Cadmore End
Church of England
Combined School

Maths Policy

Implemented: September 2023
Review July 2024

Member of staff responsible: Maths Lead

Cadmore End
Church of England Combined School

Maths Policy
2023-2024

From Small beginnings come great things.
The parable of The Mustard Seed. Matthew 13:31-32

We will apply our Christian and British values, complemented by our small-school benefits; balancing each child's educational, pastoral and emotional needs delivering an exceptional, personalized journey, enabling them to flourish in our family, our community and in the future.

Vision and Values

At Cadmore End Church of England Primary School, we believe that all of our children can become competent mathematians. The following policy is underpinned by our school values and reflects our school motto 'From small beginnings, come great things'.

INTENT:

We aim to ensure that the pupil's needs as learners and mathematicians are effectively met across the curriculum. We believe that all pupils in our school should be given the opportunity to access their year groups content, with appropriate support and challenge where needed.

We intend for our pupils to;

- become numerically fluent so that they have quick recall of number facts and the ability to apply these quickly.
- become fluent using methods to calculate so that the pupils know when and how to use a range of methods.
- be able to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, patterns and developing an argument, justification or proof using concise mathematical language
- solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication.
- be able to break down problems into a series of simpler steps and persevere in seeking solutions.
- use discussion in order to learn; they should be able to elaborate and explain clearly their understanding and ideas.

- develop a deep and sustained understanding of mathematical concepts, that are built on in subsequent lessons and units, through skilful planning and assessments.

- build knowledge of complex concepts through small steps.

- develop, understand and use accurate mathematical vocabulary.

- apply their mathematical skills to a range of areas across the curriculum.

Implementation

At Cadmore End, mathematics is taught through a mastery approach. We use the White Rose Hub as the main structure of our curriculum. This means that lessons are carefully planned and taught progressively, developing pupils' mathematical fluency, mathematical thinking and conceptual understanding. Lessons are planned using a small steps approach to ensure that pupils can build on learning to develop a deep understanding of concepts. Pupils' ability to connect new ideas to concepts that have already been understood is at the heart of this approach.

Each lesson begins with an opportunity to develop fluency. The pupils then are taught the main concept of the lesson, through use of manipulatives, a variety of representations, reasoning activities and problem solving. Learning is carefully scaffolded to support children to complete independent tasks. Each child will then complete the independent task for the lesson, with challenge questions to extend rapid graspers and appropriate support provided to those children who need it.

Impact

The aim of our approach to teaching maths is that pupils will;

- have developed numerical and conceptual fluency

- have developed reasoning and problem-solving skills

- have developed an understanding of how concepts in mathematics are interlinked

- be passionate and enthusiastic about mathematics and see how important mathematics is in everyday life

- have an understanding of a broad range of mathematical vocabulary

A MASTERY APPROACH

In September 2023, Cadmore End Church of England Combined School and Nursery joined BBO Maths Hub's "Mastery Readiness" programme. We are therefore at an early stage of our transition to a mastery approach to the teaching and learning of mathematics. We understand that this is a gradual process, with some elements of the approach taking several years to become fully embedded across the entire school. We are moving towards the approach described in this policy being in all classes across the school; at present, it is more developed in some classes than others.

What is Mastery?

Children are deemed to have 'mastered' a particular objective when they are able to build on it to develop understanding of new mathematics. For each objective, children must have enough conceptual and procedural fluency to enable them to solve non-routine problems in unfamiliar contexts without relying on memorised procedures.

Key Elements of Teaching for Mastery

Our teaching for mastery approach is underpinned by the NCETM's 5 big ideas.

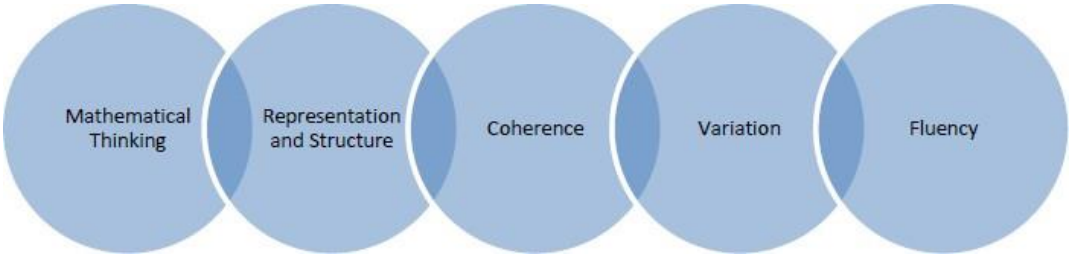


Fig.1: The NCETM's Five Big Ideas in Teaching for Mastery: https://www.ncetm.org.uk/resources/50042

Whole-Class Teaching

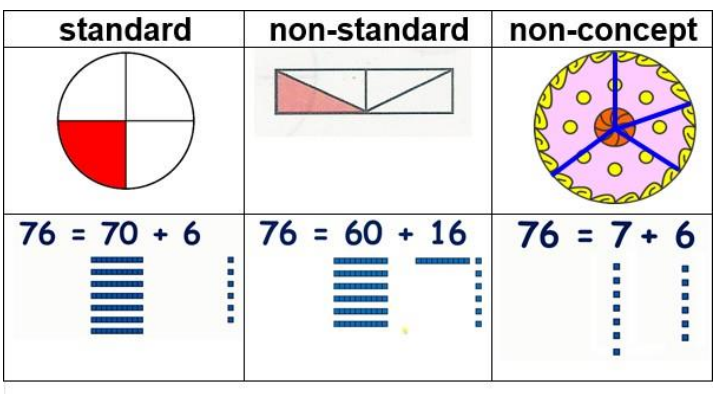
All children[1] are taught as a whole year group, and each child is given access to the same lesson content. All children will attempt the same, core task. Appropriate support is available for any child who might need it, and there are opportunities to deepen learning even further through the provision of more challenging questions and activities. No assumptions are made before the lesson about which children might need more support, nor which ones will likely move on to the more difficult tasks. In exceptional circumstances, for those children who have large gaps due to missed education or additional needs, they may be moved into year groups that are not theirs, in order to close gaps and enable them to catch up.

Longer Units of Work

Children no longer revisit maths topics each term. Instead, units of work are extended over several weeks, giving children plenty of time to grasp and rehearse every concept. Each topic is broken down into key skills which are then carefully mapped out into a coherent, logical sequence. These longer units of work allow children time to master each skill before they move onto the next. The longest time is dedicated to key mathematical topics and concepts. Regular retrieval practice takes place; that is, opportunities to revisit and apply content from previous units of work are incorporated into fluency sessions and main maths lessons.

Many and Varied Representations

A great deal of emphasis is placed on developing children's conceptual understanding. The majority of ideas in maths are entirely abstract, generally characterised by a string of symbols that, without an understanding of what they signify, are simply meaningless. In order for children to attach meaning to these abstract ideas, we need to expose them to the underlying mathematical structure. This is done through the use of concrete and pictorial resources, which help children to construct a mental image of the maths. To ensure that children gain a comprehensive understanding of each concept, teachers provide sufficient variation in the



representations and examples that they give.

Fig.2: Conceptual variation highlighting the essential features of one quarter and the partitioning of seventy-six.

Teachers also think carefully about the order in which they present questions so that important features of a conceptor strategy are emphasised.

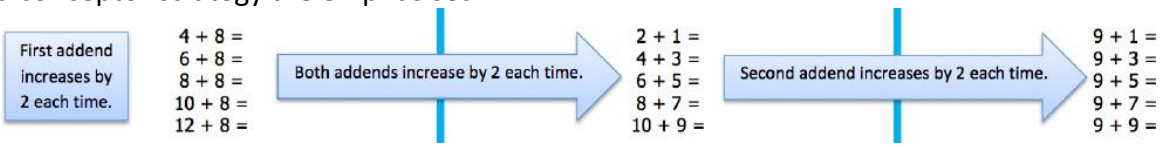


Fig.3: Procedural variation highlighting how an increase in one or both addends leads to a corresponding increase inthe sum.

Arithmetic

In the Foundation Stage, pupils are taught to 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.

In Key Stage 1, the principal focus of mathematics teaching is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This involves working with numerals, words and the four operations. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value.

In Key Stage 2, the principal focus of mathematics teaching is to ensure that pupils become increasingly fluent with whole numbers, fractions and the four operations, including number facts and the concept of place value. This will ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers, to include larger numbers as the pupils' progress. By the end of year 4, we aim for pupils to have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Fluency

Equal attention is also given to improving children's procedural fluency; that is their ability to recall core number facts (including addition, subtraction, multiplication and division facts) quickly and efficiently. Children are expected to learn some facts off by heart and they are taught mental strategies to quickly derive others. Much more time, particularly in Years 1 to 3, is now dedicated to developing these basic number skills. Children in every class are given daily opportunities in school to practise and develop their procedural fluency. Children in Years 2 to 6 use Sumdog at home and at school to support them to be able to recall rapidly the times tables.

The National Curriculum states that the principal focus of mathematics teaching in Key Stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value.

In the Foundation Stage, Nursery children are taught to develop fast recognition of up to 3 objects ('subitising'); recite numbers past 5; say one number for each item in order and show 'finger numbers' up to 5. Reception pupils are taught to verbally count beyond 20, recognising the pattern of the counting system; automatically recall number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts; subitise up to 5, as well as having a deep understanding of numbers to 10.

In Key Stage 1, the knowledge and skills developed in Foundation Stage are built upon and daily counting takes place.

In Key Stage 2, numerical fluency is developed through developing understanding and recall of number facts including multiplication facts and counting in specified steps beyond the 12 x 12 tables. Pupils also have the opportunity to count in decimals, fractions and whole numbers.

Reasoning and Problem Solving

In the Foundation Stage pupils are taught to use quantities and objects, pupils learn to add and subtract two single-digit numbers and count on or back to find the answer. They learn to solve problems, including doubling, halving and sharing.

In Key Stage 1 and 2 there are daily opportunities to solve a range of problems and develop a range of reasoning skills. Pupils are given the opportunity to orally rehearse their reasoning during lessons and create written reasoning responses. Each lesson includes reasoning questions which gives pupils the chance to explore a problem, discuss a solution and justify the method.

In Key Stage 1, pupils develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching also involves using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. They are able to discuss and solve problems in familiar practical contexts, including using quantities.

In Key Stage 2, pupils develop their ability to solve a range of problems, including those with simple fractions and decimal place value. Teaching ensures 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 ensures that pupils can use measuring instruments with accuracy and make connections between measure and number. By the end of year 6, we aim for pupils to be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Manipulatives and Pictorial Representations

As we follow a mastery approach to teaching we give pupils the opportunity to use concrete materials initially to develop an understanding of concepts. Teachers model pictorial representations to support understanding and pupils are encouraged to represent ideas using a range of representations. When pupils have a sound understanding of a concept they move on to an abstract representation, for example a formal written method.

Vocabulary

Children are encouraged to communicate what they think. They are expected to use precise mathematical language and to speak in full sentences so that mathematical ideas are conveyed with clarity. Teachers and teaching assistants support children by modelling this way of speaking. Vocabulary is outlined in the schools maths vocabulary progression document. Key vocabulary is then explicitly taught and modelled for the children to use in the lessons. This is then added to the maths working wall.

Early Intervention

Teachers identify children who are struggling with a concept within a lesson and immediate extra support is providedso that they are able to keep up with the rest of the class in the next lesson by providing post teaching support. For pupils, where the gap is greater, teachers will use the DFE Ready to Progress exemplification document and the NCETM PowerPoints to provide interventions to enable pupils to progress.

EYFS

Planning

Each week, the teachers in EYFS follow Mastering Number for four days and White Rose Maths Mastery Shape and Space for one day. The overview sets out the order in which topics should be taught and how much time should be dedicated to each one.

Timetabling

In Early Years, children have daily counting sessions, as well as number songs, lasting around 5 minutes. Reception have daily whole class maths lessons taught by the class teacher, lasting approximately 15 minutes. Nursery have a weekly maths session in small groups, led by the Nursery Teaching assistant, lasting approximately 10 minutes. These sessions are then consolidated through activities set up in the continuous provision.

In addition to these planned independent activities, children also have the opportunity to self-select resources to consolidate their maths learning during child-initiated activities. We recognise the importance of play-based learning and therefore encourage children to develop their understanding of different areas of maths during their inside and outside play.

Key Stages 1 and 2

Planning

The National Curriculum for England: Mathematics programmes of study (2014) provides the basis for all mathematics planning. To ensure whole-school consistency and progression, the White Rose Hub scheme is used to support planning in Years 1 to 6. All calculation methods taught follow the guidance given in the White Rose Hub calculation policy.

Long-Term Planning

Teachers in Years 1 to 6 follow the yearly overview for their year group set out by the White Rose Hub. The overviews set out the order in which topics should be taught and how much time should be dedicated to each one. On occasion, teachers may identify that a particular cohort requires additional time to achieve mastery of a certain topic or group of objectives. Teachers therefore exercise their professional judgement when deciding when to move onto the next unit of learning. This ensures that the skills children have previously learned are built upon and new knowledge is imparted in each unit.

Short-Term Planning

Teachers are not expected to produce short term plans for mathematics. However, the new mathematics being taught each lesson (including key points/steps and difficult points/anticipated misconceptions) is identified explicitly in the lesson slides (PowerPoint presentations). Teachers carry out formative assessment continually and, at times, in responding to this, they will alter the pace of progression through the planned material in order to better meet the needs of children.

Independent work consists of varied fluency, reasoning and problem-solving so each lesson deepens children's mathematical understanding. These questions are adapted when needed based on formative assessment of previous learning. When necessary, children will use manipulatives to show their knowledge of concepts before learning abstract methods and they are encouraged to continue to use them if they are not confident on new skills.

Lesson design and structure
Problem-solving is not seen as a separate activity but rather is embedded in every lesson. Carefully chosen contexts are provided for the abstract mathematical concepts being taught to provide extra scaffolding and so that children can develop their reasoning skills.

Teachers in Years 1 to 6 use the White Rose Hub booklets most days to consolidate learningand to assist with formative assessment. Teachers ensure that tasks are opportunities for "intelligent practice" (i.e. thatthey develop and embed fluency and conceptual knowledge). Children who grasp concepts rapidly are challenged through the provision of rich and sophisticated tasks rather than being accelerated onto new content. Additional support may be given in the following ways: further use of representations, carefully directed questioning, additional time and activities to consolidate understanding and the use of flexible focus groups.

Assessment
The assessment of mathematics is part of the overall assessment of the complete child and should be seen alongside all the other areas of development. Assessment in mathematics should reflect the general principles and procedures as in other areas of the curriculum.

Regular observations and assessments help to ensure that children who need additional intervention to consolidate their mathematical understanding are identified and supported by appropriate interventions.

At the end of every term, teachers working in Key Stages 1 and 2 will assess the children through the use of assessment materials provided by White Rose Hub. Pupils who are struggling with specific concepts are picked up through continuous assessments and given additional support. Evidence towards these assessments is collected throughout the year.
Towards the end of the academic year, teachers in Reception also make a judgement as to whether or not each child has met the level of development expectedat the end of the EYFS for each Early Learning Goal.

Teachers use the following assessments:

- EYFS and Year 1 and 2: Mastering number assessments
- Years 1 to 6: White Rose Hub end of unit assessments
- Years 1 to 6: White Rose Hub end of term assessment
- Years 2 and 6: Previous SATS papers

The recorded data from these assessments are used to track pupil progress and are discussed by the class teacher, SENDco and SLT during half termly Pupil Progress Reviews. These meetings assist class teachers to make adaptations to planning (and where required, to plan specific interventions) to ensure the needs of all children are met.

Teachers make long-term assessments towards the end of the school year. They use this data to assess progress against school and national targets. With the help of these long-term assessments, teachers are able to set targets andplan for the next school year. The long-term assessments are made using end-of-year tests and teacher assessment. Children undertake the national tests at the end of Years 6. The school will continue to use non-statutory KS1 SATS papers.

Recording and Presentation
All children in Years 1 to 6 have a maths book containing squared paper and a White Rose Hub booklet for every unit covered in the tear. Children may record in their books during the warm up questions, "guided practice" part of the lesson or fluency/arithmetic. Independent tasks will usually be completed in the White Rose Hub Maths booklets to support teachers to make assessments.

Children are always encouraged to record their own ideas and methods, using symbols, full sentences and

drawings. Children are encouraged to work as neatly as possible but fostering independent mathematical thinking is prioritised over presentation, particularly in Years 1 to 2. There should be a clear progression in children's ability to express themselves mathematically across the year, supported in the early stages by appropriate levels of adult modelling and scaffolding.

Children use only pencil in their maths books. In Key Stage 2, children write one number per square (with the exceptionof indices and fractions) and use rulers to draw straight lines. In Key Stage 1, children are also encouraged to make progress towards these expectations.

All written work in maths books and maths booklets is preceded by a short date next to the learning objective. Children then self-assess by drawing a face to let the teacher know how they found their learning for that lesson.

Feedback and marking

Research (Black et al. 2003) shows that the most effective and beneficial forms of assessment are ones which supportlearning (i.e. are formative) and are built-in to lesson design. To support assessment in mathematics, teachers:

- plan well-structured classroom activities;
- include regular discussions of answers and strategies, providing opportunities for pupils to develop reasoning skills and to check and deepen their understanding;
- provide children with plenty of opportunities for dialogue and interaction (with the teacher and with other pupils), focusing in particular on key ideas and concepts (including misconceptions and difficulty points) and effective, efficient ways of working.

Teachers are supported to focus on planning and teaching effective lessons (and to maintain a manageable workload) by the following, efficient approach to feedback and marking. Teachers regularly review children's work, both during (through 'live or 'over the shoulder' marking) and after lessons. They identify where pupils have made a simple slip and where their errors reflect a lack of understanding. Teachers point out slips verbally or highlight in pink highlighter to indicate where they occur. Children are then encouraged to self-correct these questions, and self-mark, through the use of purple pens. Teachers will highlight the learning objective either green or pink to show how the children have understood the concept for the lesson.

If errors demonstrate a lack of understanding, the teacher provides additional support, for example, one-to-one verbal feedback, additional modelling in a pupil's book or a same-day intervention with a small group of pupils. Where a large number of pupils demonstrate lack of understanding of a particular point or area, this is addressed with a whole-class review (immediately or at the beginning of the next lesson) or via the insertion of extra lessons into the unit of work.

Where a pupil has required additional support or scaffolding to complete a task, the nature of this support is recorded in the child's book by the teacher in the form of a '% supported' mark. This supports teachers to make accurate assessments and providesevidence for their judgements for internal and external moderation processes.

Representations and Resources

Resources are available for all classes and are stored within classes or in a central location.
Each classroom has a "Maths Working Wall" on which key vocabulary and representations are displayed.

Inclusion

Teachers are aware of children with identified special educational needs and disabilities and plan for their needs accordingly and on the basis of advice and guidance from the SENDco and external professionals.

Professional Development

All staff with be provided with regular professional development to support them with the teaching of mathematics. All new staff will receive appropriate support and initial training from the Maths Lead.

Home-School Links

We recognise that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the curriculum for each year group is available on the school's website, as well as guidance on end-of-year expectations and the calculation methods used across the school.

SumDog is used to support children's maths at home.

Parents and carers are informed of their child's progress at Parents Evenings and in the annual end of year report. Parents and carers are encouraged to speak to their child's teacher at any point during the year should they have any concerns or questions regarding their child's progress in mathematics; appointments can be made through the school office. The school also provides a number of opportunities for parents and carers to learn about the mathematics curriculum through parent workshops.

Monitoring and Review

The monitoring and evaluation of the Maths policy is the responsibility of the Maths Subject Leader who is responsibleto the Head teacher and the Governors for the development of Maths throughout the school.

Monitoring of the standards of the children's work and the quality of teaching in Maths is the responsibility of the Headteacher and the Maths Lead. The work of the Maths Lead also involves supporting colleagues in the teaching of Maths, being informed about current developments in the subject and providing a strategic lead and direction for the subject in the school.

The Maths Lead has an allocated regular management time in order to undertake the following:

- ensures teachers understand the requirements of the National Curriculum and supports them to planlessons. Leads by example by setting high standards in their own teaching;
- leads continuing professional development (CPD); facilitates joint professional development, e.g. lessonobservations and book scrutinys; provides coaching and feedback for teachers to improve pupil learning;
- leads the whole-school monitoring and evaluation of teaching and learning in mathematics by: observingteaching and learning in maths regularly; analysing assessment data in order to plan whole school improvement in mathematics; conducting work scrutiny to inform evaluation of progress; conducting pupil interviews;
- takes responsibility for managing own professional development by participating in external training,independent private study, engagement in educational research and scholarly reading;
- monitor and purchase resources;
- ensures that the school's senior leaders and governors are kept informed about the quality of teaching
  and learning in mathematics;
- works in close partnership with the SENDco to ensure the learning needs of all pupils in mathematics aremet effectively;
- keep parents informed of all mathematics issues;
- keep the maths policy under regular review