

Mathematics Policy

Kingsway Primary School



Mathematics Vision Statement

“Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.” National Curriculum for Maths, 2014

Mastery involves knowing how and why the mathematics works. It means being able to use mathematics knowledge in new and unfamiliar situations. Our aim is for all children to think mathematically, enabling them to reason and solve problems in a range of contexts. At Kingsway Primary School, our Mathematics Mastery curriculum has been developed to ensure every child can achieve excellence in mathematics. To support children in achieving this, we use Can Do Maths resources. These are used to both support and challenge children’s understanding, in line with the higher expectations of the National Curriculum. Our curriculum provides pupils with a deep understanding of the subject through a concrete, pictorial and abstract approach. This ensures pupils fully understand what they are learning.

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
- **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

Our definition of Mastery

Mastery is a journey and long-term goal, achieved through exploration, clarification, practise and application over time. A mathematical concept or skill has been mastered when a child can represent it in multiple ways, has the mathematical language to communicate related ideas, and can demonstrate deep understanding through rich and complex problem-solving. Mastery is not just being able to memorise key facts and procedures and to answer test questions accurately and quickly. Mastery involves knowing why, as well as knowing that and knowing how. It means being able to use one’s knowledge appropriately, flexibly and creatively and to apply it in new and unfamiliar situations. For all maths concepts, teachers need to ensure that children are “challenged through being offered rich and sophisticated problems.” After developing fluency, children need to show that they can apply their knowledge in mathematics and then move on even further to prove they have mastered the concept.

Our beliefs

Mathematics is an important creative discipline which helps us to understand and change the world. We want all pupils at Kingsway Primary School to experience the beauty, power and enjoyment of mathematics and develop a sense of curiosity about the subject. At Kingsway Primary School, we believe that ability within Mathematics is not fixed and that **all** children can achieve. We teach for secure and deep understanding of mathematical concepts, use mistakes as an essential part of learning and provide challenge through rich and sophisticated problems before acceleration through new content.

Our Mastery in Mathematics curriculum

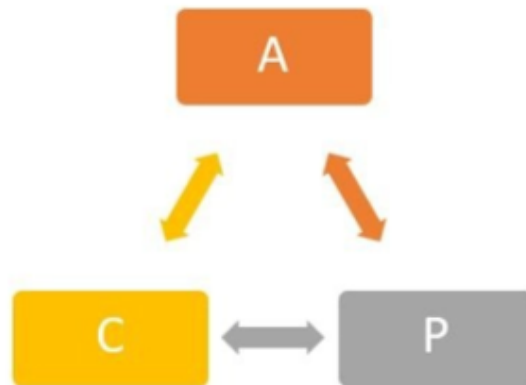
In Years 1 – 6 we have developed our curriculum to allow teachers and learners to achieve a secure and deep understanding of each mathematical concept. Our curriculum allows us to address key points individually, ensuring that children have a secure and deep understanding of those points before offering the opportunity to 'go deeper' within them. Children are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols. Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience. Our EYFS provision is based around Development Matters 2021 and provision has been paced from the beginning of nursery until the end of reception to give children the best opportunities to achieve the Early Learning Goals. In reception, the Mastering Number Programme is being followed to ensure all children a solid foundation in number which will underpin future learning. Children have many opportunities to consolidate and extend this learning through their daily continuous provision activities.

Mastery teaching and learning

All the Mathematics teaching at Kingsway Primary School is underpinned by some key ideas and documents:

1. All children can achieve – everyone can learn maths at a high level and mistakes are valuable and celebrated
2. Calculation Policy – to ensure clear progression of strategies and consistent use of mathematical language
3. Use of concrete apparatus, pictorial models and abstract calculation (CPA) - not as a continuum but a cycle
4. Maths Meeting – a session during the school day to practise key skills, check understanding prior to new learning or recap on current learning

Abstract is the 'symbolic' stage, where children are able to use abstract symbols to model and solve maths problems.

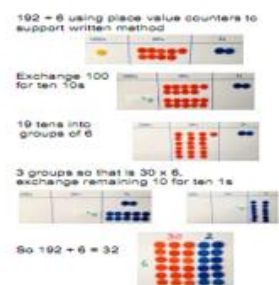


Concrete is the 'doing' stage, using concrete objects to solve problems. It brings concepts to life by allowing children to handle physical objects themselves.

Pictorial is the 'seeing' stage, using representations of the objects involved in maths problems. This stage encourages children to make a mental connection between the physical object and abstract levels of understanding, by drawing or looking at pictures, circles, diagrams or models which represent the objects on the problem.



Examples of concrete learning from math calculation policy.



Grid method linked to formal written method

x	200	40	3	
30	6000	1200	90	= 7290
6	1200	240	18	= 1458 +
				8748

If I know 4×6 then 0.4×6 is ten times smaller
 0.4×0.6 is ten times smaller again.



The Mastery Mathematics Lesson

The Mastery Mathematics lesson lasts for 45 minutes and follows the pattern: Teach it -> Do it -> Secure it -> Deepen it. All children* are included during the 'Teach it' and there is plenty of opportunity for partner talk and the use of probing questions. The children will then move to a short 'Do it' task that allows them to demonstrate their understanding of the key learning point. The 'Secure it' task will further develop the children's understanding. Finally, there is a 'Deepen it' task where the children will apply their understanding of the key learning point. Flexible seating in Mathematics lessons allows opportunities for the children will work with a variety of partners.

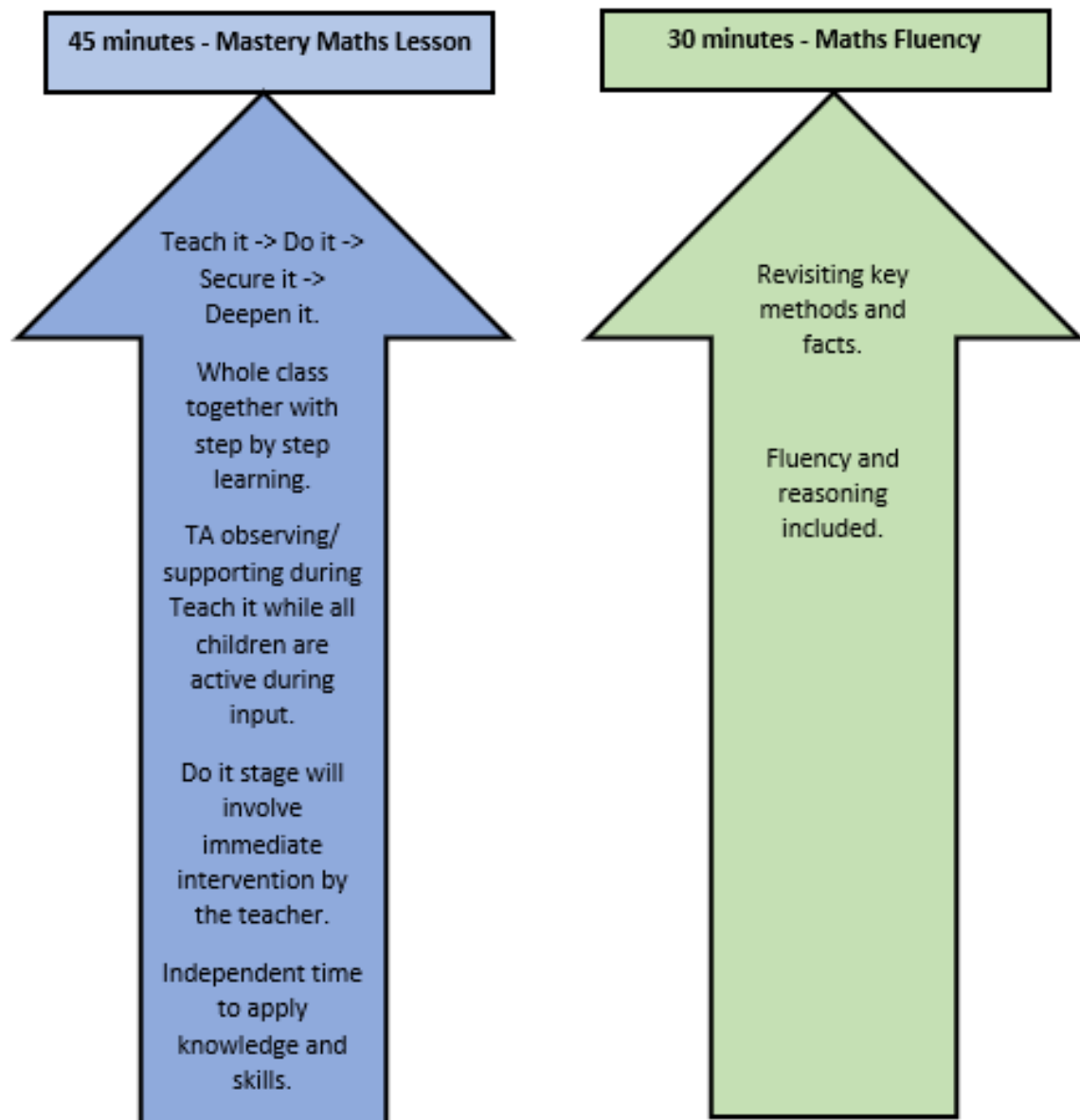
*(Where children's education needs dictate that inclusion in this part of the lessons would be entirely inappropriate, alternative methods that provide rich, inclusive and meaningful experiences to the child will be used. In such instances, a progressive and coherent curriculum model will be adopted that is tailored and ambitious.)

Mastery Mathematics lessons routinely include:

- Quality first teaching; tailored to meet the needs of the learners in each class
- Whole class learning together which provides a structured, conceptual journey through the mathematics, engaging pupils in reasoning and the development of mathematical thinking
- High-quality questioning to explore children's understanding and develop it further
- Explicit use of misconceptions and mistakes to further understanding of key concepts
- Learners exploring key concepts using a range of methods, for example concrete – pictorial – abstract representations of Mathematical concepts
- Immediate teacher-led intervention to address gaps in learning where necessary
- 'Rapid graspers' moving on to stretch their understanding and 'go deeper' by solving rich and complex problems while others consolidate their knowledge of the key concept
- Learners demonstrating a positive attitude towards Mathematics

Maths Fluency

A maths fluency session, typically between 20 and 30 minutes depending on age and focus, will take place later in the day. This will involve deliberate practice of key skills. Areas of focus typically include: practice of arithmetic, such as addition calculation, looking back at the previous weeks' learning, looking forward to the next maths topic, practice of fluency skills such as times tables or problem solving. Maths fluency sessions are not typically differentiated and subscribe to the view that 'practice makes proficient'. Teachers may occasionally use maths fluency sessions to work with individuals and groups to enable them to 'keep up' with the curriculum.



Calculation policy

We have a policy for progression in calculations methods. Our policy also links in with our concrete, pictorial and abstract approach and the bar model.

Differentiation and support

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, including through additional practice, before moving on. (National curriculum 2014)

At Kingsway Primary School, we follow a mastery curriculum and in line with the National Curriculum document ensure that most children move at broadly the same pace. However, there can still be a wide range of attainment in the class. We aim to:

- Establish a classroom climate where all pupils feel that they can contribute, and which secures their motivation and concentration
- Adopt teaching and organisational strategies to keep all pupils suitably challenged, while giving them maximum opportunity to interact with their teacher through providing rich and sophisticated problems which enables them to truly master the concept
- Provide appropriate support, aids or interventions to give particular pupils access to the planned programme and to keep any who might fall behind in step with the rest of their class

Examples of strategies include:

- Questioning – targeting individuals or groups, open questions, encouraging pupils to explain strategies and methods to each other
- Teaching focused at times on individuals/groups while others work independently
- Providing resources to support or extend pupils
- Open-ended tasks – investigations, problems

SEND Pupils

All teachers are teachers of SEND. Through high quality first teaching and the support of teaching partners, all children, irrespective of their needs, will receive high quality teaching of mathematics and support to achieve their full potential. Teachers, with support from the Special Educational Needs Coordinator and other agencies if necessary, will seek to understand any barriers to learning that may exist when a child's progress is significantly less than could be typically expected. From this detailed knowledge, children with SEND will receive support that is targeted to maximise their progress. Teachers make use of the Maths SEND support checklist when planning tasks for children with SEND and need in maths, these may include scaffolding tasks, longer use of manipulatives and the use of I G S to show the level of support with whole class work. Children with SEND and need in maths who are working more than two years below their age will be accessing out of year group curriculum.

Interventions

Interventions take two general forms:

- 1) Rapid response interventions that quickly support misunderstanding identified in learning that day or week. Spare moments in the day are used to help children keep up not catch up.
- 2) More bespoke and long term interventions will be used to close gaps or address more established misconceptions in learning through a frequent, intensive and timed intervention programme that is most suited to addressing the specific need of the child.

When children are involved in interventions, teachers are mindful of ensuring balanced provision across all subjects as well as the child's emotional engagement with learning.

Maths interventions at Kingsway Primary:

- Plus One
- Plus Two
- 5 Minute Box
- Number Stacks
- Scoop groups

Tracking attainment and progress

Formative assessment during the lesson and the children's books are the key tools for tracking attainment on a day to day basis. Teachers will use these to decide when their class are ready to move onto the next key learning point, or if individuals are ready to deepen their knowledge within each key learning point. At the end of each half term, teachers use a summative assessment – Remember It – to assess learning and further inform next steps. The data is recorded on a spreadsheet which allows teachers to monitor the progress of individuals and key groups within the class. This data is also used to inform future planning of mastery lessons and content of maths meetings. Subject leaders use this information as well as other high level data from national tests and PUMA tests to evaluate the impact of the school's curriculum and recommend developments to the Headteacher.

Mastery Leadership

Kingsway Primary School have a clear vision for the teaching and learning of Mathematics. The Mathematics Subject Leaders have led the implementation of the mastery approach, supported by the Leadership Team. Regular staff meetings slots ensure that developments, ideas and support in this approach are shared. Teaching and learning in Mathematics is closely monitored throughout the academic year through observations, work scrutiny and discussions with staff, parents and pupils. As a school, we value the direct connection between high quality pupil outcomes and teacher expertise. We take every opportunity to participate in local training to develop our expertise further and ensure that practice is in line with national guidance.

Homework

At Kingsway, we have a strong commitment to parental involvement and view homework as a way of developing the partnership between home and school. We recommend that children in Key Stage 1 complete at least half an hour of homework per week, which will include a fortnightly maths task. This task will be linked to classroom learning either to increase a specific area of knowledge or to develop fluency in a particular area. We recommend children in Key Stage 2 complete at least half an hour of homework each day. Homework will include a fortnightly maths task. This task will be linked to classroom learning either to increase a specific area of knowledge or to develop fluency in a particular area, for example times tables. Children also have access to Numbots in Year 2 and Times Tables Rock Stars in Key Stage 2.

Problem Solving

At Kingsway Primary School, we ensure that every lesson has an element of problem solving so that children can apply their understanding. The key problem solving skills are:

- Trial and error
- Trial by improvement
- Working systematically
- Working backwards
- Pattern spotting
- Visualising
- Conjecturing

Maths in the EYFS

Maths provision in the EYFS is guided by Development Matters and has been mapped out onto our own pacing document which gives children the best opportunity to reach the early learning goals in mathematics. In the earliest stages of the nursery (Ducklings), children are exposed to a range of rhymes and stories to support their early mathematical understanding alongside a range of continuous provision activities where children can gain concrete understanding of concepts. Once children move into their pre-school year, group time teaching is used to introduce key concepts alongside continuous provision to ensure that all children are given the best chances to keep track of the curriculum. Once children reach reception, the Mastering Number Programme is used for daily mathematics lessons. This is a research based programme designed to ensure that all children are systematically given opportunities to effectively count, subitise, compare and understand the composition of numbers to 10 underpinning future learning. Children in reception continue to have access to a range of continuous provision activities throughout the day where they can consolidate and extend their learning; this provision is adapted throughout the year to ensure that it supports current areas of mathematics.

Use of ICT

Calculators should not be used as a substitute for good written and mental arithmetic and should only be used near the end of key stage 2 to support pupils' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure (National Curriculum 2014). Class teachers should use their own judgment on when to use ICT to enhance the learning of mathematics. Class teachers use Mathsbot to display and model with interactive manipulatives, including the rekenrek. We use Numbots and Times Table Rock Stars to promote the use of fluency with number facts and times tables.

Spoken language

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. Pupils at Kingsway are assisted in making their thinking clear to themselves as well as others. Pupils use the key vocabulary displayed in the classroom to help them explain and reason. Teachers ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions, encouraging pupils to talk with a partner or triad. Children are taught stem sentences to support their thinking and reasoning in mathematics and are encouraged to use help words and key vocabulary to extend their mathematical thinking.

Maths across the curriculum

Staff are encouraged to develop the children's maths knowledge and skills and use these when developing topic tasks across the curriculum. Cyclical development maths to support other areas: drawing graphs then linking to science; tally charts and pie charts fitting into other curriculum areas.