

Thornhill Lees Infant and Nursery School

Maths Policy Maths Lead: Aysha Loonat



'At Thornhill Lees we celebrate our faith diversity and provide a safe environment where our children are happy to learn. We are kind, caring and respectful to others. We aim to inspire future generations of our school and community to become lifelong learners.'

At Thornhill Lees, we are continuing on our exciting journey to Teaching for Mastery. We value the importance of teaching approaches that give pupils the best chance of securing both deep understanding of mathematical concepts and a varied fluency in applying them.

Intent

Our teachers strive to deliver both depth and breadth and ensure that pupils grasp the fundamental concepts that unlock the door to mastery. We also want pupils to have a Growth Mindset 'can do' attitude, by being resilient, determined in the face of a challenge, cooperative, creative and most importantly, having a positive attitude to making mistakes and seeking solutions.

At Thornhill Lees we aim:

- To promote children's **curiosity** and enable them to safely risk take and learn from first-hand experience wherever necessary
- To support the children to become fluent in mathematical **understanding** from the most basic level so that they can build upon their own understanding.
- To develop conceptual understanding, **recall** of number facts and patterns and apply their knowledge rapidly and accurately.
- To promote children's ability to **reason** through opportunities to discuss their thinking and understanding. This emphasis may result in less written work but much deeper understanding through individual and collaborative practical application.
- To promote **problem solving** and solution finding. This is not only true in mathematical learning but in almost all aspects of school life.
- To support children to make **progress at their own pace**. Often misconceptions cause greater difficulties at a later stage of learning. We will promote the whole group mastery approach, however whenever possible and appropriate use smaller group learning opportunities to encourage children to revisit their thinking to ensure they feel secure in their understanding and able to move confidently on to next steps and challenges.

Implementation -Teaching and Learning

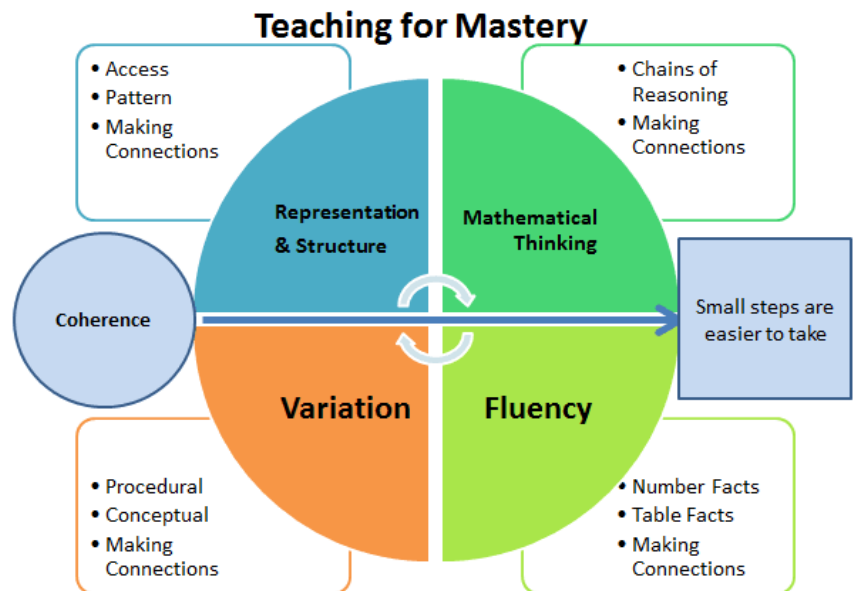
Mastering maths means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject.

The phrase 'teaching for mastery' describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths.

Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material.

Teaching for mastery in maths demonstrates a number of characteristics that underpin the approach.

- It rejects the idea that a large proportion of people 'just can't do maths'.
- All pupils are encouraged by the belief that by working hard at maths they can succeed.
- Pupils are taught through whole-class interactive teaching, where the focus is on all working together on the same lesson content at the same time. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.
- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.



The **Five Big Ideas** underpin teaching for mastery as show in this diagram.

Fluency involves:

- Quick recall of facts and procedures.
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics

Representation and Structure

Mathematical structures are the key patterns and generalisations that underpin sets of numbers – they are the laws and relationships that we want children to spot. Using different representations can help children to ‘see’ these laws and relationships.

Variation

Procedural variation – This is a deliberate change in the type of examples used and questions set, to draw attention to certain features.

Conceptual variation – When a concept is presented in different ways, to show what a concept is, in all of its different forms.

Mathematical Thinking involves:

- Looking for pattern and relationships
- Logical Reasoning
- Making Connections

Coherence

Teachers will develop detailed knowledge of the curriculum in order to break the mathematics down into small steps to develop mastery and address all aspects in a logical progression. This will ensure deep and sustainable learning for all pupils. They will use the range of White Rose Hub and NCETM Spine documents which is applicable and will cater to the needs of the cohort at the time.

As a result of teaching and learning in mathematics, our target is that pupils will be able to meet the key aims as set out in the onset of this policy.

Concrete, Pictorial and abstract approach

CPA approach: Planning has a concrete, pictorial and abstract approach because we believe that all pupils, when introduced to a key new concept need the opportunity to build competency in this area by taking this approach. The conceptual understanding and fluency of pupils is strengthened if they experience concrete, pictorial and abstract representations of a concept. Moving between these approaches enables pupils to connect abstract symbols with familiar contexts, which supports pupils in making sense of maths.

Concrete - children should have the opportunity to use concrete objects to help them understand what they are doing.

Pictorial - alongside this children should use pictorial representations. These representations can then be used to help reason and solve problems.

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

EYFS

Mathematics within the EYFS is developed through purposeful, play based experiences and will be represented throughout the indoor and outdoor provision. The learning will be based on the Reception SOL developed by White Rose Maths as well as follow pupil's interests, achievements and abilities. This updated scheme will support the delivery of a curriculum that embeds mathematical thinking and talk which will help to achieve the oracy target we have as a school. Mathematical understanding will also be developed through stories, songs, games, imaginative play, child-initiated learning and structured teaching. As pupils progress, they will be encouraged to record their mathematical thinking in a more formal way.

The organisation will be planned as follows;

- An introduction with the whole class usually involving some counting, with finger games, number rhymes and songs.
- Some teaching of the whole class on the main mathematics topic for the day.
- Group activities (Occasionally for everyone in small groups simultaneously; or one or more activities, linked to theme of the lesson. These can be supported by an adult or child initiated. Sometimes, a variety of challenges are set for the children to choose from. These may involve more problem-solving techniques.)
- A plenary with the whole class after the group activities are ended, to consolidate and extend through discussion and questioning what they been learning and identify next steps.

There will be a maths area in each classroom, and in the outside area, where activities are available for children in free play time. These activities may have been used previously in lessons and allow for extending children's learning or to consolidate their learning. Maths equipment will always freely be available for children in their play.

Key Stage 1 Maths.

The organisation of a maths lesson will build on the foundations set out in Reception but will have these additional components:

- Lessons will be of brisk pace, with teachers questioning understanding, demonstrating key skills and solutions and quizzing children's thinking.

- There will be a mixture of short tasks, time for explanations, demonstration and discussions and a lot of practical practice following the CPA approach to help reinforce children's learning.
- Some lessons where a concept is being introduced active learning will take place as mixed abilities and will also follow the ping pong approach so all children can take part in every part of the lesson where every part is deliberate, purposeful and precise. Those who have demonstrated good understanding will be able to deepen their understanding of the principles by being given challenging questions or deeper problem solving and reasoning tasks.

KS1 will follow the six-part lesson structure.

Do Now, New Learning, Talk Task, Develop Learning, Independent Task and Plenary.

Lesson Focus	Explanation
Do Now	This is a quick task all pupils can access as an introduction to the mathematics lesson, it could be a recap of previous learning. Teachers assess children's fluency and mathematical understanding through careful observation of pupils within this session without any input
New Learning	The New Learning segment introduces the main mathematical concepts for the day's lesson. Teachers teach the new learning to all pupils via the ping pong approach.
Talk Task	The Talk Task segment of the lesson practises the new learning by talking about maths with key vocabulary. This section focuses on children developing their oracy skills, modelled within the new learning section and embedded in the talk task via the use of stem sentences. When practising- teachers model how to use the correct mathematical language and the key element of using full sentences to embed the learning through both speaking and listening.
Develop Learning	The Develop Learning segment builds on the new learning and develops a deeper understanding of the maths concepts of that lesson. This is the section where teachers assess those that require additional scaffolding to enable them to reach their target.
Independent Task	The Independent task practises learning independently through solving problems. A range of methods can be used to ensure that all pupils make progress: Teacher focus group selected from AF. Peer teaching- teacher to pair peers to enable this to happen effectively. Problem solving activities linked directly to the taught concept to ensure those that have understood have the opportunity to deepen their understanding.
Plenary	The Plenary segment recaps on the lesson, checking understanding and celebrating success. This must include a reasoning question linked to the lesson's objective. Teacher can use the plenary to complete AFL of learning that has taken place.

The principal focus of mathematics teaching in key stage 1 is to ensure pupils develop confidence and mental fluency.

The essential idea behind the mastery approach is that all children have a deep understanding so that future learning continues to build on solid foundations. If the subject is represented using concrete materials, pictorial representations and abstract symbols, it will allow children to visualise maths in varied ways, see connections and to independently explore and investigate a topic. Practical

activities and resources offer the children a deeper mathematical understanding of more complex concepts. Providing children with visual representations also offers a scaffold when developing a more robust understanding of maths. Throughout Key Stage 1, it is important that children gain a secure knowledge of number and place value and become confident when using the four operations in both formal methods as well as problem solving where often the approach is not immediately evident. Alongside number work, pupils begin to identify fractions using shapes, objects and quantities and make connections to equal sharing and grouping. Pupils are taught to count to ten in fractions, recognise equivalent fractions and develop their understanding of fractions on a number line. At this stage, pupils will also develop their ability to recognise, describe, draw, compare and sort different shapes. Pupils have the opportunity to use a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money and are expected to use related vocabulary for all topics. Other subjects may have strong links to some maths topics allowing cross-curricular teaching. For example, shape through art or computing, measures through science or coordinates in geography. This is to ensure we continually maximise learning opportunities for all pupils across an entire curriculum.

Equal Opportunities

All children have equal access to the mathematics curriculum. This is monitored by analysing pupil performance throughout the school to ensure that any difference between groups is minimised and a plan of action devised to improve this. We incorporate mathematics into a wide range of cross-curricular subjects and seek to take advantage of multi-cultural aspects of mathematics. In mathematics lesson we support children with English as an additional language in a variety of ways, e.g. repeating instructions, speaking clearly, emphasising key words, the use of stem sentences, using picture cues, playing mathematical games, encouraging children to join in counting. We also endeavour to address misconceptions or further practice of the basic fundamentals during interventions where we target specific children, which include those who may be working below expected levels or those children who need challenging to reach the depth of work required when working at above age related expectations.

Planning

Within Early Years we use Development Matters in order to plan and assess learning, we will also dip into guidance published by White Rose Maths and also use Numberblocks teaching and learning materials by NCETM. Mathematics is a core subject of the National Curriculum, and we use the National Curriculum 2014 as the basis for our implementation of the Programmes of Study for mathematics, in collaboration with White Rose Hub and NCETM Spine documents. Planning is done in three phases – long term, medium term and short term.

Differentiation

Teaching maths for mastery is different because it offers all pupils access to the full maths curriculum. The mastery maths style of teaching especially the 'ping pong' (episodic) approach is a cooperative learning strategy that has students working in pairs to engage in processing new content or to practice a new skill. This inclusive approach, and its emphasis on promoting multiple methods of solving a problem, builds self-confidence and resilience in pupils. Though the whole class goes through the same content at the same pace, there is still plenty of opportunity for differentiation. Taking a mastery approach, differentiation occurs in the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. There is no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with higher attaining children, or those pupils who grasp concepts quickly, challenged through more demanding problems which deepen their knowledge of the same content. Those

children who are not sufficiently fluent are provided additional support to consolidate their understanding before moving on. Pupils' difficulties and misconceptions are identified through immediate formative assessment and addressed with intervention – commonly through individual or small group support later the same day: there are very few 'closing the gap' strategies, because there are very few gaps to close.

Resources for the Teaching of Mathematics

As concrete resources are pertinent to the mastery approach lots of practical resources are available in each classroom such as Numicon, ten frames, double sided counters, different types of number lines and other wide ranges of appropriate small apparatus (e.g. number squares, numeral cards, cubes, dice and dominoes). Within the classroom resources are readily accessible to children who are encouraged to select materials that are suitable to their task. In the Early Years this selection of resources will need guidance from the class teacher but as pupils progress through the school they should become increasingly independent in their selection.

Impact - Assessment and Monitoring

Children's written work is marked on completion of a lesson or a task. Comments on pupils' work should include personal praise for accuracy, effort and achievement of the learning objective. In addition to this there should be a mathematical 'next steps' towards improved performance. The children should then have the opportunity to improve on their work using a green pen to show they have responded to their next step or deeper question asked.

The teaching and assessing of mathematics at Thornhill Lees follow the Assessment for Learning cycle of; plan, teach, review, assess. Children's work is marked regularly, as part of our AFL policy and assessed against national curriculum objectives. Children in EYFS are assessed regularly using the Early Learning Goals.

In Key Stage 1 termly assessment information is entered onto the schools tracker to monitor progress across the school.

Some formal tests are administered to children in KS1, to assist teachers with their assessment of individual achievement and progress in mathematics.

The following test formats are used within this process:

- Maths Lead's - End of Unit term in Year 1 (usually in the spring and summer)
- SATs Preparation Assessments: Years 2 undertake a range of preparation assessments over the course of the year. These tests are used to track progress and attainment, encourage children's confidence, and support the identification of gaps in knowledge and understanding.

Monitoring and Review.

The monitoring of maths teaching and pupil progress is the shared responsibility of teachers, subject leader and the senior leadership team. The work of the subject leader includes supporting colleagues in the teaching of maths, keeping up to date with current developments as well as providing a strategic lead and direction for the subject. The school's governing body receive regular updates to inform them of the vision for continually driving forward teaching for mastery.