



Kensington Community Primary School's

Mathematics Policy

2020-2021

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.

The current National curriculum document says:

'The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. 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, this may be through additional practice, before moving on.' (National curriculum page 3)

The national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practise with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- **Reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using **mathematical language**
- Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.'

At Kensington Primary School we feel the best way to achieve the aims set out by the National Curriculum is through adopting a Mastery approach. We have used the White Rose Maths Scheme of Work as a guide to create personalised medium- and long-term planning, which timetables mathematical units. They are explored progressively, drawing on resources, data and suggestions from reliable sources such as NCETM and nrich.co.uk to link mathematical talk and knowledge across the various units.

When planning for objective coverage, teachers are expected to take the following mastery strategies into account:

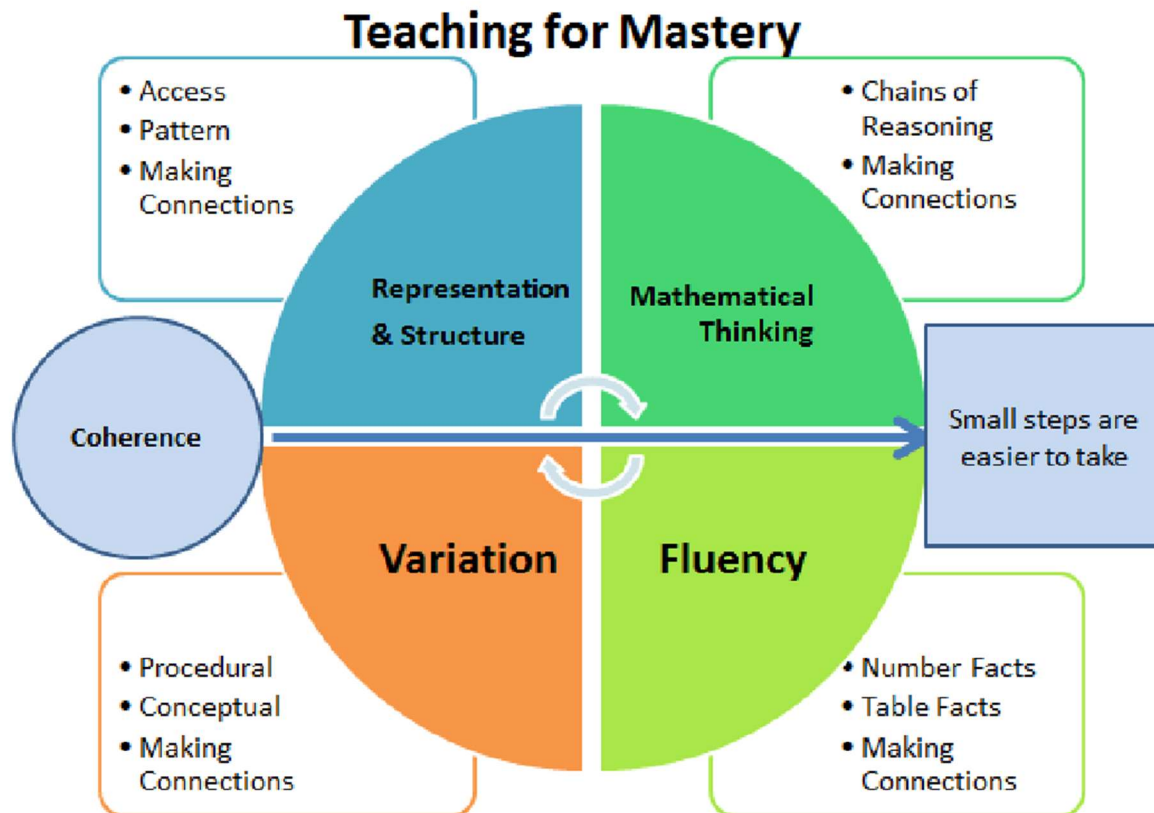
- Small steps
- Ping pong style of delivery
- Implementing the Concrete, Pictorial and Abstract (CPA) approach to introduce, explore and apply mathematical concepts
- Applying/using the Bar Model approach as an imbedded strategy, which is developed upon each year.
- Considering key questions and mathematical vocabulary at the point of unit planning
- Multiple opportunities for verbal and written/drawn reasoning (explaining and using mathematical vocabulary to explain methods or reasoning)
- Inclusion of relevant problem-solving opportunities, where children are expected to draw on and apply multiple concepts to address or approach a challenge
- Modelling of all skills and approaches
- Modelling and sharing of efficient and accurate application of methods
- Opportunities to explore maths concepts/objectives at 'greater depth'
- Include all learners, providing relevant support for those with additional needs (educational, medical or otherwise)
- To promote smaller group learning opportunities whenever possible and appropriate

Teachers are expected to audit their subject knowledge of Maths; complete training for understanding and implementing the Bar Model strategy; research application of the CPA approach for the teaching concepts and consistently identify and address (with SLT or peers) areas for development by creating a route to become confident in this particular subject area.

The Mastery Approach – The Principles

Mastering maths means acquiring a deep, long-term, secure and adaptable understanding of the subject. At any one point in a pupil's journey through school, achieving mastery is taken to mean acquiring a solid enough understanding of the maths that's been taught to enable him/her move on to more advanced material.

A central component to Mastery is the Five Big Ideas



The Five Big Ideas

Coherence

Connecting new ideas to concepts that have already been understood, and ensuring that, once understood and mastered, new ideas are used again in next steps of learning- all steps being small steps.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught. These representations are practical and pictorial models. The aim being that students can do the maths without recourse to the representation.

Mathematical Thinking

If maths concepts 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 and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics. Procedural fluency is the ability to apply

procedures accurately, efficiently, and flexibly; to transfer procedures to different problems and contexts; to build or modify procedures from other procedures; and to recognize when one strategy or procedure is more appropriate to apply than another.

Variation

Varying the way a concept is initially presented to students, by giving examples that display a concept as well as those that do not display it. Also, carefully varying practice questions so that mechanical repetition is avoided, and thinking is encouraged.

Imbedding a positive mindset towards mathematics

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. Mathematics lessons are about learning, not performing.

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.

Curriculum design and planning

- Staff use the school's medium-term and long-term plans as a starting point to develop a coherent and comprehensive conceptual pathway. The focus is on the whole class progressing together. Collaborative planning with year group colleagues is encouraged to ensure consistency.
- Learning is broken down into small, connected steps, building from what pupils already know. The lesson journey should be detailed and evident on flipcharts (Smart Notebook or PowerPoint) as there is no requirement for teachers to produce detailed paper plans.
- 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.
- The use of high-quality materials and tasks to support learning and provide access to the mathematics, is integrated into lessons. These may include White Rose Maths Schemes of Learning and Assessment Materials, NCETM Mastery Assessment materials, 'I see reasoning/problem solving' resources, NRICH, visual images and concrete resources.
- Opportunities for extra fluency practice (instant recall of key facts, such as number bonds, times tables, division facts, addition and subtraction facts) should be provided outside mathematics lessons (morning starters or post-lunch).
- Weekly assertive mentoring lessons delivered to develop fluency across all areas of maths. Lessons follow a structure of independent work, collective marking and teacher led learning on key misconceptions. In Key Stage 1, assertive mentoring sessions may be completed as a focus group or by adapting the template of the sheets. Intervention must be implemented for children who are not making sufficient progress. For children working below the age-related expectations, opportunities to accelerate them onto the next stage should be taken once their score is consistently in the high yellow / green bracket.

Lesson Structure

- 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. 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 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, 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.

Marking

Marking of maths books should meet the outlined criteria in the Kensington marking policy. This should include appropriate modelling of misconceptions and weekly quality marks to offer opportunities to deepen the children's understanding.

Assessment and Record Keeping

In addition to the formative assessment undertaken in lessons, teachers will use termly summative assessments supplied by the Assertive Mentoring materials and Rising Star assessments. Arithmetic and assertive mentoring records are saved on the google drive folder. Teacher assessments are submitted on a half-termly basis and reviewed during termly pupil progress meetings with the headteacher, SEN lead, Key Stage lead and year group colleagues.

Exercise books for recording

It is school policy that the following is used:

EYFS:	Floor books and individual profiles
Key Stage 1:	1cm squares
Year 3:	Transition to 7mm squares
KS2:	7mm squares

Requirements:

- A 2 square margin
- Children place the date in numerals in the top left-hand corner of the page or below the last ruled off piece of work. E.g. 1/10/20.
- A clear learning intention for each piece of work.
- Both the title and date are underlined with a ruler and pencil.
- Rubbers are discouraged when completing number work, children should cross out work with one or two straight lines, allowing the teacher to analyse the errors when marking.
- Rubbers are appropriate when working on shape/space work.
- Quality marks shown using a green highlighter and marked after they have been attempted.
- An additional quality mark is required for every third arithmetic paper.

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.

Impact

The exploration of mathematics should be interactive and engaging, with content made relevant to children's real-world experiences and contextualised thus to support consolidation and retainment of knowledge and skill.

Children should approach mathematical study with confidence and enthusiasm, and view tasks and challenges that call for application of varied knowledge across units of work and the selection of multiple skills with self-assuredly and a willingness to collaborate.

Approach and response to reasoning activities should improve term on term, with the expectation that by the end of the year, children are happy to accurately define and use mathematical vocabulary introduced by their teacher, as well as complete stem sentences to complete mathematical statements or reasoning.

Teaching and support staff should also see this period of implementation as an opportunity to highlight and further improve concepts that are received well and have clear impact on progress and learning, while also analysing and evaluating practice that needs to be addressed, reviewed or replaced.

Policy review and update

Last reviewed...September 2020

Date of next review...Summer term 2020