# Brinscall St John's C.E./ Methodist Primary School

# Science

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**Brinscall St John's Primary School**
**Science Policy**

## Science

At Brinscall St John's we understand the importance of science throughout the world we live in and the impact this has on everyone's lives. We appreciate the complex, inter-twining relationships between chemistry, biology and physics in our world and we understand how these can influence pupils to explore their curiosities and create a foundation of scientific knowledge.

### Intent:

Our science curriculum aims to provide children with regular opportunities to work independently and collaboratively, developing their questioning and exploratory skills regarding the world around them and developing the skills to become **problem solvers**. Children will be given the autonomy to follow their own intrigue and curiosities by working scientifically in a wide range of practical and written activities, where they will be encouraged to be **creative** in their explorations. We want children to develop a passion and love for science that they can extend and develop throughout their school lives and into their adult lives. We want to create a foundation for all children which gives them the confidence to apply their science understanding to their own lives, recognising the importance of a **healthy body and a healthy mind.**

### Implementation:

Children experience science in EYFS through their 'The Natural World' learning and this then progresses to the National Curriculum in KS1 and KS2. Throughout KS1 and KS2, classes follow the National Curriculum and ensure all statutory learning is completed, with non-statutory requirements embedding this learning further. We have our Science Principles that are embedded through our planning and displayed in classrooms, so children know what to expect when they're learning about science. As children move through school, they are expected and encouraged to take more ownership and control of their science learning, by considering what they would like to investigate and how they would do this. Children are also encouraged to talk through their thinking and queries of the world around them. We also develop reading and writing through our science lessons as children are exposed to real life scientists and key vocabulary in reading comprehensions and other written tasks. We promote the understanding that everyone has the potential to become a scientist.

Children are encouraged to explore their own curiosities and **solve any problems** and challenges they may face. In addition to being encouraged to 'work scientifically', once it has been modelled by teachers, the children are also expected to use and apply key vocabulary that they have learnt throughout their school journey. Science lessons are taught with 'steps for learning' incorporated into them, allowing **all children** to access the lesson at the same level and then progress and develop their understanding of key learning based on their individual abilities. Science is linked to all areas of the curriculum, with maths being strongly linked through use of graphs, data collection and analysis, diagrams and observations. Staff also receive continuous professional development through working with external providers such as Adrian Bowden's Science Roadshow to offer staff and children a deeper knowledge of key elements of science.

Children also have extra-curricular opportunities through clubs and groups to enhance, deepen and celebrate their understanding of science and the world.

**Impact:**

Science is linked to all areas of the curriculum, so children are more aware of how science is all around us and a part of our lives every day. Children from all abilities and ages have a love of science and an eagerness to understand and question the world around them. **Creative** and challenging lessons have inspired children to apply their understanding to their own lives, recognising the importance of science in everything we do. Children will continue to be more inquisitive and observant of things around them, actively seeking to develop their understanding of key aspects of their lives. Science at our school is a platform for all children to demonstrate a deeper, critical understanding of the world they live in and to be excited by the enormity of potential learning they can achieve in science. Children develop their understanding in all other areas of the curriculum through cross-curricular activities they experience and are continuously given opportunity to work scientifically.

**Rationale**

Brinscall St John's provides a broad and varied science curriculum, through a variety of teaching approaches and learning situations, to meet the needs of all our pupils. We seek to provide this for all, irrespective of gender, in accordance with our school policies on Equal Opportunities and Inclusion and in accordance with our statutory responsibilities under the SEN Disability Act 2001.

**Vision and Mission Statement**

**Shine with the light of Jesus** – Matthew 5:14-16. You are the light of the world. Within our school family, everyone is valued and encouraged to flourish. We encourage everyone to let their light shine in all aspects of their life, following the example of Jesus Christ. We hope for each member of our school family to understand how much they are loved by Jesus, so we can each flourish, and shine His light out into the world around us by the way that we live.

Scientific links with a spiritual interpretation about the universe and life will be made. The school grounds will be used regularly for reflection on relationships between people and their environment. Children will be given opportunities to reflect on the mystery of the natural world and physical worth, life cycles and growth whilst developing an awareness of their wonderful physical self.

**Aims:**

St John's aims are embedded within our Christian vision - 'Shine with the light of Jesus', our Vision and Mission Statement and core Gospel Values of: love, stewardship, faith, serving others, forgiveness and determination. At our school, we seek to provide a safe, caring and stimulating environment for our children.

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.

**The teaching of science:**

The school will teach science in accordance with the requirements of the National Curriculum. We recognise the importance of:

- The early learning goals at the 'foundation stage' of learning in nurturing knowledge and understanding the world.
- The *programmes of study* set out by the National Curriculum for each Key Stage and year group.

We refer to the statutory requirements for each year group to ensure each age group are covering all national expectations within their science lessons. We use a bank of resources to complement the statutory requirements, including the non-statutory suggestions and suggested activities taken from Lancashire County Council. This approach allows us to highlight links to other subject areas and the assessment tools supplied by Lancashire County Council also allows us to monitor and track progress of each child through each unit and the whole academic year.

The programmes of study for science are set out year-by-year for Key Stages 1 and 2. Brinscall St John's will teach the relevant programme of study by the end of the Key Stage, often with each unit remaining in the suggested year group. However, within each Key Stage there is the flexibility to introduce content earlier or later than set out in the programme of study. In addition, Key Stage content may be introduced during an earlier Key Stage if appropriate. As required, the school curriculum for science will be available online on a year-by-year basis.

**Science principles**

At Brinscall St John's we have 'Science Principles' which are displayed in each classroom and are key ingredients for lessons throughout school. These principles were devised by our teaching staff team and following a consultation with our Ambassadors of Science and Health (ASH) team too. These are implemented throughout our science curriculum and recognise we value science and how we view it as a school. These principles, shown below, are referenced in our planning format too:

**Science is fun when:**

1. Answers are discovered
2. Lessons are practical
3. Time is spent outside
4. It is linked to our lives
5. It is not obvious
6. We investigate things
7. It becomes useful
8. It involves everyone
9. We choose the questions

10. It is challenging
11. It is not rushed
12. It is done at our school

**Planning**

Medium term planning shows the sequence of a unit of study linked to the estimate of time each unit will take. The teaching objectives linked to the programmes of study are identified in planning, which is the responsibility of individual teachers, who build on their medium-term planning by taking account of the needs of children in a particular class and identifying the way in which ideas might be taught in the class.

Our science planning document highlights the importance of cross-curricular links through science and how these take shape through each unit and each lesson. It also highlights our science principles, key vocabulary for each unit, visits and visitors to be utilised in that unit, external links and support available and display ideas for that unit. All these aspects of the planning format are in addition to the requirements of the National Curriculum and also the Christian Values being clearly displayed for each unit too.

To accomplish our aims in science education we shall plan carefully and also ensure the intention and impact of our teaching is clear, ensuring the children's education is relevant and has clear purpose and direction. We will also monitor children's progress termly and provide a variety of teaching approaches and resources.

Inclusion, assessment, recording and reporting achievement will be the responsibility of all teachers in accordance with our other school policies.

**Scientific knowledge and conceptual understanding**

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science. Wherever relevant and appropriate, our Christian values will underpin our learning of science, allowing the children to recognise the importance of stewardship and love of our world.

**The nature, process and methods of science**

'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. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These points are also referenced on the medium-term plans.

These 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. 'Working scientifically' will be developed further at Key Stages 3 and 4 once pupils have built up a sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

**Spoken language and vocabulary**

The National Curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions. Key scientific vocabulary and understanding of these words is embedded throughout the children's journeys through school. These are also visible on the working walls within each class and the medium-term plans for each unit taught in each class.

**Attainment targets**

By the end of each Key Stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Y2 will be assessed against the teacher assessment framework at the end of Key Stage 1.
Y6 will be assessed against the teacher assessment framework at the end of Key Stage 2.

**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. All of this is also reflected and linked to our principles of science.

'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.

**Lower Key Stage 2**

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, consistently building on prior knowledge and teachings they have been taught and experienced. 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.

**Upper Key Stage 2**

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, consistently building on prior knowledge and teachings they have been taught and experienced. 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.

**Assessment and record keeping**

Assessment of children's learning is done throughout classroom practice and is built into the school curriculum and planning, to identify what pupils have learned, what progress they are making and whether they are on track to meet expectations. Ordinary classroom work will be used to assess children against learning objectives.

Assessment is ongoing throughout Key Stages 1 and 2, with the updated planning format giving the teachers the opportunity to track pupils progress lesson-by-lesson and make notes within the evaluation section of their plans. These documents can then be used to inform the overall science assessment tracking document which will record attainment of each child for each unit taught within their year group. An overall judgement of the child's progress will be made based upon these regular ongoing assessments.

**Lancashire's supports for Knowledge and Conceptual Understanding**

The Teaching and Learning Consultants for Primary Science, Lancashire have taken the year group programmes of study from NC2014 and produced grids for each unit and each year group to support teachers in tracking pupil progress of Knowledge and Conceptual Understanding *alongside* their planning. The grids can be adapted to be used in any of the following ways and will support advice about annotated planning.

These grids contain the *Key Learning* for a unit for planning purposes and space to identify any child throughout a unit who is working at, below or above year group expectations. (Grids can also be adapted to include a fourth group for specific SEN children if required). These documents are informed by the evaluation section of the planning format mentioned previously and will be used to update the science tracker used by our school and to make overall end of year judgements.

Teachers will identify children as one of the following:

- Working ***below the expected standard*** for their age group
- Working ***at the expected standard*** for their age group
- Working ***above the expected standard*** for their age group

Every year group has an assessment sheet to be completed by the end of each unit, stating the attainment of all children in the class. An overall attainment grade will then be decided upon after the teaching of all statutory objectives for that unit. From here, an overall judgement will be made at the end of the year based on the attainment of children in all units of work.

**Cross-curricular skills within science**

- Numeracy: Data, measures, scales, tables, graphs, noticing patterns

- Literacy: Using scientific vocabulary and common language effectively in sentences (verbally and written), recording their learning, background knowledge from their reading experience

- Thinking and behaving like a Scientist: Questioning, ideas and suggestions, planning investigations effectively, making decisions about what to do, carrying out practical science activities, linking the big ideas.

**Evidence:**

A subject leader folder has been put together, which will have all key documents stored and will also be accessible to other staff through the One Drive. Any activities completed during the subject leader's release time will be clear to see within the folder along with any lesson observations, book or planning scrutiny, resource audits and pupil voices. The subject leader will regularly review science throughout school and update the ***'Examining teaching and learning in science'*** document accordingly, to highlight strengths and next steps for the school. The folder will also hold samples of children's work from all year groups which enables progression to be seen more easily. Recorded work is in classroom workbooks, and often used on display. Each class also has a 'wow moments' book for science and these will hold evidence of key learning in every unit and can be used to support the children's recall of learning.

Science books will also be retained in school and passed up through classes at the end of each academic year. These will be released at the end of each Key Stage, with a selection of books being retained for evidence. This will allow children and teachers to refer back to prior learning and build on what the children already know.

**Primary Science Quality Mark (PSQM)**

At Brinscall St John's we are proud to hold the Gilt award of the PSQM and have done so since 2022. The award is valid until the end of 2025 and we will be looking to achieve an improved grading as a recognition of science within our school and wider community.

**Resources**

The school has a range of science resources relating to the various topic areas. The majority of these resources are kept in classrooms that they are relevant to or within the science cupboards in the ICT suite, labelled correctly. The school library is well stocked with science titles and teachers' resources include 'Inspiring Science' **(see Inspiring Science – Teacher Share/Shared Documents/Science)** as well as books kept in the staff room.

**ICT**

ICT will be used in various ways to support teaching and motivate pupils learning. ICT involves the computers, and audio-visual aids, CD-ROMs, DVD and digital map referencing software. Computers may be used to enhance lessons and enable children to find information off the internet and other programs to support their learning. We also have access to class iPads and Microsoft Surface's that can be used by the children. Classes use Seesaw to share what they have been doing in school and at home. This allows work to be assigned as science and can also be a useful tool for assessment.

**Health and safety guidelines**

At Brinscall St John's we are aware of the importance of assessing the potential risks to the safety and wellbeing of staff, children and visitors. Risk assessments are undertaken which assess the potential risks to pupils and others associated with activities undertaken when delivering the curriculum, and specifically primary science. Control measures are put in place to reduce those risks as far as is reasonably practicable

When planning fieldwork all teachers are required to gain permission from the head teacher before confirming a booking. The teachers must also complete a risk assessment, even if it is a site they have visited previously. Teachers should refer to the school's Health and Safety and Educational Visits Policy and the safety procedures recommended in the DfES 'Health & Safety of Pupils on Education Visits' guidelines.

**Equal opportunities and SEND**

Activities should be carefully planned by the class teacher and be differentiated where appropriate for children with SEN, and equally the more able children working above their year group expectations. Please refer to appropriate policy for more information. At St John's we have due regard for our duties under the Equality Act 2010.

Through the delivery of the Science curriculum, we will ensure that we: eliminate discrimination, advance equality of opportunity and foster good relations.