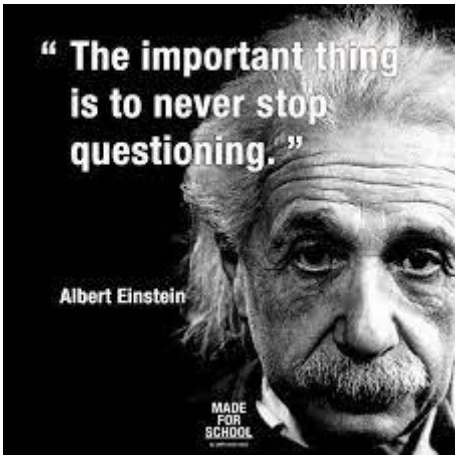
# Belton Primary School

# Science Policy




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).

• 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 within their books. This will be referenced to within the lessons 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.

• 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.
- grouping children by ability in the room and setting differentiated tasks for each ability group
- 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 dig deeper challenges.
• Teachers use Developing Experts as the starting point to their curriculum, with adaptations to challenge and support individual class needs.
• Off timetable Science Week to allow pupils to come off-timetable, provide a broader provision and the acquisition and application of knowledge and skills. These events often 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. Lesson Starter – engage: A key question to get the pupils thinking scientifically. Aimed at ensuring pupils are engrossed in their learning.

2. 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.

3. Lesson Expert – Explain: Linking the curriculum to careers. This allows pupils to see Science in the community.

4. Lesson Assignment – Elaborate: Pupils are presented with a learning challenge to allow them to apply their taught concepts.

5. Lesson Log – Evaluate: Pupils use talking partners to go through the quiz at the end and answer questions based on their learning. Key questions are asked to inform teachers formative assessments.

## Early Years Foundation Stage (see separate policy)

In the Early Years, children work to the Statutory framework for the Early Years Foundation Stage (EYFS). The section 'Understanding the World' involves guiding children to make sense of their physical world and their community through opportunities to explore, observe and find out about people, places, technology and the environment.

To ensure progression the EYFS classes follow the Development Experts EYFS programme.

## 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' – Using Developing Experts (Yr1-6). This will be produce a met and not met statement for each child.
- TAPS assessment will be used to support assessment of working scientifically skills as required.

**Overview of TAPS plans for Focused Assessment of Working Scientifically**

(Any focus can be chosen for open-ended enquiries, these are only suggestions)

| | PLAN | DO | | | REVIEW | |
|---|---|---|---|---|---|---|
| | **Ask Qs + plan enquiry** | **Set up enquiry** | **Observe + Measure** | **Record** | **Interpret + Report** | **Evaluate** |
| **R plans** | Brown apples | Incy spider shelter | Frozen balloons | Scavenger sort | Butter | Taste test |
| **KS1 (age 5-7) Develop close obs** | Ask simple Qs and recognise that they can be answered in different ways*. | Perform simple tests | Observe closely, using simple equipment. | Gather and record data to help in answering questions. | Identify and classify. *Use appropriate scientific language to communicate ideas.* | Use their observations and ideas to suggest answers to questions. |
| **Y1 TAPS plans** | Materials: reflection test<br>Materials: transparency | Materials: floating and sinking<br>Teddy zipline | Plants:structure leaf look<br>Shades of colour | Seasons: seasonal change<br>Materials: Bridge testers | Animals inc Humans: animal classification | Animals inc Humans: body parts |
| **Y2 TAPS plans** | Materials: waterproof<br>Separating colours | Materials: rocket mice<br>Daisy footprints | Plants:compare growth<br>Ice escape | Living things: woodlice habitats<br>Materials hunt | Living things: nature spotters<br>Living and nonliving | Animals inc H: handspans<br>Materials: boat |
| **LOWER KS2 (age 7-9) Develop systematic approach** | Ask relevant questions and use different types* of scientific enquiries to answer them. | Set up simple practical enquiries, comparative and fair tests. | Make systematicand careful observationsand,where appropriate,take accurate measurements,using standard units,using a range of equipment,including thermometersand data loggers. | Gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. | Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Identify differences, similarities or changes related to simple scientific ideas and processes. | Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward scientific evidence to answer questions or to support their findings. |
| **Y3 TAPS plans** | Animals inc Humans: investigating skeletons<br>Cupcake parachutes | Forces:shoe grip<br>Forces:magnet tests | Plants:measuring plants<br>Ice cream | Light:making shadows<br>Forces:cars down ramps | Rocks:rock reports<br>Eco Action | Plants: function of stem<br>Forces: balloon rockets<br>Materials: egg drop packaging |
| **Y4 TAPS plans** | Sound:investigating pitch<br>Cornflour slime | Materials: drying materials | Materials: measure temp<br>Electricity: Circuit products | Living things:local survey | Electricity: conductors<br>Sound:string telephones | Animals inc H: teeth(eggs) in liq<br>Materials: Dunking biscuits |
| **UPPER KS2 (AGE 9-11) Develop independ-ence** | Plan different types* of scientific enquiries to answer *their own questions*, including recognising and controlling variables where necessary. | Use test results to make predictions to set up further comparative and fair tests. | Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. | Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. | Report and present findings from enquiries, inc conclusions and causal relationships, in oral and written forms such as displays and other presentations,*using appropriate scientific language.* | Explain degree of trust in results. Identify *and evaluate* scientific evidence*(their own and others')* that has been used to support or refute ideas or arguments. |
| **Y5 TAPS plans** | Mat: dissolving<br>Mat: nappy absorbency<br>Forces:paper planes | Materials: insulation layers<br>Zipline testing | Humans: growth survey<br>Forces: spinners<br>Y5/6:Titanic pulleys | Materials: sugar cubes<br>Space: craters<br>Forces:Bottle flip | Materials: champion tapes<br>Living things: life cycle research<br>Solar system research | Forces: aquadynamics<br>Forces: marble run<br>Y5/6:Bridge engineers |
| **Y6 TAPS plans** | Electricity:bulb brightness<br>Light questions | Animals inc Humans: heart rate | Elect:conductive dough<br>Terrific tasters | Living things: outdoor keys<br>Light:investigating shadows | Living things<br>invertebrate research | Evolution: fossil habitats<br>Evolution: egg strength |
| **Transition** | Reaction catches | Yeast growth | Formula 1 tubs | Blood splatter | Lolly stick catapults | Cleaning coins |

*Types of enquiry including: observing changes over time, noticing patterns, grouping and classifying, comparative and fair tests, using secondary sources.

Progression statements are taken directly from England's 2014 National Curriculum, *with small additions in italics from the 2018 Teacher Assessment Framework.*

• 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 once every three lessons and misconceptions will be addressed immediately.

## 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.
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.

## 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. 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 & Evalation

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 daily, 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 disseminate to staff through staff meetings.
Expertise in school allows us to provide updates and other training for staff if appropriate.
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
August 2022

To be reviewed August 2023