



# Maths at Stuart Road Primary Academy

April, 2020

In March 2020, Stuart Road Primary Academy began transitioning towards a mastery approach to the teaching and learning of mathematics. We understood that this would be a gradual process and take a couple of years to embed. The rationale behind changing our approach to teaching mathematics lay within the research of Guskey (2009) and Skemp (1976), the Mathematics Specialist Teacher Programme, the NCETM/Maths Hub led Mastery Specialist 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.’

## 5 Big Ideas

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. A focus on **Representation and Structure** ensures concepts are explored using concrete, pictorial and abstract representations, the children actively look for patterns as well as specialise 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 and there remains an emphasis on Fluency with a relentless focus on number and times table facts.

## Teaching Principles

1. Teachers believe in the importance of mathematics and that the vast majority of children can succeed in learning mathematics in line with national expectations.
2. The whole class is taught mathematics together, with no differentiation by acceleration to new content. We do not group children by ability. The learning needs of individuals are addressed through careful scaffolding, questioning and appropriate rapid intervention where necessary, to provide the appropriate support and challenge.
3. The reasoning behind mathematical processes is emphasized. Teacher/pupil interaction explores how answers were obtained as well as why the method worked and what might be the most efficient strategy.
4. Precise mathematical language, often couched in full sentences, is used by teachers so that mathematical ideas are conveyed with clarity and precision. We value 'mathematical talk' and children get lots of opportunity to talk about and evaluate their mathematics during lessons.
5. Conceptual variation and procedural variation are used extensively throughout teaching. This helps to present the mathematics in ways that promote deep, sustainable learning.
  - 5a. Conceptual variation is where the concept is varied and there is intelligent practice. Positive variation is showing what the concept is, and negative variation is showing what the concept isn't. This clears away misconceptions at the very start. Within positive variation, both standard and non-standard representations are shown.

5 b. Procedural variation is where different procedures and/or representations are used to bring about understanding. For example, teachers may collect several solutions for a problem (some right, some wrong) before guiding the class towards the most efficient method. It also involves highlighting the essential features of a concept or idea through varying the non-essential features. Variation is not the same as variety - careful attention needs to be paid to what aspects are being varied (and what is not being varied) and for what purpose.

6. Sufficient time is spent on key concepts to ensure learning is well developed and deeply embedded before moving on.

### Features of Lesson Design

1. Lessons are short but intense; teacher input usually lasts around 30 minutes giving ample time for independent practice whilst the teacher delivers rapid intervention should somebody require it. Independent practice includes reasoning, problem solving and higher-order thinking activities.

2. Each lesson is sharply focused on one clear small step which all children are expected to master; extension activities enable those children who grasp the objective rapidly to extend their learning by exploring it at greater depth.

3. Each lesson includes elements of: fluency, to practise skills; reasoning, to deepen understanding; and problem solving, to apply skills

4. 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.

5. The use of high quality materials (White Rose Maths) and tasks (NRICH, NCETM Mastery Assessment materials) to support learning and provide access to the mathematics is integrated into lessons. Teachers use the White Rose Mastery planning and other resources to draw up medium term plans for each term, and a

small step lesson power point is produced to incorporate the above elements

5. There is regular interchange between concrete/contextual ideas and their abstract/symbolic representation.

6. Making comparisons is an important form of developing deep knowledge. The questions "What's the same, what's different?" are often used to draw attention to essential features of concepts. What is a triangle? What it isn't... What it is...

7. Teacher-led discussion is 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. This forms part of the mastery learning instructional process.

### **Resources and Displays**

Each classroom will be resourced with materials to support the delivery of Maths; such items might include: number lines, multiplication tables, 100 squares, 2D and 3D shapes, multilink cubes, dice and other smaller items.

Larger materials such as scales, trundle wheels and measuring cylinders will be held centrally in the store cupboard.

Children should be encouraged to use whatever resources are available to them in the classroom and which they feel would be beneficial to help them when completing Maths work.

Each classroom should have a display dedicated to Maths. Key vocabulary and stem sentences are to be included on the Maths learning wall.

## *Classroom Norms to Establish*

- 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.*

## *Marking*

*Marking of children's work is essential to ensure they make further progress. Work is marked against the small step, in line with the school marking policy. Children are encouraged to self-assess their work and given time to read teachers' comments and make corrections or improvements. Responses to marking are made as close to the work as possible, ideally during the lesson or at the start of the next lesson. Some pieces of work in mathematics can be marked by children themselves, exercises involving routine practice with support and guidance from the teacher - particularly in years 5 & 6.*

## *Assessment*

*Across a range of lessons children should be allowed to engage in mathematical discussion (talk partner or group work), investigations, problem solving, practical experiences and written methods, as well as allowing for time to demonstrate their understanding through response marking. In order to inform planning and to assess children's progress, teachers will maintain an assessment grid which tracks the children's progress and understanding across a range of assessment criteria objectives. This will be updated regularly and informed by work in children's books. Termly, children will be assessed through the application*

of tests; this summative assessment will be used in conjunction with the assessment grids to identify next steps and therefore inform planning. Children will be provided with feedback either verbally or through written marking. Often, in order to clarify understanding of a concept, children will be set a challenge question/ task, but not for every lesson; these should be completed by the children at the next earliest opportunity after the lesson. When marking work teachers should adhere to the school's Marking Policy.

### **Inclusion**

Teaching maths for mastery is different because it offers all pupils access to the full maths curriculum. 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.

## *Parental Involvement*

*AT SCHOOL, 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 a booklet with current targets, an interim report and a yearly report outlining their child's achievements.*
- Holding workshops for parents or family days twice or three times a year.*
- Organising Maths Days e.g. Maths Number Day where parents are invited to take part*
- Organising maths drop in sessions where parents are invited to work alongside their children in maths*
- Sending home learning activities to be completed by or with their child.*

## *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.*