

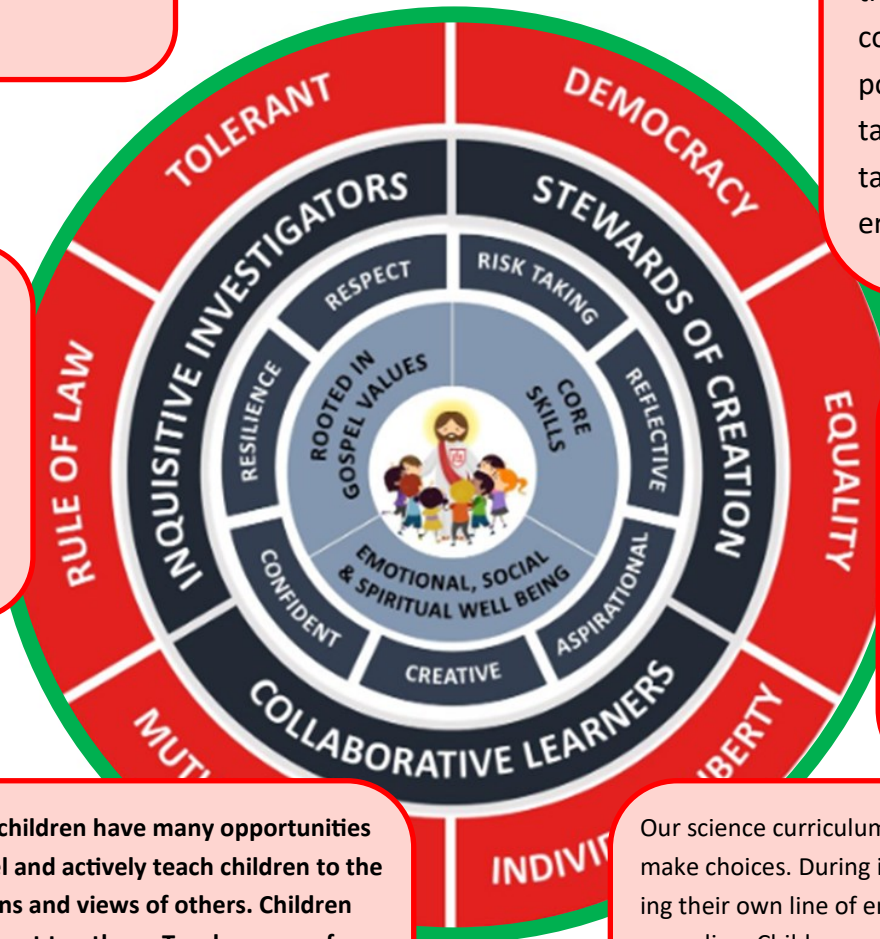
SCIENCE AT SACRED HEART



Mutual respect is encouraged throughout all science lessons within the classrooms. Children are taught to be respectful and be tolerant of other societies and beliefs. They study their own behaviour through the lessons taught examining other philosophies and cultures.

Through science teaching we provide many opportunities and activities to encourage children to develop their ability to ask questions, discuss, debate and make sense of the world around them. We encourage them to take the views and opinions of others into account. Through group enquiry children have many opportunities to take turns to suggest ideas and give and take instructions from others. Children can choose to take part in Eco club and vote to elect their eco leaders.

Children are taught to understand the importance of safety rules when working scientifically and to take responsibility for their own and other people's safety. They know that there are consequences if rules are not followed. Key issues such as use of drugs, alcohol and laws surrounding these areas are also taught.



In each year group children have the opportunity to research scientific leaders throughout time. Teachers carefully select Scientific discoveries and leaders to cover both male and female scientists and people from many different cultures to avoid stereotypes. Female and black scientists are celebrated during black history month. Teachers provide equal access to all resources ensuring all students have equal access to opportunities and participation. We make sure that learning materials do not

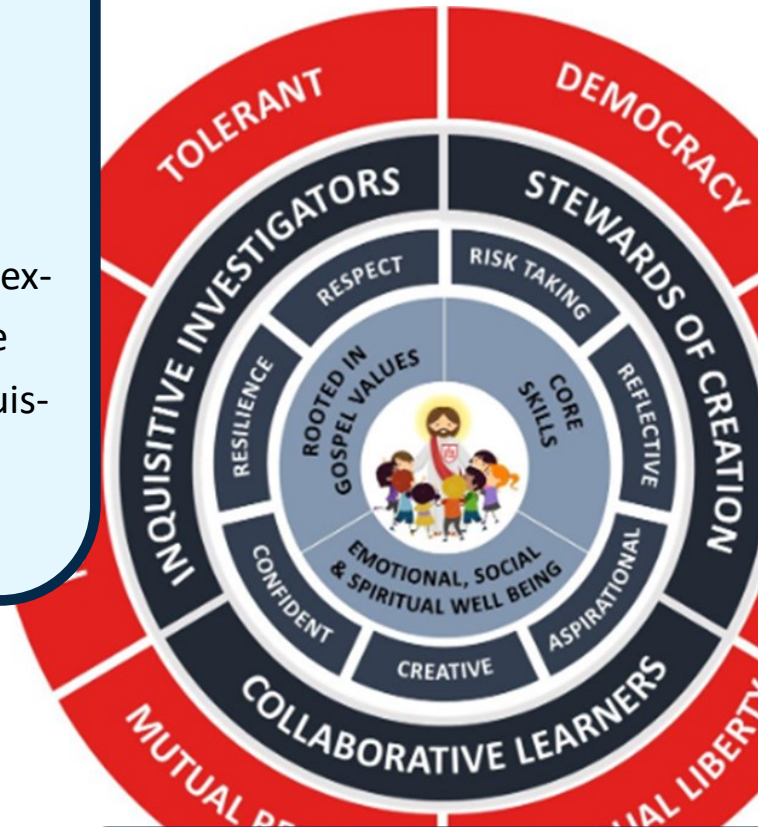
In both practical and non-practical lessons children have many opportunities to work in pairs and teams. Teachers model and actively teach children to develop open mindedness to the suggestions and views of others. Children are encouraged and praised for offering support to others. Teachers use of activities with multiple possible answers and open ended questions encourage children to argue their reasoning whilst understanding the points of views of others. These activities include odd one out, concept cartoon and positive, negative and interesting games.

Our science curriculum is carefully planned to give children ample opportunity to make choices. During investigations children in all year groups are supported in choosing their own line of enquiry, resources and chosen method of data collection and recording. Children are also given opportunities to choose how they present their understanding, through role play, diary writing, 3d models and leaflets for example. This is also fostered through open ended science homework projects that encourage children into having an emotional drive to want to know more and to wonder about aspects of the world they are interested in. In every lesson children are encouraged to develop a growth mind set by selecting their own level of challenge.

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Teachers use of odd one out, concept cartoons and other activities with multiple possible answers encourages children to ask questions and reason. Teacher use of awe and wonder demonstrations, experiments and interactive resources encourage inquisitiveness.



Environmental issues are central to our carefully planned science curriculum. Children learn to wonder about what is special about life and have an awareness of the scale of living things from the small micro-organism to the largest. Through the science curriculum, eco club, fair trade, assemblies and earth hour children are taught to think about the human impact on the earth and how they can promote awareness. This enables children to distinguish right from wrong and to develop respect. This can particularly be seen in the year 5 rainforest charity event and year 4 litter picking surveys. Each class takes responsibility for growing and maintain the school vegetable garden during welly Wednesday. They also manage the vegetable stool where proceeds go back into maintaining our grounds. Eco club provides an opportunity for children to learn and interactive with nature such as bird watching, being creative with natural objects and carrying out mini-beast surveys. They also run projects on sustainable power and recycling.

Science promotes team work. Students are encouraged and supported to share their ideas and develop a line of enquiry from beginning to end. They are actively praised by each other and adults working with them.

SCIENCE AT SACRED HEART



Through the teacher modelling ideas and ways of working students are expected to show respect of others as well as having respect



They are encouraged to take risks within experiments and to think outside the box. They are encouraging to evaluate and adapt their lines of inquiry and not to be put off by mistakes.

Through the use of investigations teacher are taught from EYFS that predictions are not always correct or data collection. They are encouraged to take risks within experiments and to think outside the box.



Peer assessments and feed forward marking makes sure children are reflective in each lesson. The use of the enquiry wheels encourages children to reflect on their scientific skills. Appropriate time is planned for to ensure children analysis, evaluate and reflect on investigations

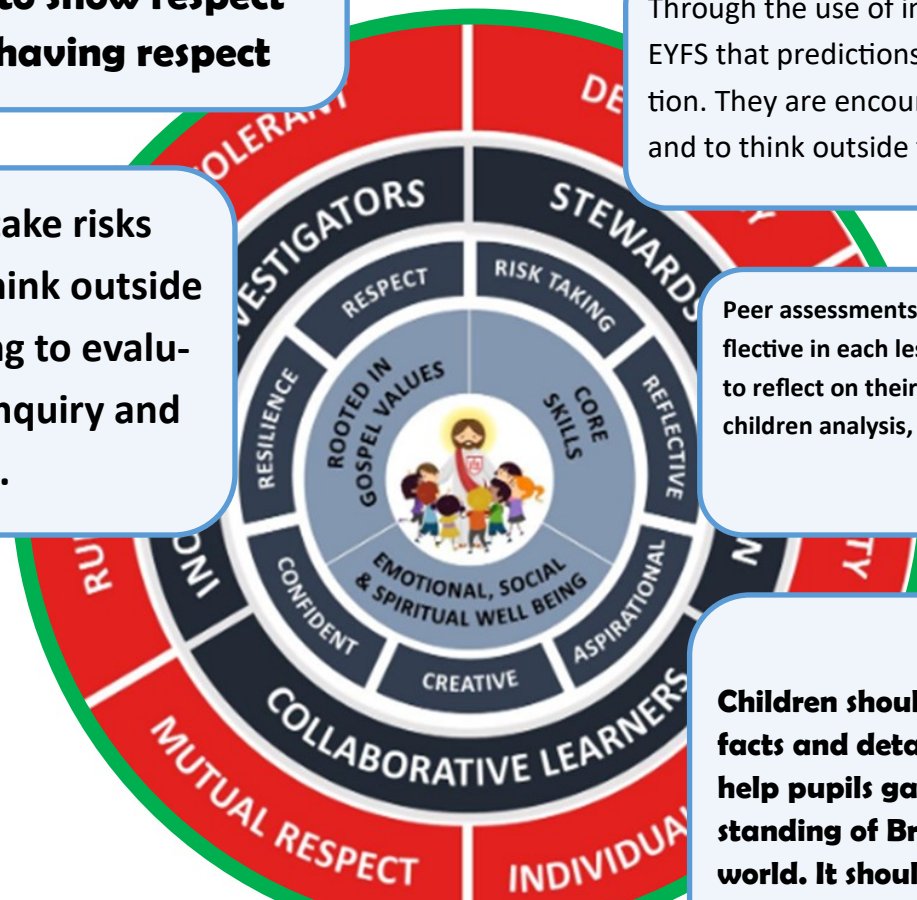


Aspirational

Children should be inspired by the teaching of science-facts and details. A high-quality history education will help pupils gain a coherent knowledge and understanding of Britain's past and that of the wider world. It should inspire pupils' curiosity to know



Children are given the freedom to explore resources and materials to create their own line of enquiry. Teachers plan and children choose a range of creative ways for children to share their understanding such as presentations, poems, dance, role-play, models and diary writing.



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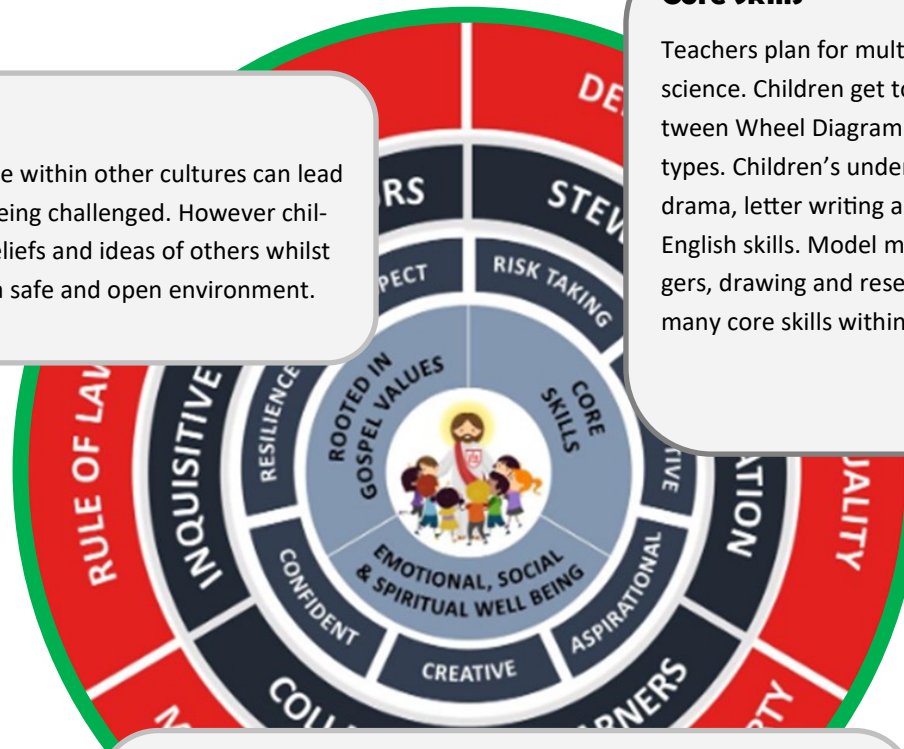


Rooted in Gospel Values

Some areas of science and science within other cultures can lead to cultural and religious beliefs being challenged. However children are taught to respect the beliefs and ideas of others whilst also sharing their own beliefs in a safe and open environment.

Core Skills

Teachers plan for multiple opportunities to embed the core skills within science. Children get to sort and classify, measure and plot data Links between Wheel Diagram and Science Curriculum using a range of graphs types. Children's understanding is shown through poems, diary writing, drama, letter writing and booklet making covering a wide range of core English skills. Model making, PowerPoint presentations, use of data bloggers, drawing and research of historical scientific discoveries also covers many core skills within the foundation subjects.



Personal and social and spiritual well being.

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SUBJECT INTENT

SCIENCE

At Sacred Heart history education is fully inclusive to every child.

Our aims are to

Intent— We aim to...

Distil a lifelong love of science within all our pupils. As a school we **recognise the importance of Science in every aspect of daily life**. As one of the **core subjects** taught in Primary Schools, we give the teaching and learning of Science **the prominence it deserves**.

Provide a **stimulating, engaging curriculum** that challenges and meets the needs of every child and develops their natural curiosity. **All children will be provided with a broad and balanced science curriculum which reflects the equality and diversity policies and practice in school**.

Our curriculum will enable children to become enquiry based learners collaborating through. Most importantly we believe in **fostering independent learners that question the world around them** and are confident in creating their own line of enquiry and understand that there are a variety of approaches to answering scientific questions. We recognise the importance of giving the children time to evaluate their findings and present their data using their own chosen method and encourage new questions to be raised. During this process Key mathematical and English skill are developed and purposeful links between curriculum are as made.

From the EYFS to KS2 our pupils **build up a body of key foundational scientific concepts and enquiry skills**. These skills are revisited and developed throughout their time at school. **Children will be immersed in key scientific vocabulary, which supports in the acquisition of scientific knowledge and understanding**. For example, a child will explore and make observations of common materials in Reception through play, develop their observations through each year group until they are finally embedded in year 6 and can use them to explain how different mixtures of

SCIENCE

Implementation—How will we achieve our aims

Curriculum
Consistent &
systematic approach

Strong teaching

We ensure high standards of teaching and learning in science, we implement a curriculum that is **progressive** throughout the school. All teachers ensure planning gives **full coverage** of The 2014 National Curriculum programmes of study for Science and Understanding of the World in the Early Years Foundation Stage. Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that **all children are capable of achieving high standards in science**.

At Sacred Heart we use the Plymouth science scheme. Science units are taught on a year rolling programme with key **vocabulary , knowledge and skills being carefully mapped out and monitored across each year group**. This ensures **learning is progressive and continuous** between year groups and guarantees topics are covered. Teachers then plan to suit their children's interests, current events, their own teaching style, the use of any support staff and the resources available. It is an expectation that science is taught **for 2 hours a week in KS1 and 2.5 hours in KS2**. Teachers have the freedom to **adapt their timetables** to teach whole science days to ensure purposeful and in depth enquiry.

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Implementation—How will we achieve our aims

Planning

At Sacred Heart we use the Plymouth Science scheme of work. This starts in the EYFS and skills and knowledge are carefully mapped out in order to extend and build upon key ideas all the way to year 6. Planning involves teachers **creating engaging lessons, using high-quality resources to aid understanding of conceptual knowledge**. Through our planning, we involve **problem solving opportunities that allow children to find out for themselves**.

Children are encouraged to **ask their own questions** and be given opportunities to use their scientific skills and research to discover the answers. This **curiosity is celebrated** within the classroom.

Teachers plan tasks that are differentiated by skill not by activity. To encourage the children to reflect on their own understanding they independently choose their task (from year 2).

Planning supports the **development of a maths and English Skills** and purposeful use of technology. Engaging reading books are used within lessons to introduce scientific concepts or deepen understanding.

Teacher planning **builds upon the learning and skill development of the previous years**. As the children's knowledge and understanding increases, and they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence.

Working Scientifically skills are embedded into each lesson to ensure these skills are being developed throughout the children's school career and new **vocabulary and challenging concepts are introduced through direct teaching**. This is developed through the years, in-keeping with the topics.

Children are expected to **reflect on the scientific skills** they have used each lesson by dating the scientific skills wheel in their books.

SCIENCE

Implementation—How will we achieve our aims

Assessment

Teachers use **feed forward marking** within lessons to **assess misconceptions on the spot** and children's learning is move forward through **next step questions** that children reply to in green pen. Teachers assess books at the end of every lesson and complete the **assessment sheets**. **Next steps** will be identified for individuals, groups or the whole class and **planning is adapted** accordingly. For every unit teachers will use pre and post formal assessment to support their teacher assessment. Teachers enter attainment data every term on **Target Tracker**. This is monitored by SLT, link governors and subject leads and the action plan is adapted accordingly.

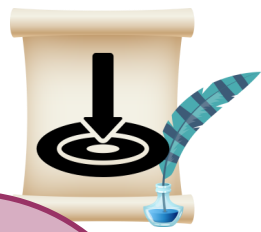
Teachers adapt and extend the curriculum to match children's interests and needs, current events, the use of any support staff and the resources available.

Enrichment

Plymouth is a stimulating and engaging curriculum that challenges and meets the needs of every child. Educational visits are another opportunity for the teachers to plan for additional and purposeful science learning outside the classroom and ensure pupils experiences are memorable. There are many enrichment opportunities provided throughout each year group including whole class trips, learning within the school environment, workshops from outside agencies and businesses.

Some Examples include: Sealife centre, Rye Meads Nature Reserve, Hertfordshire zoo, planetarium visit in school, Eco –Club and Welly Wednesday (gardening club led by parents)

Impact — How we will know we have been successful...



The successful approach to the teaching of science at Sacred Heart School will result in a fun, engaging, high quality science education, that provides children with the foundations for understanding the world that they can take with them once they complete their primary education.

Assessment at Sacred Heart is teacher based and formed using formal strategies (e.g. periodic year group assessment tasks, quizzes) and informal strategies (Use of concept maps, verbal/written outcomes, reflection tasks/presentations).

Formative assessment is used as the main tool for assessing the impact of Science at our school as it allows for misconceptions and gaps to be addressed more immediately rather than building on insecure scientific foundations.

Children at Sacred Heart School will:

- demonstrate a love of science work and an interest in further study and work in this field
- retain knowledge that is pertinent to Science with a real life context.
- be able to question ideas and reflect on knowledge.
- be able to articulate their understanding of scientific concepts and be able to reason scientifically using rich language linked to science.
- demonstrate a high love of mathematical skills through their work, organising, recording and interpreting results.
- work collaboratively and practically to investigate and experiment.
- achieve age related expectations in Science at the end of their cohort year.

The national curriculum for science understanding and Knowledge (2014) aims to ensure that all pupils:

Curriculum 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

EYFS

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

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

The national curriculum for science working scientifically (2014) aims to ensure that all pupils:

Working scientifically specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. Types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data.

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Communication and Language Listening, Attention and Understanding

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

Unit coverage for each year group

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception Covered across the year	Colour Ourselves	Celebrations Fairy Tales	People who help us	Science Week	Animals Sea life trip	More units will be added periodically for EYFS to look at.
Year 1 Changes made to Plymouth overview due to trip	Seasonal Changes (Living things and habitats)	Materials	Materials	Animals including humans Science week	Animals including humans Trip to zoo	Plants
Year 2 Changes made to Plymouth overview due to Rye Meads trip	Materials	Animals	Animals	Living things and habitats	Plants	Plants
Year 3 No change to Plymouth	Rocks	Light	Forces and magnets	Science Week	Animals including humans	Plants
Year 4 No change to Plymouth	Animals including humans	Sound	States of matter	Science Week	Electricity	Living things
Year 5 Change to Plymouth	Forces	Space Planetarium	Properties of materials	Science Week	Living things and habitats	Animals including humans
Year 6 No change to Plymouth	Animals including humans	Evolution and inheritance	Electricity	Science Week	Light	Living things and habitats STEM: Knex challenge

Progression of knowledge, skills and enquiry

	Foundation/ EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
This is what our scientists can do....	Children will ask questions about the environment including the weather outside. They will be able to suggest what they might wear. They will develop an understanding of growth, decay and changes over time and show care and concern for living things and the environment. They will use their senses when walking around and investigating . They will develop questioning and curiosity through play and understand the concept of forces and electricity through twisting, pushing, slotting and magnetic toys and seeing the effects of pushing different buttons to make sounds and movements. They can talk about similarities and differences between living things and materials and make simple observations about animals.	Children will be asking questions about the local environment including plants and animals found there including how they can look after them. They will observe and talk about the weather and changes. They will explore different materials using scientific language to describe them.	Children will be asking questions about the local environment including discussing how plants grow, survive, germinate and reproduce. They investigate different habitats (incl. micro) and observe how different animals depend on each other and its life processes. They understand basic needs of animal survival including exercise and nutrition. They can identify properties of materials and state why they are suited to purpose. They can name some scientists who have developed new materials.	Children will be asking questions about the local environment and using their observation skills to identify parts of a flower and know how water transports around the plant. Children will understand the lifecycle of a plant by drawing diagrams and using research to find the function of each part. Children will know that humans and animals have skeletons and understand why. They know how humans get nutrients. They will carry out comparative and fair tests to compare and classify rocks and soils based on their properties.	Children will be asking questions about the local environment and observe how the environment can change along with the dangers this can cause. They will understand the functions of the teeth and the importance of oral hygiene. Children will know about how the digestive system works. Children will be grouping, identifying and classifying living things and materials and using classification keys . Children will understand the water cycle and effect of heat with evaporation and condensation as well as materials changing state. Children will use representations to understand how we hear through vibrations and know how to create simple circuits including a switch. Comparative and fair tests will be used to test conductivity of materials.	Children will understand the changes that occur in humans from birth to old age and understand reproduction in plants and animals. They explore different lifecycles and can understand the similarities and differences between mammals, amphibians, insects and birds. Children will be able to explain the uses of everyday materials and describe some reversible and irreversible changes. They will be able to present their results from fair tests using tables and charts. Children will use diagrams to show the movement of the Earth and the moon and can explain how different time zones occur. They explain day and night. They will have an understanding of forces including gravity, air resistance, water resistance and friction. They will be able to mechanisms such as levers, pulleys and gears to explain forces and making jobs easier.	Children will understand how the circulatory system works and will be able to use this to explain the positive and negative effects of diet, exercise, drugs and lifestyle on the body. They will be able to recall animals from the 5 vertebrate group and some from non-vertebrate groups including their key characteristics. They will understand how plants and animals are suited to their environment and the process of evolution. Children will be able to use classification keys to identify unknown plants. They will know what fossils are and can use research and observations to show that things lived billion years ago. Children will use diagrams to explain how light travels and understand shadows. They will be able to make simple circuits using recognised symbols in their drawings . They can conduct a range of fair tests identifying cause and effect when testing brightness of a bulb or volume of a buzzer. Children will be able to conduct a range of investigations with accuracy using repeat measurements and using a range of equipment . They will use scientific theory to refute or support their arguments .