# Maths Policy 2022

## Intent

At Ravensfield we have adopted a mastery approach (Appendix 1) to mathematics to enable all children to develop a deep understanding of the subject, that can be built upon as they move through the maths curriculum from Reception to Year Six. Our rationale for adopting a mastery curriculum lies within both the National Curriculum 2014 and Early Years Curriculum 2021 which state children will:

- Develop a strong grounding in number as this is essential to enable all children to develop the necessary building blocks to excel mathematically.
- Develop a secure base of knowledge and vocabulary from which mastery of mathematics is built.
- Move through the programme of study at broadly the same pace.
- Be challenged by being offered rich and sophisticated problems before any acceleration to new content.
- Consolidate their understanding including through additional practise before moving on, if not sufficiently fluent with earlier material.
- Become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that they 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.

## Implementation

Our mastery journey is supported by our collaboration with the NCETM Maths Hub. We have chosen to use the White Rose maths progression which provides a programme of carefully sequenced and connected steps including fluency, reasoning and problem-solving questions. This ensures consistency of approach throughout school. Planning and lesson delivery is cumulative. ensuring topics learnt are revisited regularly in many concepts. Post-Covid we recognise the lack of automaticity in children's number knowledge – see Appendix 2. The use of small manageable steps ensures no child experiences cognitive overload allowing children to acquire a deep, long-term, secure and adaptable understanding of the subject. When introduced to a new concept, children will have the opportunity to build competency by taking a concrete, pictorial and abstract approach (Appendix 3).

Children identified as having special education needs will have their specific needs supported within the classroom.

**Mathematics environment**

Each class will have a maths working wall and this will reflect the concept being taught, key vocabulary and stem sentence starters will be displayed as well as pictorial examples. Care will be taken to ensure that this follows the *Enabling Classrooms* document [see SEN and Teaching & Learning policies].

**Mathematical talk**

The way children speak and write about mathematics transforms their learning (Appendix 3). At Ravensfield we use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary.

**Feedback within the lesson**

Children should leave each lesson feeling successful. Purposeful feedback enables all pupils to make progress and for teachers to be able to identify any misconceptions immediately. On occasion and where appropriate, pupils should have the opportunity to self and peer mark their work but the teacher should always complete their assessment and use this to support children's progress. It is expected that children who need additional support will have misconceptions addressed the same day in preparation for the next small step to be delivered.

**Practice and retrieval**

A key part of our maths teaching is the revisiting of prior learning as can be seen by the 15 minute daily session from Year 1 upwards (Appendix 4) while in EYFS this is seen within continuous provision.

**Record of learning**

This can be seen in Floor Books in EYFS moving onto a workbooks and exercise books with appropriate sized squares depending on age and ability.

- All work will be dated and marked according to the marking policy
- Work to be recorded in pencil

**Homework**

From Year 1 children will receive a weekly piece of maths homework. We will also encourage and promote the use of the PIxl mental maths app as well as the White Rose One Minute Maths app as appropriate.

**School-wide events**

In order to further engage children in mathematics and promote a love of the subject, as a school we take part in a variety of maths events such as:

- World Maths Day
- Barvember
- Enterprise Week

**Covid response**

SLT will lead arrangements for additional tutoring supported by the Covid Catch-up programme.

## Impact

Children's mathematical journey throughout their time at Ravensfield should fully prepare them for secondary education and later life. Impact will be seen through school internal tracking, pupil voice and book scrutiny. Detailed question level analyses will be completed by class teachers to identify gaps in learning. These will be addressed using PiXL therapies or other suitable materials.

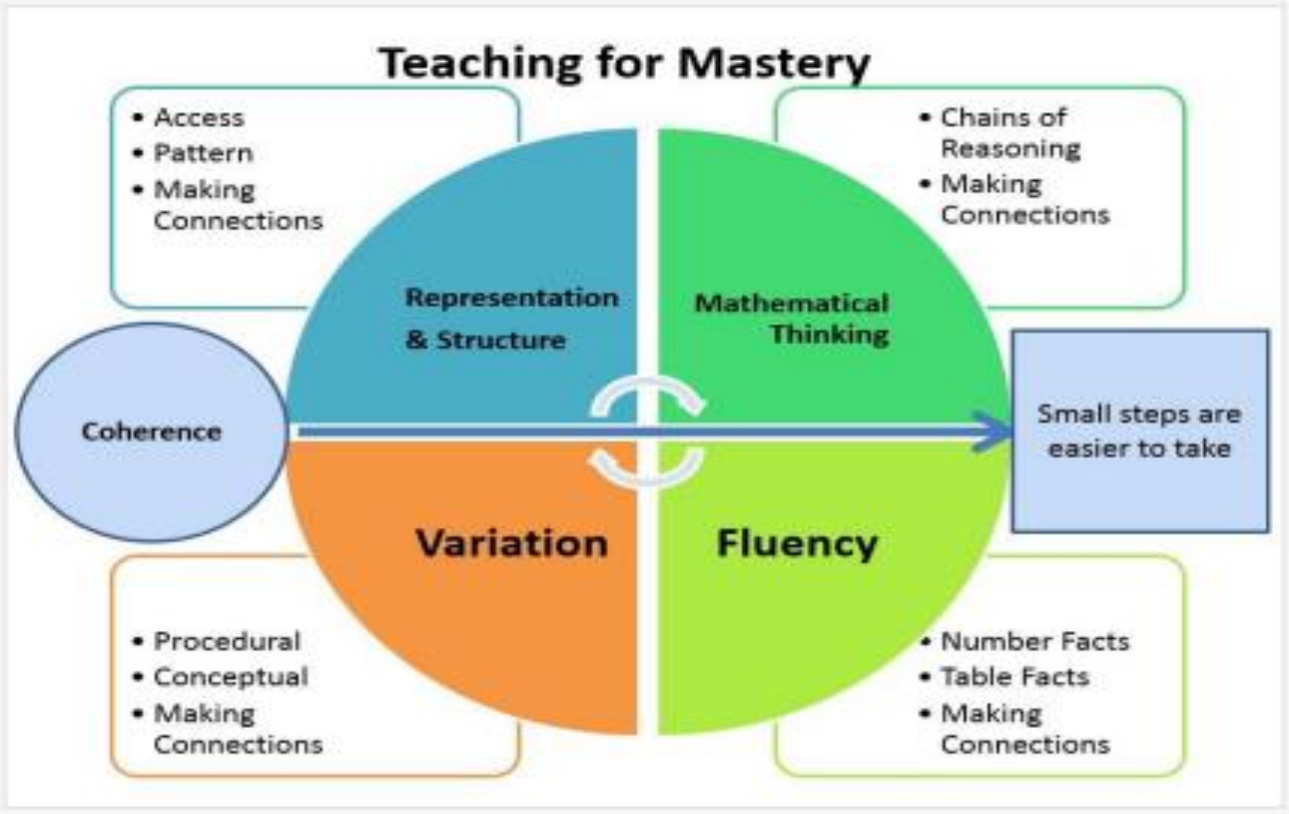
Children are summatively assessed for external purposes in the following ways:

- Reception Baseline Assessment (RBA) – within 6 weeks of starting school
- Early Years Foundation Stage Profile (EYFSP) – end of Reception
- Key Stage 1 SATs - end of Year 2
- Multiplication Tables Check (MTC) – end of Year 4
- Key Stage 2 SATs - end of Year 6

**Appendix 1 - Mastery**

We follow a mastery approach based on small steps and the five big ideas

- Representation and Structure
- Mathematical Thinking
- Fluency
- Variation
- Coherence




**What is fluency?**

Fluency comes following a concrete, pictorial and abstract process which ensures children acquire automaticity of the skill and are able to use in different contexts.

This will look like

- Conceptual understanding, accuracy, rapid recall, retention and practice using varied fluency.
- Pace – pupils are able to quickly recall the appropriate strategy to solve the calculation and progress through a number of questions at an age appropriate pace.
- Retention – pupils will be able to retain their knowledge and understanding on a separate occasion to when the concept was first introduced.
- Stem sentences – stem sentences will be shared with the children and orally rehearsed regularly in class. These will be found in the scheme of learning for the block being taught.

The key to fluency is deep knowledge and practice and making connections at the right time for a child.

**What is reasoning?**

Verbal reasoning demonstrates that pupils understand the mathematics. Talk is an integral part of mastery as it encourages students to reason, justify and explain their thinking.

This will look like:

- Children sharing their knowledge and understanding
- Enabling children to discuss and correct misconceptions
- Children showing their understanding of concepts and connections with prior learning

**What is problem solving?**

Mathematical problem solving is at the heart of the mastery approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas:

- Mathematical concepts are explored in a variety of representations and problem-solving contexts
- Pupils combine different concepts to solve complex problems, and apply knowledge to real-life situations.

## Appendix 2 – Fluency and automaticity

### Number fluency

Automaticity of recall of number facts is vital to maths fluency and progression. This is taught across the school.

***Reception & Key Stage 1***

The focus on automaticity of number facts to and within 20. This begins with facts to 10 in Reception and progresses to Year 2. This is delivered as a 15 minute separate maths fluency lesson using the NCETM Mastering Number Programme.

Parents can support children at home by accessing the *White Rose 1 Minute Maths* app to help consolidate their fluency.

***Key Stage 2***

Children who have not secured the automaticity of these number facts in Key Stage 2 will progress onto using the *Numbersense* programme which will be delivered as an intervention programme. Children who have secured the knowledge will move onto times table fluency.

### Times Tables

These must be taught and then practised. The *PiXL Times Tables* app is available for the practice at home on any device and all children have a personalised login.

Progression:

- Year 1 – be able to count in multiples of twos, fives and tens
- Year 2 – be able to count in steps of 2, 3 & 5 from 0 and from 10 from any number
- Year 3 - be able to recall 2, 5 and 3 multiplication and division facts
- Year 4 - be able to recall all multiplication facts to 12 x 12. The MTC has a pass mark of 100%.
- Year 5/6 - application of multiplication and division facts to problem solving

NB: All tables to be learnt up to 12 x 12.

In Key Stage 2 all children will complete a times tables test and chant twice per day (see separate policy).

## Appendix 3 - Lesson structure

All pupils are taught in mixed ability classes, scaffolding is provided through questioning and use of equipment.

## Mathematical talk

To encourage talk in mathematics, teachers will introduce concepts by including sentence structures (stem sentences). Pupils should be able to say not just what the answer is, but how they know it's correct, they should be able to explain mistakes and misunderstandings. This is key to building mathematical language and reasoning skills. This gives pupils the confidence to communicate their ideas clearly, before writing them down.

**Reception**

Discrete maths lessons and skills are supported by the use of continuous provision. Children are encouraged to investigate maths in all areas of the indoor and outdoor provision.

**Key Stage 1 & 2**

Before teaching a new concept, a pre-assessment will have taken place using the White Rose assessments. For children who are not sufficiently fluent with earlier material, pre-teaching will be delivered.

i) Starter activity – to revisit prior learning

ii) Introduce the new small step of learning (using the CPA approach) using discussion and independent practise using an 'I do, we do, you do' approach. Children will have the opportunity to access fluency, problem solving and reasoning questions. All children will access the same learning supported by the use of additional resources and teacher support.

iii) Reflective plenary for 'in the moment' assessment

iv) For identified children a catch-up activity before the next small step of learning will take place, using a range of materials such as PiXL therapies, White Rose, concrete activities, NCETM activities.

## What is CPA?


Children will have the opportunity to use concrete objects and manipulatives to help them understand what they are doing. Items may include: counters, Numicon, Base Ten, 10s frames.

Children will then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.

With the foundations firmly laid, children will be able to move onto an abstract approach using numbers and key concepts with confidence.

**Key resources to support implementation**

When resourcing and planning, teachers should always choose concrete resources which complement the teaching of the topic. Teachers have the flexibility to choose resources they feel are most effective to support the needs of all learners at different points of the curriculum and ensure they achieve the aims of fluency, reasoning and problem. White Rose Maths provides accompanying videos and recommends appropriate resources which fit in line with our seperate Calculation Policy.

We have access to many resources which include:

- Concrete manipulatives
- NCETM website
- Mathsaid.com website
- MyMiniMaths website
- NRich
- Twinkl website
- Third Space learning

All classes and year groups have been provided with a class set of place value resources and these should be clearly labelled and easily accessible to all children.

Key Stage One have class sets of time and shape resources. For Key Stage 2 other general maths resources are kept in the maths cupboard.

| **Year 1** | **Year 2** | **Year 3** |
|---|---|---|
| Numicon set<br>Base 10 (Diennes)<br>bead strings<br>multilink<br>double-sided counters<br>3D & 2D shapes<br>Teaching clocks | Numicon set<br>Base 10 (Diennes)<br>bead strings<br>multilink<br>double-sided counters<br>3D & 2D shapes<br>Teaching clock<br>Teaching numberline | Base 10 (80+ ones, 30 100s)<br>Numicon<br>bead strings to 100<br>multilink<br>cuisinere rods |
| **Year 4** | **Year 5** | **Year 6** |
| Base 10 (80+ ones, 30 100s, 2 1000s)<br>Numicon<br>bead strings to 100<br>multilink | Base 10 (80+ ones, 30 100s, 2 1000s)<br>bead strings to 100<br>multilink<br>Place value sliders | Base 10 (80+ ones, 30 100s, 2 1000s)<br>bead strings to 100<br>multilink<br>Place value sliders |

**Appendix 4 – Practice and retrieval**

These will predominantly use *White Rose Maths Flashback 4's* which have been developed around *Ebinghaus' Forgetting Curve* model which cover content from the:

- Day before
- Couple of days before
- Week before
- Block/term before

These are often recorded on whiteboards and used as an *in the moment* assessment to allow for re-teaching if necessary. Other practice and retrieval lessons can be used by teachers when they feel it is appropriate.