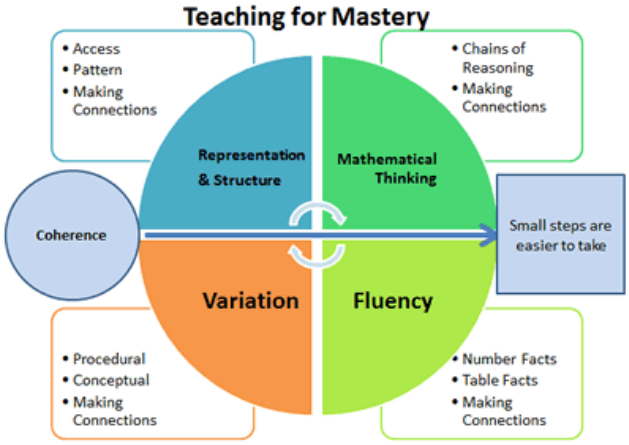
Mastery Mathematics Pedagogy at The Federation of Bishop Sutton and Stanton Drew Primary Schools

"Mastery is not just being able to memorise key facts and procedures and answer test questions accurately and quickly. It 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." – Boolean Maths Hub

The NCETM (National Centre for Excellence in the Teaching of Mathematics) have identified 'Five Big Ideas' of mastery Mathematics which are key to our teaching:



Coherence

Our long-term plan for Mathematics is designed so that knowledge is built upon unit by unit and year by year. Longer time has been designated to each topic to enable depth of understanding and sufficient practice. Sequences of lessons and the learning journey within a lesson are built on 'small steps' so that pupils can gradually build a deeper understanding of the concept or strategy they are studying. We have found that sometimes, a scheme of work's 'small steps' are 'not small enough' and have designed our own small steps according to the needs of our pupils.

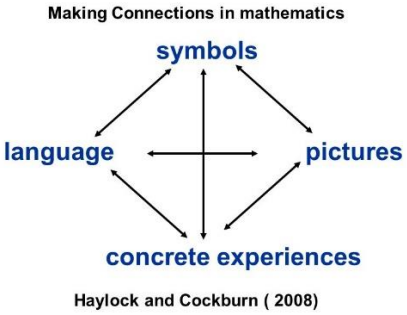
Carefully chosen representations are introduced at key points during a pupil's primary education and these are built on and developed as they move through the school. Consistent and precise use of vocabulary is encouraged and there is a clear progression in the teaching of written calculation (*please see our policies*).

We are extremely thankful to Bishop Sutton PTA and Stanton Drew Friends for funding new concrete resources for the whole federation. This has enabled all pupils to access high-quality, effective resources that are consistent in look and feel across year groups.

In the school year 2022-2023, we chosen as a federation to focus on Measurement: Time and Shape in the first two weeks of the year. This is to address gaps in knowledge and understanding following two lockdowns (and recovery). We will then continue to follow our long-term plan adapted from the White Rose Scheme 3.0 overview/ Lighthouse Schools Partnership overview.

Representation and Structure

Key representations (such as the tens frame, the number line, the 'part part whole' model and the bar model) are chosen and explored carefully in order to reveal the structure of a mathematical concept. Concrete and 'real life' examples are often used to introduce a new concept with pupils then developing their abstract mathematical thinking by moving on to pictorial examples and then abstract representations (such as formal symbols and equations).



We are mindful that the pathway from concrete to pictorial to abstract is not a one-way road however, and encourage the use of Haylock and Cockburn's 'Connections Model' as explained by one of our mastery Maths advisors, Sue Raynor – **"Good Mathematicians can Do, Talk , Draw and Write Maths."** Using concrete and pictorial examples can often be a highly effective way to extend pupils' learning by asking them to 'prove' or 'show' their reasoning using these representations.

Variation

We want pupils to understand a concept. Representations and question types used in whole class teaching and independent learning (from our White Rose scheme of work, Power Maths, NCETM or other quality resources) will encourage pupils to apply concepts to a range of different situations and explore what a concept 'is', 'also is' and what it 'is not'. We encourage verbal discussion and reasoning to aid pupils' understanding.

Mathematical Thinking

We aim for every pupil to have the opportunity to apply their mathematical knowledge in problem-solving and reasoning activities in each lesson. Verbal reasoning is expected in whole teaching and pupils will have the opportunity to problem-solve and reason independently (or in small groups) after showing they have secured the key skill.

Fluency

We want our pupils to become fluent and flexible in their application of strategies and concepts they learn in mathematics. The above 'Big Ideas' are incorporated to help this process.

We also value fluency of key number facts (such as times tables and number bonds). This is essential so that pupils do not experience 'cognitive overload' when applying strategies in context. We aim for each child to have at least four key number fact sessions a week where this key knowledge is practised. All pupils have access to the online programmes 'Times Tables Rock Stars' and 'Numbots' in school and at home.

Year Reception to Year 2 take part in regular **'Mastering Number'** sessions (an NCETM programme) to focus on fluency in cardinality, place value, addition and subtraction.

Pupils in Years 3 and 4 take part in twice-daily, short times tables practice following the NCETM-recommended **'Ashley Down Times Tables Scheme'**.

In Years 5 and 6, pupils take part in a 10-15 minute **'Quick Maths Fluency'** session at least 4 days a week. The fluency sessions are planned by class teachers and are designed to 'fill gaps' (from summative assessment), work towards the 'Ready to Progress Criteria' in the DfE document: *Guidance – Teaching Mathematics in Primary Schools* (2020) and use Retrieval Practice (Rosenshine, 2012) to recap key skills and strategies from previous terms or year groups. This has been a key strategy in helping pupils to progress quickly and fill gaps in knowledge after two Covid-19 lockdowns.

We are mindful of the transition between key stages/ year groups and now assess pupils on their recall of key facts at the beginning of the year. In Year 3, Terms 1 and 2 will focus on recapping key additive facts from the Mastering Number scheme if pupils need more support (either as a class or as an intervention group) before they start the Ashley Down Times Tables scheme. In Years 4, 5 and 6, we assess the pupil's recall of multiplicative facts and focus on improving recall in Terms 1 and 2 before moving on to our 'Quick Maths Fluency' if needed.

How do we support children who are struggling to grasp a concept?

Firstly, we keep the whole class working on the same maths topic. What is important, is that each pupil is making progress on their own 'individual learning journey'. Both summative and formative assessment is used to inform us of each child's understanding and progress. Assessment from one lesson will inform input and activities in the next. Pupils who have come to us with gaps in their understanding or are struggling to grasp a concept are supported in a number of ways:

- Adult support in whole-class teaching sessions or independent/ group work
- Carefully planned tasks to support conceptual understanding and next steps
- The use of manipulatives or pictorial representations to aid understanding
- Where possible, carefully planned interventions outside of the Maths lesson
- Targeted homework

How do we challenge children who grasp a concept rapidly?

Challenge is provided by going deeper rather than accelerating into new mathematical content. Children who have grasped a concept rapidly are given further opportunities for problem-solving and especially mathematical reasoning. Accurate use of vocabulary, concise explanations and generalising are encouraged and developed.

Where possible, 'rapid graspers' will also have the opportunity to work closely with the class teacher or teaching assistant during the week.

We remember that **"Good Mathematicians can Do, Talk, Draw and Write Maths."**

Please see 'What Does a Good Maths Lesson Look Like?' and our 'Policies Towards Written Calculation Fluency'.