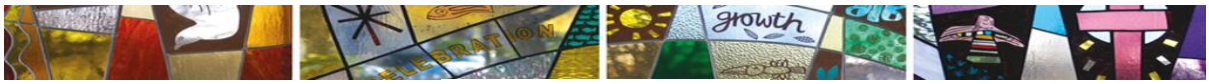


St. Peter's
Church of England Primary School

Science Subject Rationale

Our Vision

LOVE, LEARN, SHINE.

SHINE in the light and love of God.

LOVE
We nurture each individual to be happy, healthy and safe, build positive and respectful relationships with others valuing their uniqueness and including everyone.

LEARN
We inspire children to a lifelong love of learning, to develop wisdom, knowledge and skills and be fluent, confident learners who are well prepared for life in a diverse world.

SHINE
We support children to grow and develop socially, emotionally, physically and spiritually, helping them to shine and share their light enabling themselves and others to flourish.

'People do not light a lamp and cover it with a bowl or put it under the bed. Instead they put it on a lampstand, so that people will see the light as they come in'.

Luke 8 V16.

Vision into Curriculum

Our vision translates directly into our curriculum in that;
Our curriculum promotes a love and appreciation of life and learning enabling children to *SHINE,* realise a passion for what is possible and enjoy life in all its fullness

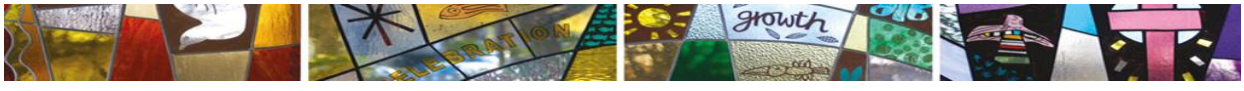
National Curriculum Aims and Purpose

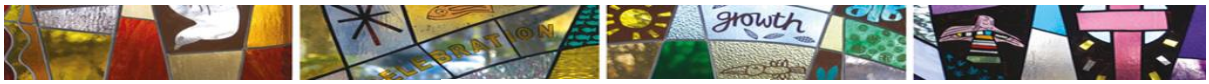
A well planned and effectively implemented curriculum begins with a sound and secure knowledge of the National Curriculum purpose and aims for the subject.

In Science they are;

National Curriculum Purpose - Science

A high-quality science education will help pupils gain a coherent knowledge, understanding and recognition of the importance of science in everyday life while reinforcing the increased development for respecting our world. Teaching should engage, enrich and excite the pupils to become innovative learners who seek out answers and develop skills associated with science as a process of enquiry.





St. Peter's
Church of England Primary School

National Curriculum Aims

- 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

Quality First Curriculum Implementation in Science

Quality first curriculum implementation in Science supports children in becoming secure, and fluent in the identified agreed core knowledge and skills in Science. Fluency and security in core knowledge allows children to explore concepts in greater depth exploring and evaluating concepts and ideas enabling children to articulate informed responses about scientific understanding and enquiry.

At St Peter's the journey to becoming scientifically literate begins in the Early Years. Our youngest children learn about science within the EYFS area of learning known as 'Understanding of the World'. The objectives are set out in the Early Learning Goals which underpin the curriculum planning of children aged between three and five years old. These will be led by the children's interest and the 'here and how' gained from the observation, assessment and planning cycle. Examples of the themes incorporated include understanding the key features of the life cycle of a plant and an animal. This may include observing the stages of development from hatched eggs into butterflies.

By the time children reach the end of Year Six they will be securely scientifically literate and working in line with age related national expectations. They will have experienced a number of trips to enhance their scientific understanding.

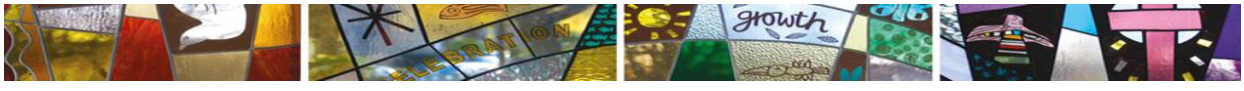
Our children will have a rich and deep knowledge of local, national and international science and will be able to use scientific thinking skills such as investigating, considering, reflecting and reviewing scientific world.

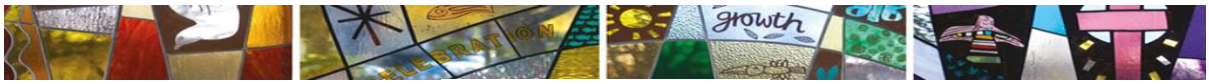
Our children will enjoy asking and answering challenging questions about science and making links within different subjects.

When conducting scientific research, they will select from a range of scientific sources, using vocabulary confidently and accurately. They will be able to analyse and evaluate the sources of information they use.

Essential Characteristics of Science

A feature of our curriculum design is the use of Essential Characteristics. These are the learning characteristics developed through the subject overtime. They act as a common thread between all the units studied in a subject and are developed from Early Years to Year 6.





St. Peter's
Church of England Primary School

In Science they are;

•The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.

• Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.

• Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.

• High levels of originality, imagination or innovation in the application of skills.

• The ability to undertake practical work in a variety of contexts, including fieldwork.

• A passion for science and its application in past, present and future technologies.

Science Threshold Concepts

A further feature of our curriculum design are Threshold concepts.

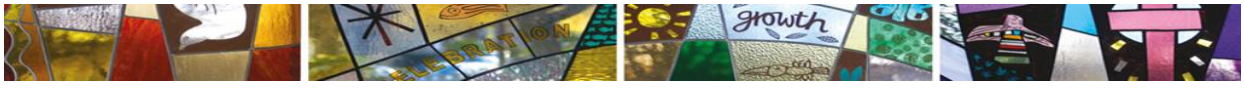
Threshold concepts are the 'big ideas' that shape children's thinking within each subject. The same threshold concepts will be explored in every year group and children will systematically build their understanding of them. An important principle, is that exploring concepts will never be complete; children will continue to explore them for as long as they continue to study the subject.

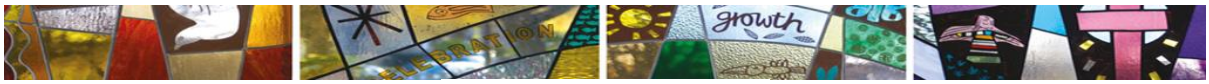
In Science they are;

- **Work Scientifically**
  This concept involves learning the methodologies of the discipline of science.

<u>Biology</u>

- **Understand plants**
  This concept involves becoming familiar with different types of plants, their structure and reproduction.
- **Understand animals and humans**
  This concept involves becoming familiar with different types of animals, humans and the life processes they share.
- **Investigate living things**
  This concept involves becoming familiar with a wider range of living things, including insects and understanding life processes.
- **Understand evolution and inheritance**
  This concept involves understanding that organisms come into existence, adapt, change and evolve and become extinct.





St. Peter's
Church of England Primary School

CHEMISTRY

- **Investigate materials**
  This concept involves becoming familiar with a range of materials, their properties, uses and how they may be altered or changed.

PHYSICS

- **Understand movement, forces and magnets**
  This concept involves understanding what causes motion.
- **Understand the Earth's movement in Space**
  This concept involves understanding what causes seasonal changes, day and night.
- **Investigate light and seeing**
  This concept involves understanding how light and reflection affect sight.
- **Investigate sound and hearing**
  This concept involves understanding how sound is produced, how it travels and how it is heard.
- **Understand electrical circuits**
  This concept involves understanding circuits and their role in electrical applications.

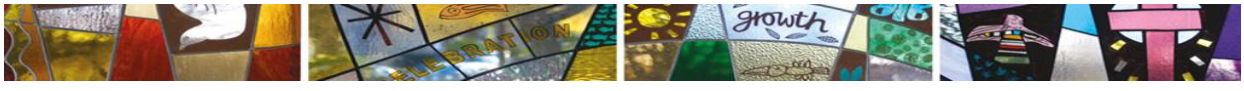
Knowledge in Science

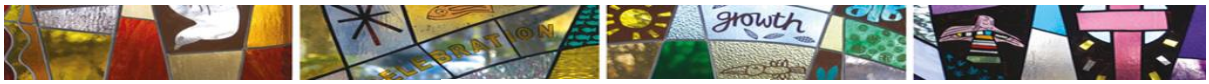
Knowledge in Science typically falls into two categories. Substantive knowledge concerns the key facts and concepts in a subject (e.g. the Life Cycle of Plants and animals). Disciplinary knowledge relates to the thought process and understand needed to explore and construct understanding within the subject (e.g. scientific enquiry, including investigations and experiments: predicting, gathering data, drawing conclusions and evaluation)

Science for All

Wherever possible or appropriate children with SEND access Science along with their peers as we recognise the importance for all our children to access our curriculum in line with our curriculum design principles.

For some children with SEND, particularly those with high needs, access to Science is considered along with ensuring they have access to their personalised or adjusted curriculum. For example, enabling access to specialist programmes such as those advised by speech and language therapists, occupational therapy programmes or the SEN Hub. These programmes are timetabled to minimise the impact on the child's access to a broad and rich curriculum and do not impact on access to educational visits relating to Science. Typically, these programmes are identified in EHCPs and ILPs and curriculum adaptations are agreed with parents.





St. Peter's
Church of England Primary School

Higher attainers in this subject are challenged to ensure they become fluent with the core key concepts through additional questioning and prompts (and tasks where appropriate) which helps extend their verbal reasoning skills as well as supporting them to engage in creating, evaluating, and analysing, delving deeper into the subject content.

For children with SEND, access to the learning in Science in lessons may need to be differentiated and scaffolded, whilst the planned, progressive curriculum content is retained. Children are supported to succeed through:

- Breaking down tasks into smaller chunks to achieve and prioritising understanding over task completion
- Giving sufficient time to process instructions, or adapted verbal or written instructions
- Wherever appropriate or possible, information is supported by pictorial or concrete cues. E.g. Circuit Symbol cards alongside actual circuits and equipment.
- Scaffolded questions from adults and orally rehearsing thoughts with an adult
- Where appropriate or necessary, pre-teaching core vocabulary or concepts
- Resources that support reduced cognitive load. E.g. *Science* – pre-written labels to match to match scientific properties i.e. independent variable.

For children with very high needs, they may require additional resources such as social stories to learn challenging concepts. They are supported with additional teaching assistant time that is proportioned to enable children to succeed in Science whilst promoting independence.

Monitoring & Assessing Progress in Science

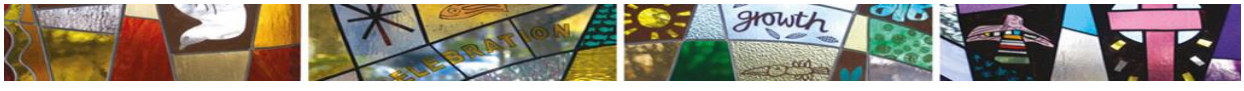
By progress, we mean children knowing and remembering more. They key question we ask is; *'has a child really gained the knowledge to understand the key knowledge and concepts''*.

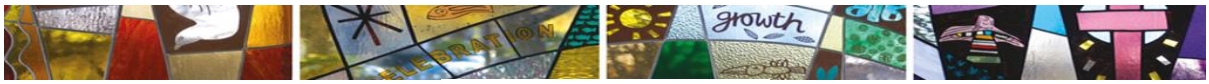
Assessing children's progress is vital in order to establish their acquisition of knowledge and skills is building confidence and fluency in all subjects. At St Peter's learning always starts with the children's prior knowledge and any misconceptions they may have. Class teachers decide upon the most appropriate age-related way of obtaining the children's prior knowledge. Misconceptions that arise throughout the unit are identified and addressed appropriately by the teacher.

We track progress through teacher judgement, supplemented by frequent low stakes knowledge recalls (frequently in quiz format) and occasional formal tests to ensure knowledge is recalled and children are genuinely building upon secure prior knowledge.

In most subjects we are developing, knowledge organisers summarise key vocabulary (with agreed definitions), facts, and concepts. These clarify what has to be taught and are used as the basis of quizzes so that teachers can check the knowledge has been embedded.

In addition to assessing if children have secured the agreed key knowledge 'Milestones' related to the threshold concepts are used to assess children's understanding and progress. Systematic planning of opportunities to learn and practice the knowledge and skills of each milestone is built into each subject planning overview.





St. Peter's
Church of England Primary School

A blocked approach to curriculum delivery including systematic structured opportunities for recall is currently being developed and implemented.