Dropmore Infant School

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Approved by Chair of Governors: ……

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INTENT:

At Dropmore Infant School we provide a high-quality, balanced and progressive Mathematics curriculum. In line with DfE best practice we have embedded a mastery approach to Maths teaching, focussing on building pupils' understanding, confidence and independence through the use of concrete and pictoral representations alongside abstract notation. Through our mastery approach we allow for all children to become **fluent** in the fundamentals of maths, developing their conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. Children will be able to **reason mathematically** by justifying, making links to known facts, or providing proof using mathematical language. Understanding of concepts will be challenged through **solving problems** by applying their mathematic knowledge. **Links** within other subjects will be highlighted allowing children to apply their skills and mathematical knowledge. We will equip children with the foundations of mathematics that are essential to everyday life.

Aims:

The EYFS Framework 2012 aims to ensure that all children:

- count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.
- use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

The 2014 National Curriculum for Mathematics aims to ensure that all children:

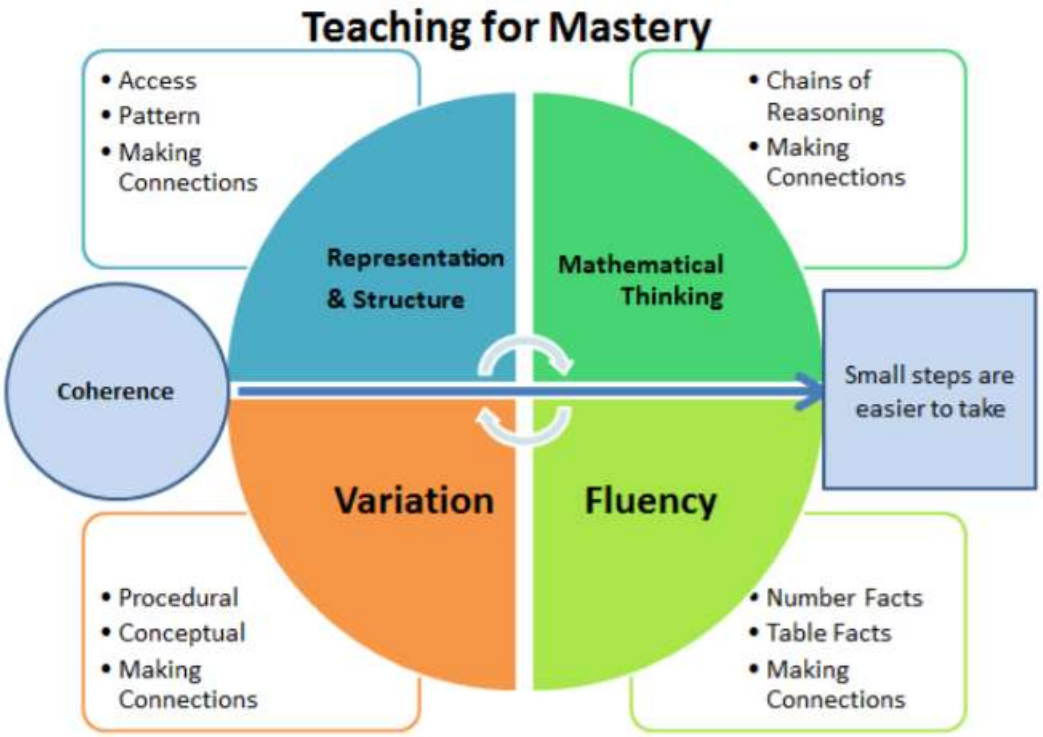
- become fluent in the fundamentals of Mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- are able to reason mathematically by 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:

In September 2017, Dropmore Infant School began the transition towards a whole school mastery approach to the teaching and learning of mathematics. The rationale behind changing our approach to teaching mathematics lay within the NCETM Maths Hub Programme as well as the National Curriculum aims.

From September 2019, Maths Mastery has been fully embedded across all 3 year groups. Through a mastery approach all pupils acquire a solid enough understanding of the maths that's been taught to enable them to move on to more advanced material.

Our teaching for mastery is underpinned by the 5 big ideas of mastery and the teaching for mastery principles:



- Opportunities for **Mathematical Thinking** allow children to make chains of reasoning connected with the other areas of their mathematics.
- A focus on **Representation and Structure** ensures concepts are explored using concrete, pictorial and abstract representations, the children actively look for patterns and generalise whilst problem solving.
- Coherence is achieved through the planning of small, connected steps to link every question and lesson within a topic.
- Teachers use both procedural and conceptual **Variation** within their lessons and there remains an emphasis on **Fluency** with a relentless focus on number and times table facts.

Teaching for Mastery Principles:

- It is achievable for all we have high expectations and encourage a positive 'can do' mindset towards mathematics in all pupils, creating learning experiences which develop children's resilience in the face of a challenge and carefully scaffolding learning so everyone can make progress.
- Deep and sustainable learning – lessons are designed with careful small steps, questions and tasks in place to ensure the learning is not superficial.
- The ability to build on something that has already been sufficiently mastered – pupils' learning of concepts is seen a continuum across the school.
- The ability to reason about a concept and make connections – pupils are encouraged to make connections and spot patterns between different concepts (E.g. the link between ratio, division and fractions) and use precise mathematical language, which frees up working memory and deepens conceptual understanding.
- Conceptual and procedural fluency – teachers move mathematics from one context to another (using objects, pictorial representations, equations and word problems). There are high expectations for pupils to learn times tables, key number facts (so they are automatic) and have a true sense of number. Pupils are also encouraged to think whether their method for tackling a given calculation or problem is Appropriate, Reliable and Efficient (A.R.E).

- Problem solving is central – this develops pupils' understanding of why something works so that they truly have an appreciation of what they are doing rather than just learning to repeat routines without grasping what is happening.
- Challenge through greater depth - rather than accelerated content, (moving onto next year's concepts) teachers set tasks to deepen knowledge and improve reasoning skills within the objectives of their year group.

Planning:

The expectation of the 2014 National Curriculum programme of study is that the majority of pupils will move through the programme of study at broadly the same pace. For children to progress well lessons should be carefully planned to secure pupils' understanding. All year groups use the White Rose Scheme of Work as a starting point in order to develop a coherent and comprehensive route through mathematics. The medium-term plans give details of the main teaching objectives for each term and define what we teach. They ensure an appropriate balance and distribution of work across each term, and ensure all areas of mathematics are taught.

The learning is broken down into small steps that build on children's prior learning. The lesson journey should be detailed in our lesson plans and any relevant learning is reflected onto our class working wall or recorded on flipcharts (Smart notebook or PowerPoint). Difficult points and potential misconceptions are identified in advance and strategies to address them are planned, as well as key questions to challenge thinking and develop learning for all pupils. We also ensure key vocabulary is taught at relevant points in the lesson journey to reinforce mathematical knowledge. Context and representations are carefully chosen to develop reasoning skills and help pupils link concrete ideas to abstract mathematical concepts. All lessons should have elements of the concrete, pictorial, abstract approach (CPA) to mathematical teaching.

The use of high-quality materials and tasks to support learning and provide access to the mathematics are integrated into lessons. These include

- White Rose Maths Schemes of Learning and Assessment materials,
- Power Maths online materials and textbook activities,
- Maths No Problem! textbook,
- Number blocks NCETM resources,
- NCETM Mastery assessment materials & Spine resources (progress in calculation)
- NRICH
- visual images and concrete resources.

The children undertake a fluency activity at the start of every mathematics lesson. Where possible we use further opportunities for extra fluency practice (key instant recall of key facts such as number bonds, times tables, division facts), such as morning starters etc.

Teaching sequence:

Lessons are taught in a series of structured blocks that are carefully chosen to build on prior knowledge. Each lesson is focused around a key new learning point which are explicitly taught alongside reasoning and problem solving. These lessons are designed to progress from each other building upon children learning and recalling previous learning.

A typical Key Stage 1 lesson is outlined below:

- Our Mathematics lesson will start with a problem to set the context for learning.
- The pupils will use a range of concrete apparatus, pictorial representations and abstract representation to explore the problem and different ways of solving it. They may need to draw on prior knowledge to suggest how to solve this.
- The teacher will then lead the class in a discussion of their ideas encouraging children to ask as well as answer mathematical questions. We strongly encourage children to use correct mathematical vocabulary in full sentences when explaining their reasoning.

- A variety of examples will be modelled and discussed together after which children work collaboratively to answer guided practise questions.
- Children then work independently to complete a core task in their Maths Book.
- The lesson will finish with a Challenge activity which is available to all children. This enables them to apply their new knowledge in different contexts and so deepen their understanding.
- We believe all children have the ability to succeed in Maths and structure our lessons in this way so this can be achieved.

A typical EYFS lesson is outlined below:

Although many of the principles of a mastery lesson are used in Reception, their lesson structure is not as formal as in Key Stage 1. Children in EYFS explore mathematical concepts through active exploration and their everyday play-based learning. Children are taught key concepts and develop number sense using a hands-on practical approach. EYFS practitioners provide opportunities for children to manipulate a variety of objects which supports their understanding of quantity and number. Pupils explore the 'story' of numbers to twenty and the development of models and images for numbers as a solid foundation for further progress. The CPA approach is used when teaching children key mathematical skills. Practitioners allow children time for exploration and the use of concrete objects helps to support children's mathematical understanding. Mathematics in the early years provides children with a solid foundation that will enable them to develop skills as they progress through their schooling and ensures children are ready for the National Curriculum.

Progression:

For details of progression in Mathematics, see the following documents:

- White Rose Maths Scheme of Learning
- Dropmore Infant School Mental Calculation policy
- Dropmore Infant School Written Calculation policy
- Dropmore Infant School Progression document – Mathematics

Assessment and feedback:

Verbal feedback is given throughout the lesson to address misconceptions, support calculation methods, encourage mathematical thinking and develop confidence. Through ongoing formative assessment, the teacher checks pupils' understanding and adjust lesson plans accordingly.
Mathematics books are marked in line with our Marking and Feedback policy, using the Dropmore Taxonomy. Next steps are not necessary as the next lesson is normally the next step in learning. However, it is essential that all marking picks up and addresses any misconceptions/mistakes and thorough questioning ensures children have clarified their thinking clearly. This should be reflected in the Dropmore Taxonomy where children that are requiring further support will be highlighted as stage 1 or 2 and children that may be requiring further challenge will be identified as stage 5.

Summative Assessments:

In addition to the formative assessments undertaken in lessons, our reception children are assessed against the EYFS framework and their progress is continually monitored throughout the year.

In KS1, teachers will use termly summative assessments provided by White Rose Maths Hub to support their judgements and provide further opportunities to identify gaps in pupil learning and tailor further support. These are recorded in our Herts for Learning progress grids and discussed at termly pupil progress meetings, ensuring targeted support can be given to those who need it.

Children in Year 2 will be assessed against the End of Year 2 Teacher Assessment Framework. We use the national tests (SATS) for children in Year 2 to inform and support our end of KS1 teacher assessment.

Equality Impact Assessment:

Through differentiation and our Mastery approach we ensure all pupils are able to master the mathematics objectives for their year group, irrespective of special educational or medical needs or protected characteristics. Differentiation for those that need further challenge as well as those that need additional support is incorporated into all mathematics lessons in a variety of ways:

- Daily use of hands-on equipment and pictoral representations
- Collaborative learning – frequent discussion in lessons, both with other pupils and adults to develop the use of correct mathematical language and the ability to explain their reasoning
- Revisiting concepts pupils found tricky at the start of the next lesson
- Pre-teaching concepts for those pupils identified
- Frequent verbal feedback
- Written feedback, addressing any misconceptions or providing next steps
- Opportunities to consolidate their understanding for those not sufficiently fluent
- Challenge through a range of problems for those grasping concepts rapidly
- Support or extension from the teacher or TA

For more information on SEN (Special Educational Needs) and MAP (Most Able Pupils) please see the corresponding policies.

Enrichment:

Enrichment opportunities are carefully selected to enhance learning opportunities for children by demonstrating real life contextual understanding of mathematics. Dropmore children also take part in a number of activities outside of their Maths lessons including Dropmore shop and silver coin week.

IMPACT:

Children at Dropmore Infant School enjoy Mathematics and understand the important role of Mathematics in everyday life at and age-appropriate level. This is evident through pupil voice and monitoring which takes place every term by the curriculum leader.

Through quality first teaching, a mastery approach, high quality resources and effective feedback, most children achieve age-related expectations by the end of each year group. At the end of KS1, our children leave our school well-prepared for the next step in their mathematical education.

Summative assessment takes place at the end of each term and children's progress and attainment is discussed with the Headteacher in pupil progress meetings. Formative assessment takes place on a daily basis and teachers adjust planning accordingly to meet the needs of their class.

Monitoring:

Monitoring of the standards of children's work and the quality of teaching in Mathematics is the responsibility of the Mathematics subject leader, the headteacher and the class teacher.
Mathematics monitoring includes book scrutinies, planning scrutinies, analysis of assessment results, lesson observations and/or learning walks and pupil voice interviews or questionnaires, in order to ascertain curriculum coverage, the quality of teaching and learning and the children's attitudes to Mathematics. This information is then used to inform further curriculum developments and provision is adapted accordingly. The named governor responsible for Mathematics, visits the school termly and meets with the Mathematics subject leader in order to discuss developments and review progress.

Resources:

All classrooms have a complete set of Numicon resources and a wide range of appropriate small equipment. A range of maths apps are available on the school laptops and iPads. Additional whole school geometry and measurement resources are stored in the Year 2 cloakroom.

Teachers and TAs have access to the range of support provided by Power Maths, including videos and online lesson guides which highlight key teaching points, possible misconceptions and other key features of lesson design.

Review:

This policy will be reviewed every 3 years. It will be presented to the Curriculum Development and Pupil Matters (CDPM) Committee for ratification.