

Maths, Intent, Implementation & Impact Policy

Compiled by:	Maths Lead - Vicky Carr
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To be reviewed:	Every 2 years or sooner if required
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 Turton Edgworth CE/Methodist Primary School



Mathematics at Turton and Edgworth C of E/ Methodist Primary School; Intent, Implementation & Impact

'Mathematics is, in its own way, the poetry of logical ideas'
Albert Einstein

INTENT

Why do we teach this? Why do we teach it in the way we do?

Mathematics is an important creative discipline that helps us to understand and change the world. We want all pupils at Turton and Edgworth C of E/ Methodist Primary School to experience the beauty, power and enjoyment of mathematics and develop a sense of curiosity about the subject with a clear understanding.

At Turton and Edgworth, we foster positive can-do attitudes and we promote the fact that **'We can all do maths!'** We believe all children can achieve in mathematics, and teach for secure and deep understanding of mathematical concepts through manageable steps. We use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated problems. At our school, the majority of children will be taught the content from their year group only. Teachers will set tasks to deepen knowledge and improve reasoning skills within objectives of their year group. Pupils will spend time becoming true masters of content, applying and being creative with new knowledge in multiple ways.

We aim for all pupils to:

- become **fluent** in the fundamentals of mathematics so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
 - be able to **solve problems** by applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios
- **reason mathematically** by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.
- have an appreciation of **number** and number operations, which enables mental calculations and written procedures to be performed efficiently, fluently and accurately to be successful in mathematics.

At Turton and Edgworth, these elements are embedded within maths lessons and are developed over time. Maths is a rich and interconnected subject and our aim is to support children to move fluently between different concepts and different representations of mathematical ideas, through both procedural and conceptual variation. Programmes of study are carefully designed to enable children to make these rich connections across mathematical ideas and to develop fluency, reasoning and their confidence to solve increasingly sophisticated problems.

We follow a 'Teaching for Mastery' approach to mathematics teaching which has at its heart a belief that all children can achieve well and be successful mathematicians. The phrase

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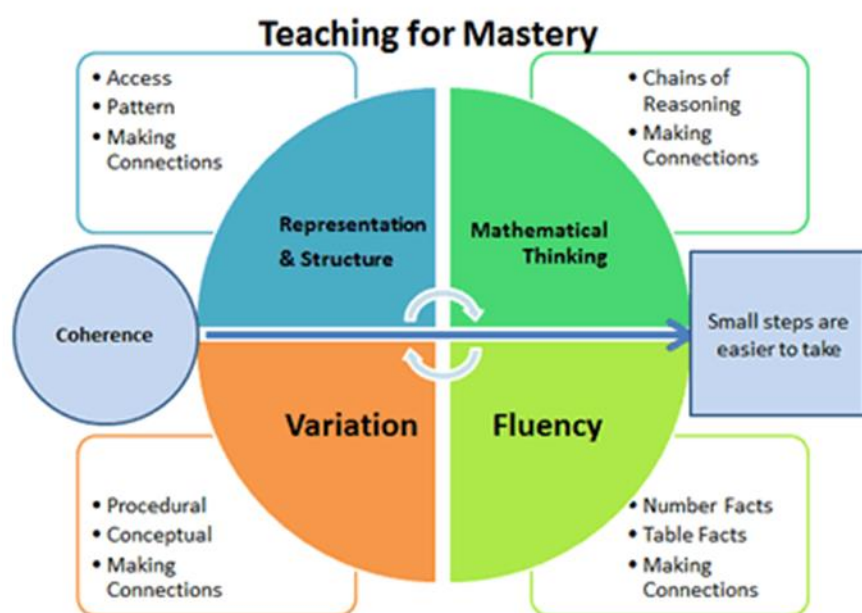
"You will have life and life in all its fullness" (John 10:10) 'Do all you can' (John Wesley)

'Teaching for Mastery' describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths. Mastering maths means pupils acquire a deep, long-term, secure and adaptable understanding of the subject.

This approach promotes teaching for depth and enables children to develop their independence, confidence and competence in mathematics through the use of carefully designed small steps in and across lessons.

The rationale behind adopting a Teaching for Mastery approach to teaching mathematics lay within the NCETM Teaching for Mastery Maths Hub Programme as well as the 2014 National Curriculum, which states:

- The expectation is that most 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.



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

- Opportunities for **Mathematical Thinking** allow children to make chains of reasoning connected with the other areas of their mathematics.

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- A focus on **Representation and Structure** ensures concepts are explored using concrete, pictorial and abstract representations, the children actively look for patterns and generalise whilst problem solving.
- **Coherence** is achieved through the planning of small, connected steps to link every question and lesson within a topic.
- Teachers use both procedural and conceptual **Variation** within their lessons to develop conceptual understanding
- The development of **Fluency** in number facts is given a high priority both within and outside of maths lessons.

At Turton and Edgworth, we promote the following 'Positive Classroom Norms' within mathematics lessons:

1. Everyone can learn maths to the highest levels.
2. Mistakes are valuable.
3. Questions are really important.
4. Maths is about creativity and making sense.
5. Maths is about connections and communicating.
6. Maths class is about learning and not performing.
7. Depth is more important than speed.

'Positive Norms to Encourage in Maths Class', Jo Boaler, Youcubed

Local Maths Hub work

At our school, we stay connected to a network of maths specialists and maths leaders through working closely with our local Maths Hub. The maths lead, is a Primary Maths Mastery Specialist who receives regular training and updates about maths mastery which is regularly disseminated with all staff within and across school. In addition, other teachers within school, are involved with on-going maths hubs projects and workgroups. The maths lead and other teachers are part of Teacher Research Groups. Teacher Research Groups, (TRGs) meet regularly to plan, observe and discuss teaching for mastery. In between meetings, teachers explore mastery approaches in their own classrooms and across their school. This model of professional development involves hands-on learning and peer-to-peer support. It is evidence based and designed to support substantial long-term change. Our ongoing involvement with the Maths Hub allows us to constantly strive for excellence in our approach to mathematics teaching and ensures staff are constantly developing their knowledge and skills.

Continuing Professional Development

In order to ensure the highest quality teaching and learning in Maths, the school is committed to the continuing professional development of both teachers and teaching assistants. The Maths subject leader has the responsibility for coordinating, delivering or sourcing the relevant

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development opportunities for staff.

Spiritual, Moral, Social and Cultural Development

The beauty of mathematics is shared with our pupils and helps them to understand the world around them. Maths lessons help pupils make connections between the mathematical concept and their daily experiences. There are many opportunities for pupils to collaborate with others and each pupil's reasoning and mathematical thinking is valued when shared with the group.

Equal Opportunity and Inclusion

We endeavour to provide all children with an equal opportunity to maximise their individual potential; this is regardless of ability, gender, cultural background, race, religion, or disability. Activities are planned in a way that encourages full and active participation by all children, matched to their knowledge, understanding and previous experience. Equal emphasis will be given to the roles of both men and women in society, without reinforcing gender, religious or cultural stereotypes. Staff ensure that activities are appropriate for all children and all children are challenged at an appropriate level for the individual.

IMPLEMENTATION

What do we teach? What does this look like?

Teachers use careful questioning throughout lessons to enable all children to master the curriculum in maths and children are encouraged to talk about and explain their mathematical thinking. Whilst those who are identified as SEND or underachieving receive individualised support drawing from the CPA (concrete-pictorial-abstract) approach. Challenge is available to all children through opportunities for deep learning, reasoning and open-ended challenging problems.

During the lessons, live marking allows immediate feedback and the opportunity to move the children's learning on through challenge. Following on from this, learning is revisited and consolidated where needed through FIX IT activities or planned interventions.

Maths in our school is enhanced by our individual class working walls designed to aid children through each topic showing key vocabulary, sticky knowledge and methodology. We promote the use of IT, developing the home-school link through our use of TT Rockstars.

Lesson design and structure

At Turton and Edgworth CE/Methodist Primary School we draw upon different resources to support teachers in all aspects of their planning whilst delivering Maths Mastery methods effectively. Although we primarily draw upon the White Rose Maths Hub objectives which are fully supported by the Department for Education we also use a range of other high-quality resources such as the

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NCETM Professional Development resources, Ready to Progress criteria, 'I see Reasoning' and NRich Materials.

As part of this process, teachers plan using a Teaching for Mastery' lesson structure which features a 'ping-pong' or 'extended handover' style of teaching. We call this structure 'I do, we do, you do' and this can be repeated several times within a lesson. Lessons will include the following elements:

- Daily fluency focus
- Hook (a real-life context/ problem to promote mathematical thinking and conversation)
- 'Let's learn' session - Teacher-modelling (I do)
- Guided Practice - Teacher and class work through examples together (we do)
- Independent Practice incorporating a chance to be challenged (you do)

EYFS

In the Early Years Foundation Stage (EYFS), we relate the mathematical aspects of the children's work to the Development Matters statements and the Early Learning Goals (ELG), as set out in the EYFS profile document. Maths development involves providing children with opportunities to practise and improve their skills in counting numbers, calculating simple addition and subtraction problems, and to describe shapes, spaces, and measures.

We continually observe and assess children against these areas using their age-related objectives and plan the next steps in their maths development. There are opportunities for children to encounter Maths throughout the EYFS (both inside and outside) - through both planned whole class, small group and continuous provision activities and the self-selection of easily accessible quality maths resources. Whenever possible children's interests are used to support delivering the maths curriculum.

Curriculum design and planning

Staff use the White Rose Maths Schemes of Learning as a starting point in order to develop a coherent and comprehensive conceptual pathway through the mathematics. The whole class progress through the learning together.

Learning is broken down into small, connected steps, building from what pupils already know. Difficult points and potential misconceptions are identified in advance and strategies to address them planned. These may include immediate planned interventions and/or pre-teach sessions. Teachers plan key questions to challenge thinking and develop learning for all pupils.

Representations and contexts are carefully chosen to expose mathematical structures and develop reasoning skills. The concrete-pictorial-abstract approach allows children make connections and develop depth of understanding and there is regular interchange between concrete/contextual ideas, pictorial representations and their abstract/symbolic representation.

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There are opportunities for extra fluency practice (instant recall of key facts, such as number bonds, times tables, division facts, addition and subtraction facts) outside of mathematics lessons (morning starters or post lunch etc). Key new learning points are identified explicitly. The development of fluency with number facts is given high priority in Key Stage One.

Making comparisons is an important feature of developing deep knowledge. The questions "What's the same, what's different?" are often used to draw attention to essential features of concepts across year groups. Repetition of key ideas (for example, in the form of whole class recitation, repeating to talk partners etc) is used frequently. This helps to verbalise and embed mathematical ideas and provides pupils with a shared language to think about and communicate mathematics. **Stem sentences** are used to provide a scaffold to mathematical discussions and support depth of understanding.

Formative assessment is carried out throughout the lesson; the teacher regularly checks pupils' knowledge and understanding and adjusts the lesson accordingly. Gaps in pupils' knowledge and understanding are identified early by in-class questioning and reference to the DFE Guidance document and Ready to progress criteria. They are addressed rapidly through individual or small group intervention, either on the same day or the next day, which may be separate from the main mathematics lesson, to ensure all pupils are ready for the next lesson.

Teachers discuss their mathematics teaching regularly with colleagues, sharing teaching ideas and classroom experiences in detail and working together to improve their practice. Demonstration lessons and follow on teacher discussions are a key part of in-house maths CPD at Turton and Edgworth.

Fluency

Fluency in maths is about developing number sense and being able to choose the most appropriate method for the task at hand; to be able to apply a skill to multiple contexts. The National Curriculum states that pupils should become fluent in the fundamentals of mathematics through varied and frequent practice.

Fluency includes:

- 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

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Russell (2000) spells this out in more detail and suggests that fluency consists of three elements:

Efficiency - this implies that children do not get bogged down in too many steps or lose track of the logic of the strategy. An efficient strategy is one that the student can carry out easily, keeping track of sub-problems and making use of intermediate results to solve the problem.

Accuracy depends on several aspects of the problem-solving process, among them careful recording, knowledge of number facts and other important number relationships and double checking results.

Flexibility requires the knowledge of more than one approach to solving a particular kind of problem, such as two-digit multiplication. Students need to be flexible in order to choose an appropriate strategy for the numbers involved, and also be able to use one method to solve a problem and another method to check the results.

In addition to incorporating opportunities for fluency development in mathematics lessons, all Reception, Year One and Year Two children take part in the **NCETM 'Mastering Number' Programme**. The programme is aimed at strengthening the understanding of number, and fluency with number facts, among children in the first three years of school. Mastering Number is wholly consistent with and complementary to the Teaching for Mastery approach to mathematics teaching. Children have a daily 'Mastering Number' session outside of the usual maths lesson. These sessions will explicitly teach number facts and support fluency development. Over the year, children will use a range of materials and representations, including a small abacus-like piece of equipment called a rekenrek.

Throughout the programme, children will develop conceptual understanding, fluency and confidence with the following key mathematical areas: In Reception: Subitising, cardinality, ordinality, counting, composition of number, comparison of numbers and partitioning. In Years One and Two: Subitising, cardinality, ordinality, counting, composition of number, comparison of numbers, partitioning and addition and subtraction number facts.

From September 2023, Year Four and Year Five children will take part in the Key Stage Two Mastering Number which will build on the firm foundations from the Key Stage One programme. The Key Stage Two programme will focus on Multiplicative Reasoning. Knowledge of multiplication and division and its applications forms the single most important aspect of the KS2 curriculum and is the gateway to success at secondary school. It is also a key area that pupils often struggle with. Automaticity with multiplication tables relieves cognitive load and develops pupils' confidence to achieve success.

In addition to the KS2 Mastering Number Programme, fluency with multiplication and division facts are further developed across school with the Karate Maths initiative. Children collect karate belts as they progress with their times tables knowledge and understanding.

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IMPACT

What will this look like?

By the time children leave KS1 they will:

Key Stage One

By the time children leave KS1 we aim for the children to have developed fluency with the following key number facts, as outlined in our Fluency policy. Participation in the Maths Hub KS1 Number Facts project in 2021-22 will further support children's understanding and fluency with the following facts.

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

Key Stage Two

By the time children leave our school they will:

By the end of KS2 we aim for children to be fluent in the fundamentals of mathematics with a conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. They should have the skills to solve problems by applying their mathematics to a variety of situations with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios. Children will be able to reason mathematically by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.

Children will also display a positive and resilient attitude towards mathematics and awareness of the fascination of maths.

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