



# How We Teach Maths at Wildmoor Heath School

September 2024

## **MATHEMATICS INTENT**

At Wildmoor Heath, we aim to deliver a curriculum that meets the needs of our children through our unique curriculum drivers, which are: Opportunities, Communication, Community, Creativity, Environment and Well-Being.

We aim for all our children to be confident, happy and resilient mathematicians who relish the challenge of maths. We want to create independent and reflective learners whose skills not only support them in maths but also helps across the whole curriculum and in later life.

In addition to this, our aims align with that of the national curriculum, which are to develop learners who are: fluent in the fundamentals of maths; able to reason mathematically and able to apply their maths to a range of problem-solving scenarios.

## **MATHEMATICS IMPLEMENTATION**

### **White Rose Scheme**

At Wildmoor Heath we use the Maths Mastery approach and follow the White Rose maths schemes of work which map out all the units of work for the whole year (**Appendix 1**). Within each unit the small steps across a unit of work are mapped out so that the children can master each conceptual step before moving on to the next. All resources and materials can be found here: <https://whiterosemaths.com/>.

## **LESSON PLANNING AND RESOURCING**

Each small step is mapped out in the White Rose schemes of work. This includes a context for the lesson and examples of fluency, reasoning and problem-solving tasks. Teachers at WMH are expected to plan their maths learning journeys using these small steps.

A maths lesson will consider the following parts, which is based on the EEF Improving Mathematics in Key stage 2 report (**Appendix 2**):

- Maths recall, which is a low stakes activity to embed key skills from previous learning.
- Revisit and secure the prior key learning before exposure to the new learning.
- Predicting misconceptions and address these in the teaching input.
- Teacher modelled examples of the new learning.
- Independent/collaborative activity with examples to develop understanding.
- Using manipulatives to support understanding when necessary.

At the end of each lesson teachers, using live marking and formative assessment, assess how each child has progressed and plan the following lesson accordingly.

In addition to this, we also use the most recent Government guidance to support the teaching of the key objectives that allow our children to be ready to move on to their next learning stage. This guidance can be found here:

<https://www.gov.uk/government/publications/teaching-mathematics-in-primary-schools>.

## CONCRETE PICTORIAL ABSTRACT

The lessons are created with a concrete, pictorial, abstract (CPA) approach. This means that for new learning, children should use concrete resources first, then represent this pictorially before moving to abstract recording of maths. This process helps the children develop a strong understanding of the concept being taught. For more information on this please follow the link here: <https://thirdspacelearning.com/blog/concrete-pictorial-abstract-maths-cpa/>

## MATHS RECALL STARTERS

Learning can be defined as moving information from the short-term memory to the long-term memory. For this to happen, science has shown that repetition is key. As a result, at the beginning of every maths lesson, we complete a maths recall starter. This starter gives children the opportunity to recall and rehearse concepts and skills that have already been taught in the past. The questions should be purposeful and linked to the needs of the children. Therefore, the following are used to decide on the recall questions:

- 1) What have the children got wrong previously?
- 2) What area of maths did the children find most challenging?
- 3) What do the children need to recall to access the learning the following week?

## NUMBER FACT MASTERY SESSIONS

### EYFS and Key Stage 1

Research has shown that pupils who are not able to recall number facts easily struggle with other concepts, such as calculation, later on in their school journey. Many children benefit from a systematic approach to learning number facts. We are part of the **NCETM's Teaching for Mastery: Number** program:

<https://www.ncetm.org.uk/news/mastering-number-a-new-programme-for-early-primary-pupils/>

This scheme provides all lessons and resources to teach daily, 15-minute maths mastery sessions for Year R, Year 1 and Year 2 and builds a strong foundation of number.

### Key Stage 2

In daily number fact fluence sessions, which last 15 minutes, Key Stage 2 children practise multiplication facts as well as other arithmetic skills.

The expectation for primary school children is that all times tables up to  $12 \times 12$  will be learnt by the end of Year 4. Research suggests that speed and memory activities are not the best way for children to become fluent in their understanding of multiplication facts and that it is more important to develop "number sense" rather than memory. Therefore, it is best for children to learn times tables using a balanced approach, teaching and rehearsing them both conceptually and through repetition and low stakes testing.

These sessions include a range of the following activities.

- Recognising multiplication facts conceptually in a range of forms e.g. arrays.
- Repeated addition
- Multiple counting, which involves number lines, counting sticks, chanting and progresses to missing multiples out and counting backwards.

## **TIMES TABLE ROCKSTARS**

At home, so that the rehearsal of facts is continued, children use Times Table Rockstars ([TTRS](#)), which allows the children to practise their tables and their recall speeds are recorded. Children are then given instant feedback and facts that are less fluent are identified and revisited.

## **CALCULATION POLICY**

When teaching calculation methods, we follow the school calculation policy which has been designed to match the methods used in White Rose.

## **UNIT ASSESSMENTS**

Following the completion of each maths unit, White Rose have created a short assessment which aims to test the children's understanding of what has been taught. These assessments are completed by the children two weeks after the teaching to see if the learning has truly been embedded. These assessments are used to identify areas which have not been retained or not fully understood. These concepts can then be revisited again in recall sessions and later on in the year.

The outcomes of these assessments are used to inform teachers as to whether the children are working at their year group's expected standard.

At the end of each term, children are given HeadStart Arithmetic and Reasoning Assessments to identify scaled scores and overall progress across the key stage and year.

## **IMPACT**

Once a term, Teachers meet with senior leaders to discuss how the children are progressing in maths. Teachers decide whether children are working below (WTS), at (EXS) or above (GDS) the year's expected standard based on what has been taught already. This information is generated from teacher assessment, end of unit assessments and end of term summative assessments and is recorded on the All in One Tracker spreadsheet.

In Pupil Progress Meetings, with senior leaders, children are compared to their previous statutory assessment point and their progress to date is evaluated. Children who are making less progress from their starting points become focus children and discussed again at the following PPM. If necessary the SENCO can become involved at this stage to offer suggestions for appropriate interventions.

The maths subject leader and members of the SLT complete termly lesson visits and book looks, as well as talking to pupils about their learning.

# Appendix 1: Year Group Overviews (White Rose Scheme of Learning)

## Year 1

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value (within 10)					Number Addition and subtraction (within 10)					Geometry Shape	Consolidation
Spring	Number Place value (within 20)			Number Addition and subtraction (within 20)			Number Place value (within 50)		Measurement Length and height		Measurement Mass and volume	
Summer	Number Multiplication and division			Number Fractions		Geometry Position and direction	Number Place value (within 100)		Measurement Money	Measurement Time		Consolidation

## Year 2

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value				Number Addition and subtraction					Geometry Shape		
Spring	Measurement Money	Number Multiplication and division					Measurement Length and height		Measurement Mass, capacity and temperature			
Summer	Number Fractions			Measurement Time			Statistics		Geometry Position and direction		Consolidation	

## Year 3

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value			Number Addition and subtraction				Number Multiplication and division A				
Spring	Number Multiplication and division B			Measurement Length and perimeter			Number Fractions A		Measurement Mass and capacity			
Summer	Number Fractions B		Measurement Money	Measurement Time			Geometry Shape		Statistics		Consolidation	

## Year 4

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value				Number Addition and subtraction			Measurement Area	Number Multiplication and division A			Consolidation
Spring	Number Multiplication and division B			Measurement Length and perimeter		Number Fractions			Number Decimals A			
Summer	Number Decimals B		Measurement Money	Measurement Time		Consolidation	Geometry Shape		Statistics	Geometry Position and direction		

## Year 5


	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value			Number Addition and subtraction		Number Multiplication and division A			Number Fractions A			
Spring	Number Multiplication and division B			Number Fractions B		Number Decimals and percentages			Measurement Perimeter and area		Statistics	
Summer	Geometry Shape			Geometry Position and direction		Number Decimals			Number Negative numbers	Measurement Converting units		Measurement Volume

## Year 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number Place value	Number Addition, subtraction, multiplication and division						Number Fractions A		Number Fractions B		Measurement Converting units
Spring	Ratio		Algebra		Number Decimals		Number Fractions, decimals and percentages		Measurement Area, perimeter and volume		Statistics	
Summer	Geometry Shape			Geometry Position and direction	Themed projects, consolidation and problem solving							

## IMPROVING MATHEMATICS IN THE EARLY YEARS AND KEY STAGE 1

### Summary of recommendations

**1**  Develop practitioners' understanding of how children learn mathematics

- Professional development should be used to raise the quality of practitioners' knowledge of mathematics, of children's mathematical development and of effective mathematical pedagogy.
- Developmental progressions show us how children typically learn mathematical concepts and can inform teaching.
- Practitioners should be aware that developing a secure grasp of early mathematical ideas takes time, and specific skills may emerge in different orders.
- The development of self-regulation and metacognitive skills are linked to successful learning in early mathematics.

**2**  Dedicate time for children to learn mathematics and integrate mathematics throughout the day

- Dedicate time to focus on mathematics each day.
- Explore mathematics through different contexts, including storybooks, puzzles, songs, rhymes, puppet play, and games.
- Make the most of moments throughout the day to highlight and use mathematics, for example, in daily routines, play activities, and other curriculum areas.
- Seize chances to reinforce mathematical vocabulary.
- Create opportunities for extended discussion of mathematical ideas with children.

**3**  Use manipulatives and representations to develop understanding

- Manipulatives and representations can be powerful tools for supporting young children to engage with mathematical ideas.
- Ensure that children understand the links between the manipulatives and the mathematical ideas they represent.
- Ensure that there is a clear rationale for using a particular manipulative or representation to teach a specific mathematical concept.
- Encourage children to represent problems in their own way, for example with drawings and marks.
- Use manipulatives and representations to encourage discussion about mathematics.
- Encourage children to use their fingers – an important manipulative for children.

**4**  Ensure that teaching builds on what children already know

- It is important to assess what children do, and do not, know in order to extend learning for all children.
- A variety of methods should be used to assess children's mathematical understanding, and practitioners should check what children know in a variety of contexts.
- Carefully listen to children's responses and consider the right questions to ask to reveal understanding.
- Information collected should be used to inform next steps for teaching. Developmental progressions can be useful in informing decisions around what a child should learn next.

**5**  Use high quality targeted support to help all children learn mathematics

- High quality targeted support can provide effective extra support for children.
- Small-group support is more likely to be effective when:
  - children with the greatest needs are supported by the most experienced staff;
  - training, support and resources are provided for staff using targeted activities;
  - sessions are brief and regular; and
  - explicit connections are made between targeted support and everyday activities or teaching.
- Using an approach or programme that is evidence-based and has been independently evaluated is a good starting point.



# Improving Mathematics in Key Stages Two and Three – Recommendations Summary

## 1

Use assessment to build on pupils' existing knowledge and understanding

- Assessment should be used not only to track pupils' learning but also to provide teachers with information about what pupils do and do not know
- This should inform the planning of future lessons and the focus of targeted support
- Effective feedback will be an important element of teachers' response to assessment
- Feedback should be specific and clear, encourage and support further effort, and be given sparingly
- Teachers not only have to address misconceptions but also understand why pupils may persist with errors
- Knowledge of common misconceptions can be invaluable in planning lessons to address errors before they arise

## 2

Use manipulatives and representations

- Manipulatives (physical objects used to teach maths) and representations (such as number lines and graphs) can help pupils engage with mathematical ideas
- However, manipulatives and representations are just tools; how they are used is essential
- They need to be used purposefully and appropriately to have an impact
- There must be a clear rationale for using a particular manipulative or representation to teach a specific mathematical concept
- Manipulatives should be temporary; they should act as a 'scaffold' that can be removed once independence is achieved

## 3

Teach pupils strategies for solving problems

- If pupils lack a well-rehearsed and readily available method to solve a problem they need to draw on problem-solving strategies to make sense of the unfamiliar situation
- Select problem-solving tasks for which pupils do not have ready-made solutions
- Teach them to use and compare different approaches
- Show them how to interrogate and use their existing knowledge to solve problems
- Use worked examples to enable them to analyse the use of different strategies
- Require pupils to monitor, reflect on, and communicate their problem solving

## 4

Enable pupils to develop a rich network of mathematical knowledge

- Emphasize the many connections between mathematical facts, procedures, and concepts
- Ensure that pupils develop fluent recall of facts
- Teach pupils to understand procedures
- Teach pupils to consciously choose between mathematical strategies
- Build on pupils' informal understanding of sharing and proportionality to introduce procedures
- Teach pupils that fractions and decimals extend the number system beyond whole numbers
- Teach pupils to recognise and use mathematical structure

## 5

Develop pupils' independence and motivation

- Encourage pupils to take responsibility for, and play an active role in, their own learning
- This requires pupils to develop metacognition – the ability to independently plan, monitor and evaluate their thinking and learning
- Initially, teachers may have to model metacognition by describing their own thinking
- Provide regular opportunities for pupils to develop metacognition by encouraging them to explain their thinking to themselves and others
- Avoid doing too much too early
- Positive attitudes are important, but there is scant evidence on the most effective ways to foster them
- School leaders should ensure that all staff, including non-teaching staff, encourage enjoyment in maths for all children

## 6

Use tasks and resources to challenge and support pupils' mathematics

- Tasks and resources are just tools – they will not be effective if they are used inappropriately by the teacher
- Use assessment of pupils' strengths and weaknesses to inform your choice of task
- Use tasks to address pupil misconceptions
- Provide examples of concepts and non-examples
- Use stories and problems to help pupils understand mathematics
- Use tasks to build conceptual knowledge in tandem with procedural knowledge
- Technology is not a silver bullet – it has to be used judiciously and less costly resources may be just as effective

## 7

Use structured interventions to provide additional support

- Selection should be guided by pupil assessment
- Interventions should start early, be evidence-based and be carefully planned
- Interventions should include explicit and systematic instruction
- Even the best-designed intervention will not work if implementation is poor
- Support pupils to understand how interventions are connected to whole-class instruction
- Interventions should motivate pupils – not bore them or cause them to be anxious
- If interventions cause pupils to miss activities they enjoy or content they need to learn, teachers should ask if the interventions are really necessary
- Avoid 'intervention fatigue'. Interventions do not always need to be time-consuming or intensive to be effective

## 8

Support pupils to make a successful transition between primary and secondary school

- There is a large dip in mathematical attainment and attitudes towards maths as children move from primary to secondary school
- Primary and secondary schools should develop shared understanding of curriculum, teaching and learning
- When pupils arrive in Year 7, quickly obtain a good understanding of their strengths and weaknesses
- Structured intervention support may be required for Year 7 pupils who are struggling to make progress
- Carefully consider how pupils are allocated to maths classes
- Setting is likely to lead to a widening of the attainment gap between disadvantaged pupils and their peers, because the former are more likely to be assigned to lower groups