Mathematics Curriculum Statement: Foxhills Infant School

Vision for Maths at Foxhills Federation – Foxhills Infant School

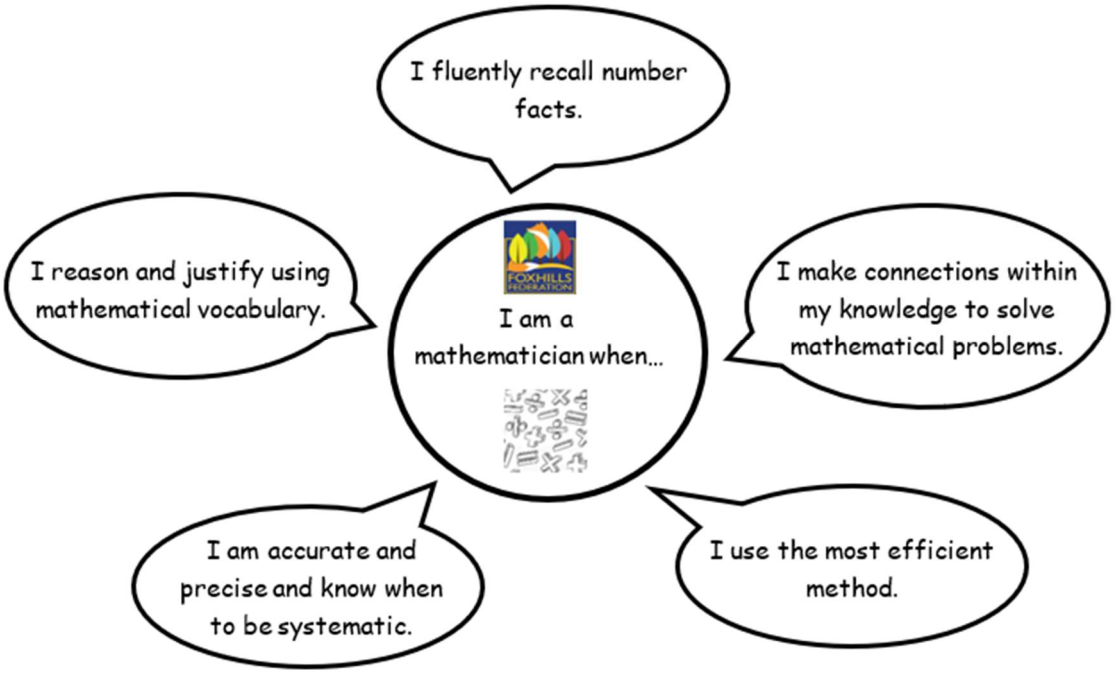
For every child to master the key concepts in maths to be able to reason, solve problems and work fluently and systematically.

Mathematics is a creative, rich and exciting area of the curriculum, which allows children to understand the world around them more deeply. Through building their knowledge across various domains, pupils are prepared for the future. Indeed, mathematical literacy is essential to everyday life; critical to science, technology and engineering; and necessary for financial literacy and most forms of employment. It nurtures the development of logical, methodical and creative mindsets, as well as providing children with the knowledge required to solve all manner of problems.

The Mathematics curriculum at Foxhills Infant School has been carefully designed to address the requirements of the National Curriculum (2014), ensuring that all pupils develop proficiency in the three key areas over time:

- Fluency
- Reasoning
- Problem Solving

Our vision for mathematics is that every child will develop fluent and automatic access to key mathematical knowledge. This will enable them to engage with rich problem solving and reason about mathematics with confidence. This will enable all children, no matter their starting point, to see themselves as mathematicians and appreciate the joy and wonder of mathematics.



Sequencing of the Maths Curriculum

The curriculum at Foxhills Infant School has been carefully sequenced to reflect the hierarchical nature of knowledge in mathematics. It aims to ensure that knowledge builds cumulatively over time and that children are supported to integrate new information into increasingly sophisticated schema (mental models).

In order to do this, using the National Curriculum as a base, we have carefully mapped the progression of substantive and procedural knowledge from EYFS to Year 2, identifying the key knowledge which children must acquire to make sense of mathematics and achieve the milestone objectives set out in the National Curriculum (2014). Our approach has been informed by subject specific guidance from the NCETM and is constantly under revision to ensure that all of our children receive the best offer within the teaching of mathematics.

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Our curriculum contains four key documents:

- Overview Long Term Plan
  This identifies which key topics are taught at which point within the academic year.
- Mathematics Mapping
  This explicitly details each individual piece of substantive and procedural knowledge to be taught during a mathematics unit;
- Medium term planning,
  This explicitly breaks down key milestones into the coherent, hierarchically sequenced small steps. This supports our teachers to plan effectively sequenced learning journeys that enable children to keep up.
- Picture Glossary
  This explicitly defines the key mathematical vocabulary identified within the mathematics mapping to ensure that, through their mathematics education, concepts are defined consistently, minimising extraneous cognitive load.

The careful sequencing of our curriculum and the documents available to support staff with its delivery support pupils to experience success within mathematical learning; we believe this is essential, as success with learning is one of the key predictors of high pupil motivation.

Within our mathematics mapping and medium term planning, we have identified key knowledge which must be retrieved and consolidated from previous learning journeys in order to support their success. This supports our teachers to plan effective retrieval and assess pupils' readiness to begin a new unit of learning.

Each year group's coverage has a broadly similar structure: beginning with an introduction to the underpinning number knowledge children need to secure to access the wider areas of mathematics and progressing to manipulation of this new number knowledge with increasingly sophisticated calculation techniques. In light of the recommendations from the recent report 'Co-ordinating mathematical success: the mathematics subject report' (2023), we have ensured that geometry knowledge is sequenced throughout each academic year group's curriculum.

Within each year group's curriculum, each half term will usually include knowledge from each of the following areas.

	Number – Place Value: Integer or fractional numbers
	Number – Calculation: Four operations of addition, subtraction, multiplication and division.
	Wider Mathematical Knowledge – Geometry, measures and statistics.

Where this is not the case (for example when calculation knowledge has been covered by the end of the Spring term), there is an expectation that teachers are regularly revisiting these strands, continuously developing pupils' procedural fluency.

Year R

Autumn

Numbers to 5	Positional language	Number bonds within 5	Properties of 2D shapes

Spring

Numbers to 10	Properties of 3D shapes	Number bonds within 10	Comparing measures

Summer

Numbers beyond 10	Equal-ness	Money

Number: Our Year R teachers support children to recognise the crucial idea within mathematics: number has meaning. Children develop an understanding of the core features of the numbers 0-10; develop one-to-one correspondence when counting; begin to recognise that our number system increases as we count up; and build towards a deep understanding of "the fiveness of five" as they develop their perceptual subitising skills. Children encounter increasingly large numbers each term, ensuring that they to build deep, strong and flexible representations of each number before moving on. Children are exposed to numbers and the ordinal counting sequence of numbers beyond 10, to support them to begin counting within 100 as they enter KS1.

Calculation: In Year R, calculation is taught alongside number. Children explore in depth the composition of the numbers 0-10, developing automatic recall of their number bonds within 10.

Wider Maths: Although shape, space and measure do not have an Early Learning Goal, we believe it is important that our children are introduced to the rich language associated with these areas from the earliest years of their mathematical education. Learning the language associated with these everyday mathematical concepts empowers our youngest children to share their thoughts about the world in which they live confidently and precisely.

Year 1

Autumn

Numbers to 20	Properties of 2D shape.	Additive relationships	Properties of 3D shape.

Spring

Number to 100	Fractions	Additive relationships	Time

Summer

Multiplicative relationships	Money	Position and direction	Measures

Number: In Year 1, children build upon their knowledge of number from EYFS, developing a deep knowledge of increasingly large numbers. Our Year 1 curriculum initially introduces children to numbers to 20, which they will explore in depth, developing accurate digit formation, reinforcing their understanding of the ordinality of numbers to 10, reinforcing fluent recall of number bonds within 10 and developing an understanding of the 'place value' of number – that the position of a digit in a number tells us about its value. The time spent on this early number concept helps to establish strong building blocks for children's later mathematical understanding. Once this knowledge is established, children will develop confidence counting within 100 and will extend their knowledge of the 'place value' of number past 20. They will develop an understanding of counting in 10s and 1s, and will begin to consider how numbers between 30 and 100 may be represented to support their formal introduction to this in Year 2. They will finish the year by exploring the idea of fractions, initially by considering what it means to be 'equal' and then extending this knowledge to the simple unit fractions of $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$.

Calculation: In Year 1, children's calculation with primarily calculate with small numbers (within 20). Initially, children will reinforce their knowledge from EYFS of the composition of the numbers 0-10, further developing their automatic and flexible recall of number bonds within 10. Children will then develop a more explicit understanding of different additive structures through the context of number stories: aggregation/partitioning and augmentation/reduction. This will set children up for success later in their mathematics education as they will develop familiarity with the different

structures of addition. Children will then progress to developing their efficiency when adding: recognising when number bonds can help them to solve problems mentally, recongnising how their knowledge of number bonds within 10 can help them to know their number bonds within 20 and recognising when they can reorder addends to simplify calculations. Later, children will build upon their knowledge of counting as they begin to explore basic multiplicative structures, including the difference between quotative and partitive division.

Wider Maths: In Year 1 we build on the mathematical vocabulary introduced in EYFS around the world in which we live. Children will have an initial introduction to the key areas of shape (2D and 3D), money, turns, time and measures and will be given practical experience recognising these areas of mathematics within their lives.

Year 2

Autumn

Numbers within 100	Properties of 2D and 3D shape.	Addition and subtraction

Spring

Multiplication and division	Statistics	Fractions: wholes, halves, thirds and quarters	Position and direction

Summer

Addition and subtraction	Money	Time	Multiplication and division	Measures

Number: In Year 2 children will build upon the secure number sense they have developed in EYFS and Year 1, and will develop a detailed understanding of numbers up to 100. They will develop confidence representing larger numbers in different ways, including in words and numerals. Children will also extend their knowledge of comparison to use appropriate mathematical symbols (<, > and =) and more complex comparative language (ascending, descending). Children will develop their counting knowledge learning about the patterns we see in different number sequences, describing these confidently using mathematical language (including that of odd and even). Children will also develop a more explicit knowledge of numbers which represent parts of a whole (fractions) and begin using formal notations for wholes, halves, thirds and quarters in a range of contexts.

This firm foundation of conceptual knowledge and mathematical language will set children up for success when working with more complex numbers as they enter Junior School.

Calculation: In Year 2, we build on children's secure number bond knowledge from EYFS and Year 1. Children will continue to retrieve and apply this knowledge until recall is automatic. Children will be systematically taught a range of strategies which will support their later development of fluent and accurate mental calculation, including using a 'make 10' strategy, bridging 10s, using number bonds to solve larger addition and subtraction problems and adding/subtracting 10 from any number. Children will also explicitly consider a new structure of subtraction: subtraction as difference. Once children have developed facility with additive calculation (working mentally, using secure knowledge of place value) children will begin to learn more efficient written calculation strategies which make use of their knowledge of the place value of number. This secure knowledge of calculation will set children up for grappling with increasingly complex number problems as they begin KS2. Children will also begin to develop fluent recall of multiplication facts in preparation for junior school, developing confident knowledge of doubles and halves, and the two, five and ten times tables.

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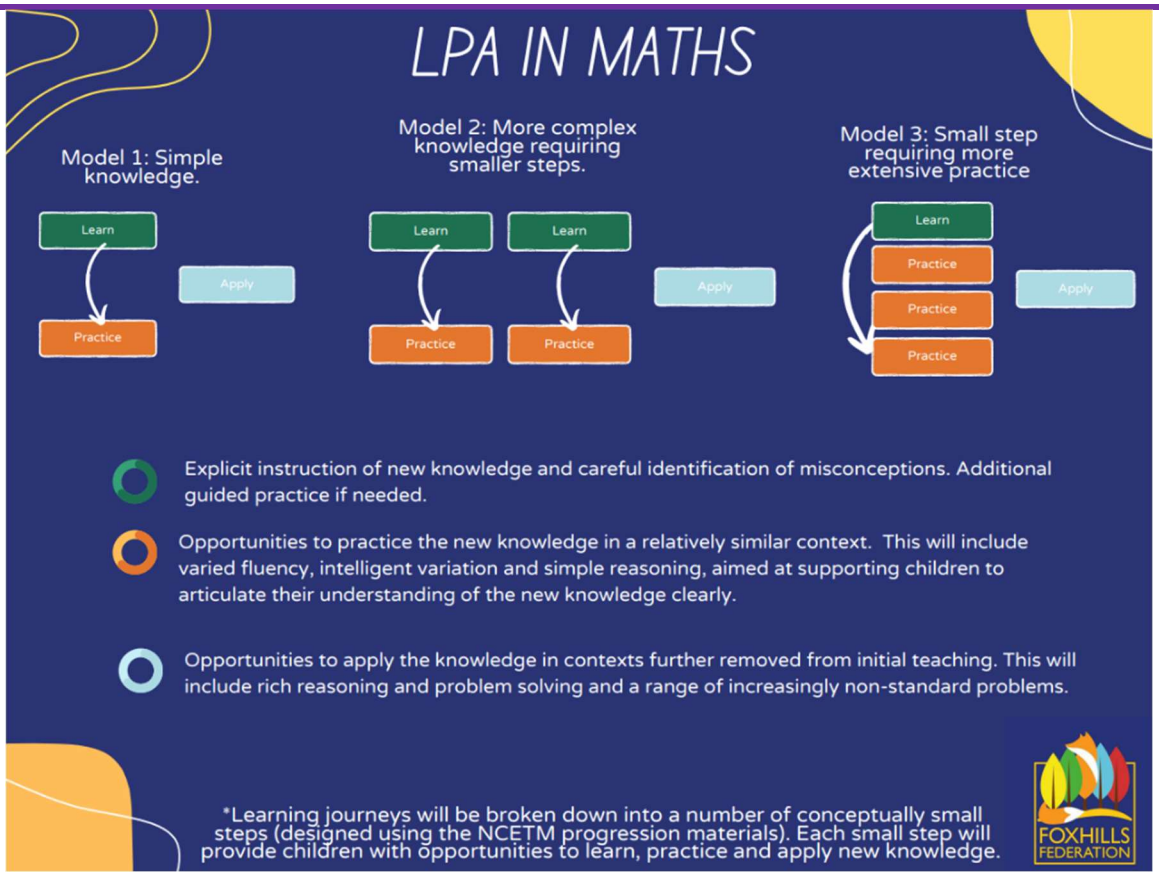
	Wider Maths: In Year 2, we continue to build on the early mathematical language developed in Year 1, drawing links to more explicit mathematical terminology and concepts. This includes supporting children to recognise more complex properties of shape (such as symmetry), link their knowledge of fractions to turn (describing turns using precise mathematical language), telling the time using an analogue clock to the nearest 5 minutes, applying knowledge of the four operations to money and measure problems and encountering the mathematical idea of 'estimation' as a sensible, mathematical guess. Children will also encounter the new mathematical domain of statistics for the first time, and will be introduced to a range of different charts used to record discrete and categorical data.
What are the knowledge types and how will they be taught?	The curriculum at Foxhills is knowledge-based because our staff are united by the belief that knowledge promotes intellectual growth: The more you know, the more you understand the world. Knowledgeable children are confident and can broaden their experiences. In line with OFSTED's research reviews and mathematics curriculum guidance, in mapping mathematics, we have identified key types of knowledge which progressively build over the course of children's education. Because of the complexity of knowledge within mathematics, our mapping focusses predominantly on explicitly outlining the substantive and procedural knowledge. • **Substantive knowledge:** The specific facts which children are expected to learn as a result of our mathematics curriculum. Within our mapping, these are identified as 'know that…' statements. Due to the nature of mathematics, there is a significant amount of substantive knowledge for children to acquire; our mapping ensures that this in introduced at the most appropriate time and supports teachers to identify pre-requisite knowledge to support unpicking of any misconceptions. • **Procedural knowledge:** The knowledge of key procedures within mathematics. In our mapping, these are identified as 'know how…' statements. Each aspect of procedural knowledge will be grounded in clear, explicit teaching of linked substantive knowledge. Conditional and disciplinary knowledge within mathematics are taught though the instruction of the substantive and procedural knowledge, and are modelled clearly by teachers as they show children how to approach reasoning and problem solving challenges. • **Disciplinary knowledge**: This forms the basis of our 'what it means to be a mathematician' statements, and underpins pedagogy across all areas of the mathematics curriculum. • **Conditional knowledge:** Conditional knowledge provides the link between the other types of knowledge within our curriculum as it exemplifies when and why children will need to apply their mathematical knowledge. This will be taught through careful and explicit modelling of a broad range of problem solving and reasoning problem types to support children to develop complex, interrelated schema over time.
How is the curriculum implemented?	Our mathematics curriculum is designed to be taught using our pedagogical approach: Learn, Practice, Apply, Revisit (LPAR). This approach is based on cognitive science and recognises the effectiveness of direct instruction, followed by ample opportunities for purposeful practice. The aim of our approach is that pupils are enabled to 'keep up', not 'catch up'. This diagram reflects how LPAR is implemented within the teaching of mathematics.



In practice, the teaching of mathematics at Foxhills Infant School takes three parts

- Explicit teaching and deliberate practice of new knowledge *(mastery teaching).*
- Regular revisit of learned knowledge *(Last step, last journey, last year…)*.
- Additional explicit teaching and revisit of key number knowledge *(automatic number knowledge).*

Mastery Teaching

Teachers use curriculum documents to inform their short-term planning. Teachers use the mapping and associated documents to plan their explicit instruction: they use concise and clear exposition supported by the most appropriate representations (concrete, pictorial or abstract) to help pupils understand new mathematical ideas. All pupils are exposed to the representation which will best support the development of conceptual understanding, even if they already show some procedural knowledge of the taught concept. Because of this, children will ordinarily begin learning as a whole class. However, during explicit teaching, teachers plan regular opportunities for pupils to demonstrate their understanding, using collective response strategies wherever possible (e.g. I do, we do; hinge questions). Teachers use this information to make appropriate decisions about how to support pupils' progress: for example, this may mean using 'cutaway' so pupils who are secure begin independent learning earlier; providing additional worked examples; using different representations and addressing misconceptions with smaller groups. This flexible approach to teaching and learning allows our teachers to personalise learning effectively with a mixed ability classroom.

When pupils have demonstrated that they have understood the new knowledge, teachers provide them with ample opportunities to practise in a context relatively similar to initial instruction. This deliberate practice supports pupils to secure new knowledge in their long-term memories.

All pupils are then given the opportunity to apply their knowledge in more complex, problem solving contexts, where they may need to draw links between a range of mathematical ideas to be successful. This helps them to link their new knowledge to other schema within their long term

	memory, increasing the flexibility of their understanding. Throughout initial practice and application of knowledge, pupils are given regular opportunities to reason about mathematics and our teachers have high expectations of pupils' use of mathematical language: by developing the vocabulary of maths, we empower our pupils to explain their thinking with ever-increasing confidence. At all times, children will be working on the same 'small step'. Children who reach conceptual security more quickly will be challenged to deepen their understanding, rather than accelerating through new content. Deepening can take a wide range of forms: for example, teachers may provide children with an open-ended deepening task, may ask a pupil to explain their reasoning, may extend a completed tasks using careful questioning or simple tools such as an adapted Frayer model or may use reduced feedback to encourage increased reflectiveness and encourage the adoption of effective checking strategies. Revisit Alongside effective instruction and opportunities to practice new learning, our teachers plan for children to have regular opportunities to revisit previously learned knowledge as we know 'remembering' this helps our pupils to secure their new knowledge within their long term memories and ensure it is easy for them to access. Retrieval is included in the following ways (however, this is not an exhaustive list; retrieval is crucial to pupils' success within mathematics): • Regular retrieval practice. In EYFS, this is through the careful design of maths stations within the enhanced provision. In Year 1 and 2, this is through the use of a regular retrieval practice task, which is designed to present previously learned knowledge at increasingly spaced intervals. • Clever design of practice and apply problems to include knowledge which has already been learned in a previous learning journey. • Inclusion of 'revisit' tasks at the beginning of a new learning journey to support a teacher to assess whether pupils have mastered the pre-requisite knowledge. Where teachers' assessment for learning (AfL) has identified that a pupil or group of pupils are at risk of falling behind, teachers may use revisit time to work with a small group of pupils on 'keep up' where they address any misconceptions and ensure pupils are ready to access the learning in the mastery lesson. <u>Mastering Number</u> Automatic recall of key number facts is essential to reduce cognitive load. Therefore, our teachers deliver separate, short and focussed fluency sessions. These are designed to be explicit and quick, providing regular opportunities for pupils to retrieve key facts and strengthen their knowledge of these and develop a deep understanding of a range of mental methods which will support their attainment in the wider mathematical curriculum. These sessions will be interactive, oral and may incorporate use of approved computer programmes (such as Times Tables Rockstars in Year 2).
Adaptation and Variation	We have a 'keep-up' approach in mathematics as we believe all children have the right to succeed in mathematics. Therefore, we expect that, wherever possible, all children are accessing the same learning. To support this, we use a range of strategies to support all children to make exceptional progress from their starting points. We recognise that strategies must be applied flexibly and must be in response to individual children's needs in specific areas of the mathematics curriculum. Often, effective adaptation and variation can be made during quality first teaching. Varying the resources available to children on tables, providing additional worked examples and using faded worked examples can all be used successfully to support learning during quality first teaching. Additionally, flexible use of adult time will allow for pupils to receive the support/challenge they need. For example, adults can adapt in the moment by

- Cutting pupils away to work independently when they have demonstrated conceptual security to maximise learning time
- Working with smaller groups following initial teaching, adapting modelling or using varied representations to address misconceptions
- Circulating effectively to provide effective and timely feedback
- Pulling small groups back to work with an adult to address misconceptions or challenge children to extend thinking.

Other strategies may be deployed to address more specific barriers to success within mathematics. Some of the strategies we have identified which our teachers may use to support their learners are shown in the table below. We recognise that children may need support in mathematics at different times and for different reasons; therefore, we encourage our teachers to utilise supporting strategies flexibly, as informed by the needs of their learners.

Barrier	Possible strategy
Gaps in pre-requisite knowledge meaning that pupils may struggle to grasp new learning.	• Pre-teaching • Same day intervention • Design of revisit tasks to diagnose specific gaps • Use of 'revisit' time to fill gaps in knowledge • Appropriate interventions (e.g. number blocks, precision teaching)
Difficulties reading (e.g. as a result of dyslexia) may create a barrier to accessing more complex worded problems.	• Adapted task including pictorial representations to support conceptual understanding. • Recording worded problems on a talk tin or through 'google classroom' for pupils to hear the question read aloud. • Use of coloured paper/visual overlays (where pupils have identified visual strain – e.g. Irlen syndrome) • Addition of 'sound buttons' on more complex decodable words to support independent reading.
Difficulties writing (e.g. as a result of dysgraphia or fine motor issues) may create a barrier providing written responses.	• Use of alternative forms of response (e.g. adult scribing, audio-recording a pupil's verbal response, pictures/diagrams, word-processing) • Adapted equipment (pen grips, triangular pencils, adapted ruler)
Struggling to organise information	• Task planners • Worked examples and faded worked examples • Worked example books • Effective modelling on learning wall to refer to
Difficulties retaining new knowledge	• Overlearning • Precision teaching • Same day intervention • Additional use of spaced retrieval • Additional practice, including guided practice if necessary
Difficulties getting started/overwhelm when tackling a range of problems	• Reducing the number of questions per sheet • Strimming individual questions to reduce overwhelm • Completing a modelled example as the first question for an 'easy start' to generate the feeling of success. • Use of task planners • Rest and movement breaks • Guided practice and faded worked examples

	Weaker/limited mathematical vocabulary	• Pre-teaching • Use of pictorial word banks • Effective learning walls

Where children are at risk of falling behind, our teachers take action quickly to identify the foundational knowledge they have not secured and fill these gaps. This may be completed during mathematics lessons through effective use of cutaway teaching or, where necessary, through structured, timetabled interventions.

In mathematics, we recognise that one of the most effective ways to intervene when a child struggles with new learning is through same day intervention to ensure that gaps do not develop or widen. Wherever possible, if a pupil has been identified to have struggled within a lesson, they will receive additional support from an adult to fill these gaps. Alternatively, this support may be provided the following day, or through planned cutaway in a following lesson.

Rationale for enrichment and wider personal development

In addition to our mathematics curriculum, we have carefully sequenced a range of opportunities for children to apply their mathematical knowledge in a real-life context, and to explore ways in which mathematics may enrich their future lives. Opportunities planned are wide and varied, including careers days, number themed days, inter-house competitions, enterprise projects and application of mathematics in other areas of the curriculum. This supports our children to see the value and purpose of their mathematical learning, and aims to compensate for children who may, otherwise, not have access to wide and varied mathematical experiences.

Impact

We recognise that, by its very nature, our mathematics curriculum is a working document. Leaders systematically assess the impact of our mathematics curriculum in order to make appropriate changes to the curriculum to ensure all children make the best possible progress during their time at Foxhills.

When monitoring mathematics, leaders look for:

- Evidence of effective use of concrete, pictorial and abstract representations, both in adult modelling and in children's learning.
- Evidence of accurate and precise mathematical language used ambitiously and defined in line with our mathematics mapping.
- Evidence of children being taught and applying a range of different strategies, both to support mental calculation and to support reasoning and problem solving.
- Evidence of children articulating their mathematical thinking clearly.
- Evidence of misconceptions being identified early, systematically addressed and not reoccurring
- Evidence of adults providing children with high quality feedback which moves learning forwards, and evidence of children responding to this.
- Evidence of children having secure and automatic recall of mathematical facts.
- Evidence of positive attitudes towards mathematics and a can-do approach.
- Evidence of adaptation and variation which allows all children to access the same, age-appropriate knowledge.
- Evidence of mathematical non-negotiables for each year group in place.

To evaluate these statements, leaders triangulate information from the following sources of evidence and identify key actions to further drive improvements in the quality of mathematics instruction:

- Learning walks and lesson observations

- Pupil conferencing
- Summative assessments
    - Termly tests
- Book looks
- Supportive work with individual year group teams
- Intervention evaluations
- Patterns of performance in retrieval practice
- Pupil progress data

We believe it is important that our teachers ensure that new knowledge is learned before moving on. Every cohort is different and may reach conceptual security at different speeds; therefore, it is likely that the time taken for specific learning journeys will differ year on year. However, we also recognise the potential risk to curriculum coverage. As a result, subject leaders also complete regular curriculum coverage monitoring to ensure that a strategic approach is taken to adapting the long term overview, where necessary, for specific cohorts. This allows the subject leader to ensure that coverage is thorough, that teachers are able to respond flexibly to the needs of their pupils and that curriculum revision can take place if necessary.