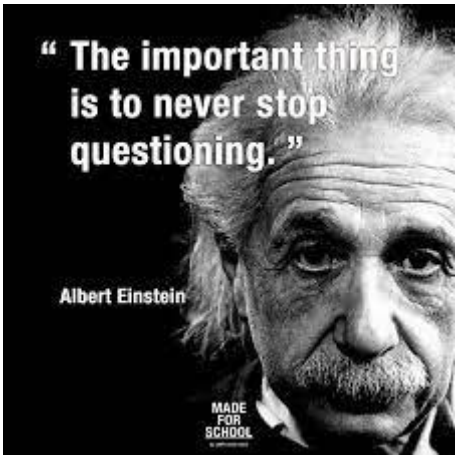
Belton Primary School

Science Policy

Updated August 2023



This document is a statement of the aims, principles and strategies for the teaching and learning of Science at Belton Primary School.

Aims and Objectives:

Science teaches an understanding of natural phenomena. It aims to stimulate a child's curiosity in finding out why things happen in the way they do. Children are constantly intrigued by everything in the world in which they live in. As a result of this, Science makes a valuable contribution to each child's understanding. It teaches methods of enquiry and investigation to stimulate creative thought. Science changes as human understanding and experience develop. It is an on-going learning process as children's ideas about the world around them are constantly developing. Children learn to ask scientific questions and begin to appreciate the way Science affects the world.

As a school we aim:

- to develop the natural curiosity of children about the world in which they live;
- to develop skills in questioning through a range interesting and enjoyable experiences;
- to help all children develop the skills they need to make systematic enquiries;
- to provide as many opportunities as we can for children to apply skills that they have learned to the solving of practical problems;
- to enable all children to develop an increasing attention to accuracy;
- to continue developing positive attitudes towards science and increase pupils' understanding of how science is used in the wider world;
- to provide a growing range of relevant experiences to all pupils, allowing them to acquire knowledge, skills and understanding in the key areas of Working Scientifically, Animals including Humans, Plants, Living Things and Their Habitats, States of Matter, Properties and Changes to Materials, Electricity, Forces and Magnets, Forces, Light, Sound, Earth and Space through a variety of teaching and learning strategies;
- to continuously develop the accurate use of scientific vocabulary used by each child;

- to meet the individual needs of each child so that they will reach their full potential in Science.
- to create a sense of awe and wonder through the Science topics that are taught in different year groups.

Teaching and Learning:

We use a variety of teaching and learning styles in Science lessons. Our principal aim is to develop children's knowledge, skills, and understanding, as well as nurture a sense of enjoyment and natural enquiry in the subject. We encourage the children to ask, as well as answer, scientific questions. They have the opportunity to use a variety of data, such as statistics, graphs, pictures and photographs. Children use technology in Science lessons where it enhances their learning.

Our school fosters an adaptable approach to teaching Science by:

• All pupils will have access to appropriate Science equipment and will have instruction on its use.

• Groupings of pupils will be based on starting points, prior assessments and misconceptions that have been identified. These are fluid and are subject to change on a regular basis.

• Teaching staff are aware of any gaps in Scientific understanding from the prior year group and plan their own starting points based on these.

• Lessons will follow the requirements of the National Curriculum 2014, with carefully mapped progression across the year groups (please see progression document).

• Through the use of Developing Experts we ensure that there are close links between the Early Years and Year 1 to ensure progression into the National Curriculum.

• Misconceptions are identified and addressed during the lessons and assessed to assure that they are dealt with quickly.

• Lessons will have clearly defined objectives appropriate for the pupils involved, with relevant success criteria where needed.

• Pupils will have access to Scientific vocabulary on displays and this will be referenced to within the lessons using rocket vocabulary to ensure pupils understand and can use relevant vocabulary.

• Linked knowledge organisers enable pupils to learn, retain the important, useful and powerful scientific vocabulary within each unit.

• Scientific knowledge and enquiry skills are developed with increasing depth and challenge as pupils move through the year groups. This can be seen in our progression documents.

• We recognise that there are children of widely different scientific abilities in all classes and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways by:

- setting common tasks which are open-ended and can have a variety of responses;
- setting tasks of increasing difficulty
- providing resources of different complexity, matched to the ability of the child

- where possible, using learning support practitioners to support the work of individual children or groups of children
- mixed ability groups in which pupils plan and work together but record their work separately.

• Pupils who grasp concepts rapidly are challenged through questioning within lessons and where appropriate dig deeper challenges within tasks.
• Teachers use Developing Experts as the starting point to their curriculum, with adaptations to challenge and support individual class needs.
• Off timetable we celebrate Science Week to allow pupils to come off-timetable, provide a broader provision and the acquisition and application of knowledge and skills. We also have termly whole school Science afternoons where children are able to use the scientifically skills taught in lessons (see rolling programme). Where possible we involve families and the wider community.
• Planned opportunities to complete investigations to allow pupils to apply their substantive knowledge into a variety of different contexts.

Lesson Structure

Lessons at the Belton Primary School are planned by class teachers. Teachers use Developing Experts as a starting point with the following lesson structure.

1. **Retrieval** – At the start of the lesson children are given the opportunity to answer questions based on previous lessons, units and years. They also revise any previous vocabulary learnt over the unit.

2. **Lesson Starter – engage:** A key question to get the pupils thinking scientifically. Aimed at ensuring pupils are engrossed in their learning.

3. **The Story – Explore and Explain:** Pupils are taught key concepts through talk partners, songs, choral response questions, keywords/rocket words, key concept '30 second challenges'. This aimed at helping pupils master their content so that the knowledge moves from their short - term memory to their long - term memory. At the beginning of the lesson, the question from the previous lesson is revisited.

4. **Lesson Expert – Explain:** Linking the curriculum to careers. This allows pupils to see Science in the community and allows them to have the opportunity to view different people who work with Science despite colour, race, gender. We feel this is important as we want to encourage the children into seeing the wider world of work beyond the village of Belton and different STEM opportunities.

5. **Lesson Assignment – Elaborate:** Pupils are presented with a learning challenge to allow them to apply their taught concepts. These challenges are adapted for the needs of the children but ensure that children follow the same objective.

6. **Assessment quiz – Evaluate:** Pupils use whiteboards to write down the answers from today's learning. Key questions are asked to inform teachers formative assessments.

Working Scientifically and Scientific Enquiry

Within our lessons, children will be made aware of the skill they are learning that will help them become Scientists. These are clearly marked in their books and children have them at the start of their books to refer to.

Scientific enquiry enables children to use their skills in order to answer a question. As children progress through school they will begin to develop an understanding of the enquiry types and be able to come up with their own investigations to test answer to questions.

Over the year we ensure that children have the opportunity to develop each skill and participate in every enquiry type. Through our Science Investigation days we ensure that children are given the opportunity to apply the skills in a range of different contexts.

	Autumn	Spring	Summer
Cycle A	Fly High Friday – Making and testing paper aeroplanes	Which biscuit is the best dunker?	Summer Bubbles Making the biggest bubbles/ best bubble formula
Cycle B	Christmas Science	Make a lava lamp https://sciencebob.com/blobs-in-a-bottle-2/	Our grounds + minibeasts

Retrieval

A before unit and end of unit quiz will be done to see what the children have learnt throughout the unit.

As well as the last lesson question the children will answer some questions to ensure that prior learning is retained. As we realise the importance of remembering key vocabulary this may be used for retrieval questions or separately in a quiz.

Gold – Previous learning from this unit

Silver – Learning from another unit this year

Bronze – learning from a previous year that may link with the unit taught
Vocabulary – A word or two that the children have been taught.

Scientific Vocabulary

We realise the importance of understanding Scientific vocabulary. Teachers therefore refer to the key vocabulary (rocket words) at the start of every lesson. This is modelled within the lesson by the teacher and children are asked what the word means. In written work children are encouraged to use the key vocabulary from the lesson.
Knowledge Organisers that contain these words are placed at the start of the unit and children are encouraged to refer to them during lessons.
Working walls show the rocket words used during the unit so children are able to refer to them.

Scientist Progression (see rolling programme)

We ensure that children have the opportunity to learn about Scientists through our different units of learning and therefore we would like the children to be introduced to a wide range of Scientists whether historic or modern or from different backgrounds and under-represented groups. Children are given the opportunity to research about them for homework or where appropriate through the unit of lessons.

Mixed Age classes & sequencing rationale

As we have mixed age classes we follow a two year rolling programme in KS1 and 2. The curriculum is carefully sequenced following advice from the PSEC (https://drive.google.com/file/d/1dkKK8o7DgyiIkn3PQqkdQ9jPm5bSsL_p/view)
For schools adopting this approach, it is important to ensure that the two cycles for each phase are constructed so that the topics included in each do not rely on prior learning that only features in the other cycle. (PSEC)

	AT1	AT2	Spring 1	Spring 2	S1	S2
EYFS	My Body Know about and name body parts Describe what different body parts do Explore how our bodies change Think about how we are similar and different What do we use our arms, legs and chest for? What do our hands and feet do? Why we have eyes and a nose?	Weather and Seasons Know the names of different seasons State what weather is likely in different seasons Recognise types of weather Discuss ways to be safe in different types of weather What is rain, ice and water? Why does the air move? Why is the snow melting? How are rainbows made in the sky?	Animals Name different types of animals Explore different habitats animals live in Discover dinosaurs and how they are now extinct Where do animals live and what do they need? Where do birds live and what do they need? What are bears? Did dinosaurs live on earth?	Food Know where food comes from Informed about healthy food choices Understand how animals are used for food production Say why measuring ingredients is important Where does food come from? What forms a healthy diet? How are animals used in food production? How can we measure when learning about ingredients used in	Plants Know what a plant looks like Name different parts of a plant Discuss how to look after plants Understand how plants are made and grow Are plants living? Where do plants come from? How do I look after plants?	Beach Know about materials used to build a sandcastle Understand how to measure length properly Learn more about the beach environment and how to protect it How do waves wear away the coastline? How do you make the perfect sandcastle? How long is your foot print in the sand?

	Can I describe my ears, mouth and hair? How has my body changed since I was a baby?	What happens in spring and summer? What happens in autumn and winter? <u>Materials</u> Reflective / non reflective		different food products?		

		AT1	AT2	Spr 1	Spr 2	S1	S2
KS1	Cycle A	Growth	Exploring Materials	Plants – yr 1	Exploring everyday materials	Lifecycles	Living Things & their Habitats
	Cycle B	About Me	Seasonal Changes	About Animals	Plants – yr 2	Uses of materials	Habitats from Around the World
LKS2	Cycle A	Light	Skeletons + Teeth	Digestive System	States of Matter	Living Things – yr 4	Electricity
	Cycle B	Forces	Plants	Conservation	Sound	Scientific Enquiry	Rocks
UKS2	Cycle A	Living Things – yr 5	Living Things – yr 6	Changes of Materials	Evolution & Inheritance	Forces	Circulatory System (Puberty)
	Cycle B	Properties of materials	Light	Electricity	Animals incl. Humans - 5	Space	Looking after the environment

Rationale (Taken from PSEC – Sequencing Science Topics)

KS1

Plants

If pupils encounter the Year 2 Plants topic as the first cycle, they would not have the necessary prior knowledge from the Year 1 topic to access the learning. Consequently, we have decided that the following statement from the Plants topic in Year 1 needs to be covered in both cycles.

· Identify and describe the basic structure of a variety of common flowering plants. including trees.

Therefore, the two Plants topics can be taught in different cycles as long as this statement is added to the Year 2topic.

Seasonal change

As indicated in the general sequencing information above for Year 1, pupils should be "making observations about the weather and how this affects living things". To maintain this learning

interdependency between the Seasonal change and Plants topics, it is advisable that they are kept in one cycle. We have decided to teach this in Cycle A however it will be referenced during Cycle B.

Animals, including humans

The Year 2 statements "Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)" from the Animals, including humans topic and "... describe how different habitats provide for the basic needs of different kinds of animals..." from the Living things and their habitats (Habitats Around the World) topic are linked. To maintain this learning interdependency, we have aimed to keep them within the same cycle.

Materials

Both units from Year 1 Materials will be taught in Cycle A while within Cycle B the Year 2 unit will be taught however in cycle B, the following statements from the Everyday materials topic in Year 1 would need to be covered in both cycles.

- Distinguish between an object and the material from which it is made.
    - Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.

LKS2

Animals, including humans

We have decided to put both Animals incl. Humans topics in cycle A. This is because if pupils encounter the Year 4 Animals, including humans topic as the first cycle, they would not have the necessary prior knowledge that animals and humans "get nutrition from what they eat" from the Year 3 topic. Consequently, before teaching about the digestive system in the Year 4 Animals, including humans topic, the pupils will need to be taught that animals and humans get the nutrients they require from the
food they eat.
There is no other content in Year 4 that relies on prior knowledge from Year 3. There are, however, topics that are linked within year-groups, as shown above. Therefore, it makes most sense to have the Year 3 topics in one cycle and the Year 4 topics in the other.

Scientists (see rolling programme)

We ensure that children have the opportunity to learn about Scientists through our different units of learning. These are ones who are historic or modern-day Scientists. Children are given the opportunity to find out more about them during homework or where appropriate within the sequence of lessons.

Upper Key Stage 2

Living things in their habitats

If pupils encounter the Year 6 topic as the first cycle, they would not have the necessary prior knowledge from the Year 5 topic to access the learning. Consequently, these two topics have been kept in the same cycle.

Evolution and inheritance

If pupils encounter the Year 6 Evolution and inheritance topic as the second cycle, they would not have the necessary prior knowledge from the Year 5 Living things and their habitats topic to access the learning. Consequently, we have decided to keep these two topics in the same cycle.

Properties and changes of materials

As materials is the only Chemistry topic in upper Key Stage 2, it is a large one. Therefore we have split it into two smaller topics - Properties of Material and Changes of Materials; putting them both into two separate cycles.

*Animals, including humans

This topic contains important information about puberty which should be delivered in Year 5. We teach aspects of this topic to both Year 5/6 seperately, outside of the science two-year cycle for the phase.

Forest School & Outdoor Learning

Each class in school benefits from a 1 hour per week lesson from our Forest School lead. Some aspects of the Science curriculum will be taught in these sessions (see Forest School Curriculum + Policy). Any lessons which have been covered in Forest School will be documented and used as revision.

Where appropriate teachers will use the outdoors to enhance the children's learning.

Early Years Foundation Stage (see separate policy)

In the Early Years, children work to the Statutory framework for the Early Years Foundation Stage (EYFS).

Understanding the World

Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and local areas to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. To further support their understanding of the natural world, children follow Developing Experts and use scientific enquiry skills from an early age as a basis for future learning; skills which are further embedded through play with links to all areas of the curriculum. As well as building important knowledge, playing and talking about the world around them extends familiarity with words and enriches and widens children's vocabulary.

Understanding the world

- The Natural World
- Past and Present
- People, Culture and Communities

The Understanding the World curriculum is delivered through weekly adult led teaching which often involves modelling, role play and fun hands on activities to support learning. The learning is supported every day through general interactions in the classroom and when children are accessing the continuous provision.

Measure, Shape and Spatial Awareness	Baseline	Compare Size, Mass and Capacity Exploring Pattern	Circles and Triangles Positional Language	Shapes with 4 sides. Time	Compare Mass (2) Compare Capacity (2)	Length & Height Time	3D-shape Pattern (2)		Spatial reasoning (1) Match, rotate, manipulate	Spatial reasoning (2) Compose and decompose	Spatial reasoning (3) Visualise and Build	Spatial Reasoning (4) Mapping
Understanding of the world (UW) Past and Present People, Culture and Community The Natural world	My Body Know about and name body parts Describe what different body parts do Explore how our bodies change Think about how we are similar and different What do we use our arms, legs and chest for? What do our hands and feet do? Why we have eyes and a nose? Can I describe my ears, mouth and hair?		Weather and Seasons Know the names of different seasons State what weather is likely in different seasons Recognise types of weather Discuss ways to be safe in different types of weather What is rain, ice and water? Why does the air move? Why is the snow melting? How are rainbows made in the sky?		Animals Name different types of animals Explore different habitats animals live in Discover dinosaurs and how they are now extinct Where do animals live and what do they need? Where do birds live and what do they need? What are bears? Did dinosaurs live on earth?		Food Know where food comes from Informed about healthy food choices Understand how animals are used for food production Say why measuring ingredients is important Where does food come from? What forms a healthy diet? How are animals used in food production? How can we measure when learning about ingredients used in		Plants Know what a plant looks like Name different parts of a plant Discuss how to look after plants Understand how plants are made and grow Are plants living? Where do plants come from? How do I look after plants?		Beach Know about materials used to build a sandcastle Understand how to measure length properly Learn more about the beach environment and how to protect it How do waves wear away the coastline? How do you make the perfect sandcastle? How long is your foot print in the sand?	
	How has my body changed since I was a baby?		What happens in spring and summer? What happens in autumn and winter?				different food products?					

Assessment and Marking

Assessment at Belton Primary School is teacher based and formed using formal strategies (e.g. half termly 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 as it allows for misconceptions and gaps to be addressed more immediately rather than building on insecure scientific foundations. Forms of Science assessment that will be used include:

• Teacher / TA live marking

• End of unit 'mini assessments' – based on the Knowledge Organisers

EYFS assessment against their own curriculum – evidence of activities can be found within learning journeys and in photographs. Pupils to be awarded emerging or expected in the area of Understanding the World.

• End of Year 6 (externally) reported judgement stating 'met' or 'not met'.

• Overall judgement awarded at the end of the year as Greater Depth, Age Related and Working Towards based on the whole year's curriculum.

End of Academic Year triangulation using pupil books, teacher judgement and End of Unit assessment material outcomes. These to be passed to next teachers to inform teaching and planning for the subsequent year.

• Copies of assessments are forwarded to Science coordinator for analysis.

- Termly data analysis by co-ordinator to see trends and address any issues early on.

Marking will be done for each piece of Science work following our school's marking policy. Moving on comments will be given to each child at least once every block every three lessons and misconceptions will be addressed immediately. In Yr1/2 children will receive verbal feedback when necessary.

Planning

Planning follows the National Curriculum programme of study for each year group. Teachers adapt planning to suit their individual cohorts.

• Long term planning will reflect the National Curriculum 2014.

• Medium term planning will follow the Developing Experts structure.

• Short-term planning will be done on a weekly basis, by the class teacher(s), with assessments made of each lesson based on the Developing Experts criteria.

Lesson assessments will be used to assist the teacher's future plans. Amendments to short-term plans can be made if the need arises through teachers' personal annotations.

• Teachers plan for their own classes and groups but call on the advice of their colleagues and the curriculum coordinator where appropriate.

• At the end of each school year a teacher will liaise with the class' previous teacher to ensure progression and continuity.

Cross – curricular links

English:

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. Some of the texts that the children study in English are of a scientific nature. The children develop oral skills in Science lessons through discussions and through recounting their observations of scientific experiments. They develop their writing skills through writing reports and projects and by recording information.

Mathematics:

Science contributes to the teaching of mathematics in a number of ways. The children use weights and measures and learn to use and apply number. Through working on investigations they learn to estimate and predict. They develop the skills of accurate observation and recording of events. They use numbers in many of their answers and conclusions. They also produce diagrams, charts and graphs using the data from real investigations.

Computing:

Children use technology in Science lessons where it is appropriate. They use it to support their work in science by learning how to find, select, and analyse information on the Internet and on Children use technology to record, present and interpret data and to review, modify and evaluate their work and improve its presentation.

Personal, Social and Health Education (PSHE) and Citizenship:

Science makes a significant contribution to the teaching of personal, social and health education. This is mainly in two areas. Firstly, the subject matter lends itself to raising matters of citizenship and social welfare. For example, children study the way people recycle material and how environments are changed for better or worse. Secondly, children benefit from the nature of the subject in that it gives them opportunities to take part in debates and discussions. Science promotes the concept of positive citizenship.

Spiritual, Moral, Social and Cultural Development:

Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world was created. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the

teaching of science, children have the opportunity to discuss, for example, the effects of smoking and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it also promotes respect for other people.

British Values & Science

Democracy	The Rule of Law	Individual Liberty	Mutual Respect	Tolerance of those of different faiths and beliefs
In **the Science classroom** we learn through our lessons to take into consideration the views and opinions of others. We take turns and instructions from others.	In our **Science** lessons we learn and understand the importance of following safety rules when working scientifically. **Science** lessons help children to understand the consequences of their actions, which in turn helps them to apply this understanding to their own lives.	In **Science** we learn to confidently share our own opinions and ideas and respect the opinions of others. Within our lessons pupils are encouraged to make their own choices when planning an investigation and recognise that others may have different points of view.	When learning and investigating during **Science** lessons we work as a team, supporting each other and sharing ideas and opinions. We discuss our findings and respect each other's work - through this we offer support and advice to others.	Through lessons and discussion we look at scientific discoveries which have come from other cultures and how religious beliefs often compete with scientific understanding. We learn to be respectful of these beliefs and to appreciate and understand them.

Special Educational Needs

Provision for pupils with Special Educational Needs, in relation to Science, will be made through a partnership of all staff in the school. All pupils will have access to a broad and balanced curriculum, which includes Science. Extra support will be provided, where necessary, to enable all pupils to access the Science curriculum. (Refer to Belton Primary Special Educational Needs Policy).

Equal Opportunity

All pupils irrespective of age, gender and ethnic origin are entitled to participate fully in, and benefit from, a broad range of appropriate Science activities at every Key Stage (See Equal Opportunity Policy.)

Resources:

We keep our resources in a central store located in the Squirrels class and the Badgers class. The library contains a supply of Science topic books and the Computer Suite has a range of computer software to support children's individual research. A yearly budget is given to the subject and new resources ordered as required. Staff inform the co-ordinator of any requirements for new apparatus.

Monitoring & Evaluation

Evaluation and review of the procedure for Science takes place on an annual basis. All staff are involved in any changes or adaptations to the procedure. Monitoring and evaluation of planning, teaching and pupils' learning takes place on a weekly, termly and yearly basis. (see school monitoring proforma) Staff are encouraged to continuously monitor and assess their subject knowledge and identify any training needs through staff questionnaires or discussion with the subject leader. Governor monitoring occurs on a yearly basis and end of year reports are shared with governors. Data analysis of the subject is done termly and any trends are addressed through CPD or discussion where necessary.

Training

Termly co-ordinator meetings are held at Ashmount for the subject leader and information is disseminated to staff through staff meetings.
We also invite parents to attend curriculum days to strengthen the partnership with the community.

Science Lead

One member of staff is designated as Science coordinator. The Science Coordinator at Belton Primary School is: CATRIN YENDALL

The Co-coordinator's role includes: -

- Supporting all staff in matters relating to the teaching of School in school
- Preparing a draft procedure for staff discussion
- Helping to standardise planning
- Auditing and updating resources
- Monitoring and evaluating resources
- Leading staff meetings to discuss Science in school
- Leading staff training on Science Curriculum updates
- Conducting book trawls to monitor the quality of learning and teaching in Science
- Conducting lesson observations to monitor the quality of learning and teaching in Science
- Speaking to pupils (learning conversations) to monitor the quality of learning and teaching in Science
- Collecting and analysing data to assess the performance of Science across the school
- Reviewing teachers' plans (termly)

C Yendall
September 2023

To be reviewed August 2024