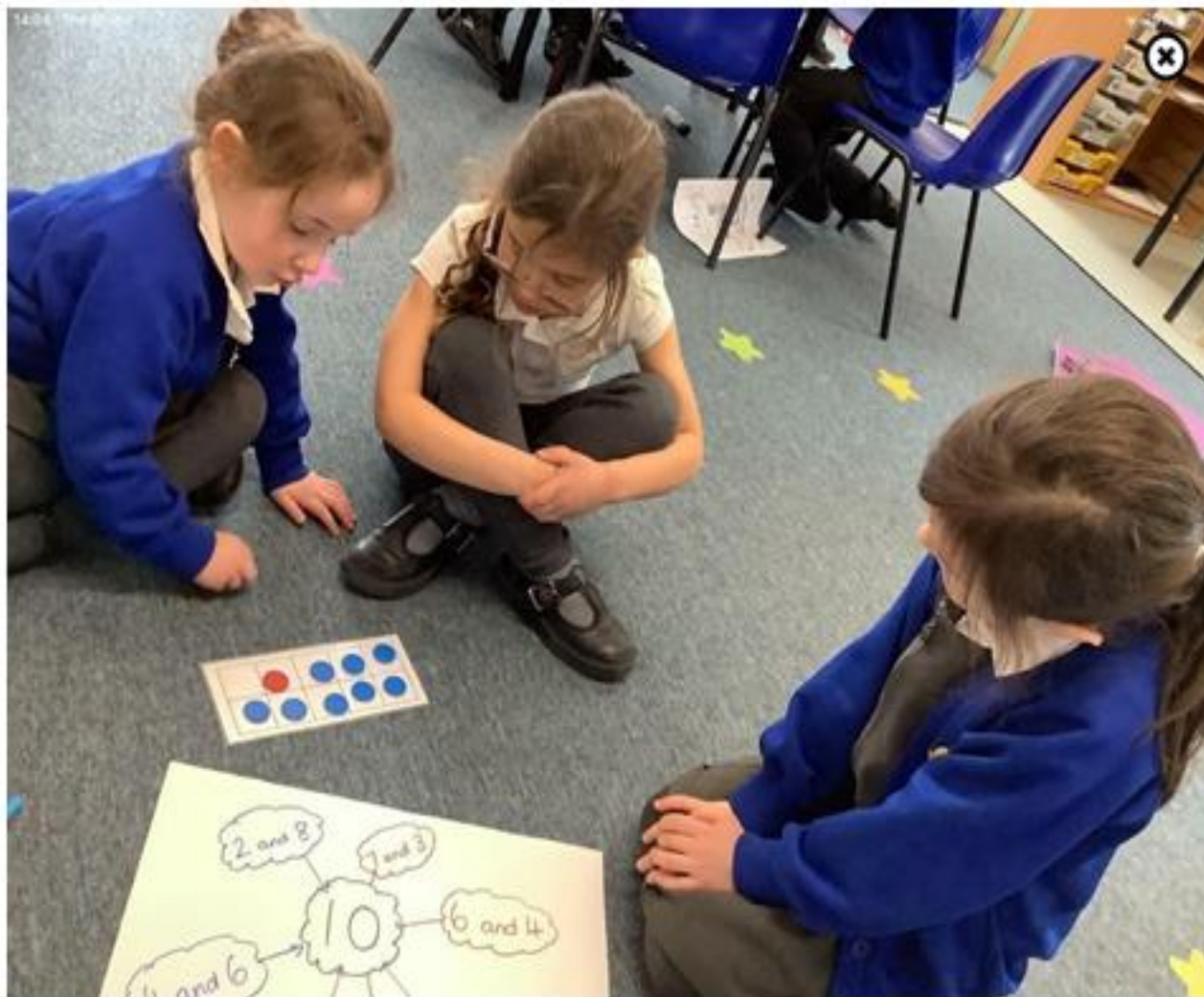




Belton C of E Primary School

Mathematics Policy

'Mathematics is a creative and highly interconnected discipline that has been developed over centuries providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering and necessary for financial literacy and most forms of employment. A high quality mathematical education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the power and beauty of mathematics, and a sense of enjoyment and curiosity about the subject.' (DfE 2013)

As can be seen from the above introduction, mathematics pervades all aspects of our lives and helps us to make sense of our world. With this in mind this policy promotes the basic and wider understanding of mathematics, and hopes to instil an enjoyment in the subject by supporting children to engage with it and build upon their own understanding and promote further learning.

Learning skills are an important aspect of mathematics but such skills are only a means to an end, and should be taught and learned in a context that provides purpose and meaning.

This policy should be read in conjunction with the following school policies:

- Calculation Policy
 - EYFS Policy for Mathematics
- Assessment Policy
- Marking & Feedback Policy
- SEND Policy

Maths Vision Statement

The language of mathematics is international. The basic skills of Mathematics is essential to everyday life, critical to science, technology and engineering; necessary for financial literacy and most forms of employment. Our aim is for all children to think mathematically enabling them to reason, solve problems and assess risk in a range of contexts: developing a sense of enjoyment and curiosity about the subject.

A high- quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

At Belton C of E Primary School, our mastery curriculum has been developed to ensure children can achieve excellence in Mathematics. Our philosophy is to empower our pupils to say 'We are Mathematicians' and 'As Mathematicians we...' Children can experience a sense of awe and wonder as they solve problems for the first time, discover different solutions and make links between the different areas of Mathematics. It provides the pupils with a deep understanding of the subject through a concrete, pictorial and abstract approach. This ensures pupils fully understand what they are learning.

The National Curriculum for Mathematics 2014 aims to ensure that all pupils:-

- Become fluent in the fundamentals of Mathematics
- Are able to reason mathematically
- Can solve problems by applying their Mathematics

Aims of Mathematics at our school

At Belton C of E Primary School, we aim to develop motivated, creative and resilient mathematicians who can confidently apply what they learn. We do this by:

- developing and nurturing a '**growth mindset**', based on the belief that everyone can do mathematics
- teaching new skills and encouraging the children to practise - intelligent practice
- avoiding children just memorising a single procedure - they need to know why they are doing what they are doing and know when it is appropriate to use different methods

- developing procedural fluency and conceptual understanding in tandem because each supports the development of the other.
- using concrete, pictorial and abstract activities in turn to support understanding
- building on previous concepts through carefully structured and progressive learning units
- teaching children to reason and, therefore, explain/deepen their understanding
- revisiting and consolidating areas of study, spending significant time developing deep knowledge of the key ideas that are needed to underpin future learning
- making connections at the optimum time
- emphasising the structure and connections within the mathematics, so that pupils develop deep learning that can be sustained
- providing the 'tools' needed to be a 'problem solver' both in maths and in other areas of the curriculum
- pitch lessons to challenge all to reach the highest standard
- promoting the relevance of maths in real life scenarios
- regularly and diagnostically assessing children's outcomes and measuring progress
- supporting our learners at home

As a result of this learning, our children will:

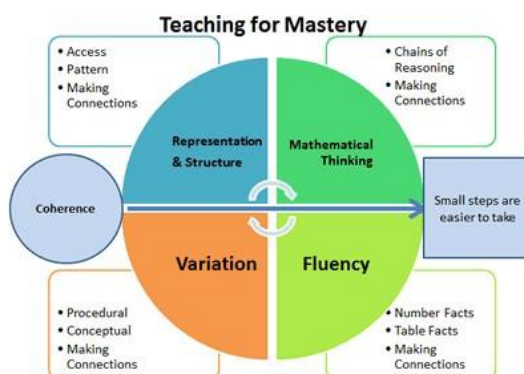
- learn number facts and times tables to automaticity to avoid cognitive overload in the working memory
- solve problems efficiently and think logically
- be **resilient** in their learning
- be **reflective** and able to discuss and evaluate their work with confidence
- reach the highest standard possible and to think for themselves within the subject
- be creative and imaginative, to appreciate the power and beauty of mathematics
- be confident to talk about their work
- be confident to work mentally
- be the best that they can be independently, choosing **resources** to help their understanding as they need them
- be prepared for applying their skills effectively in everyday life situations, in their future learning and in the work place

Our approach to the teaching of mathematics focuses upon high quality teaching of mathematics, to introduce, and then secure and embed key concepts. At Belton C of E Primary School, we teach for mastery.

Teaching for Mastery

Our Mathematics curriculum is underpinned by the NCETM Five Big Ideas.

Effective teaching for mastery is underpinned by five big ideas, first published by the National Centre for Excellence (NCETM) in mathematics in 2017



Coherence

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others

Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

Variation

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

Source: <https://www.ncetm.org.uk/teaching-for-mastery/mastery-explained/five-big-ideas-in-teaching-for-mastery/>

How Mathematics is taught

Maths is taught daily during the morning for all year groups from EYFS to Year 6 and all year groups follow White Rose planning to ensure consistency and progression across year groups.

A typical maths lesson lasts between 45 minute - 1 hour and begins with a short number fluency activity from White Rose that ensures recall of learning from last week, last topic and last year. Year 6 also have the opportunity to undertake Arithmetic in these sessions.

The small step for the lesson is then shared with the children and they revisit key concepts from previous learning that support the key learning of the lesson. Children then solve contextual problems as a class, with the teacher that expose the structure of the mathematical concept. In this part of the lesson, teachers use careful questions to draw out children's discussions and their reasoning and the children learn from misconceptions through whole class reasoning. To support this, the teacher will often use a stem sentence to scaffold children's articulation of mathematical ideas and reasoning, and/or a generalisation that supports application of the concept. The variation in this part of the lesson enables a deeper understanding of the concept

and may include the use of related concrete resources, as well as representations of the problem to provide a secure base of understanding.

Children will then complete the start of their practice task. The teacher will review responses and then share answers and strategies, addressing any misconceptions, before children continue with their practice. This practice uses conceptual and procedural variation to build fluency and develop greater understanding of underlying mathematical concepts. This 'intelligent practice' supports mathematical thinking and enables children to:

'Recognise and use connections among mathematical ideas; understand how mathematical ideas interconnect and build on one another to produce a coherent whole; recognise and apply mathematics in contexts outside of mathematics' (Annenberg Foundation, 2017)

Where appropriate and depending on the topic, children will continue to have access to concrete resources which they can use to complete the practice task. Some children might be supported through additional scaffolding provided by the teacher. This may include provided models of the calculation method that the children will need to use, or copies of the worded question, with key aspects and vocabulary highlighted.

Children who have mastered the lesson can start further on, on the worksheet if deemed appropriate. Children who complete this are provided with further 'rich and sophisticated' problems from the White Rose Maths Small Steps guidance.

All children undertake mathematical problem related to the key learning or a PSR question which all children have a go at in their books.

The final part of the sequence is a 'True or False' question, which requires the children to use mathematical reasoning to prove or disprove a related statement. This supports us with seeing who has understood the lesson and may need further support.

Mixed Age

We use a variety of ways to teach the children in our classes.

- Teach the classes separately with one group doing independent activities while the teacher works with the other year group.
- Work together when possible with the teacher extending the higher year group.

Work in books

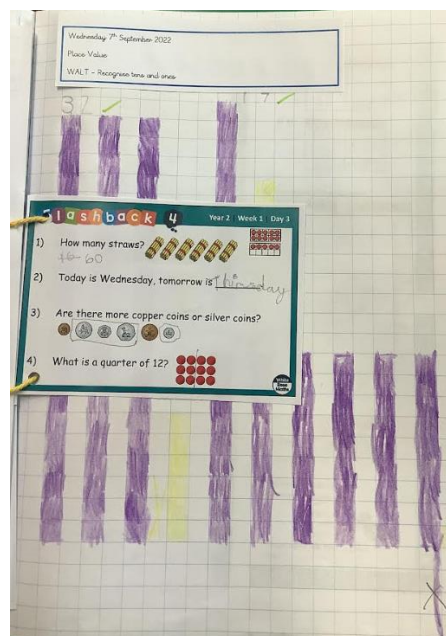
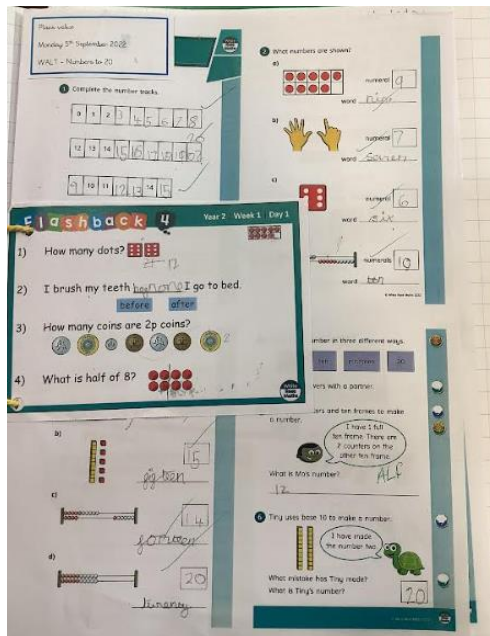
EYFS

Pictures are taken of practical activities and photocopies of work done on whiteboards is added to the learning journey.

KS1

Children work either practically or on worksheets. Any practical work is photographed and put

in their workbook. Where a lesson allows children will draw representations and write in their books. (see below)



KS2

In KS2 children will work in their books. Where necessary elements of the worksheet will be stuck in for the children. (See below)

Problem Solving & Reasoning

All children will undertake a Problem Solving and Reasoning challenge (labelled PSR) and True and False challenge at the end of the lesson. This is for AfL purposes and to ensure all children have a go at a problem solving and reasoning activity.

Dive Deeper & Higher Attainers

Dive deeper challenges will be clearly labelled in books. These will be taken from the problem solving and reasoning section of White Rose or targeted now what questions such as:-

Year 5



Children who need extending will be extended in the following ways:-

- Flexible Thinking eg What goes on behind the answer?

- Choosing multiple methods eg Could you solve the question in another way?
- Spotting patterns and making connections eg Give them the answer - why does this happen? Does it always work?
- Thinking creatively & not being scared to try new things

Questions will be used to extend examples of these may include:-

- How do you know?
- What is?
- What can it not be? Why?
- How many ways can you find?
- Is that the only answer? How do you know?
- Convince me this is true.

Assessment

Assessment for Learning:

Children receive effective feedback through teacher assessment, both orally and through written feedback, and AfL is integral to the design of each lesson;

- The structure of the teaching sequence, ensures that children know how to be successful in their independent work. A daily fluency activity supports children's recall of key number facts, which frees working memory. Teachers will make informed choices as to when they should progress to new content according to the degree of fluency that children are able to demonstrate.
- The 'Let's Learn' task provides the means for the teacher to assess, review and revisit previous related content, so that all children are well prepared for new content.
- The 'Get Ready' part of the lesson is when a new mathematical concept is introduced and the guided practice aspect of this part of the lessons means that children are well prepared to be able to apply the skills, knowledge and strategies taught they have learnt for the 'Your turn' task.
- Common misconceptions are identified and addressed within the teaching sequence and key understanding within each 'small step' is reviewed and checked by the teacher and the children before progression to further depth.
- The final phase of the lesson is a whole class 'True or False' statement. Teachers use the children's responses as a means to assess the depth of their understanding.
- Where needed ALF is to show that they have spoken to a child within a lesson.
- Opportunities for additional practice and correction are provided by the teacher, as appropriate, during marking, with a focus on promoting and achieving a growth mindset approach in the subject. Children are expected to correct their work at the start of the next lesson.

Formative Assessment:

Short term assessment is a feature of each lesson. Observations and careful questioning

enable teachers to adjust lessons and brief other adults in the class if necessary.

The lesson structure of a White Rose Maths lesson is designed to support this process and the 'True or False' statement at the end of each lesson also allows for misconceptions to be addressed.

At the end of each blocked unit of work, the children also complete the carefully aligned White Rose Maths 'End of Unit Assessment'. The outcome of this is used by the teacher to ensure that any identified gaps in understanding can be addressed before the next unit is taught. Each child's scores are also input on a class spreadsheet, which provides an overview of achievement in each specific area within the programme of study. This also informs dialogue with parents and carers during parents evenings, as well as the judgements made at the end of the term as to the extent that each child has achieved the expectation for their year group.

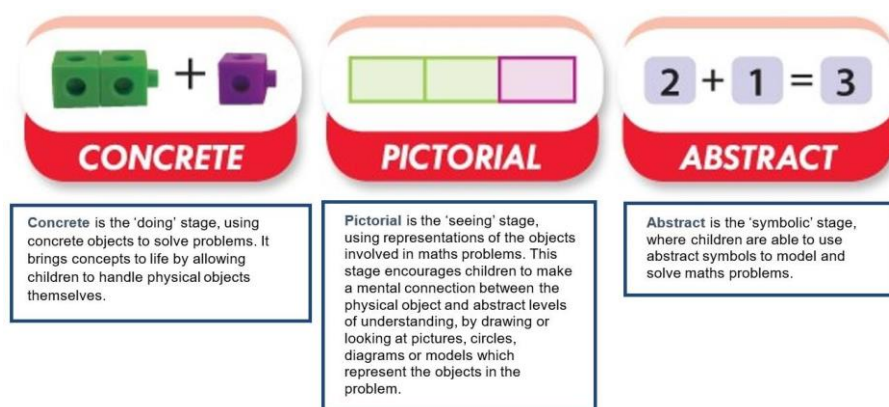
Summative Assessment:

Teachers administer a termly arithmetic paper and reasoning and problem-solving paper from NFER (In Year 1 this occurs later in the year) The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers at Parents Evening. They are also used alongside the end of unit assessments and outcomes of work, to inform the whole school tracking of attainment and progress of each child. In Year 6, SATS papers are used. The results are used to show gaps and support future learning.

Assessment data in maths is reviewed throughout the year in pupil progress meetings and to inform interventions and to also ensure that provision remains well-informed to enable optimum progress and achievement. End of year data is used to measure the extent to which attainment gaps for individuals and identified groups of learners are being closed. This data is used to inform whole school and subject development priorities for the next school year.

Planning and Resources

The use of manipulatives objects is an integral part of the White Rose Maths scheme which incorporates the concrete - pictorial - abstract pedagogy:



There is a central store of resources. As well as this each classroom has its own supply of mathematical equipment, in line with the White Rose Maths calculation policies, which the school

as adopted (this is also available on the school's website).

Teachers also have access to the White Rose Maths Interactive Teaching Resources for the purpose of modelling strategies and demonstrating the use of concrete resources.

The school subscribes to the White Rose Maths Premium Resource Centre. This provides access to visual resources (including lesson slides that teachers can adapt), as well as small steps planning guidance and reasoning and problem-solving questions that accompany each small step, to inform and use in lessons. We have decided to move over to the newer version of White Rose which supports with staff CPD.

Teachers are encouraged to use the school playgrounds as an outdoor classroom when possible, for example, when teaching length, area or perimeter.

Organisation

The school has implemented a blocked curriculum approach to the teaching of Mathematics. This ensures that children are able to focus for longer on each specific area of Maths and develop a more secure understanding over time. This approach is also designed to enable children to progress to a greater depth of understanding.

Subsequent blocks continue to consolidate previous learning so that the children continually practise key skills and are able to recognise how different aspects of Maths are linked. For example, when children have completed a block which has enabled them to master the multiplication of two-digit numbers, a subsequent block on area and shape might provide opportunities to use this understanding when calculating the area of shapes with 2-digit length and width dimensions.

To ensure children are secure in areas of the curriculum that are important for their year group we have developed a non-negotiable plan which is taught every fortnight.

Maths Non-negotiables

	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Autumn 1	Say the number names in order to 5	Know all addition number bonds to 10	Know all number bonds to 20	Know multiplication and division facts for the 4 times table	Know multiplication and division facts for the 9 times table	Know all decimals that total 1 or 10 (1 decimal place)	Know all decimals that total 1 (2 decimal places)
Autumn 2	Say the number names in order to 10	Know the days of the week and months of the year	Know all double and halves within 20	Know multiplication and division facts for the 8 times table	Know multiplication and division facts for the 12 times table	Know metric conversion facts e.g. 1kg = 1000g	Use all multiplication and division facts to derive $\times$ and $\div$ of small multiples of 10 and 100 (e.g. 30×900 ; $8100 \div 9$)
Spring 1	Begin to recognise the days of the week	Know all addition number bonds within 10	Know multiplication and division facts for the 10 times table	Consolidate 2s, 5s, 10s, 3s, 4s and 8s times tables	Know multiplication and division facts for the 7 times table	Know the doubles and halves of all two-digit numbers	Use multiplication and division facts to multiply and divide decimals (e.g. 1.2×8)
Spring 2	Partition numbers to 5 into two groups	Know addition and subtraction facts for all numbers within 10.	Know multiplication and division facts for the 2 times table	Know multiplication and division facts for the 6 times table	Consolidate multiplication and division facts up to 12×12	Know pairs of factors of numbers up to 100	Know the decimal and percentage equivalents of the fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{10}$ and $\frac{1}{5}$
Summer 1	Count forward and backwards in ones from any number up to 10	Know all doubles and halves to 10	Know multiplication and division facts for the 5 times table	Know multiplication and division facts for the 11 times table	Consolidate multiplication and division facts up to 12×12	Know the decimal and percentage equivalents of the fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$	Know the prime numbers within 50
Summer 2	Count forwards and backwards in ones from any number up to 20	Count forwards and backwards in ones from any number up to 100.	Know multiplication and division facts for the 3 times table	Consolidate 2s, 5s, 10s, 3s, 4s, 8s, 6s, and 11s times tables	Consolidate multiplication and division facts up to 12×12	Know square numbers and square roots to 12×12	Know the doubles and halves of all multiples of 10 to 10,000

The following week's lesson will be a problem solving lesson which is taken from Nrich and links into the current learning where possible.

Maths in EYFS (see policy on website for more detail)

We believe that "Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically.

In order for our children to have a solid foundation in their Mathematics learning. Maths in the EYFS

Will follow the White Rose planning and focus on Number as well as Numerical Patterns. This will ensure progression in skills throughout KS1.

Lessons are practical and engaging with work photographed and any observations put into their learning journeys. Children have the opportunity to use manipulatives such as Numicon, counting bears, tens frames and part whole models. Links are made to outside learning and their environment with lots of opportunities to develop mathematical concepts through play.

KS1 and KS2

Through Years 1 to 6 we use a coherent programme of high-quality materials and exercises, which are structured with great care to build deep conceptual knowledge, alongside developing procedural fluency.

Our KS1 and KS2 teachers use White Rose Maths Premium lesson slides, which they adapt accordingly. Children record their work in their Maths books. They might also use their maths book to record key number facts and make representations of mathematical concepts.

Lessons in both key stages follow the same sequence (see section 2: Teaching and Learning). In all year groups, the teacher might use 'mini-plenaries' to explain each question during the children's completion of the practice book and also to check children's understanding before they complete the next question. This ensures that all children are able to complete the task with confidence.

The White Rose Maths progression document, available on the school website, provides an overview of how the scheme covers the statutory requirements of the 2014 National Curriculum and Ready to Progress criteria. It also shows how concepts build over time and how the teaching blocks are sequenced in each year group.

Working Walls

Working walls are used effectively and should include:-

- Vocabulary
- Stem sentences
- Strategies for children to use to support with the lesson
- Where appropriate CPA

Equal Opportunities

The school is committed to ensuring the active participation and progress of all children in their learning.

All children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation or the progress of which they are capable.

Inclusion

Taking a mastery approach, differentiation occurs in the support and intervention provided to different children, not in the topics taught, particularly at earlier stages. The National Curriculum states:

'Children who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.'

There is little differentiation in the content taught but the questioning and scaffolding individual children receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems, which deepen their knowledge of the same content before acceleration onto new content. Children's difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention - commonly through individual or small group support later the same day or within the lesson.

A range of inclusion strategies, are embedded in practice and teachers are aware of the special educational needs of the children in their Maths.

Role of the Subject Leader

- The subject leader will raise the profile of Maths at Belton C of E Primary School through best practice. They will model lessons, as appropriate to new staff, NQTs and peers to support continued professional development.
- They will ensure the high quality of Maths displays around the school, present certificates of achievement during assemblies and involve the school in 'celebrations' of Maths, including participation in events such as 'World Maths Day'.
- The subject leader will support staff in providing opportunities for learning outside the classroom in Maths and will identify and organise opportunities which enable this, as appropriate.
- The subject leader will monitor progression and continuity of Maths throughout the school through learning walks and regular monitoring of outcomes of work in Maths exercise books.
- The subject leader will ensure that all staff have access to year group plans and the relevant resources which accompany them. The subject leader will monitor children's progress through the analysis of whole school data. They will use this data to inform the subject development plan which will detail how standards in the subject are to be maintained and developed further.
- The subject leader will, on a regular basis, organise, audit and purchase central and class based Maths resources.
- Through ongoing involvement in the DfE funded Maths Hubs programme - TRG, the subject leader will keep up to date on current developments in Maths education and disseminate information to colleagues.
- The subject leader will extend relationships and make contacts beyond the school.
- The subject leader will develop opportunities for parents/carers to become more involved

in Maths education.

- The subject leader will ensure that all staff have access to professional development including observations of outstanding practice in the subject.
- The Maths lead will attend subject leader meetings and CPD which will be disseminated to all staff.

Parents

- The school recognises that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the Maths curriculum is available on the school's website, as well as guidance in the progression in calculation methods used by the school. Paper copies of these documents are also available on request and the curriculum letter, sent home by each year group, also outlines the Maths topics to be covered.
- Activities which link to each Maths topic are suggested for parents and carers to try at home with their child in each Reception newsletter.
- Children are given Maths homework at least once a week from Reception to Year 6. Activities are set on Mathletics. These are linked to previous learning or as a pre-teach for the next unit (previous years objectives)
- White Rose Maths Parent Books which cover the key content from each year group are available on the school's website. Paper copies are available on request and made available to identified children who would benefit from additional practice at home.
- Parents are informed of their child's progress at Parents Evenings and this is also communicated in written school reports.

Monitoring

The mathematics subject leader and headteacher will monitor the approaches detailed in the policy as per the monitoring calendar. The subject leader will also undertake half termly monitor to ensure high standards in the subject. Monitoring will employ a variety of strategies including work scrutiny, lesson observations, pupil interviews and termly pupil progress meetings.

Governance

The named link governor for maths is responsible for meeting with the maths subject leader to examine the effectiveness of the policy and any actions/ impact of the school improvement plan relating to maths.

Catrin Yendall - Maths Lead

Updated:- September 2022

To be reviewed:- September 2023