Wordsworth Primary School

Maths Policy

Approved by:	Julie-Anne Palfrey, Headteacher	
		Date: 10.10.23
Last reviewed on:	**10.10.23**	
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At Wordsworth Primary School, we strive to '*use every relevant subject to develop pupils' mathematical fluency. Confidence in numeracy and other mathematical skills is a precondition of success across the national curriculum.*' National Curriculum, 2014.

'Children's chances of success are maximised if they develop deep and lasting understanding of mathematical procedures and concepts.' National Centre for Excellence in the Teaching of Mathematics (NCETM), 2021.

Mathematics is a universal language that helps us to understand the world and is a core part of the curriculum. As well as teaching about numbers, shapes, statistics and patterns, it provides important tools for work in areas such as physics, architecture, medicine and business. It helps learners to develop logical and methodical thinking, to focus and to solve a wide range of mathematical problems. Ofsted – Coordinating Mathematical Success, 2023.

How we teach Maths at Wordsworth Primary School

At Wordsworth, we use a Teaching for Mastery approach to ensure that our pupils develop a deep, secure and adaptable understanding of mathematics. Our maths curriculum is designed to ensure a coherent and detailed sequence of essential content to support sustained progression over time. We teach maths through a process of modelling, guided practice, applying and deepening using a variety of concrete and pictorial representations to support a conceptual understanding of the subject.

Children are taught to make independent use of concrete and pictorial resources to support their understanding, and to use mathematical vocabulary to explain their thinking. Problem solving skills are clearly modelled and taught to enable children to tackle problems independently. Our pupils develop mathematical learning behaviours such that they can engage fully as learners who reason and make mathematical connections.

The Maths Curriculum

Our school follows the National Curriculum 2014 and the programmes of study set therein for each year group.

- Our planning is informed, but not dictated, by the NCETM Curriculum Prioritisation and Professional Development documents. Teachers can use or adapt activities for fluency, reasoning and problem solving within each learning journey.
- Our planning is further supported by quality maths resources, such as those provided by White Rose, Testbase, NRICH and Maths Shed.

Our Principles of Teaching

- Explicit modelling of skills and knowledge
- Use of concrete, pictorial and abstract representations of number
- Teaching of key mathematical vocabulary
- A high level of mathematical dialogue between teachers and pupils
- Scaffolds and guided practice to support children's understanding
- Small step progression in conceptual understanding as children move through the school
- Independent practice to develop pupil automaticity

Fluency, Reasoning and Problem Solving

These are three key areas required to gain a deep mathematical understanding. 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 will make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They will also apply their mathematical knowledge to science and other subjects.

Planning for Maths Lessons

Planning for maths follows the National Curriculum programmes of study for each year group and the curriculum maps suggested by the NCETM Curriculum Prioritisation. Teachers use the agreed format of planning across the school to outline the small steps needed to enable the children to reach the intended learning outcome. Learning is progressive and ensures children are taught the skills, knowledge and understanding needed over the unit so that by the end of the unit good progress is evident.

Planning is not over detailed or bureaucratic. The intention of planning at Wordsworth is to provide a structure of small learning steps and set out the appropriate teaching points and vocabulary to support this learning. Rather than adding detail to plans, more time is used discussing the steps, teaching points and key vocabulary between teachers and supporting adults. Adults discuss:

- the desired endpoint of the learning
- any barriers or misconceptions that exist in the current understanding
- what concrete and pictorial resources will be used and how they will be used
- key questions that will help adults to assess pupils' understanding of the concept
- the key vocabulary and sentence stems
- how to stretch and challenge more confident children

Planning has a sequence of inputs to teach the children the key skills they need to access the age-related mathematical problems independently. Teaching sequences involve concrete, pictorial and abstract methods of calculations (as appropriate) or mathematical skill to aid conceptual understanding of the objective. All inputs require an 'I do, We do, You do' model, where the teacher models the skill and then the children have the opportunity to practise the skill. Once a child has shown they are proficient in using this skill, they then have the opportunity to practise this skill in a range of ways.

Talk for Maths is essential to our pupils developing a secure mathematical understanding, and this supports their ability to reason and understand links between different mathematical concepts. Teachers plan for frequent opportunities for pupils to discuss their maths learning with their peers, and for them to prepare and rehearse their reasoning explanations.

All steps in the learning journey allow all children to become fluent, reason effectively and solve problems that are appropriate to their next steps. These statements do not reflect the learning journey. It is expected that all children will have opportunities to reason and problem solve at their level.

Concrete, Pictorial and Abstract Representations to Scaffold Understanding

Concrete representations are essential for children to develop conceptual understanding of their mathematics. Concrete representations are always used to support introducing new concepts and to support extending prior learning. All children participate in concrete activities in order to support their conceptual understanding. We do not need to take photos of children using concrete resources and stick these in books; this is evidenced in planning. Some of the concrete representations used at Wordsworth can be seen in Appendix 3.

Pictorial representations are the next essential step in conceptual understanding of mathematics. They enable children to explain and prove their own ideas. All children participate in pictorial activities in order to support their conceptual understanding. Children are taught how to draw their own pictorial representations, as well as to interpret given examples.

When children are confident with their conceptual understanding whilst using concrete and pictorial representations, teachers will then move them on to abstract representations of the same concept. Abstract representations do not always equate to formal written methods; they can also include other strategies including bar models, part-whole models and mental calculation. Children who still need concrete and pictorial representations will continue to use them, and children who have mastered the abstract method are moved on to tasks that deepen their understanding of the concept.

Number

Efficient, accurate recall of key number facts and procedures is essential for fluency, freeing pupils' minds to think deeply about concepts and problems, but fluency demands more than this. It requires pupils to have the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, and to choose appropriate methods and strategies to solve problems.

Our curriculum provides for explicit teaching of key number facts and procedures, and opportunities to practise these so that children become fluent. The required skills for each year group are detailed in the mental maths overview (Appendix 1). Children should be taught and given the opportunity to practise these skills at relevant points during maths lessons throughout the year.

All year groups in KS1 and KS2 practise the retrieval of previously taught material daily. This retrieval practice should be completed independently in the front of maths books at the start of each lesson. Children should be encouraged to recall strategies they have been taught and use these to solve fluency and problem-solving questions in a variety of contexts.

Pupils practise number fluency through 'Numbots' and 'Times Tables Rockstars'. Children are encouraged to use these online systems to practise their number fluency both at school and at home. Teachers monitor their pupils' progress and target further teaching to key number facts that the students have not yet mastered.

Mastering Number in EYFS and KS1

The Mastering Number programme secures firm foundations in the development of good number sense for all children from Reception through to Year 1 and Year 2. This ensures pupils leave KS1 with fluency in calculation and a confidence and flexibility with number. Attention is given to key knowledge and understanding needed in Reception classes, and progression through KS1 to support success in the future.

- Children are able to clearly communicate mathematical ideas
- Teachers have a secure understanding of how to build firm mathematical foundations
- Teachers demonstrate intentional teaching strategies focused on developing fluency in calculation and number sense for all children
- Teachers use appropriate manipulatives to support children's understanding of mathematical structures

Mathematics in EYFS

At Wordsworth, we believe that Mathematics should be firmly embedded into the curriculum through a mixture of child led, 'Discovery Time' opportunities and through adult led activities to support the maths curriculum. All children can and should achieve in maths and we teach to develop a secure and deep early understanding that lay the foundations of excellent mathematical enquiry and reasoning.

Children develop a deep understanding of numbers to 10 through the NCTEM Mastering Number programme, which they then apply to the rich and creative environment that Wordsworth has to offer. They are given

opportunities to explore other key areas of maths including exploring shapes, patterns and measuring, which ensures they have access to a well-rounded curriculum. Children play with what they know, discuss their ideas, experiment, are exposed to a wide range of supporting resources and are always given the opportunity to explain, ask questions and build on prior knowledge.

Inclusion in mathematics

Children identified as making slower progress than their peers at pupil progress meetings have a range of strategies put in place to accelerate progress. Changes to 'Quality First Teaching' (QFT) are made with a focus on these children. Teachers use QFT to close the gap to year group expectation rapidly. Teachers should use their professional judgement to identify which steps are essential in order to achieve this and ensure the difference to age-related expectation is closed rapidly. Interventions may be planned in over and above QFT to support gaps in learning.

Some pupils, who have been identified by the SENDCo, will require a more personalised learning journey. This follows the mathematics principles of the school and is consistent as planning and progress of these pupils is overseen by their class teacher and supported by the SENDCo where necessary.

Assessment in Mathematics

Teachers build in opportunities for independent tasks covering a range of content domains and key performance indicators (KPIs) which are used to support teacher assessment. These will include, but are not limited to, the 'Prove It' task at the end of each unit.

At the end of each term in Years 2-6, each child completes a National Test-style Standardised (NTS) assessment in Mathematics. These are then used by teachers to identify gaps and inform planning for the next term.

As part of our school assessment cycle, there are regular opportunities to moderate evidence in order to validate teacher judgements both in school and across the JEP partnership. Year teams also carry out informal moderations in the lead up to data entry points at the end of each term. The National Curriculum and Hamwic KPIs are used to inform judgements.

Evidence used for teacher assessments and moderation must be independent.

Appendix 1 – Mental Maths Overview

Year	Objective mental maths regular chanting/games starter
1	▪ count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number ▪ count in multiples of twos, fives and tens ▪ given a number, identify one more and one less ▪ read numbers from 1 to 20 in numerals and words. ▪ read numbers to 100 in numerals
2	▪ count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward ▪ read numbers to at least 100 in numerals and in words ▪ recognise the place value of each digit in a two-digit number (tens, ones) add and subtract numbers mentally, including: ▪ a two-digit number and ones ▪ a two-digit number and tens ▪ two two-digit numbers ▪ adding three one-digit numbers ▪ recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
3	▪ 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 ▪ read 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 ▪ a three-digit number and hundreds ▪ recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables ▪ calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental methods ▪ count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10

4	▪ 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) ▪ round any number to the nearest 10, 100 or 1000 ▪ recall multiplication and division facts for multiplication tables up to 12 × 12 ▪ use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers ▪ recognise and use factor pairs and commutativity in mental calculations ▪ count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
5	▪ read, 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, including through zero ▪ round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 ▪ read Roman numerals to 1000 (M) and recognise years written in Roman numerals. ▪ add and subtract numbers mentally with increasingly large numbers ▪ identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers ▪ know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers ▪ establish whether a number up to 100 is prime and recall prime numbers up to 19 ▪ multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers ▪ multiply and divide numbers mentally drawing upon known facts ▪ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
6	▪ read, write, order and compare numbers up to 10 000 000 and determine the value of each digit ▪ round any whole number to a required degree of accuracy ▪ perform mental calculations, including with mixed operations and large numbers

Appendix 2 – Times Tables

Year 2

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Year 3

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- use place value, known and derived facts to multiply and divide mentally

Year 4

- recall multiplication and division facts for multiplication tables up to 12 × 12
- multiply and divide whole numbers by 10, 100, 1000
- use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; dividing by 1; and multiplying three numbers together

Year 5 & 6

- recall multiplication and division facts for multiplication tables up to 12 × 12
- identify multiples and factors, including finding all factor pairs of a number and finding common factors of 2 numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Recognise and use square and cube numbers
- multiply and divide numbers involving decimals by 10, 100, 1000
- multiply and divide numbers mentally, drawing upon known facts e. 8 x 7 = 56 therefore 8 x 700 = 5600

	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Year 2	2s	5s	10s	All	All	All
Year 3	2s, 5s, 10s	3s	4s	8s	All	All
Year 4	2s, 5s, 10s, 3s, 4s, 8s	6s, 9s, 12s	7s, 11s	All	All	All
Year 5 & 6	2s, 5s, 10s & Related Facts	3s, 6s, 12s & Related Facts	4s, 8s & Related Facts	7s, 9s, 11s & Related Facts	All & Related Facts	All & Related Facts

Teaching

It is essential that times tables are explicitly taught as a method of mental calculation for multiplication AND division. This must include specific whole-class teaching of individual times tables, alongside regular practice of those tables that have already been taught.

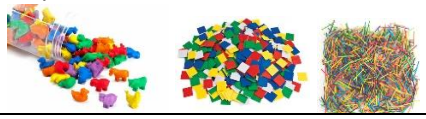
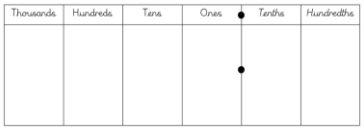
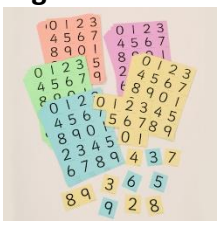
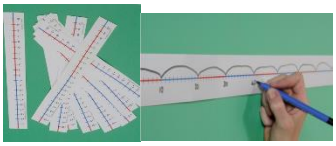
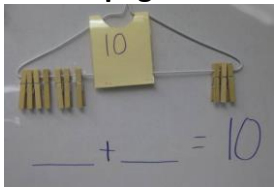
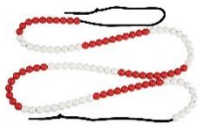
* Explicit teaching of each times table for each year group BEFORE any written multiplication methods teaching.
* Written multiplication should focus mainly on the times tables for the year group and any previously learnt tables facts (not the next year group times tables).
* There should be no whole class teaching/practising of any times tables that are beyond each year groups' expectations.
* Mathematical language is explicitly taught in relation to multiplication and division, e.g. Factors, multiples, product, divisor, dividend, quotient

Practising

Practice is important to ensure that previously taught times tables are remembered and embedded. On a regular basis, known times tables are over-learnt in order to ensure automatic recall.

Practise continues to expose children to times tables in a variety of different representations, not just purely reeling off a list of numbers in that times table. This improves confidence with times tables, and speed of application, both of which are important for developing automaticity and freeing up working memory.

Appendix 3 – Concrete Resources

Place value counters (including decimals and fractions) **All Classes** 	**Counting equipment** (matchsticks, counters, animals etc) **KS1 and LKS2** 	**Base ten equipment** (e.g. dienes) **All Classes** 
Place value arrow cards  **All Classes**	**Geoboards**  **All Classes**	**Cuisenaire rods**  **All Classes**
Place value grids  **All Classes**	**Straws** (grouping, sharing, counting, base ten applications, geometry)  **All Classes**	Laminated **part whole model** cards  **All Classes**
Digit cards  **All Classes**	**Egg boxes** (division, grouping, fractions, alternative tens frames…)  **KS1 and LKS2**	**Playing cards**  **All Classes**
Number lines – structured and blank  **All Classes**	**Clothes pegs**  **KS1 and LKS2**	**Dice**  **All Classes**
Multilink / unifix cubes  **All Classes**	**Bead strings**  **KS1 and LKS2**	**Number shapes** (e.g Numicon)  **All Classes**
Fraction tiles / foam fraction bars  **Year 2 upwards**	**Tens frames** (laminated cards or plastic / foam framed)  **KS1 and LKS2**	**Dominoes**  **KS1 and LKS2**