Mathematics 2022/23

Intent

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. Crucially, a sound knowledge of mathematics is **vital** for young people seeking employment, and securing a qualification in mathematics is a fundamental requirement for the majority of employers.

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.

In line with the National Curriculum Objectives for Mathematics, our intent is that all pupils:

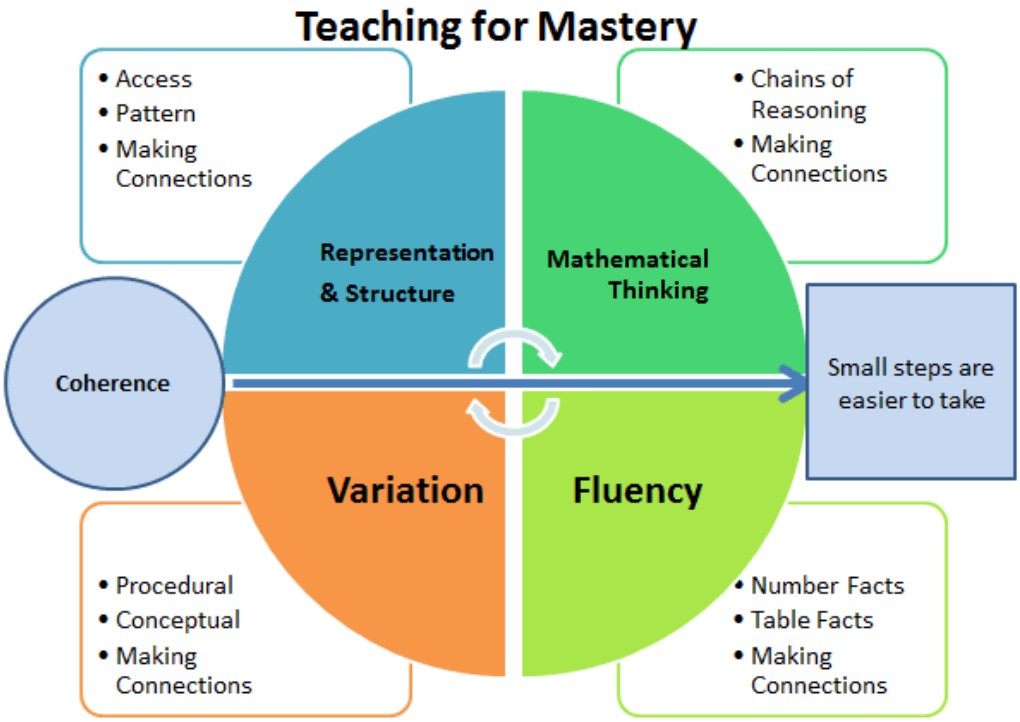
- become **fluent** in the fundamentals of mathematics, including through **varied and frequent** practice with increasingly complex problems over time, so that pupils **develop conceptual understanding** and the ability to **recall and apply** knowledge **rapidly and accurately**

- ***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*

Mathematics is an interconnected subject in which pupils need to be able to move ***fluently*** *between* ***representations*** *of mathematical ideas. Pupils should make* ***rich connections*** *across mathematical ideas to develop* ***fluency, mathematical reasoning*** *and competence in* ***solving increasingly sophisticated problems****. They should also* ***apply*** *their mathematical knowledge to the wider curriculum.*

Central to our approach are the ***5 Big Ideas*** *which underpin mastery in mathematics.*

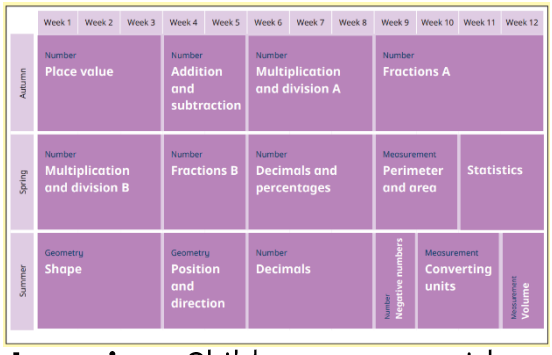


Our intent (in Maths) at Beckers Green is to encourage all children to become independent thinkers and learners in their maths knowledge and understanding. We aim to give every child equal opportunities to become successful and have

the expectation that all children make positive progress throughout their time at Beckers Green, irrelevant of their starting points. We encourage all teachers to be creative in their lesson planning and delivery and to adapt their daily challenges based on the ability and needs of the children in their class. Mastery is at the heart of our curriculum as we believe that through reinforcement and deeper learning every child has the ability and opportunities to be successful in maths. Planning and delivery of the maths curriculum must be ambitious, but also be tailored to all learning styles and needs. Children with additional learning needs are scaffolded and supported with intelligent practice which enables them to reach the high standards which are expected.

Implementation

At Beckers Green, children study mathematics daily following the **White Rose Maths** Scheme of Learning. WRM is a blocked scheme, which allows for depth and breadth of learning within each strand of mathematics.



- **Concrete, Pictorial and Abstract Learning:** Children engage with a wide and varied range of concrete manipulatives, pictorial representations and abstract methodologies within each session. **Cohesive** use of CPA is a fundamental part of mastery in mathematics for all learners, not just those pupils with SEND. Concrete and pictorial references scaffold and strengthen understanding and are widely used as a teaching and learning tool from Foundation Stage to Year 6.

- **Fluency, Reasoning and Problem Solving:** Every learning session includes the opportunity to develop fluency skills, construct chains of reasoning using relevant knowledge alongside relevant terminology and solve increasingly complex problems in a systematic and coherent way.
- **Interleaved Learning:** WRM is a blocked learning scheme and as a consequence certain strands of maths are not covered until later in the term. To ensure frequent timely introduction and revisiting of concepts, we plan and deliver interleaved learning sessions as part of our Daily Maths Meetings through the use of 'flashback 4s'
- **Fluent Recall:** We are committed to ensuring that pupils secure their knowledge of Times Tables and Related Divisional Facts by the end of Year 4. Our pupils engage in regular low stakes testing through Times Tables Rock Stars and arithmetic practice questions to embed fluent recall.

We encourage children to become independent thinkers and learners through the use of choose and challenge each day. Children will experience 5 stages of each maths lesson: explore, model, shared practise, independent practise and reflect and challenge. During the 'explore' stage of learning children are given time to discuss, reason, make connections and prove their learning through open ended/discussion-based questions related to their learning. The teacher will then 'model' the learning before 'shared practise' where children will work through examples together (in their book) to refer back to later to help them during their 'independent practise'. During the 'independent practise', children will have the choice of 'ready and steady' challenges which will focus on fluency/varied fluency (most days). Children also have the option of starting on 'warm up' if they need further support. Following 'independent practise', the class will move onto the 'reflect and challenge' section of the lesson where the whole class will attempt problem solving/reasoning with the teacher modelling before moving onto 'go and turbo' to practise this independently. Therefore, the children gain confidence in the process they are learning and through continual reinforcement the learning will be embedded and reach the long-term memory. The use of metacognition in maths is also a driving force to encourage children to become independent thinkers, each day they have to explain their level of understanding at different points throughout the lesson (First, Before and After stage) and then explain how they will further develop their understanding to make progress and be successful. Where possible, we aim to link new knowledge to existing knowledge they have previously acquired.

In EYFS we have adopted to take part in the 'NCETM - Mastering number' project (also KS1 as an intervention). This new initiative which has been rolled out in many schools in 2021 has the aim for the children to develop a greater understanding of number and their 'number sense'. This will then enable the children to have solid foundations of number before moving into KS1. At Beckers, we have a strong focus on the idea that ALL children can be successful and therefore, no matter their starting ability, all children are expected to make good progress quickly. The use of White Rose is also used alongside the NCETM materials through specific 'Maths lessons' which are taught on a 10-15 minute basis each day, these will encompass all of the national curriculum early learning goals throughout the year:

- ELG Number Focus:
    - numbers to 10 – including composition of each number
    - Subitise up to 5
    - Fluent recall of bonds to 5, extending to bonds to 10 and doubling facts
- ELG Numerical Patterns:
    - Verbally count beyond 20 and express understanding of patterns in the counting system
    - Compare quantities up 10 10 in a range of contexts, recognising greater than, less than or the same
    - Explore and represent patterns within numbers up to 10 – including even, odd, double and how quantities are distributed equally (the building blocks of division)

Our setting provides the opportunity for children to develop a deep and sustained understanding of numbers to 10, with a focus on the relationships between numbers within the sequence, and the patterns within those numbers. We provide frequent and varied opportunities for children to explore number and apply understanding of the structure of those numbers through use of concrete manipulatives – from real world objects to scaffolded tens frames. In

line with our school-wide philosophy, our setting also provides the opportunity for children to practice, use and apply mathematical knowledge with accurate age and stage vocabulary. Alongside out daily maths lessons children take part in 'Number Ninja' each day. This is another 10 minute 'lesson' which focusses on a different number each week. During this, the children will focus mainly on concrete learning and building the oracy through counting and sentence building when answering. As the year progresses, maths lessons become more formalised to prepare children for a more formal approach when entering KS1. Throughout EYFS, the class has a whole class 'learning journal' wich documents the learning throughout each day. Although EYFS do not adopt the 'choose and challenge' approach to maths, towards the summer term they will have different 'challenges' present which the children will be guided to, forming the basis of choose and challenge which will take place in ks1.

Impact

At Beckers Green, the expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. We aim for each child to be confident in each yearly objective and develop their ability to use this knowledge to develop a greater depth understanding to solve varied fluency problems as well as problem solving and reasoning questions.

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 are challenged through rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material consolidate their understanding, including through additional practice, before moving on. Where necessary, earlier material should consolidate their understanding, including through additional practice, before moving on.

Formative Assessment: *Teachers carry out formative assessment through AfL in each session and feedback is given to children verbally, through self/peer assessment and through marking. Teachers then use this assessment to influence their planning. Children are rapidly identified as needing further challenge or additional support, and we ensure that this is provided in a timely manner.*

Timely Interventions: *Teachers believe that all children can achieve in maths, through quality first whole class teaching. Where* ***prerequisites*** *are not secure, timely interventions will be carried out. We understand that catch-up*

does not work, and as a consequence our interventions are focused on **Same Day Interventions** and **pre-teaching** if required.

Low Stakes Quizzing and Fluent Recall: We use a range of low stakes testing throughout the teaching cycle to assess attainment and progress. From Year 1 to Year 6, children complete regular tests in Arithmetic and Times Tables.

Termly, each year (except foundation stage) will complete '**Cornerstones/Curriculum Maestro**' tests which assesses all areas taught so far. Through gap analysis, this will give the teachers an understanding of which areas the children are secure in and which areas need further development before children become secure. At Beckers, we then correlate this data with target tracker teacher assessments and expect every child to make 6 steps within a year. Our current focus, after analysing data/planning/drop ins, is for each class to make sure they are challenging the higher ability children through the use of Go and Turbo challenges, keeping the learning within their year, but delving deeper. With this, we also found the need to cement the knowledge through fluency tasks before problem solving/reasoning as essential within our school. Due to all classes (year 1 – year 6) adopting a choose and challenge approach, it enables each child to be prepared for their next stage in their education as all children are becoming independent thinkers. Our results (which can be seen on our website) show how our children are: knowing more, remembering more and ultimately able to do more as a result of our curriculum.