



How we teach maths at Bentfield Primary School

At Bentfield, we aim to inspire children to appreciate the beauty and power of mathematics. We recognise that mathematics is a highly creative, inter-connected discipline, essential in laying down the foundations for understanding the world and developing skills for life. We have the determination that all children will become successful mathematicians during their time at our school in preparation for their next stages in education and beyond.

From an early age, children gain a sense of number and are taught key fluency facts that underpin the rest of the curriculum. By having instant recall of these facts, children can wrestle with increasingly complex problems that form rich connections between areas of the curriculum. By the end of the mathematical journey a child embarks on at Bentfield, they will have become more flexible and fluent thinkers; inquisitive and insightful questioners; attentive and deliberate observers; and resourceful and resilient problem solvers.

Maths Mastery

At Bentfield, we follow a mastery curriculum. We believe that, when teaching mathematics, it is important that lessons are broken into small steps so that all children can become confident mathematicians. We aim for every lesson to demonstrate the five key strands of mastery as defined by the NCETM:

- Coherence (Small steps are easier to take)
- Mathematical thinking (Chains of Reasoning and Making Connections)
- Representation and Structure (Access, Patterns and Making Connections)
- Variation (Procedural, Conceptual and Making Connections)
- Fluency (Number facts, Table facts and Making connections)

Teaching for mastery should enable children to reach 'expectations' for their year group. Some pupils will need to be supported to catch up with their peers and to build their confidence whilst still giving them opportunity to develop their higher order thinking skills through reasoning and problem solving. Other children will need to be supported and challenged to further develop their mathematical abilities and ensure a greater depth of understanding.

Coherence

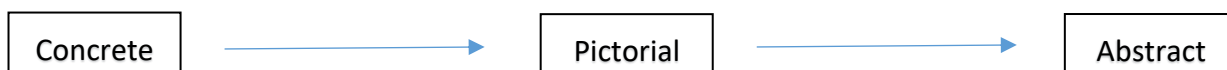
Coherence is the idea that the maths curriculum is carefully sequenced in a manner such that the learning builds upon previous knowledge and broken into small easy to manage steps. Therefore, the learning becomes easier for the children to grasp and everyone is able to achieve within a lesson. This will then lead to all children being able to move through the mathematics curriculum at roughly the same pace.

Mathematical Thinking

Mathematical thinking is ensuring that we are giving children the chance to think like mathematicians in all of our lessons. We will promote the children in verbalising their understanding of concepts and provide them with the chance to fully explain problems that they face. We will also promote our mathematicians to spot patterns and explain what they are noticing happen. This will allow them to become more efficient problem solvers.

Representation and Structure

We believe, through our mastery approach, that it is important for children to be introduced to the concrete representation of a mathematical concept using a range of manipulatives, before moving on to a pictorial representation. Once children are secure with these visual representations, they will be taught the abstract (written) method.



For a child to demonstrate mastery they should be able to explain all three representations of the mathematical concepts.

Variation

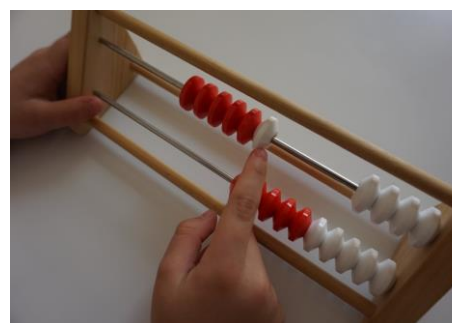
The purpose of variation is to draw closer attention to a key feature of a mathematical concept or structure through varying some elements while keeping others constant. We believe that these small changes allow children to make links in a more manageable way, and we make sure that this is done through both conceptual and procedural variation. Conceptual variation involves varying how a concept is represented to draw attention to critical features, whilst procedural variation considers how our pupils will 'proceed' through a learning sequence. We ensure that purposeful changes are made in order that pupils' attention is drawn to key features of the mathematics, scaffolding their thinking to enable them to reason logically and make connections.

Fluency

In order to be a successful mathematician, we recognise the importance of being fluent with key 'instant recall' number facts. Having a secure knowledge of these is an essential part of becoming an efficient mathematician. It means that a child can focus their entire attention on the mathematics behind a problem rather than try to calculate facts that should be instantly recalled. Examples include number bonds, addition and subtraction facts within 20 and times tables up to 12 x 12. Throughout mathematics at Bentfield, children are continually exposed to the teaching of these facts. This is done in a variety of ways:

Mastering Number Programme

Throughout EYFS and KS1, children have a ten minute daily lesson called mastering number. This is a scheme produced by the NCETM aiming to ensure that all children are fluent with number bonds and addition/subtraction facts before the end of KS1. Within these sessions, children are exposed to structures of number and taught how to manipulate these to become more flexible. Alongside other classroom maths resources, these sessions will often be taught using a Rekenrek (see picture).



Quick Maths

Throughout KS2, there is an expectation that all children take part in a ten-minute maths session on top of their regular maths lesson. This ten-minute session has a focus on developing mental arithmetic skills and key instant recall facts alongside other key facts to support learning in other areas of the maths curriculum.

Times Tables

It is vital that children are fluent with multiplication facts in order to help them solve mathematical problems accurately and confidently. The national curriculum specifies that children should be able to recall times tables facts up to 12×12 by the end of Year 4. In the summer of Year 4, schools are required to administer an online multiplication check to see whether this has been met. Consolidation for all children will happen during Years 5 and 6, as these number facts underpin a huge amount of the Year 5 and 6 curriculum.

- By the end of Year 2, we would expect all children to be fluent (answer within 5 seconds) with their 2s, 5s and 10s.
- By the end of Year 3, we would expect all children to be fluent in 3s, 4s, 8s and 6s.
- By the end of Year 4, we would expect all children to be fluent in 9s, 11s, 7s and 12s.

Children are exposed to structures of multiplication and taught multiple representations of each table. In order to practice their tables, children are expected to use our online platform, **Times Table Rockstars**. This program has been developed over many years and has in-built algorithms, which ensure that children are practising the exact number fact that they need to be practising in order to become fluent. Pupils are able to access Times Tables Rockstars at home for continued practise.

Race for Recall

Race for Recall is a programme for pupils throughout Years 1 to 6, to support them learn and instantly recall a range of number facts to improve their fluency. Pupils are allocated specific stages throughout the programme, based on their level of understanding, and will be provided with a grid of maths activities to support their learning at home. The learning of such facts will represent a pupil's maths homework, alongside any other tasks in their homework books from class teachers.

Each week, pupils will have a short (typically 1 minute and 15 seconds) test so that teachers can monitor their progress in recalling number facts for the level they are working on. Within each level, there are three progressive attainment tests (bronze, silver and gold). The underlying facts are the same, but the way in which recall is tested gets progressively more challenging. If a score of 100% is achieved pupils receive a reward sticker and advance through bronze, silver and gold (or to the next stage if gold has been achieved).

Maths Curriculum Overview

We follow the long-term structure set out by the Herts for Learning Maths Scheme of Work, which ensures a clear progression throughout our school. The yearly overviews outline which area of maths will be taught in which term and in approximately which week (please see the Bentfield Maths Curriculum document

for further information). We ensure that we spend significantly longer on number than any other concept, as we believe children who have an excellent grasp of number make better mathematicians. Spending longer mastering key topics builds a child's confidence and helps to secure their understanding. The scheme has been designed to give sufficient time for pupils to explore concepts in depth, rather than covering them superficially and then coming back to them several times. It interweaves prior content in new concepts, for example linking measurement back to calculation strategies. In addition, it clearly supports mastery through exposing pupils to conceptual and procedural variation, learning through small steps and allowing teachers to plan for their own pupils' needs.

The accompanying sequence documents from Herts for Learning break the learning into small steps, and include models and images, destination questions, suggestions for greater depth activities and speaking frames. In addition to this, teachers incorporate further questions and activities from resources such as White Rose Maths and the NCETM.

Lesson Structure

To support pupils' understanding and to ensure consistency across the school, individual maths lessons in KS1 and KS2 are taught using our school lesson structure. For new areas of learning, this will commence with a starter activity. This may recap directly relevant prior learning (often using a 'same and different' approach) or introduce a new topic by means of open discussion around a model, diagram, or representation.

Beyond this, lessons will be structured using four main parts, to allow pupils to work at their own level of understanding, becoming secure in each aspect before moving on, and having the opportunity of deepening their understanding when ready. These four parts are:

Explore

The explore section will typically include a 'ping-pong' style approach, where the teacher orchestrates a continual back-and-forth dialogue with the children, using skilfully asked questions, short tasks, explanations, demonstrations, and discussions. There will be an emphasis on the theory of conceptual variation (same concept with different representations) and an emphasis on oral use of mathematical language. Pupils will independently complete a small quantity of questions to show their initial understanding.

Practise

The practise part of the lesson will be made up of carefully chosen tasks, which have been selected to support pupils in developing their understanding further. These questions are typically based on procedural variation, allowing pupils to gain confidence in using new strategies by approaching their learning in small steps.

Apply

The apply section is designed to provide a higher level of challenge and test deeper understanding of a concept. It requires the children to call upon the skills and knowledge they have acquired and use it in unfamiliar situations, for example to solve problems or puzzles with multiple steps.

Challenge

Typically, the majority of pupils can access these questions but the open-ended nature gives opportunities for demonstrating greater depth thinking. These questions require greater reasoning skills with fuller explanations and can often have multiple outcomes.

This lesson structure is flexible and can be adapted to suit the learning requirements of the class or individual pupils (for example, the inclusion of a longer explore part of the lesson may be used at the start of a new area of learning). It also provides the opportunity for pupils to work at their own level of understanding and supports teaching staff in assessing this before allowing a pupil to move on to further sections. The latter parts of the lesson structure are for those pupils who have a secure understanding and can deepen their learning, without the expectation to move to the subsequent year's teaching programme.

Where required, in each lesson, further adaptations are made to support pupils with SEND. This may include an increased focus on basic skills and number concepts or specific interventions (highlighted on classroom support plans, one plans, or a pupil's EHCP). For our pupils with significant learning difficulties (SLD), a separate engagement model curriculum is followed. Whilst this curriculum will be different to that of their peers, teachers will always aim to make links to the current learning of the other children in the class so that all children are working on the same topic.

Assessment

Teachers and support staff are continually making informal assessments in order to plan the most effective learning, either within a lesson or for the following session, and to make sure all children have a secure understanding before moving on to the next stage. The lesson structure is key to this, with teaching staff using a range of questioning techniques, as well as analysis of the completed learning, to assess pupils. In addition to this, each lesson has a key 'hinge question' which is used mid-way through a lesson to provide an overview of understanding across the class. Responses are expected to be framed within full sentences using precise mathematical vocabulary (Herts for Learning supports the use of stem sentences which may be used to scaffold children's reasoning, vocabulary and understanding).

We encourage self-assessment and all pupils in Years 1 to 6 will reflect on their success by using three assessment trays within the classroom to evaluate their learning. Pupils will place their books in one of the trays at the end of the lesson to show whether they feel fully confident that they have met the learning objective, partly confident that they have met the learning objective, or struggled to understand the learning objective. Where a pupil has identified that they need extra support, this is then provided, where possible, before the next lesson, either through LSA or teacher guidance, or intervention sessions. To encourage this self-assessment process, we celebrate mistakes to ensure children understand that this is the way we learn and that we can overcome them together.

More formal assessments are made at the end of each block or at the end of term to track the overall progress and attainment of pupils. These are made using materials from Herts for Learning or White Rose. Results from these assessments inform the teacher of any misconceptions or areas of difficulty, which can then be addressed before moving on.