'At Yealmpstone Farm Primary School we promote equality between all people, recognising the Equality Act 2010'

Introduction

This policy outlines what we are aiming to achieve in respect of pupils' mathematics education at Yealmpstone Farm Primary School. It also describes our agreed approach to the planning, delivery and assessment of the English curriculum. The English taught and the methods used follow statutory requirements outlined in the following documents:

(A) The National Curriculum in England: Primary curriculum (Sept 2013)
(B) Statutory Framework for the Early Years Foundation Stage (Early Adopter Version – July 2020)

The aim of the policy is to provide information and guidance for teachers, governors and other interested persons.

Aim and purpose

Our aim is to provide pupils with the fluency and confidence to carry out a range of mathematical problems and solve them by utilising reasoning skills in each and every lesson. Pupils in Yealmpstone Farm Primary School display positive approaches to maths and display attitudes that embrace challenge.

The aims of the 2014 National Curriculum are for our pupils to:

- Become fluent in the fundamentals of mathematics through varied and frequent practice with complexity increasing over time.
- Develop conceptual understanding and ability to recall and apply knowledge rapidly and accurately.
- Reason mathematically; follow a line of enquiry, conjecture relationships and generalisations.
- Develop an argument, justification and proof by using mathematical language.
- Problem solve by applying knowledge to a variety of routine and non-routine problems. Breaking down problems into simpler steps and persevering in answering.

The purpose of mathematics in our school is to develop:

- positive attitudes towards the subject and awareness of the relevance of mathematics in the real world
- competence and confidence in using and applying mathematical knowledge, concepts and skills
- an ability to solve problems, to reason, to think logically and to work systematically and accurately
- initiative and motivation to work both independently and in cooperation with others
- confident communication of maths where pupils ask and answer questions, openly share work and learn from mistakes
- an ability to use and apply mathematics across the curriculum and in real life
- an understanding of mathematics through a process of enquiry and investigation.

Philosophy

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."

Mathematics equips pupils with the uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways. Mathematics is important in everyday life, critical to science, technology and engineering, and necessary in most forms of employment. It is integral to all aspects of life and with this in mind we endeavour to ensure that children develop a healthy and enthusiastic attitude towards mathematics that will stay with them.

General principles

Children who have mathematical fluency are confidently able to apply their mathematical knowledge and skills both at school and in their daily lives.

The new national curriculum for mathematics aims that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems overtime, 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 argument, justification or proof using mathematical language;

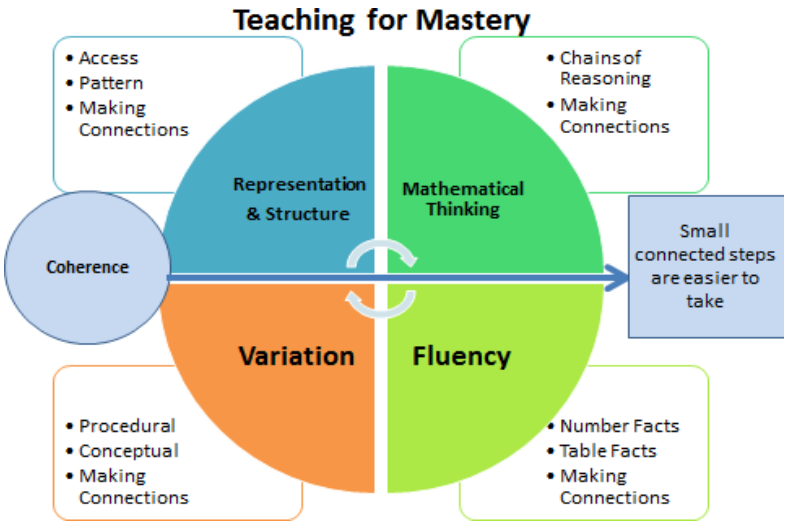
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Our school is committed to delivering a '**Mastery Curriculum**', which ensures continuity and progression in the teaching of mathematics. Within a unit of work, the time spent on teaching a specific learning objective or set of learning objectives depends on the needs of the children. A '**Mastery Curriculum**' is designed to create a learning atmosphere:

- Where all pupils can and will achieve
- With a focus on the development of deep structural knowledge
- Developing rapid recall of key number facts
- Through carefully chosen examples and representations supporting the opportunity to make connections between mathematical ideas
- Keeping the class working together wherever possible

- Spending longer time on key topics to ensure depth of understanding
- Providing regular problem solving opportunities in familiar and unfamiliar contexts.

What is teaching for mastery?



Fluency involves:

- Quick recall of facts and procedures
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics

Representation & Structure

Mathematical structures are the key patterns and generalisations that underpin sets of numbers – they are the laws and relationships that we want children to spot. Using different representations can help children to 'see' these laws and relationships.

Variation

Procedural variation – This is a deliberate change in the type of examples used and questions set, to draw attention to certain features.

Conceptual variation – When a concept is presented in different ways, to show what a concept is, in all of its different forms.

Mathematical thinking involves:

- Looking for pattern and relationships
- Logical Reasoning
- Making Connections

Alongside all of these areas the maths must be taught as a coherent journey, using small steps to build knowledge and constantly make connections/links to previous learning to maximise retention.

EYFS

Mathematics within the EYFS is developed through purposeful, play based experiences and will be represented throughout the indoor and outdoor provision. The learning will be based on pupil's interests and current themes and will focus on the expectations from Development Matters / Early Years Outcomes. Mathematical understanding can be developed through stories, songs, games, imaginative play, child initiated learning and structured teaching. As pupils progress, they will be encouraged to record their mathematical thinking in a more formal way.

Yealmpstone Farm primary school Mathematics Policy

Key Stage 1 Maths.

The principal focus of mathematics teaching in key stage 1 is to ensure pupils develop confidence and mental fluency. The essential idea behind the mastery approach is that all children have a deep understanding so that future learning continues to build on solid foundations. If the subject is represented using concrete materials, pictorial representations and abstract symbols (CPA Approach), it will allow children to visualise maths in varied ways, see connections and to independently explore and investigate a topic. Practical activities and resources offer the children a deeper mathematical understanding of more complex concepts. Providing children with visual representations also offers a scaffold when developing a more robust understanding of maths. Throughout Key Stage 1, it is important that children gain a secure knowledge of number and place value and become confident when using the four operations in both formal methods as well as problem solving where often the approach is not immediately evident. Alongside number work, pupils begin to identify fractions using shapes, objects and quantities and make connections to equal sharing and grouping. Pupils are taught to count to ten in fractions, recognise equivalent fractions and develop their understanding of fractions on a number line. At this stage, pupils will also develop their ability to recognise, describe, draw, compare and sort different shapes. Pupils have the opportunity to use a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money and are expected to use related vocabulary for all topics. Other subjects may have strong links to some maths topics allowing cross-curricular teaching. For example, shape through art or computing, measures through science or coordinates in geography. This is to ensure we continually maximise learning opportunities for all pupils across an entire curriculum.

Key Stage 2 maths

Lower Key Stage 2 – Years 3-4. The principal focus of mathematics teaching in lower Key Stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of Year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Upper Key Stage 2 – Years 5-6 The principal focus of mathematics teaching in upper Key Stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems.

Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of Year 6, pupils should be

fluent in written methods for all four operations,including long multiplication and division, and in working with fractions, decimals and percentages.

Inclusion

Teaching maths for mastery is different because it offers all pupils access to the full maths curriculum. This inclusive approach, and its emphasis on promoting multiple methods of solving a problem, builds self-confidence and resilience in pupils. Though the whole class goes through the same content at the same pace, there is still plenty of opportunity for differentiation. Taking a mastery approach, differentiation occurs in the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. There is no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with higher attaining children, or those pupils who grasp concepts quickly, challenged through more demanding problems which deepen their knowledge of the same content. Those children who are not sufficiently fluent are provided additional support to consolidate their understanding before moving on. Pupils' difficulties and misconceptions are identified through immediate formative assessment and addressed with intervention.

SEND Pupils

SEND pupils may be supported by additional adults, different resources or by using differentiated activities. They may also complete additional activities outside of the mathematics lesson.

NB: We have high expectations of all children and strongly believe that all children are equally able to learn mathematics. Some may take longer to grasp concepts and may need careful scaffolding or extra time/support (guided groups, pre-teaching, intervention groups) but when concepts are presented in the right way all children can learn.

Planning, learning and teaching:

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 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. (In line with the government's recently released document – 'Ready to Progress Criteria') Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

At Yealmpstone Farm Primary:

- All children receive a **daily maths lesson**, although mathematical skills run through many other areas of the curriculum.
- Each lesson focuses on one **clear learning focus** which all children areexpected to master; extension activities enable those children who grasp the objective rapidly to extend their learning by exploring it at greater depth.
- Each lesson can include elements of: **fluency**, to practise skills; **reasoning**, to deepen

understanding; and **problem solving**, to apply skills depending on the objective being taught and the understanding of the children.

- Teachers use the White Rose Mastery planning and other resources to draw up medium term plans for each term, and a daily lesson plan is produced to incorporate the above elements.
- Whole class teaching is adopted and children work in **mixed ability groups**.
- **Small steps** of learning will be planned for and used effectively to consolidate, assess and take learning forward.
- ***Questioning*** is the key to success in all of our mathematics sessions and questions will be continuously adapted by the teacher and support staff based on assessment for learning.
- Daily '***quick maths***' activities are taking place in each class (year 1 to year 6) to develop our pupils' mathematical fluency. Numbersense is a new initiative we are using to support the learning of new strategies to rapidly solve addition and subtraction facts. (Foundation – Y3 plus intervention groups in KS2)
- Teachers' plan of effective ***visual representation*** to support conceptual understanding is evident in each lesson.
- Pupils are given **physical resources** to manipulate during the lesson, hence deepening their understanding of the maths taught.
- Teachers are encouraged to teach and apply areas of mathematics, such as shapes, space, measure, handling data, ratio and percentages, in *other areas of the curriculum* to enable them to focus on teaching the key skills of mathematics during the formal maths lessons. It also enables the children to make greater connections between what they learn at school and real life.
- Lessons provide the children with opportunities to '**talk the mathematics**' speaking in full sentences to develop their mathematical vocabulary and consolidate their understanding of the maths being taught. Children are required to provide justification and reasoning for their answers. For example, 'I know the shape is a square because….'

Progression of calculation methods:

We have documents for progression in reasoning and progression in written calculation methods to ensure continuity and consistency throughout the school, and to provide exemplification to parents who wish to support their child. Please see separate documents.

Assessment:

Assessment is regarded as an integral part of teaching and learning and is a continuous process. It is the responsibility of the class teacher to assess all pupils in their class. This is firstly achieved through questioning, marking/pupil self-marking and verbal feedback throughout a lesson.

In addition to these assessment opportunities, teachers are using cold and hot assessment tasks at the beginning and end of each unit of work to show point to point progress, as well as termly assessment to support age-related judgement from the White Rose Maths Hub.

Furthermore, a whole school challenge has been put in place as an incentive for our pupils to develop their rapid recall of their times table facts, and to deepen their knowledge and understanding. 'Times Table Rockstars' and 'Numbots' allows the children to practise the times tables and number bonds that the teacher has set for them, with certificates for different levels. The up-to-date whole school and class records of this challenge show the progress in *fluency* in each class and can be used to assess needs and to feed into planning.

Monitoring and Review

The monitoring of maths teaching and pupil progress is the shared responsibility of teachers, subject leader and the senior leadership team. The work of the subject leader includes supporting colleagues in the teaching of maths, keeping up to date with current developments as well as providing a strategic lead and direction for the subject. The school's governing body receive regular updates to inform them of the vision for continually driving forward teaching for mastery.

Within school we regularly conduct peer review sessions whereby we critically look at Maths as a subject within the school. We observe lessons, speak to children/staff, analyse books/marking and ultimately come together as a staff to critique what we are doing well and what we want to improve.

Parental links:

The following parental links are in addition to those outlined in the 'Learning and Teaching' policy:

- all maths policies and documents are available on the school website and clearly illustrate the progression in calculation (both written and through reasoning);
- teachers have recorded videos of how they teach the four calculations. These videos are available to parents on the website;
- parents workshops are organised with relation to different curriculum areas.

Review date: **Autumn 2023**