



Forest Hills Primary School

Mathematics Policy

Document Control Table

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FOREST HILLS PRIMARY SCHOOL

Mathematics Policy

At Forest Hills we promote an inclusive curriculum where every child has the right to achieve their potential.

We strive to inspire so children aspire and have ambition, offer children experiences relevant to the curriculum and enrich their language in all we do. We will continue to interweave our school motto 'Living, Learning, Growing' and our core values into everything we do:



With this in mind, at Forest Hills Primary School, we believe that Mathematics makes a valuable and distinctive contribution to pupils' education. The basic skills of mathematics are vital for the life opportunities of our children.

INTENT

At Forest Hills Primary School, we believe mathematics is an important part of children's development throughout school, right from an early age. Our aim is for all children to think mathematically, enabling them to reason and solve problems effectively - experiencing a sense of awe and wonder as they solve a problem for the first time, discover different solutions and make connections between different areas of mathematics.

We intend on delivering a curriculum which:

- Allows children to be a part of creative and engaging lessons that will give them a range of opportunities to explore mathematics
- Gives each pupil a chance to believe in themselves as mathematicians and develop the power of resilience and perseverance when faced with mathematical challenges.
- Recognises that mathematics underpins much of our daily lives and therefore is of paramount importance in order that children aspire and become successful in the next stages of their learning.
- Engages all children and entitles them to the same quality of teaching and learning opportunities, striving to achieve their potential, as they belong to our school community.
- Makes rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- Allows children to use and understand a wide range of appropriate mathematical language to discuss, explain and justify their mathematical thinking and reasoning.
- Provides opportunities for children to apply their mathematical knowledge to other subjects (cross-curricular links).

Early Years Foundation Stage

Within the Early Years Foundation Stage there are 7 areas of learning:

- 3 prime areas- Physical Development, Communication & Language and PSED
- 4 specific areas- Knowledge and Understanding of the World, Literacy, Expressive Arts and *Mathematics*.

Mathematics is then split into two Early Learning Goals- Number and Numerical Patterns. By the end of Reception, the aim is for all children to have reached these Early Learning Goal statements:

Early learning goal – Number

- Have a deep understanding of number to 10, including the composition of each number.
- Subitise (recognise quantities without counting) up to 5.
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Early learning goal – Numerical Patterns

- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Year 1-6

The National Curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. Pupils 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.

Key Stage 1 - Years 1 and 2

The principle focus of mathematics teaching in Key Stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with concrete materials.

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value.

An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at Key Stage 1.

Lower Key Stage 2 - Years 3 and 4

The principle focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling.

Upper Key Stage 2 - Years 5 and 6

The principle focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

IMPLEMENTATION

At Forest Hills, to help children become competent with and to gain a deep understanding of new mathematical concepts, we follow a concrete-pictorial-abstract approach:



Concrete- Children have opportunities to use concrete (practical) objects and manipulatives to help them understand what they are doing.

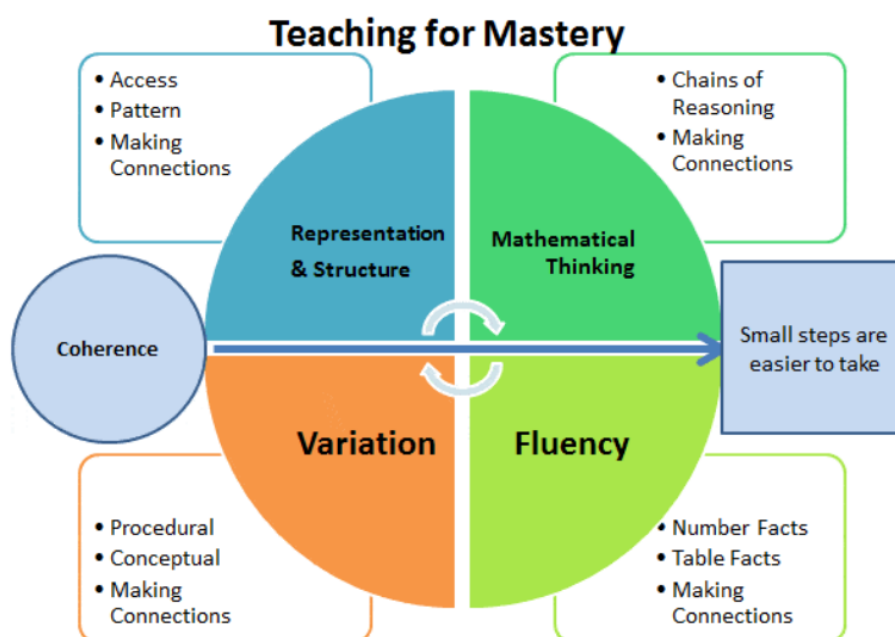
Pictorial- Alongside the concrete, children use pictorial representations (where they are exposed to a range of representations to help draw out mathematical structures). These representations then help children to reason and problem solve.

Abstract- Both concrete and pictorial representations support children's understanding of abstract methods.

This approach contributes to children's conceptual understanding and conceptual understanding supports retention, which is our ultimate goal.

At Forest Hills Primary School, we teach for Mastery of Mathematics: it is our aim that all children will master the concepts of mathematics at their level.

We use the 5 big Ideas in Mathematics:



What is **Fluency**?

Fluency includes conceptual understanding, accuracy, rapid recall, retention and **practice**. The key to fluency is deep **knowledge** and **practice** and making connections at the right time for a child. Varied fluency is offered each lesson, and children are required to practice skill in a variety of ways.

What is **Reasoning**?

Reasoning demonstrates that pupils **understand** the mathematics. Talk is an integral part of mastery as it encourages students to **reason**, **justify** and **explain** their thinking. Teachers promote this mathematical talk throughout the lesson, through effective questioning and paired talk. Children should be able to say not just what the answer is, but how they know it's right. This is key to building **mathematical language** and reasoning skills. This gives pupils the confidence to communicate their ideas clearly, before writing them down. Each day children are also given the opportunity to record their reasoning in writing.

What is **Problem Solving**?

Mathematical problem solving is at the heart of the Mastery Approach. Pupils are encouraged to identify, **understand** and **apply** relevant mathematical ideas and **make connections** between different them. This builds the skills needed to tackle new problems, rather than simply repeating routines without a secure understanding. Mathematical concepts are explored in a variety of representations and problem-solving contexts to give children a richer and deeper learning experience. Children combine different concepts to solve complex problems, and apply knowledge to real-life situations.

Lesson Structure

Each week, children have four maths lessons (Monday-Thursday) and 1 arithmetic lesson (Friday). Additionally, Monday-Thursday, 'keep up' and 'catch up' interventions take place.

Start of the lesson

At the beginning of each lesson, the children will complete an arithmetic starter called 'Rapid Recall'. The purpose of the Rapid Recall is to settle the children into the day's learning, discussing previous learning (from the previous day, week, term, or year) which will support them in the lesson's new objective. If the lesson is a completely new skill, then the rapid recall will focus on using Maths in a real-life context, such as telling the time, using money or measuring.

Main teaching

After the arithmetic starter, introduce the Learning Objective (an explicit skill to be taught which is the same for all children and will be pitched at ARE) and the Success Criteria (this may show differentiation through support or resource). New Mathematical vocabulary can then be introduced and referred to throughout the lesson. Ideally, no more than six new words will be introduced per lesson to avoid cognitive overload.

Effective Modelling

The teaching of mathematics is to follow the CPA approach (Concrete, Pictorial, Abstract) in line with the school's calculation policy for the four operations. The visual calculation policy can also be used in class for effective modelling.

- Manipulatives are used to ensure conceptual understanding.
- Children are exposed to a wide range of models and images throughout.

Mathematics lessons incorporate: varied fluency, reasoning and problem solving. Each part of the lesson being modelled, following the 'I do, We do, You do' approach.

During every lesson, the tasks that children independently complete follow the structure of varied fluency, reasoning and problem solving. These three types of activities are evidenced in books daily.

Mini-plenaries

Children are to self-assess their learning against the success criteria and mini-plenaries or reviews can be used as and when throughout the lesson.

Calculation Policy

To ensure consistency, we follow a school calculation policy when teaching the four operations and a fractions policy for the teaching of fractions. This is available to children, parents and staff on our school website.

[Mathematics for Forest Hills Primary](#)

Meeting the needs of all learners

In order to meet the needs of all children in Mathematics they may be seated according to ability for some activities, to aide differentiation by support. These groupings must be flexible and mixed ability groupings may be appropriate on other occasions which will lead to differentiation by outcome. We differentiate to meet the needs of individual children through resources and support.

In accordance with our school's policy on differentiation and SEND, all children are given tasks suitable to their age, aptitude and ability.

In Mathematics, SEND pupils can:

- work on the same content at different rates and levels through open ended tasks matched to individual groups needs.
- be taught concepts through discussion, concrete examples and practical activities.
- make use of stem sentences.
- be exposed to the pre teaching of vocabulary.

In Mathematics, exceptionally able pupils:

- will be exposed to open ended tasks which enable them to tackle and solve more complex problems.
- will be required to reason at a higher level.
- deepen and broaden their knowledge and understanding of mathematical concepts they are studying.
- choose the most efficient and effective methods— and can justify their choices.
- will have the opportunity to apply their knowledge and understanding whilst collaborating with other able mathematicians and fostering their love for the subject (i.e. Inter MAT maths challenge days)

Planning

At Forest Hills Primary School, teachers in Reception to Year 6 follow the White Rose Planning. This provides long term and medium-term planning for each year group and also mixed year planning.

Short term planning is recorded on Activ Inspire flipcharts and follows the lesson structure above. Exemplar slides are used to ensure consistency for children and staff. Staff use White Rose planning as their starting point and adapt this to suit the needs of their class.

Planning is uploaded weekly and is monitored termly by the Mathematics Lead.

Mathematics in Early Years

Twos

Within our Two's provision, planned mathematical opportunities take place through rhymes (e.g. 5 little ducks, 3 cheeky monkeys etc), puzzles and stories (e.g. hungry caterpillar). Other mathematical opportunities are provided through the enhancement of the continuous provision with maths resources (e.g. numbers in sand, sorting activities, blocks/shapes, construction etc).

Nursery

Within our nursery provision, planned mathematical opportunities continue to take place through rhymes, puzzles and stories. Other mathematical opportunities continue to be provided through the enhancement of the continuous provision with maths resources. Within the nursery setting, there is also a dedicated maths area, where children are provided with the opportunity to complete planned maths activities and access maths manipulatives of their choice throughout the session. Adult led activities are also planned for, which may take place within the maths area or in any other area of the setting (e.g. counting conkers outside, finger painting numbers in the creative area, weighing babies in the home corner, etc.).

Reception

In Reception, we begin our Mastery Approach using White Rose Maths. In Reception, there is a greater focus on adult led activities (pitched in order for children to achieve the Early Learning Goals- see the statements above). Maths is still also heavily evident throughout the continuous provision. Children are taught specific skills and are expected to record their maths activities during an adult led activity. Children have opportunities to apply these skills to problem solving activities within the continuous provision. Evidence of children's achievement towards the ELG's (including both adult led and continuous provision) are recorded within the children's maths book.

Mathematics across the Curriculum

Wherever possible, we try to make links to Maths across the Curriculum, providing children with opportunities to consolidate and enhance their mathematics skills. Applying and developing skills across the curriculum allow children to become more confident at tackling mathematics in any context, particularly real life situations.

STEM

All children are curious about the world around them and how things work. At Forest Hills Primary School we aim to nurture inquiring minds, logical reasoning, and collaboration to prepare them for a world where skills in science, technology, engineering and maths are increasingly important. We provide opportunities for pupils to engage in practical investigation making links

between science, mathematics, technology and developing engineering skills. This helps to encourage critical and creative thinking and makes the acquisition of knowledge and skills relevant and interesting. As a school we try to integrate the STEM subjects, encouraging children to think independently and find solutions to problems.

CPD

Where appropriate members of staff, and/or the co-ordinator, are sent on relevant courses. This is determined by SLT, based on the needs of individual year groups and whole school priorities, and the suitability of courses offered.

SMSC within Mathematics

Children will have opportunities to:

Spiritual Education

Use their imagination and creativity to explore ideas while learning mathematics by:

- identifying and applying patterns and rules to everyday problem-solving;
- writing own problems and challenges that use those patterns or rules.

Moral Education

- Understand the consequences of actions, e.g. if you perform a particular action to one number, will the same outcome apply to other numbers?
Is it always the case? 'Sometimes, always, never' statements.
- Apply the skills required to solve various problems and understand how decisions are made dependent upon the outcomes of the problem.

Social Education

- Develop personal qualities and use social skills.
- Work in pairs or groups to solve problems
- Persevere when struggling to answer questions;
- Take risks and not being afraid to try – it's ok to be wrong, it's not ok not to try
- Take turns when playing maths games.
- Tackle questions types such as, 'X thinks ____, Y thinks ____, who is right?' Discuss.

Cultural Education

- Understand and appreciate personal influences, taking into account other people's views and understand how to express own views, e.g. How to explain to someone where they may have gone wrong in a question.
- Understand that mathematics is a universal language of the world
- Develop a realisation that many topics we learn today have travelled across the world and are used internationally.

British Values within Mathematics

At Forest Hills Primary School, we ensure that through our school vision, values, rules, curriculum and teaching we promote tolerance and respect for all cultures, faiths and lifestyles. We have a duty to prepare our children for life in modern Britain and to keep them safe. We value, uphold and teach pupils about the British Values as directed under Ofsted guidance:

'ensure that they and the school promote tolerance of and respect for people of all faiths (or those of no faith), cultures and lifestyles; and support and help, through their words, actions and influence within the school and more widely in the community, to prepare children and young people positively for life in modern Britain'

Through mathematics we advocate and actively promote the fundamental Modern British Values:

Democracy

- Taking into account the views of others in shared activities.
- Voting when collecting data.

The rule of law

- Following class rules during tasks and activities for the benefit of all.
- Understanding the consequences if rules are not followed.

Individual liberty

- Challenging ourselves to work independently to achieve personal success.

Mutual respect

- Take turns and share equipment.
- Review each other's work respectfully.
- Working collaboratively to solve problems.

Tolerance of those with different faiths and beliefs

- Trying to find mathematics everywhere regardless of the context.
- Use maths to learn about different faiths and cultures around the world, e.g. looking at patterns/shapes within Islam/Hindu religions.

Home/School Link

The link between home and school within Mathematics takes place in many forms:

- Termly curriculum newsletters are sent out informing parents of topic areas that are to be covered.
- To provide a detailed outline of the child's progress and attainment, termly reports are sent out to parents/carers
- Termly parent consultations, providing parents/carers with information on their child's progress and attainment.
- A variety of parent/carers workshops are held throughout the year, ranging from subject knowledge specific sessions to information sharing about statutory testing.
- Parents/carers are encouraged to join their children within the classroom on specific days throughout the year, helping to raise the profile of mathematics, e.g. World Maths Day, NSPCC Number Day, Rockstar Day (TTRS).

IMPACT

Each year group has a copy of the assessment grid for Mathematics. This grid lists the objectives to be covered. These are teacher assessed throughout the year, and assessments made at five checkpoints.

The Mathematics Lead is responsible for monitoring curriculum coverage and will review short term plans on a termly basis. Monitoring of classroom practice and children's work is carried out by the subject lead. The lead will carry out a review each term and produce a report for Governors to inform where the subject is now and the intentions for moving forward.

Supporting Teacher Assessment

- Formative, ongoing assessment for learning is carried out by staff daily and used to inform subsequent sessions/interventions.
- Summative testing is carried at three points in the year, a baseline in September, a midline in February and an endline in July - question level analysis activities are then carried out so that assessment outcomes directly inform future planning.

Outcomes of formative and summative assessments are used to regularly update individual pupils' target sheets.

Statutory Testing

- Baseline Assessment in Reception
- Y2 End of KS1 SATs Test
- Y4 Multiplication Check
- Y6 End of KS2 SATs Test