EVERSLEY PRIMARY SCHOOL

POLICY FOR THE TEACHING OF MATHEMATICS

INTRODUCTION

This document is a statement of aims, principles and strategies for the teaching and learning of mathematics at Eversley Primary School.

It is linked to the school policies for teaching and learning, behaviour and equal opportunities.

OVERVIEW

The National Curriculum states that:

"Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject".

AIMS AND OBJECTIVES

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 have **conceptual understanding** and are able to recall and apply their knowledge rapidly and accurately to problems

- **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 or **routine** and **non-routine** problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

(National Curriculum 2014)

EVERSLEY MATHS LEGACY

At Eversley Primary School, we aim to deliver an inspiring and engaging mathematics curriculum through high quality teaching, enabling the children to be numerate, creative, independent and inquisitive. Our curriculum prepares our children to be logical and critical thinkers by providing them with rich opportunities to problem solve, reason and become fluent in number skills, all through making mathematical connections.

Our aim is for all children to leave Eversley having acquired a deep, long-term, secure and adaptable understanding of the subject, through mastering mathematical concepts and skills. Teaching for Mastery, which builds gradually as a child goes through school, is a tool for life, and immeasurably more valuable than the short-term ability to answer questions in tests or exams. This teaching approach seeks to engage and challenge pupils as well as promote confidence, enthusiasm and a sense of achievement of the subject, leaving children confident to take risks and continue to progress and achieve their full potential in life.

OUTCOMES:

In Mathematics at Eversley, we aim to embed and sustain in all children:

- Confidence, enthusiasm and enjoyment through practical activity, exploration and discussion;
- Awareness of relationship and pattern, and how these connections can bring about a clearer, deeper understanding;
- An appreciation of mathematics as a means of communication through which they can analyse information and ideas;
- The ability to solve problems through decision making and reasoning in a range of contexts; routine and non-routine problems;
- The ability to work systematically where the task requires a careful accurate approach, as well as the ability to show imagination, initiative and flexibility when appropriate;
- The ability to use pupil voice to justify and reason mathematically
- Sensible use of factual recall, mental and written methods.
- Independence of thought and action as well as the ability to work collaboratively within a group;
- To understand the importance of mathematics in everyday life;
- A sense of achievement

TEACHING FOR MASTERY

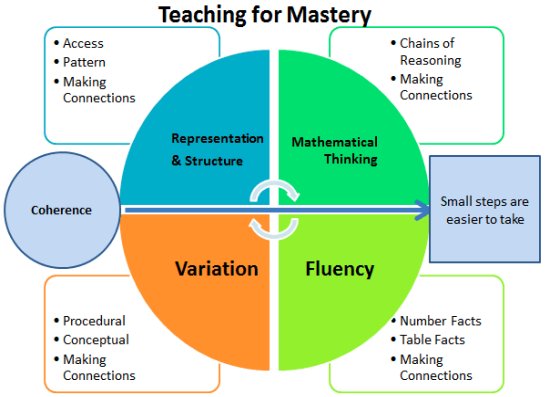
In line with the 2014 Maths curriculum, we have adopted a 'Teaching for Mastery' approach at Eversley. Mastery is something that we want all pupils to acquire. The idea that Maths is taught in a coherent, progressive manner to help pupils, over time, acquire mastery of the subject which is a deep, long-term, secure and adaptable understanding of the subject.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make **rich connections across mathematical ideas** to develop fluency, mathematical reasoning and competence in solving increasingly **sophisticated problems**. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage.

Pupils who grasp concepts rapidly should be **challenged through rich and sophisticated problems before any acceleration through new content**. Those pupils who are not sufficiently fluent with earlier material should **consolidate their understanding, through additional practice, before moving on. (**National Curriculum, 2014)

This diagram of the Five Big Ideas is used to help bind these mastery ideas together when planning and teaching Maths lessons at Eversley:



Day-to-day Maths Lessons are carefully planned to reflect and further embed the **Mastery Five Big Ideas**:

Coherence

Coherence underpins the other 4 principles of our mastery curriculum here at Eversley. Teachers strive to make Mathematics lessons accessible to all pupils by breaking the learning down into a sequence of small, progressive steps. In doing so, mathematical concepts are gradually developed and pupils are encouraged to make links in their mathematical thinking, develop flexibility in understanding and apply their learning across a range of contexts. Teacher's careful planning predicts and prevents misconceptions developing, while every step in learning is carefully thought through to ensure children are noticing key mathematical structures.

Representation and Structure

Mathematics is an abstract subject and representations are a way of helping the children to access and develop their understanding through exposing the mathematical structure. At Eversley, when introducing and developing a mathematical concept we make sure the children experience multiple representations of that concept. They are encouraged to develop their understanding by thinking about what it is, what it is not and how it connects to other aspects of mathematics. Representations are carefully thought out, in order to draw out the structure of the maths being taught. When planning for the lesson, teachers think about what mathematics will be highlighted and how it will be interpreted within the class, making sure that links are made explicit in order for children to notice. By using representations to highlight structure, the aim is that the children will be able to eventually do the maths without relying on the representation.

Mathematical Thinking

At Eversley, Mathematical Thinking is encouraged through practical investigation, supported through use of our C-P-A approach. First children use concrete materials in order to build a foundation for their mathematical knowledge. They then use onto a pictorial representation when ready, before finally understanding and using an abstract method. This approach is not linear throughout primary school. The CPA approach is used whenever a new idea or concept is introduced. Children are given the opportunity to explore Mathematical problems both collaboratively, independently and through whole class discussions. Pupils are encouraged to make connections between what they already know, and the new areas of learning being taught. They investigate and develop methods to solve problems and these methods are then thought about, reasoned with, and discussed with others. Teachers use precise questioning and stem sentences in class to assess and encourage pupil's deep knowledge and reasoning skills. Questions asked include: How did you solve this? Can you explain your thinking? Which method would you use? Why? If you know… then can you solve….? The objective of the lesson is pulled out from these

discussions. Children then record their thinking in their books through answering challenges that allow them to generalise, make connections or prove/disprove a conjecture. This knowledge and thinking is then reflected on and built on in future lessons.

Fluency

Here at Eversley, we believe every child can be a fluent mathematician which in return provides confidence when exploring any aspect of the mastery curriculum. If a child is fluent in maths it means they are able to recall facts and procedures quickly and efficiently, moving flexibly between different contexts and representations of mathematics. To help children with this at Eversley, we encourage pupils to practice their fluency recall skills daily through flashback tasks for early morning work with a view to developing children's ability to calculate efficiently and to help them become effective at recalling key facts and methods. To supplement this, we have also invested a lot of time into a new learning app: Times Table Rock Stars, which further encourages children to practise and recall number and multiplication facts in a fun and engaging manner.

Variation

At Eversley, we believe that variation is crucial to secure understanding. Variation is twofold. Within each lesson, teachers ensure they represent the mathematical concept being taught in multiple ways and children are encouraged to explore, discuss, compare and make connections between different representations in their Maths books. Teachers use varied questions to further encourage challenge. This carefully designed variation builds pupil's fluency and understanding. White Rose Maths and NCETM (National Centre for Excellence in the Teaching of Mathematics) materials ensure appropriate curriculum coverage and lessons are well sequenced with practice and consolidation of skills playing a central role. As well as this, these resources ensure continuity and progression in the teaching of mathematics. New learning is introduced carefully through a series of well crafted, small steps. Pupils explore what stays the same and what changes as they encounter different mathematical ideas. This ensures children are able to build upon their prior knowledge and make connections between different mathematical structures and the relationships between them. In turn, this encourages our pupils to develop deep and sustained knowledge.

DEVELOPMENTS IN 2021

Due to the Coronavirus (COVID 19) pandemic and the impact this has had on children's progress and learning during 'lockdown' and school closures, there have been changes made to support with the recovery of any lost learning.

Staff will undertake training to focus on the non-statutory guidance for Key stages 1 and 2 published by the DfE. This publication 'identifies the most important conceptual knowledge and understanding that pupils need as they progress from year 1 to year 6. These important concepts are referred to as ready-to-progress criteria and provide a coherent, linked framework to support pupils' mastery of the primary mathematics curriculum'. (DfE guidance 2020)

The six areas of priority are as follows:

- Number and Place value
- Number facts
- Addition and Subtraction
- Multiplication and division
- Fractions
- Geometry

Teachers will make informal, formative assessments of the pupils in their classes at the very beginning of the Autumn term to identify any gaps/areas of knowledges and understanding in the 6 key areas as set out by this non-statutory guidance. These ready-to-progress criterions are explained within the corresponding year group chapter so teachers will have a good understanding of the 'starting points' for their children. In most cases, it is anticipated that children will need to revisit mathematics objectives from their previous year group to ensure that they have achieved mastery of these key areas before moving forward successfully onto the next stage of their learning in the subject.

Whilst we will be prioritising the above key areas and spending the necessary time required to secure children's learning and mastery of these 'ready to progress' criteria, **we will continue to follow the whole curriculum for Mathematics, which remains a statutory requirement.** However, by meeting the ready-to-progress criteria, pupils will be able to more easily access many of the elements of the curriculum not included in the DfE guidance.

THE FOUNDATION STAGE

Work undertaken within the Foundation Stage is guided by the requirements and recommendations set out in the Early Years Foundation Stage document. In line with the Primary Maths curriculum and how we encourage our pupils to acquire mastery of the subject through developing a deep, long-term and sustainable understanding of the subject, the teaching and learning in EYFS equally seeks to embed a sustainable understanding of Mathematics. We provide all of the children with opportunities to develop their problem solving, reasoning and number

skills to further develop an understanding of number and numerical patterns through varied activities that allow them to enjoy, explore and talk confidently about mathematics.

The most recent EYFS reforms for the key area of Mathematics states that there is to be a crucial focus on number and numerical patterns in Early years. The frameworks states that:

"Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically". (DfE, EYFS statutory framework 2021)

In Reception classes a wide range of activities supports the teaching and learning of mathematics so that pupils can develop a secure foundation of knowledge and vocabulary from which mastery of mathematics is built. The focus is for pupils to develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. These activities include:

- Observation of number and pattern in the environment and daily routines;
- Using pebbles, cubes and tens frames to count confidently
- Board games;
- Large and small construction;
- Stories, songs, rhymes and finger games;
- Sand and water;
- Two- and three- dimensional work with a range of materials;
- Imaginative play;
- Cooking and shopping;
- Outdoor play and 'playground' games.

In addition, at Eversley, we ensure that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships through spotting connections.

By the summer term we aim for the children to experience maths lessons in preparation for Year One.

PLANNING FOR MATHEMATICS TEACHING

Mathematics is a core subject in the National Curriculum and we use the Curriculum as the basis for implementing the statutory requirements of the programme of study for mathematics.

We carry out the curriculum planning in mathematics in three phases (long term, medium term and short-term planning). The New Curriculum for teaching gives a detailed outline of what we teach in the long term, while our yearly teaching programme identifies the key objectives we teach to in each year.

Our medium term mathematics 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.

The class teacher works closely with their year group partners to complete the weekly plans for the teaching of mathematics. These plans list the specific key learning objectives and other objectives for each lesson and give details of how the lessons are to be taught.

We plan the activities in mathematics so that they build on the children's prior learning. While we give children of all abilities the opportunity to develop their skills, knowledge and understanding, we also plan progression into the scheme of work, so that there is an opportunity to build upon their learning.

These plans are reviewed by the subject leader, feedback on planning is given to teachers and targets are set to continuously improve planning.

THE STRUCTURE FOR THE TEACHING OF MATHEMATICS

The approach to the teaching of mathematics within the school is based on:

- A Mathematics lesson every day
- A clear focus on whole class teaching to include learning opportunities of fluency, problem solving and reasoning.
- Lessons are carefully designed using the Mastery five big ideas and objectives are taught as lesson journeys not separate stand-alone lessons to support pupils to build on prior knowledge and apply and deepen their understanding.

Maths planning is designed from the National curriculum Maths aims and its yearly teaching programmes.

This yearly teaching programme is taught through daily mathematics lessons of approximately 45minutes at the start of Key Stage One extending to an hour in Key Stage Two. Teachers are encouraged to deliver maths teaching in an agile teaching approach, where pupils enter the lessons with a quick review/flashback task before being set a challenge to explore and spark curiosity of learning straight away. Teachers expose the pupils to the challenge of open-ended tasks where less teacher talk is necessary and more mini plenaries are used to support and extend both teaching and learning.

Our school uses a variety of teaching and learning styles in mathematics lessons in accordance with the school's teaching and learning policy. Our principal aim is that children will:

- Experience a high proportion of whole class, group-direct teaching, and exploration of ideas with mini plenaries to extend learning.
- Be encouraged to ask as well as answer mathematical questions.
- Have the opportunity to use a wide range of resources/manipulatives, such as number lines, number squares, digit cards, Numicon, Diennes, Place Value Counters, tens frames and Cuisenaire Rods.
- Use ICT in mathematics lessons to enhance and/or support their learning.
- Wherever possible be encouraged to apply their learning to everyday situations.

It is important that children are allowed to explore maths and present their findings not only in written form but also visually; to that end, the school will adopt the 'CPA approach': concrete, pictorial & abstract. This will allow children to experience the physical aspects of maths before finding a way to present their findings and understandings in a visual form before relying on the abstract numbers. The manipulatives mentioned above are available in each classroom to help facilitate this process.

SUPPORT & CHALLENGE

Teaching for Mastery is representing maths in a variety of contexts and giving all the children opportunity to look at maths actively and work with these contexts in order to achieve learning.

In all classes, children have a range of mathematical abilities. We recognise this fact and provide suitable learning opportunities for all children by placing them in class or mixed abilities groups for maths lessons. We believe that this approach is of great benefit to all pupils and continues to promote a 'mastery for all' approach.

The teaching and learning that takes place in day to day Maths lessons is scaffolded in order to support pupils who need additional support and also to challenge those pupils who feel confident to deepen their understanding of the objective being taught- enabling all children to access what is being taught. Questioning and scaffolding vary to further support individual progress within lessons. All pupils are given ample opportunities to extend and further apply their learning once they show a solid understanding of the lesson objective. Misconceptions are dealt with immediately.

We achieve this through a range of strategies – in some lessons through three step challenges and in other lessons by organising the children to work in groups, pairs on open-ended problems or games. We use classroom assistants to support some children inside the classroom to ensure that all individual children experience inclusion within mathematics. In the upper key stage 2 classrooms, we attach an additional highly skilled teacher to teach lower achievers who require additional support to access the curriculum.

RESOURCES

All classrooms have a number line and a wide range of appropriate small apparatus including number lines, number squares, digit cards, Numicon, Diennes, Place Value Counters and Cuisenaire Rods. Calculators are available from the central storage area. The library contains a number of books to support children's individual research. A range of software is available to support work with the computers and interactive whiteboards in each classroom.

LEARNING FOR ALL

We ensure that all children have access to the New Curriculum. It is part of the school curriculum policy to provide a broad and balanced education for all.

SEND pupils:

- Learning Opportunities are matched to the needs of children with learning difficulties.
- Targets that set for individuals in an Individual Support Programme (ISP) are taken into account in daily planning.
- Pupils with learning difficulties in mathematics may receive extra support from a teacher, teaching assistant or learning support assistant, in order to consolidate and reinforce basic skills.
- Target children are given extra support by teaching assistants, SENCO, Maths subject leader, Class Teachers using the Top Tips intervention programme. Rapid maths and 1 to 1 maths support are also forms of additional support offered to pupils.

More-able pupils

- Enrichment activities organised to support the maths learning that happens at Eversley.
- All lessons involve challenges of non-routine problems to stretch and broaden the understanding of more able pupils

HOMEWORK

As per the updated homework policy, homework is set in accordance with the school's homework policy to support the teaching of mathematics (see Homework policy). This is set on a weekly basis in Year 1-Year 6 by each class teacher and parents are encouraged to be involved in their child's learning.

Homework is set either via an online tool called: My Maths or via the school's home learning platform: Teams. When MyMaths provides an opportunity to link National curriculum objectives to weekly homework tasks, this online tool will be used to support consolidation of learning. Where the objectives do not have any supporting homework on MyMaths, teachers set an online assignment via Microsoft Teams. For example, adapted White rose questions/challenges or number fluency practice.

ASSESSMENT FOR LEARNING

- Formative assessment is used to guide the progress of individual pupils in mathematics. It involves identifying each child's progress against the key objectives determining what they have learnt and what should be the next stage in their learning.
- We assess children's work from three aspects: long-term, medium-term and short term. We make short term assessments which we use to help our daily plans. These short-term assessments are closely matched to the teaching objectives.
- Medium term assessments are made to measure progress against the key objectives and to help us plan the next unit of work. Teachers use assessment appropriate to the level of the children which help them identify the specific level the children are at. They use this information to plan personalised learning targets from the children every term. We use White Rose Maths end of block assessments to assess pupils understanding.
- Long term assessments are made towards the end of the year using end of year tests and teacher assessments. We use the national test for Year 2 and Year 6 and the optional White Rose assessments for pupils at the end of Year 1, 3, 4 and 5.
- We use the information from the medium – term and long – term assessments to plot onto a tracking sheet (plotted in June, December and March) to assess how much progression is made by each child throughout the year. We pass the information on to the next teacher at the end of the year in order to help them plan for the new academic year.
- Assessing pupil progress through 'I can' statements. Pupils each have a target card in the front of their maths books. Teachers

highlight when objectives are met as a means of communicating with their pupils. The pupils can also see their next steps for moving on. This encourages self-assessment. Teachers assess whether pupils are 'working towards', 'working at' or 'working above' age related expectations termly.

FEEDBACK TO PUPILS AND TARGETS

Feedback to pupils about their progress in mathematics is achieved by effective formative assessment which:

- Aims to be encouraging and supportive and move children on;
- Next step marking which is often carried out through discussion between child and teacher during a task;
- May on occasions be carried out by pupils marking their own or each other's work when this is thought to be appropriate or effective;
- Targets are set each term against the key objectives. These are discussed with the individual and are based on both formative and summative assessment. Pupil's targets should be changed regularly when targets have been achieved.

REPORTING

Reporting to parents is done three times yearly through consultation evenings and annually through a written report. Reporting in mathematics will focus on each child's:

- Attitude to mathematics
- Competence in number skills and developing mathematical fluency
- Ability to apply mathematical knowledge to new situations.
- Ability to reason mathematically
- Review and setting of targets

RESOURCES & STAFF TRAINING

The Mathematics subject lead will ensure that:

- Each classroom has a range of mathematics manipulatives to promote conceptual understanding across the mathematics curriculum

- Regular Maths Hub and borough led Mathematics courses are attended and relevant information and training is disseminated to staff

- Whole school in-service training sessions are used to discuss current trends and practices in keeping with the new curriculum and linked to the whole school key priorities. We aim to provide at least one in-service training session each term devoted to whole staff training in the teaching and learning of mathematics.