Mathematics at Windmill Primary School

Intent
'Every child a mathematician'

Mathematics is vital for the life opportunities of our children. Our aim is for all children to think mathematically, enabling them to reason and solve problems in a range of contexts. We believe that every child has the right to achieve without a preconceived limit being put on their ability or attainment. The ability to succeed is not fixed and this is clear in both lesson design and class teaching. Therefore, children are given the opportunity to access each lesson and the role of the teacher is to scaffold learning so that gaps are short, if there at all.

At Windmill Primary School, our Mathematics Mastery curriculum has been developed to ensure every child can achieve excellence in mathematics. Children can experience a sense of awe and wonder as they solve a problem for the first time, discover different solutions and make links between different concepts; providing pupils with a deep understanding of the subject through a concrete, pictorial and abstract approach. This ensures pupils fully understand what they are learning. The design of the Mastery curriculum caters for the needs of every child; including different abilities, pupils on the special educational needs and disabilities register and pupils with English as an additional language.

Key features of our Maths Mastery curriculum:

- High expectations for every child
- Fewer topics, greater depth
- The answer is just the beginning – Focus on mathematical thinking, language and reasoning
- Concrete, pictorial and abstract resources
- Calculate with confidence– understand why it works and make links.

Planning:

The National Curriculum is delivered through the use of a range of resources. Although we are guided by White Rose-we supplement this with some of the other best resources that we find- such as from the NCETM. The termly overviews identify the objectives for each topic block, which are derived directly from the National Curriculum. The objectives in each block are broken down in to a series of carefully planned small steps. The content should be taught in order as it is designed to gradually develop children's understanding and show progression.

How lessons are taught? Implementation

There are aspects of mathematics teaching which will be seen in every classroom at Windmill:

Lesson starters:

KS1: The lesson should start with a number song, or an activity related to our school created 'counting and multiplication scheme. This scheme focuses on developing the fluency of number and addition facts, counting, doubling and use of near doubles. The teacher uses their AFL to decide which activity to select.

KS2: The lesson should start with either a timetable dance/ song, or an activity from our School created 'counting and multiplication document. This not only focuses on developing recall of multiplication facts, but counting forward and backwards from different two digit numbers- focusing on crossing boundaries such as 100, 1000, 10 000, 100 000- depending on the year group.

Following this, there should be a few questions related to key arithmetic skills. 'Fluent in 5' is often the preferred resource for this. This is an important part of the lesson, to ensure the children regularly re-visit the key arithmetic skills – which therefore helps them develop their fluency, confidence- including a feeling of success, and for any children who may not be secure- they are provided with the chance to see the concept modelled regularly.

In some class, you may also see a Rapid Reasoning question after this. This is to help develop exposure to reasoning questions, provide an opportunity to discuss key mathematical vocabulary and re-visit previously taught concepts from a range of year groups, while identifying the teacher to any 'gaps,' – which will then feed in to their future planning.

Fluent in 5 and Rapid Reasoning were included into lessons as concept of 'revisiting previous content/ skills' is based on looking into research on the brain and research demonstrating the massive benefits of 'spaced practice.'

During the main lesson:

- A ping-pong approach is used- where children are presented with the opportunity to work on a problem and have chance to feedback their strategies and methods, allowing the teacher to pick up and misconceptions, re-model if needed and provide further questions to reinforce/ embed the learning.
- During this ping-pong approach, children work in mixed attainment pairings for part of the lesson and talk and explanation are encouraged. To encourage the development of language, STEM sentences are used regularly.
- Children will often have access to multiple representations and use concrete, pictorial and abstract representations alongside each other, where possible, to develop deep understanding of concepts and methods.

- After this Ping Pong approach, children are often provided with a chance to work independently to enable them to apply and re-inforce their learning
- Adults use skilful questioning to reveal, probe and address misconceptions
- Children who grasp concepts rapidly are challenged through rich and sophisticated problems
- Scaffolding is provided for children when required
- Ping-pong may take up a larger part of the lesson than previously 'traditional inputs.'
- The independent work will often be marked together as a class, with the children using green pen, enabling the teacher to re-address any misconceptions, reinforce the key learning points and have the information instantly available to decide which children need selecting for 'same day intervention.'

End of the lesson:

- Don Nao Jin/ Problems solving questions are used to get the children to really think and apply their learning.
- This time may also be used to reflect on the learning of the day.

*Key note: the vast majority of children attempt to access each lesson as a class. Teachers and teaching assistants will use their judgement to determine whether or not children will remain in the whole class teaching or spend part of the lesson working on personalised learning.

*Due to small steps and lesson design, it enables roughly 10mins for the lesson starter, and 45 mins on the new small-step teaching.

Here is an example of the planning check list teachers have been provided with:

Maths lesson planning checklist	Yes/ No
When planning the lesson, have I thought about the small step approach?	
Starter: Does my lesson start with a x table dance/ number fluency song? Or have I included work from the school counting starter.	
Starter: Have I included 3/4 arithmetic questions, based on fluent in 5? Children can choose the order they attempt the questions in/ tailored it to the needs of the class.	
Starter: In KS2 have I included a 'rapid reasoning problem' solving question? This leads to a discussion of language and recap of previously covered content, relating to work on the brain. Or shall I do it outside the Maths lesson?	

Main teaching: Are the children working in mixed attainment pairings during the teaching/ guided practice?	
Are Stem sentences being used and the children encouraged to answer in full sentences?	
Am I using a 'ping-pong approach?' – having the children feedback responses after attempting a question, uncovering misconceptions, addressing these, and then continuing to move the learning forwards.	
The lesson has been planned with the aim of helping all children achieve and meet the requited expectations- as opposed to using the chilli challenge.	
Have I included a Don N Jin? / A harder problem solving question at the end of the lesson?	
Have I got and am I using the Maths working wall to support learning, that includes the following areas: concrete, pictorial, stem sentences, key vocabulary, amazing mistakes Don Nau Jin	
Is same day intervention/ assembly being used to pick up children who have not achieved, before the next lesson?	

Impact

- All children will have a greater conceptual understanding of number and calculation. They will be able to visualise and generalise more readily due to a more in-depth understanding.
- All children will be fully supported through accessing concrete equipment and use of visual models to support understanding.
- All children will be challenged through exposure to unfamiliar problems, development of reasoning skills and by exploring multiple ways to manipulate numbers and solve problems

Assessment timetable: Alongside formative assessment, that is used daily, we also carry out summative testing once a term. Below is the summative assessment timetable. These are used to help identify gaps and inform next steps in planning and interventions.

	Autumn Term	Spring Term	Summer Term
EYFS	Reception Baseline	Teacher Assessment.	Teacher Assessment VS ELG
Year 1	Teacher assessment.	NFER Paper 1 and Paper 2	NFER Paper 1 and Paper 2.
Year 2	NFER Autumn arithmetic and Autumn Reasoning	NFER Spring arithmetic and Spring Reasoning	End of KS1 SATS
Year 3	NFER Autumn arithmetic, Test 1 and Test 2.	NFER Spring arithmetic, Test 1 and Test 2.	NFER Summer arithmetic, Test 1 and Test 2.
Year 4	NFER Autumn arithmetic, Test 1 and Test 2.	NFER Spring arithmetic, Test 1 and Test 2.	NFER Spring arithmetic, Test 1 and Test 2.
Year 5	NFER Autumn arithmetic, Test 1 and Test 2.	NFER Spring arithmetic, Test 1 and Test 2.	NFER Spring arithmetic, Test 1 and Test 2.
Year 6	2018 SATS	2019 SATS test	SATS

- Tests are to only be used once. Data carries over from the previous term- so please do not use the same autumn test for a baseline and then re-do the same test later in the term.
- Teachers will record the standardised score on insight.
- For children working significantly below, the Sandwell Test will be used to monitor progress.

- We carry out End of unit mini-assessments. There are analysed and the teachers acts upon them accordingly- offering further support to address any areas of need.

Official Interventions:

- Success at Arithmetic - Year 4
- Plus 1
- Power of 2
- Staff are currently being trained in first-class number
- Same day intervention is also used to close any gaps for the next lesson.

Feedback:

At Windmill Primary school, formative assessment is integrated into the lesson. During the teaching input, children will share their answers with the teacher, verbally or in books or whiteboards. Teachers use this information to pick up misconceptions and feedback the required strategies needed to answer the question. During the session, using the ongoing assessment, the teacher may add extra questions into the lesson to help develop the understanding of the children before they then move into independent practice.

After taking part in the independent practice, the children will either self-mark it, or the teacher may choose to tick, highlight or dot the answers.

The objective is highlighted green if the children have achieved and pink if they have not. Where possible, children who receive pink will receive some same day intervention or extra support.

We do not use gap tasks as we believe that the ‘next step’ is the next lesson.