

Core Mathematics Policy

Richard Hill Church of England Primary School
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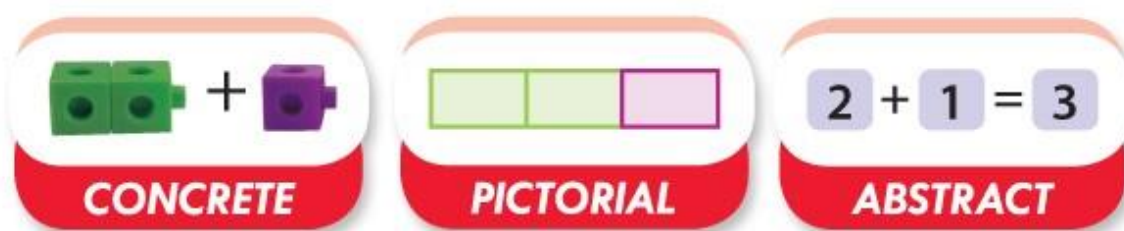
At Richard Hill CE Primary School, we strive for our children to be successful and proficient mathematicians. Maths is a life skill – we use it all the time for example when we are drawing, shopping, cooking, waiting for a train. The list is endless. We even use maths when we don't even realise it.

Our aim is that children:

- Reach age related expectation developing both a conceptual and procedural understanding of mathematical concepts and skills.
- Are fluent in their number skills. A large amount of time is spent on developing a love for learning maths and the exciting connections that can be made.
- Are supported by teachers to ensure that each and every child to be confident and proficient learners in maths. Teachers are responsible for delivering engaging, memorable lessons to promote a motivation to want to learn.
- Have the opportunity to work together and build their key learning skills of leadership, organisation, resilience, initiative and communication within their lessons.
- Demonstrate a growth mind-set displaying confidence, perseverance, enjoyment and curiosity for mathematics.
- Have plenty of time to build reasoning (the communication of thinking/metacognition) and problem solving elements into the curriculum.
- Communicate mathematical thinking using formal mathematical language

Mastery Teaching

To be successful in Maths, we recognise that pupils need to develop their conceptual understanding. In other words, pupils don't only need to be able to recall facts quickly, they also need to be able to apply their knowledge in a range of different contexts, including those that are new and unfamiliar. In order to develop conceptual understanding in our pupils, we are implementing the CPA approach to learning (concrete, pictorial and abstract). This approach recognises that in order for pupils to understand abstract concepts, they must first learn mathematical concepts through the use of concrete resources and pictorial representation.



Concrete is the 'doing' stage, using concrete objects to solve problems. It brings concepts to life by allowing children to handle physical objects themselves.

Pictorial is the 'seeing' stage, using representations of the objects involved in maths problems. This stage encourages children to make a mental connection between the physical object and abstract levels of understanding, by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem.

Abstract is the 'symbolic' stage, where children are able to use abstract symbols to model and solve maths problems.

Teaching and Learning of Mathematics

The Foundation Stage

Maths is taught to help children develop a love for number and Maths and with an aim of children achieving the Early Learning Goals designated as 'Mathematics' in the EYFS Curriculum. The EYFS Curriculum is made up of two strands: Numbers and Numerical Patterns. The children will receive some whole class and adult led maths teaching as part of which we follow 'Mastering Number' a scheme developed and created by NCETM to develop children's confidence in early number work. Children also have access to independent child-initiated maths activities daily. Children are given opportunities to work on maths activities both indoors and outdoors. These activities are planned based on the main areas as outlined in the EYFS curriculum as supported by 'Mastering Number' and with additional lessons and experiences planned in to the year to support early learning around shape, space and measure. EYFS staff also provide opportunities for the children to work on their maths targets both independently and as guided groups.

Key Stage 1 and 2

Planning

The New National Curriculum has several strands

- Number: number and place value, addition and subtraction, multiplication and division, fractions (and in Yr 5 & 6 only – percentages).
- Measure
- Geometry: properties of shape, position and direction
- Statistics (Year 2 onwards)
- Algebra (Yr 6 only)
- Ratio and Proportion (Yr 6 only)

Teachers follow the PowerMaths scheme of Learning as well as using other recommended resources to develop a learner's breadth and depth of an area.

Lessons are designed using a range of resources including PowerMaths, White Rose Maths Hub Planning Documents, Primarywise PIXL, Nrich and NCETM to support learning and develop opportunities to review, teach, practise and apply skills in all strands. Planning and teaching demonstrates how the aims of the National Curriculum are being addressed (reasoning, problem solving and fluency).

Teaching

In Key Stage 1 and 2 children have a daily mathematics session of approximately 75-90 minutes. New concepts are taught in small, progressive steps using a range of representations to develop children's awareness and understanding. There is additional time given during the week for mental maths and arithmetic practice. Planning across other subject areas also provides opportunities to apply a range of mathematical methods.

A typical lesson will follow a mastery approach and questioning to develop a deeper thinking of all students and this is encouraged across all elements of the lesson.

Mastery Maths – Lesson Design

<p>Whole Class Input An introductory activity for pupils. Mental maths and an open task that gives pupils the opportunity to talk and explore. New concepts are introduced through a concrete - pictorial - abstract approach. Vocabulary introduced. Teacher may use concrete equipment, models and images to develop understanding. Misconceptions are addressed.</p>	<p>Misconceptions What are the possible misconceptions? How will they be addressed within the lesson?</p>	<p>Vocabulary: Key language for each lesson Share with pupils Display in classroom</p>
<p style="text-align: center;">Guided Learning</p> <p>Pace and Timings This will vary from one lesson to another</p> <p>Teacher and pupil input where necessary. This part of the lesson might move between teacher and pupil. An opportunity for teachers and support staff to use AfL to identify any pupils who may need further support. Children may be regrouped and teacher/support staff may have a focused group.</p>		<p>Stem Sentence(s)/Success criteria: The main learning points Includes key vocabulary Shared and repeated by the children</p>
<p>Independent Work Intelligent practice. An opportunity to apply learning and develop both conceptual and procedural understanding.</p>	<p>Rapid Interventions</p>	<p>Questioning: A range of open and closed questions Provokes higher order thinking</p>
<p>Differentiation: 'Differentiation includes finding an alternative route to get to high-levels of thinking. It's not teaching them low-level maths.' Yeap Ban Har Consider ways of supporting your struggling learners and providing greater depth for your rapid graspers</p>		

Extra support

Every child learns differently to one another and it is important that we give all children the opportunity to learn and fulfil their potential. Interventions that are based on PIXL will be used as an additional learning tool to help students to secure their learning and develop knowledge to suit all individual learning needs.

Greater Depth and Special Educational Needs (SEND)

Our school provides a fully inclusive maths curriculum where teaching and learning is differentiated appropriately to meet the needs of all learners with challenge for all.

SEND Provision

If a child has a specific difficulty relating to maths that is listed on their ESP, they may be given extra time or additional support with a teacher or LSA to address their specific needs and to support and develop their maths knowledge and skills accordingly. Children working well below age related expectations will be given the opportunity to develop mastery at the stage they are working at.

Wherever possible children with special educational needs and/or a disability will work on the same curriculum content as their peers; however, it is recognised that a few children may need to work on earlier curriculum content than that designated for their age. The principle, however, of developing deep and sustainable learning of the content they are working on will be applied.

Opportunities for Greater Depth:

Where children are excelling in an area of maths, they will be given further opportunities to deepen their understanding and apply higher order thinking skills through carefully planned tasks. This includes opportunities for pupils to conjecture themselves and test their own ideas.

To develop mastery with greater depth, pupils will be given the opportunity within lessons to:

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

EAL Provision

Care is taken to diagnose when an error is caused by language proficiency or a mathematical difficulty. When language is the barrier to learning, mathematics is made 'clearer' and opportunities are provided to enable EAL pupils to engage with the learning and convey and develop their mathematical ability.

Assessment

Class teachers are responsible for assessing individual children's attainment in maths in line with the school's Assessment format. Parents will be informed of children's progression in maths twice a year during parent meetings, through a yearly report and half termly short reports.

Maths assessment happens in 2 forms:

- *Formative* – the day to day assessment that takes place continually and informs teacher's short term planning e.g. work output, observation notes, questioning.
- *Summative* – formal assessment that takes place termly for years 1-5 and half termly for year 6. Additional assessments may take place at the end of a strand of learning and all year groups will make a judgement for the whole year taking into account all evidence gathered through formative assessments e.g. work in books, end of unit reviews, SATS tests (Year 2 and 6).

Assessment records

Assessment records are kept by all class teachers. In the Foundation Stage teachers continually monitor children learning and create a whole class learning journey with observations, photographs and work samples which details the children's progress in maths. Class teachers also keep more formal records directly relating to learning objectives and Early Learning Goals.

In Key Stage 1 and 2 teachers' records may include annotated planning, notes on observations, photographs, written work recorded in maths books and assessment input from tests.

Assessment for Learning (Afl) in maths

Children are expected to assess their own learning in maths. This can take different forms depending on the age and ability of the children. In the early stages of Afl, children will be expected to talk about their learning by identifying what they are good at and what they find hard and what they need to get better at. As children move through the school they will begin to talk in more detail about their learning and areas for improvement. Children will self-assess using the traffic light system of red, amber and green to identify their own competence at a particular objective. This is recorded in their books.

Expectations

All pupils should be working at age related or greater depth for each year group as stated in the National Curriculum 2014.

By the end of Foundation Stage, most children, when assessed against the Early Learning Goals for Mathematics, will be judged as 'expected' this means that they have reached the level of development expected at the end of the EYFS. For example, they will:

- Count from 1 to 20 and place numbers in order.
- Say which number is one more or one less than a given number.

- Using quantities and objects: add and subtract two single digit numbers; count on or back to find the answer and solve problems, including doubling, halving and sharing.

By the end of Year 1 children are expected to achieve Age Appropriate Expectations or above. For example, they will:

- Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- Count, read and write numbers to 100 in numerals
- Count in multiples of twos, fives and tens
- Given a number, identify one more and one less
- Read and write numbers from 1 to 20 in numerals and words.
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract one-digit and two-digit numbers to 20, including zero

By the end of Year 2, teachers will use class work and SATs test results to make a level judgement about children's attainment. Children are expected to achieve Age Appropriate Expectations or above. For example, they will:

- Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward
- Recognise the place value of each digit in a two-digit number (tens, ones)
- Compare and order numbers from 0 up to 100
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables
- Recognise odd and even numbers
- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
 - a two-digit number and ones
 - a two-digit number and tens
 - 3 one-digit numbers
- Find simple fractions, e.g. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$ of shapes & amounts.
- Tell and write the time to five minutes

By the end of Year 3, teachers will use class work and test results to make a level judgement about the children's attainment. Children are expected to achieve Age Appropriate Expectations or above. For example, they will:

- Count from 0 in multiples of 4, 8, 50 and 100
- Find 10 or 100 more or less than a given number
- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- Compare and order numbers up to 1000
- Read and write numbers up to 1000 in numerals and in words
- Add and subtract numbers mentally, including:
 - a three-digit number and ones
 - a three-digit number and tens

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- Add and subtract fractions with the same denominator within one whole
- Know the number of seconds in a minute and the number of days in each month, year and leap year

By the end of Year 4, teachers will use class work and test results to make a level judgement about the children's attainment. Children are expected to achieve Age Appropriate Expectations or above. For example, they will:

- Count in multiples of 6, 7, 9, 25 and 1000
- Find 1000 more or less than a given number
- Count backwards through zero to include negative numbers
- Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- Order and compare numbers beyond 1000
- Solve number and practical problems that involve all of the above and with increasingly large positive numbers
- Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- Recall multiplication and division facts for multiplication tables up to 12×12
- Add and subtract fractions with the same denominator
- Read, write and convert time between analogue and digital 12 and 24-hour clocks

By the end of Year 5, teachers will use class work and test results to make a level judgement about the children's attainment. Children are expected to achieve Age Appropriate Expectations or above. For example, they will:

- Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero
- Add and subtract whole numbers with 4 or more digits
- Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$)
- Convert between different units of metric measure including time

By the end of Year 6, children will take their statutory KS2 test. Children are expected to achieve Age Appropriate Expectations or above. For example, they will:

- Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- Add, subtract, multiply and divide numbers with up to 4 digits using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division
- Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places

- *Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions*
- *Express missing number problems algebraically*
- *Convert between miles and kilometres*