Loudwater Combined School

Mathematics Policy

Intent

At Loudwater Combined School, we have a mastery approach in the learning and teaching of mathematics. Mastering maths means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject. The main aim of such an approach and development of a curriculum model that values 'going deeper' is to ensure that our children develop a secure knowledge of mathematical concepts, so that those pupils beginning their education at school are able to access age-appropriate ideas and do not see gaps open in their learning over time.

Integral to this curriculum model is the school's vision for mathematics which rejects the idea that a large proportion of people 'just can't do maths,' and that all pupils are encouraged by the belief that by working hard at maths they can succeed.

Our Intent is that all pupils:

- Develop a positive attitude towards mathematics, which fosters an enthusiasm, curiosity and love of the subject.
- Develop the motivational and metacognitive skills, which allow them to persevere in challenging tasks and in seeking solutions.
- Become fluent in the fundamentals of mathematical skills through varied and frequent practise, with increasing complexity over time.
- Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification and proof.
- Solve a variety of problems by breaking them down into a series of smaller steps and applying the mathematics that they know.
- Develop the correct use of mathematical language and vocabulary, in order to reason mathematically and apply these skills to reading and solving problems.
- Make rich connections between mathematical ideas and across subjects, including science, ICT, the humanities and everyday life.

National Curriculum

At Loudwater Combined School, our mathematics curriculum follows the Programme of Study and Aims of the National Curriculum.

The National Curriculum for mathematics aims to ensure 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.

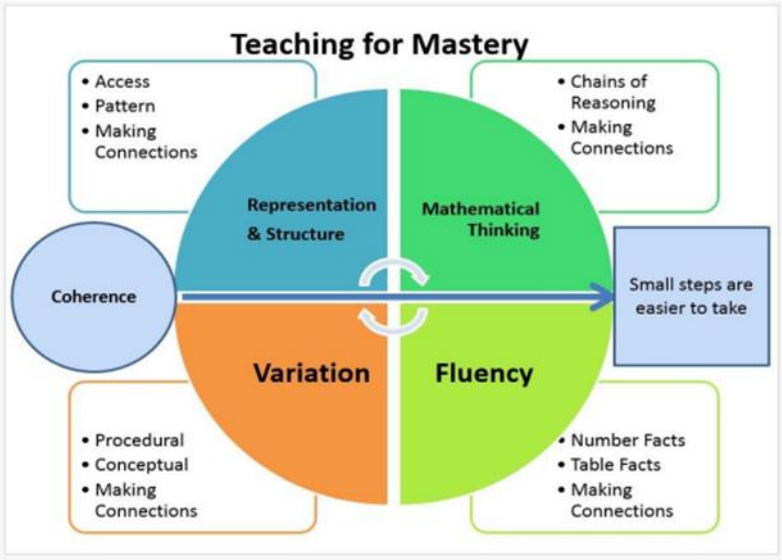
Maths mastery

Despite implementing a mastery approach in the learning and teaching of mathematics, we are aware that some children will have gaps in their pre-requisite knowledge. Consequently, our medium-term planning has been designed to take into account cases where 'catch-up' is still required. Medium term planning also shows longer being spent on each topic as mastery is an integral part of the system, so that a broadening of knowledge and skills can take place as part of pupils' learning experiences. Curriculum mapping documents show the progression of each mathematics topic across key stages one and two, and allow teachers to take into account the prerequisite knowledge which pupils should be secure in before moving them onto more complex mathematical concepts.

As a result of this approach being taken, it is likely that those undertaking learning walks and/or monitoring lessons will see more whole-class teaching than may have been evident before the implementation of the 2014 National Curriculum. It is our expectation that all pupils within a class will progress through the curriculum at broadly the same pace. This means that each pupil within a class will be working on the same learning outcome during the same lesson. Whilst working on the same lesson content, teachers may scaffold or extend certain groups of pupils so that they are able to:

- Grasp concepts and methods through more varied use of practical equipment
- Be challenged through exposure to greater depth in their learning through tackling more complex problems in different contexts

Differentiation is likely to appear more subtle than before. Practise and consolidation play a central role in pupils' learning experiences, and where children are more confident with a concept, they can be moved onto the independent practise phase more rapidly in their learning journey. Further challenge is provided to all children through use of problem solving, which may be linked to other subjects across the curriculum and real-life contexts.



NCETM's Five Big Ideas for teach mastery

Implementation

The mathematics subject leader is responsible for the development and monitoring of the mathematics curriculum to ensure there is a well-designed learning journey for all pupils. The leader's role is to:

- Support teachers with their planning
- Be responsible for updating and monitoring the school's policy and scheme of work and the school's mathematics action plan
- Assist teachers by leading staff meetings, planning and leading INSET activities, provide consultancy and advice by supporting teachers in the classroom
- Be responsible for implementing changes required by government guidelines and new initiatives and ideas which affect the teaching of mathematics at Loudwater Combined School
- Attend training courses in line with changes and developments within the subject and impart the information to colleagues through regular staff meetings and on INSET days.

Teaching is based on the objectives set out in the National Curriculum. These objectives cover number and place value; addition and subtraction; multiplication and division; fractions decimals and percentages; ratio and proportion; measurement; properties of shapes; position and direction; statistics and algebra. In the Foundation Stage, mathematics takes place throughout the whole curriculum and children have continual expose to mathematical concepts. Across key stage one and key stage two, we teach five one-hour maths lessons per week and five 20-minute guided maths sessions per week.

Teachers use the White Rose Maths Scheme (new for 2022-23) as the basis for their teaching. To guide our approach, we use the White Rose Maths calculation policy which ensures consistency across the year groups. Teachers use the White Rose Maths scheme to plan progress across the year and enable children to know more and remember more over time. Through their lessons, teachers aim to promote connections within and across National Curriculum domains, so that children are taken deeper with their learning over time and recognise the interconnectedness of concepts. It is also intended that pupils revisit concepts, for example, multiplication within area when presented as an array model, which means that pupils absorb learning within their long-term memory.

It should be noted that varied use of practical resources, structures and representations, and questioning that requires deeper reasoning is used to ensure all children are supported/challenged appropriately. A progression in key representations and structures, leading to understanding of sometimes complex and abstract concepts, has been defined and is exemplified in the school's calculation policy. This in turn supports the delivery of consistent approaches and equity of access for learners. Practical resources and manipulatives that teacher's regularly use in lessons include, but are not limited to:

- Place value counters alongside place value charts
- Plain and see-through counters
- Base ten blocks
- Number beads
- Numicon
- Cuisenaire rods
- Counting cubes
- Double sided counters

In terms of assessment, and in order for the mastery approach to work, we understand the need for children to achieve key objectives for their current stage of learning. Such assessment links with day-to-day Assessment for Learning, which informs teachers about the elements of learning pupils need to develop further. In lessons, teachers use precise questioning to check conceptual and procedural knowledge. They formatively assess how misconceptions can be used as growth points in learning, whilst also diagnosing who requires intervention. Flexible grouping allows interventions to be put into place during daily guided maths time and aim to quickly address these misconceptions, meaning that all children are expected to 'keep up' rather than 'catch-up.' Assessment gathering is kept meaningful and is viewed as a diagnostic tool whereby collated information is used purposefully when planning pupils' next-steps. A variety of strategies are used to ensure that teachers have a clear understanding of each child's knowledge:

- Opportunities are given for children to express their ideas orally and in writing. This gives teachers and children a chance to clarify ideas and identify misconceptions.
- At times, home-learning is set which requires children to explain their learning to somebody at home.
- Active assessment opportunities are used, such as true or false statements, in order to encourage children to share and justify their mathematical thinking.
- Learning through errors and misconceptions is integrated into lessons. A supportive environment that encourages the sharing of mistakes as an opportunity for learning is evident in all classes.
- Children self-assess their learning at the end of each lesson by evaluating their progress towards the learning objective and completing their feedback 5 score.

Lesson Structure

All main mathematics lessons at Loudwater School follow the following structure:

Maths in minutes – from Year 1 daily. Children work at speed to complete a set of questions as accurately as possible.

Cracking Times Tables – from Year 3 weekly – children complete a set of questions in 3 minutes testing their accurate and rapid recall of multiplication and division facts.

Starter activity – Flashback 4 provides an opportunity for retrieval practice where the questions asked are from yesterday's learning, last week's learning, the previous term's learning and last year's learning.

Get ready activity – Prior learning that links to the new learning for the lesson is reactivated.

Teaching input - using the Mastery Approach and children have opportunities to demonstrate their understanding.

Reflective time – children mark their work. At the end of each lesson, all pupils should have made progress by learning a new technique, gaining an improved understanding of a concept or being able to complete a new activity. This new learning/progress should be evidenced by the competition of Feedback 3 or 5 as appropriate.

Numbots and Times Tables Rockstars

Numbots and TT Rockstars are initiatives used from Year 1. They provide a fun way to practise number facts and times tables. In achievement assembly each week, awards are given for pupils who participate and make progress on Numbots and TT Rockstars. Pupils are expected to log onto TT Rockstars at home for 15 minutes per week.

Mathematics Classroom Environment

Mathematics is visible in all classrooms through the maths working wall. This working wall contains key vocabulary for the unit of work, possible stem sentences for the children to use, worked examples of methods, practical resources, labelled 2d or 3d shapes. The working wall is updated regularly to reflect the current topic that the children are learning in maths.

Home-learning

In KS1 children should be encouraged to engage with Numbots at home each week. The class page of Google Classroom details some activities children could engage with at home and this is updated half termly. In KS2 a mathematical task should is set as home-learning each week. This could be Times Tables Rockstars, Maths Whizz (Y5 & Y6) or an activity from My Maths to consolidate class learning.

Impact

- Mathematics is monitored for impact every year in a number of ways:
- Planning is monitored by senior leaders on a regular basis.
- Lesson drop-ins are carried out on a regular basis.
- There are termly lesson observations which will at certain times of the year focus on maths.
- A scrutiny of a sample of books from each class is carried out each term.
- Data about children's performance in tests is analysed each half term and this information is used to inform future planning and provision.
- Regular pupil voice sessions take place to gain an understanding of mathematics from the pupils' viewpoints

The attainment and progress of pupils' learning is tracked by class teachers and senior leaders, so that swift interventions can be put into place, including for children who have not always experienced a mastery approach in mathematics over time. Assessment is ongoing and used to inform planning and to make the Teacher Assessment judgements at the end of each term. PIXL assessment papers focusing on arithmetic, and problem solving & reasoning are completed to inform these teacher assessments. The relevant QLA documents are completed and uploaded to PIXL as well as saved on Teacher Share.

At the end of each term, all teachers attend a Pupil Progress meeting to share data and to discuss pupils who have not made expected progress and may require an intervention.

In cases where children's learning is most effectively being deepened, the following descriptors can be seen in their learning:

Depth:

- describe it in his or her own words;
- represent it in a variety of ways (e.g. using concrete materials, pictures and symbols – the CPA approach)[8]
- explain it to someone else;
- make up his or her own examples (and non-examples) of it;
- see connections between it and other facts or ideas;
- recognise it in new situations and contexts;
- make use of it in various ways, including in new situations.[9]

Greater depth:

- solve problems of greater complexity (i.e. where the approach is not immediately obvious), demonstrating creativity and imagination;
- independently explore and investigate mathematical contexts and structures, communicate results clearly and systematically explain and generalise the mathematics.

The curriculum mapping documents used by teachers specify the knowledge and skills that children are expected to have at the end of Foundation Stage, Key Stage One and Key Stage Two. The school's Marking and Feedback policy allows children's levels of independence to be evident, as instances where pupils have the most secure knowledge and skills can most easily be recognised when they've applied learning independently and in a range of ways, including across different areas of the curriculum. On occasions when such extended depth has yet to be developed, an expected core impact of our curriculum is that pupils are at least ready to move on to the next key stage of learning. Currently, our school action plan highlights areas where we have noticed children not gaining depth in their learning, and outlines actions that are being implemented to address this.

December 2022