



THORNTON PRIMARY SCHOOL MATHEMATICS POLICY



Overarching Subject Vision

“A mathematical mindset reflects an active approach to mathematics knowledge, in which students see their role as understanding and sense making.”

Jo Boaler, Professor of Mathematical Education, Stanford University 2019

Thornton is a community of mathematicians. One that encourages its members to employ a growth mindset in relation to their maths learning. Holding such a mindset makes maths enjoyable and reduces the anxiety which some feel when studying mathematics.

Our aim is to prepare our mathematicians not only for secondary school, but also for life ahead. The basic numerical skills learned at Thornton have the potential to widen an individual's life chances and increase their employability later in life.

To achieve this, Thornton's maths curriculum provides pupils with opportunities to acquire both substantive and disciplinary knowledge. Therefore, we have adopted a nationally recognised programme of study, White Rose Maths, which is both coherent and progressive. The scheme's strength is that it promotes arithmetical proficiency, deep reasoning and problem solving. The programme is implemented in such a way that pupils encounter concrete, pictorial, and abstract approaches, which varies according to individual need and task. Ultimately, our aim is for all our mathematicians to demonstrate the three elements of fluency: efficiency, accuracy, and flexibility.

Outside of maths lessons we also exploit opportunities to demonstrate how mathematics can be applied in the wider curriculum. Doing so is important, as offering children practice in context builds mathematical memory (schema in their long-term memory). Furthermore, we consider this important as it shows pupils how crucial mathematical thinking is in relation to the study of other disciplines, and to general problem solving.

Aims for our pupils' learning

- To develop a growth mindset and positive attitude towards mathematics.
- To gain arithmetical proficiency.
- To acquire increasing fluency in all areas of mathematics, but particularly number.
- To reason and to communicate this thinking with others.
- To build an ability to solve problems, working systematically and accurately.
- To obtain an expansive mathematical vocabulary which aids their ability to communicate their mathematical thought with others.

Documents and resources which guide our planning

As described above, we use the White Rose Maths Hub Scheme of Learning (Years 3-6) which is supplemented by NCTEM 'read-to-progress' materials, MyMaths, TimesTables Rockstars and NRICH to support our planning. The school's ongoing engagement with the DfE funded Maths Hub programme continues to ensure that our staff are challenged to work in the most current and evidence informed way.

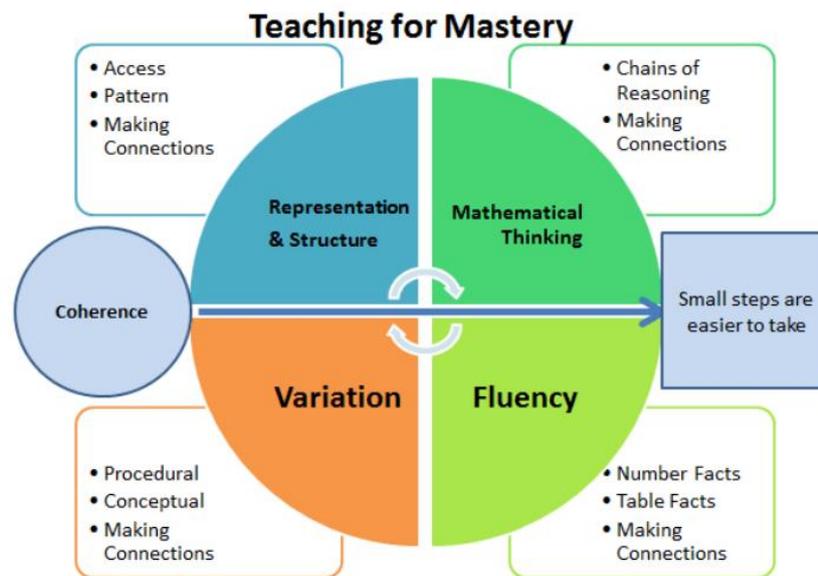
How often is mathematics taught

Mathematics is taught daily in school. Each year group has a 50-60-minute Mathematics lesson and a daily 20-minute arithmetic lesson.

Curriculum design and planning

- Staff use **White Rose Maths Schemes** of Learning as a starting point in order to develop a coherent and comprehensive conceptual pathway through the mathematics curriculum. The focus is on the whole class progressing together. Collaborative planning with year group colleagues is encouraged to ensure consistency.
- Special consideration is also given to the NCTEM 'ready-to-progress' materials as a means of ensuring that gaps in knowledge that have emerged as a result of the Covid pandemic.
- Staff complete short term fortnightly plans in PPA, The White Rose medium- term and long-term plans are followed to ensure coverage and progression in learning.
- Learning is broken down into small, connected steps, building on what pupils already know. The lesson journey is detailed and evident on flipcharts (usually PowerPoint).
- Difficult points and potential misconceptions are identified in advance and strategies to address them planned.
- Key questions are planned, to challenge thinking and develop learning for all pupils.
- Contexts and representations are carefully chosen to develop reasoning skills and to help pupils link visual representations to abstract mathematical concepts. • Opportunities for extra fluency practice (instant recall of key facts, such as number bonds, times tables, division facts, addition and subtraction facts) are provided in daily arithmetic lessons, as well as provided outside mathematics lessons (morning starters or post lunch).

Teaching for Mastery



Our teaching for mastery is underpinned by the NCETM's 5 Big Ideas.

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, efficient and accurate 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.

The Five Big Ideas were first published by the NCETM in 2017.

Teaching for Mastery Principles

- **It is achievable for all** – we have high expectations and encourage a positive ‘can do’ mindset towards mathematics in all pupils, creating learning experiences which develop children’s resilience in the face of a challenge and carefully scaffolding learning so everyone can make progress.
- **Deep and sustainable learning** – lessons are designed with careful small steps, questions and tasks in place to ensure the learning is not superficial.
- **The ability to build on something that has already been sufficiently mastered** – pupils’ learning of concepts is seen a continuum across the school.
- **The ability to reason about a concept and make connections** – pupils are encouraged to make connections and spot patterns between different concepts (E.g. the link between ratio, division and fractions) and use precise mathematical language, which frees up working memory and deepens conceptual understanding.
- **Conceptual and procedural fluency** – teachers move mathematics from one context to another (using objects, pictorial representations, equations and word problems). There are high expectations for pupils to learn times tables, key number facts (so they are automatic) and have a true sense of number. Pupils are also encouraged to think whether their method for tackling a given calculation or problem is Appropriate, Reliable and Efficient (A.R.E).
- **Problem solving is central** – this develops pupils’ understanding of why something works so that they truly have an appreciation of what they are doing rather than just learning to repeat routines without grasping what is happening.
- **Challenge through greater depth** - rather than accelerated content, (moving onto next year’s concepts) teachers set tasks to deepen knowledge and improve reasoning skills within the objectives of their year group.

Cross curricular

Opportunities to extend and promote Mathematics should be sought across all subjects. Within every Science topic, children will also develop their mathematical skills. This will help children appreciate how to Work Scientifically but also practise discrete mathematical skills. Nevertheless, the prime focus should be on ensuring mathematical progress delivered discretely or otherwise.

Assessment and Record Keeping

In addition to the formative assessment undertaken in lessons, teachers will use end of block assessments and termly summative assessments (during Assessment Week) supplied by the White Rose Maths to reinforce their judgements and provide further opportunities to identify gaps in pupil’s learning and tailor future lessons/interventions. Teacher assessments are made and recorded on Target Tracker each half-term. Teacher assessments and pupil progress is discussed at half-termly pupil progress meetings: this ensures children identified as not on track can receive targeted support swiftly.

Marking and feedback

Marking of mathematics books should be completed in line with the Thornton Primary School's marking policy. It is essential that all marking picks up and addresses any misconceptions/mistakes and thorough questioning ensures children have clarified their thinking clearly. Next steps are provided to address misconceptions and to move learning forward.

Inclusion and Special Needs

Thornton Primary School aims to meet the needs of all, considering gender, ethnicity, culture, religion, language, disability, age and social circumstances. The provision for children with special needs is detailed in the SEND Policy. SEN pupils may be supported by additional adults, different resources, differentiated activities. They may also complete additional activities outside of the mathematics lesson or be taught in a smaller intervention group (Y3-6). We have high expectations of all children and strongly believe that all children are able to achieve in mathematics. Some may take longer to grasp concepts and may need careful scaffolding or extra time/support.

Home/School Link

At Thornton Primary School we encourage parents to be involved in the mathematics curriculum by:

- Providing parents with termly curriculum summaries with upcoming maths topics and QR codes to suggested learning platforms such as MyMaths and Times Tables Rockstars.
- Inviting parents to workshops to explain KS2 assessments and the Year 4 Multiplication Tables Check.
- Inviting parents in twice a year for parents' evening to discuss their child's progress.
- Reporting on mathematical progress in their child's report.
- Using our mathematics curriculum page on the school website to provide information about how we teach the four calculations as pupils move through the school. Pupils are also provided with mathematics home-learning on a weekly basis on MyMaths and Times Tables Rockstars.

Role of the Subject Leader

- Ensures teachers understand the requirements of the National Curriculum and supports them to plan lessons.

- Leads continuing professional development; facilitates partnerships with schools both locally and nationally: provides coaching; and feedback for teachers to improve pupil learning.
- Leads the whole-school monitoring and evaluation of teaching and learning in mathematics by observing teaching and learning in mathematics regularly; analysing assessment data in order to plan whole school improvement in mathematics; conducting work scrutiny to inform evaluation of progress; conducting pupil interviews.
- Takes responsibility for managing own professional development by participating in external training, independent private study, engaging in educational research and scholarly reading and keeping up-to-date with Teaching for Mastery developments.
- Ensures that the school's senior leaders and governors are kept informed about the quality of teaching and learning in mathematics.
- Works in close partnership with the school's senior leaders to ensure the learning needs of all pupils in mathematics are met effectively.
- Keeps the school's policy for mathematics under regular review.

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