

# MATHS POLICY

## Intent

All pupils should become fluent in the fundamentals of mathematics, including through varied and frequent practice, so that pupils develop conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems. (National Curriculum, 2014)

At the centre of our mastery approach to the teaching of mathematics is the belief that all pupils have the potential to succeed. Developing a 'Mathematical Mindset' in all enables children to proactively self-regulate and take ownership of their learning through metacognition. All pupils have access to the same curriculum content and, rather than being extended with new learning, they deepen their conceptual understanding by tackling varied and challenging problems. Similarly with calculation strategies, pupils do not simply rote learn procedures but demonstrate depth of their procedural understanding using concrete materials and pictorial representations. Going back and forth between representations reinforces teaching and learning and promotes levels of fluency that ensures pupils are confident and accurate. Pupils who grasp concepts rapidly are presented with problems rooted in 'real life' and challenged to apply their knowledge and understanding, before any acceleration through new content. Those pupils who are not sufficiently fluent with earlier material consolidate their understanding through additional practice, before moving on.

We are continually striving to improve our bespoke maths curriculum in order to best suit the needs of our children. We do not follow a set scheme; instead we utilise the best resources available including NCETM resources, NRICH, White Rose Maths, Third Space Learning and I See Maths.

- **All learners are successful mathematicians.**
  - We believe everyone can be a successful mathematician.
  - Mistakes and misconceptions help us all learn.

- Effort is recognised and praised.
- Early success helps us all achieve.
- Learners are resilient, independent and motivated.
- **Successful mathematicians make connections.**
  - Connections are explicitly taught and shared.
  - Models and representations are used to support understanding.
  - Exploring the underlying structure of our number system ensures depth of understanding.
- **Knowing key facts allows efficient problem solving.**
  - Recalling key facts regularly helps us feel free up working memory to solve increasingly complex problems.
  - We apply known facts in a variety of contexts.
  - Discussing, sharing and using mathematical vocabulary helps us efficiently describe and extend our learning.

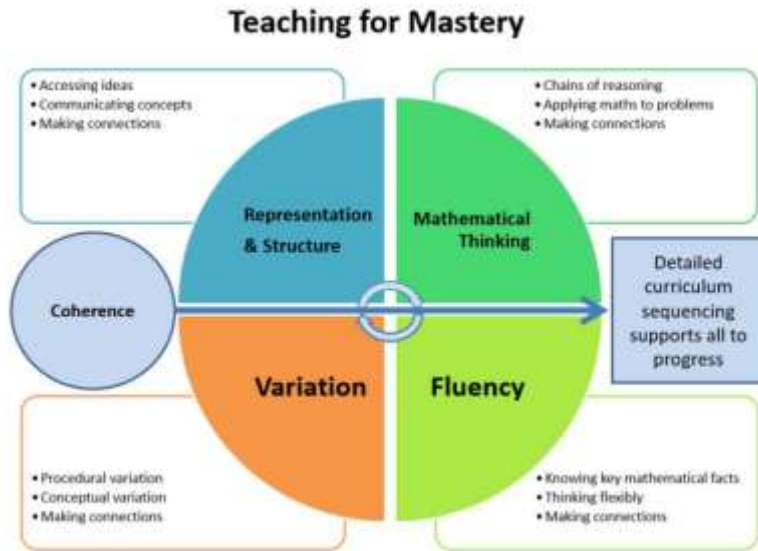
### Implementation

The National Curriculum for Mathematics emphasises the importance of all pupils mastering the content taught each year and discourages the acceleration of pupils into content from subsequent years.

At XXXX Primary Academy, we feel the best way to achieve the aims set out by the National Curriculum is through adopting a Mastery approach.

## Teaching for Mastery: The Principles

### The Five Big Ideas (NCETM)



### Coherence

Teaching is designed to enable a coherent learning progression through the curriculum, providing access for all pupils to develop a deep and connected understanding of mathematics that they can apply in a range of contexts.

### Representation and Structure

Teachers carefully select representations of mathematics to expose mathematical structure. The intention is to support pupils in 'seeing' the mathematics, rather than using the representation as a tool to 'do' the mathematics. These representations become mental images that students can use to think about mathematics, supporting them to achieve a deep understanding of mathematical structures and connections.

### Mathematical Thinking

Mathematical thinking is central to how pupils learn mathematics and includes looking for patterns and relationships, making connections, conjecturing, reasoning, and generalising. Pupils should actively engage in mathematical thinking in all lessons, communicating their ideas using precise mathematical language.

### Fluency

Efficient, accurate recall of key number facts and procedures is essential for fluency, freeing pupils' minds to think deeply about concepts and problems, but fluency demands more than this. It requires pupils to have the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, and to choose appropriate methods and strategies to solve problems.

### Variation

The purpose of variation is to draw closer attention to a key feature of a mathematical concept or structure through varying some elements while keeping others constant.

- Conceptual variation involves varying how a concept is represented to draw attention to critical features. Often more than one representation is required to look at the concept from different perspectives and gain comprehensive knowledge.
- Procedural variation considers how the child will 'proceed' through a learning sequence. Purposeful changes are made in order that pupils' attention is drawn to key features of the mathematics, scaffolding childrens' thinking to enable them to reason logically and make connections.

### Maths Curriculum design and approach

At XXX Primary Academy we use the National Curriculum objectives as the basis for our curriculum planning, along with our long and medium term curriculum plans. We have adopted our own approach to teaching for Mastery.

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.

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 concrete ideas to abstract mathematical concepts.

High quality materials and tasks are integrated into lessons to support learning and provide access to the mathematics.

### Long term planning

The National Curriculum for Mathematics 2014, Development Matters and the Early Learning Goals (Number and Numerical Patterns) provide the long term planning for mathematics taught in the school.

### Medium term planning

Medium term planning is influenced by White Rose, NCETM, NRICH, Third Space Learning and I See Maths resources using many representations and visual models to promote varied fluency and to direct practical activity. Learning is routed in real experiences and cross-curriculum links are made.

### Short term planning

Teachers will produce daily presentations (usually PowerPoints) following the six-part lesson approach.

### **Agreed principles for Mathematics**

- The date will be clearly indicated at the top of children's work and underlined (where handwritten).
- A line will be left after the date and the learning objective will be written underneath and underlined (Key Stage 2), unless stuck in as part of the success criteria/worked example.
- In Key Stage 1 and Key Stage 2, children will work in books. One digit/ symbol per square is the agreed rule. (age appropriate)
- Any work on separate pieces of paper will be stuck in their books.
- Where children use a formal method of calculation, these will be in-line with the school's calculation policy.
- Self-assessment will be encouraged but may not necessarily be recorded in books.
- There will be gradual progression through the key stages, according to the child's needs, towards independence.
- Weekly homework will be set.
- There will be a maths working wall in every classroom with key resources to support learning in evidence. This will be in line with the display/working wall policy.

### **Teaching and Learning**

In order to achieve the aims and high expectations set at XXXX we use a variety of teaching and learning styles within our maths lessons in order to provide varied, high-quality teaching. Learning should take the form of individual, group and whole class teaching.

### **Lesson structure**

- In lessons there are opportunities for exploration, structuring, documenting, practice and reflection.
- Input is delivered through small steps of sequential learning with opportunities for children to tackle problems. Carefully planned questions are used to assess understanding and address misconceptions. During the input, children are exposed to the same element of maths in lots of different representations.
- Guided practice allows children to develop fluency. They can then practise and apply their new knowledge (and methods) to different problems with support as needed from a peer or adult.
- Children should then be able to apply their understanding to independent tasks, which will need them to use what they have learnt, to answer different questions.

- Enrichment is used over acceleration through provision of ‘challenge’ activities. High attainers should be able to show recordings in more than one way, find different possibilities, explain it as a story, verbalise thinking methods and explore reasoning, etc.
- We have adopted the six-part lesson which is seen either within one lesson or a sequence of lessons.
- Daily opportunities for practising multiplication tables and key arithmetic concepts.

### **The Six-Part Lesson Explained**

(Rosenshine’s Principles of Instruction, Oliver Caviglioli and EEF Cognitive Science)

1) Flashback Five - The purpose of this is to consolidate previous learning. This could be reviewing what was learnt the day before or learning from the previous week’s or half term’s learning.

#### 2)New Learning

This introduces the main learning for the lesson, begun by sharing the lesson’s key vocabulary with the pupils. This segment requires clear explanations and modelling of tasks to be completed throughout the lesson, especially the Maths Talk task.

#### 3)Maths Talk

The main focus here is on the children working together in pairs or small groups and talking in full sentences about maths. Developing pupils’ language we believe is an important feature of the Mathematics Mastery approach, and taking turns and listening are important to children’s development. In addition to this, teachers can also use the talk task to apply the skills they have learnt previously, by discussing and reasoning mathematically.

#### 4)Develop Learning

This mirrors the New Learning but aims to move the pupils’ learning on further and deepen their understanding. Learning is developed by introducing different resources, adding a problem solving element, or encouraging further good language use following the Maths Talk.

#### 5)Independent Task

Pupils practise their Develop Learning by working independently and demonstrating what they have understood and learnt

### 6)Plenary

The plenary is used to reflect on learning, gather evidence for assessments and plan for future learning. It should sum up what the children have learnt during the lesson, consolidating all learning, address any common misconceptions, and pose a question for the next lesson.

### Early Years Foundation Stage

Children in our Nursery and Reception classes follow Statutory Framework for the Early Years Foundation Stage to ensure most children reach expectation in number and numerical patterns. Mathematical teaching is delivered through practical, concrete experiences using inside and outside space to maximise learning. Children learn as a whole class, in small groups and through individual exploration often following their own lines of fascination and enquiry. Mathematics is integral to classroom routines and children learn and explore following adult modelling. Mathematical language is introduced in lessons and embedded during play activities and in discussions. Children are encouraged to be curious and explore new words and their meanings in a mathematical context. EYFS mastery approach is followed using NRICH, NCETM resources and White Rose models and representations. This ensures a solid foundation is laid and children are ready to access National Curriculum objectives moving into key stage 1.

### Key Stage 1

In Years 1 and 2, the focus of maths is to ensure the children develop confidence and mental fluency with whole numbers, counting and place value. This often involves working with numerals, words and the four operations (+ - x ÷). The children should be precise in using and understanding place value and know number bonds to 20. The children also develop their ability to recognise, describe, draw, compare and sort different shapes. The children use a range of measures to describe and compare different quantities (such as length, mass, capacity/volume, time and money).

*Year 2 pupils are prepared for KS1 SATs*

### Key Stage 2

In Years 3 and 4, the focus is to ensure the children become increasingly fluent with whole numbers and the four operations(including number facts and place value). Pupils begin to develop efficient written and mental calculations with increasingly large whole numbers. They begin to develop their ability to solve a range of problems, including simple fractions and decimal place value. The children develop mathematical



reasoning to help them analyse shapes and their properties and confidently describe their relationships. By the end of Year 4, children should have memorised their multiplication tables up to and including the 12 times table and be able to show precision and fluency in their work.

*Pupils in Year 4 are prepared for the Multiplication Tables Check (MTC), from 2022 onwards.*

In Years 5 and 6, the focus of maths is to ensure that children extend their understanding of the number system and place value to include larger integers. Pupils should be able to make connections between multiplication and division with fractions, decimals, percentages and ratio. Children should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems that demand the use of efficient written and mental methods of calculation. Children are introduced to algebra as a means for solving a variety of problems. The children's understanding and knowledge in geometry and measures consolidates and extends the knowledge they have developed in number; children should be able to classify shapes with increasingly complex geometric properties, using the vocabulary they need to describe them with accuracy and confidence.

*Year 6 pupils are prepared for KS2 SATs.*

### **Features of teaching**

Lessons are sharply focused; digression is generally avoided.

Key new learning points are identified explicitly.

There is regular interchange between concrete/contextual ideas, pictorial representations and their abstract/symbolic representation.

Mathematical generalisations are emphasised as they emerge from underlying mathematics, which is thoroughly explored within contexts that make sense to pupils.

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.

Repetition of key ideas (for example, in the form of whole class recitation, repeating to talk partners, etc.) is used frequently, particularly through the use of thinking stems. This helps to verbalise and embed mathematical ideas and provides pupils with a shared language to think about and communicate mathematics.

Teacher-led discussion is likely to be interspersed with short tasks involving pupil to pupil discussion and completion of short activities.

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. They are addressed rapidly through individual or small group intervention, either during the lesson or during same-day interventions held during assembly time, to ensure all pupils are ready for the next lesson.

### **Inclusion and Equal Opportunities**

At Lutton St. Nicholas Primary Academy we have a strong belief that all children should be able to access our maths curriculum no matter what their ability, background, individual needs, gender or race is. All teachers adapt tasks within lessons, ensuring that all the needs of the children are catered for, including those with special educational needs and disabilities. Tasks will be adapted for each child and support provided by both the teacher and teaching assistants within the classroom. The development of confidence in each individual child is promoted by celebrating their strengths and provides appropriate support and scaffolding to allow independence.

Additional provision is made for children who are working significantly below their age on the national curriculum objectives.

### **Spiritual, Moral, Social and Cultural Development**

#### **Social**

- We help pupils develop their mathematical voice and powers of logic, reasoning and explanation by offering explanations to each other.
- We seek out events and team maths challenges for increased pupil involvement.
- We open our school to others to show our maths teaching and learning

#### **Moral**

- Within the classroom, we encourage respect and reward good behaviour. We value listening to other's views and opinions on problem solving.

- We promote discussion about mathematical understanding and challenge bias and assumptions, supporting students to question information and data that they are presented with.
- We equip students with a solid grounding to understand all areas of mathematics which will support them in their adult lives: understanding finances, managing time, and providing skills to problem solve and think critically etc.

### **Spiritual**

- We are sensitive to students' individual needs and backgrounds and experience.
- By developing deep thinking, and questioning the way in which the world works, we promote the spiritual growth of our students through mathematics.
- We aim to give all students an appreciation of the richness and power of maths through mathematical investigations.

### **Cultural**

- We share the appreciation with the pupils that mathematics, its language and symbols have developed from many different cultures around the world.
- We look to make explicit reference to mathematician's contribution to certain areas of mathematics.

### **Parental Involvement**

We encourage parents to be involved by:

- Inviting them into school twice/three times yearly to discuss the progress of their child.
- Providing parents with current targets, two face-to-face parents' evenings and a yearly report outlining their child's achievements.
- Holding workshops for parents and families to support them with the strategies their children are learning in maths.
- Sending home learning activities weekly to be completed by or with their child.
- Tapestry in EYFS - maths challenges – running dialogue parents posting what they have done.

## **Marking and Assessment**

Assessment is carried out through questioning, observations, written marking and feedback, verbal feedback, testing, children carrying out self-assessment and peer assessment. Teachers will carry out assessment for learning continually in order to identify any misconceptions and pupil progress. This will inform future planning and allow for the provision of individual next steps for each child.

Assessment is a vital tool in the teaching of mathematics, designed to monitor children's progress and measure attainment. It is also used to inform future planning by staff at this school or the child's next school.

'Next steps marking' is not necessary as the next lesson is normally the next step in learning. However, it is essential that marking picks up and addresses any misconceptions/mistakes which are addressed either in the next lesson or in a same-day intervention through thorough questioning or small group discussion. This should be evidenced in the feedback sheets.

Where possible, the checking or marking of work will be done with ('live marking') or by the child who will be given the opportunity to ask questions and self-correct. (age appropriate)

Assessment opportunities are built into the planning of lessons and a range of other methods are used as appropriate.

- Formal assessments, 3 times a year following the PiXL timetable.
- Self-assessments and peer assessments by the children
- Listening to what children say and questioning them to ascertain their level of understanding

All this leads to informed decisions being made about the mathematical ability of children in relation to national expectations.

Standard Assessment Tests (SATs) are used for children in Year 2 and 6. Children in Year 4 are also required to take a multiplication tables check (MTC) in the Summer Term. The purpose of the check is to determine whether pupils can fluently recall their times tables up to 12, which is essential for future success in mathematics.

A whole school tracking system is used to closely monitor children's progress throughout the school and teacher assessments are entered termly.

### Impact

Our school aims to establish that:

1. Everyone can learn mathematics to the highest levels.
2. If you 'can't do it', you 'can't do it yet'.
3. Mistakes are valuable.
4. Questions are important.
5. Mathematics is about creativity and problem solving.
6. Mathematics is about making connections and communicating what we think.
7. Depth is much more important than speed.
8. Maths lessons are about learning, not performing.

### Monitoring and Review

The maths subject team has the responsibility of implementing this policy through monitoring the standards of children's work and the quality of maths teaching across all year groups at Lutton St. Nicholas Primary Academy. High quality teaching across the school will be ensured through the support provided by the Maths Lead and Senior Leadership Team. The Maths Lead has allocated time to allow for visits to classes to observe maths lessons, support staff in the delivery of maths and the reviewing of children's work.

Agreed by Staff: February 2023

Approved by Governors: July 2023

Review Date: July 2024