to compare objects, materials and living things;
- decide how to sort and classify objects into simple groups with some help. Such as animals and materials.

Lower Key Stage 2

Making systematic and careful observations, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.

Setting up simple practical enquiries, comparative and fair tests.

Children can:

- make systematic and careful observations;
- observe changes over time;
- use a range of equipment, including thermometers and data loggers;
- ask their own questions about what they observe;
- where appropriate, take accurate measurements using standard units using a range of equipment
- set up and carry out simple comparative and fair tests.

Upper Key Stage 2

Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Children can:

- choose the most appropriate equipment to make measurements and explain how to use it accurately;
- take measurements using a range of scientific equipment with increasing accuracy and precision;
- make careful and focused observations;
- know the importance of taking repeat readings and take repeat readings where appropriate.

WORKING SCIENTIFICALLY – RECORD (Identifying, Classifying, Recording and Presenting Data)

Key Stage 1

Identifying and classifying. Gathering and recording data to help in answering questions. Children can:

- use simple features to compare objects, materials and living things;
- decide how to sort and classify objects into simple groups with some help;
- record and communicate findings in a range of ways with support;
- sort, group, gather and record data in a variety of ways to help in answering questions such as in simple sorting diagrams, pictograms, tally charts, block diagrams and simple tables.

Lower Key Stage 2

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.

Children can:

- talk about criteria for grouping, sorting and classifying;
- group and classify things;
- collect data from their own observations and measurements;
- present data in a variety of ways to help in answering questions;
- use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge;
- record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables.

Upper Key Stage 2

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Children can:

- independently group, classify and describe living things and materials;
- use and develop keys and other information records to identify, classify and describe living things and materials;
- decide how to record data from a choice of familiar approaches;
- record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.

WORKING SCIENTIFICALLY – REVIEW (Drawing Conclusions, Noticing Patterns and Presenting Findings)

Key Stage 1

Using their observations and ideas to suggest answers to questions. Children can:

- notice links between cause and effect with support;
- begin to notice patterns and relationships with support;
- begin to draw simple conclusions;
- identify and discuss differences between their results;
- use simple and scientific language;
- read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1;
- talk about their findings to a variety of audiences in a variety of ways.

Lower Key Stage 2

Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Children can:

- draw simple conclusions from their results;
- make predictions;
- suggest improvements to investigations;
- raise further questions which could be investigated;
- first talk about, and then go on to write about, what they have found out;
- report and present their results and conclusions to others in written and oral forms with increasing confidence.

Upper Key Stage 2

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. Children can:

- notice patterns;
- draw conclusions based in their data and observations;
- use their scientific knowledge and understanding to explain their findings;
- read, spell and pronounce scientific vocabulary correctly;
- identify patterns that might be found in the natural environment;
- look for different causal relationships in their data;
- discuss the degree of trust they can have in a set of results;
- independently report and present their conclusions to others in oral and written forms

Using Scientific Evidence and Secondary Sources of Information

Key Stage 1

Lower Key Stage 2

Identifying differences, similarities or changes related to simple scientific ideas and processes.

Using straightforward scientific evidence to answer questions or to support their findings.

Children can:

- make links between their own science results and other scientific evidence;
- use straightforward scientific evidence to answer questions or support their findings;
- identify similarities, differences, patterns and changes relating to simple scientific ideas and processes;
- recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.

Upper Key Stage 2

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

Children can:

- use primary and secondary sources evidence to justify ideas;
- identify evidence that refutes or supports their ideas;
- recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact;
- use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas;
- talk about how scientific ideas have developed over time.