Mathematics Policy

Intent

At Windmill, we understand that mathematics teaches children how to make sense of the world around them: to calculate, reason and solve problems; to understand relationships and identify patterns. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

We adopt a mastery approach to teaching mathematics, believing that **all** pupils can be successful mathematicians. Our mathematics curriculum is based on National Curriculum objectives and is influenced by the resources and schemes of learning from White Rose Maths Hub. Inspiration for many of the pedagogical strategies employed come from the work of Craig Barton (How I Wish I'd Taught Maths).

All pupils, within a year group, work on the same objectives at the same time. However, work is set at an appropriate level, with pupils being given the support and challenge relative to their own developmental needs. We also acknowledge the value of pupils having rapid recall of basic fluency facts such as number bonds, times tables, equivalences etc. Such aspects are developed as an aid to general arithmetic and to free up working memory so that pupils can apply their knowledge to deep thinking tasks and problem solving.

We aim for all Windmill mathematicians to:

- be fluent in the fundamentals of mathematics,
- be confident, creative and curious in using and exploring the number system recognising number in various representations,
- be competent in using arithmetical procedures,
- quickly recall key facts, methods and formulae and the meaning of key terminology,
- apply their conceptual understanding to reason logically and articulate their thoughts and justifications,
- be **courageous** and **positive** when solving problems, **reflecting** on prior knowledge and past successes and failures, and adopting a systematic approach where possible,
- be **resilient**, **adaptable** leaders within their own their learning, understanding that struggle is often a necessary step in learning,
- work both independently and collaboratively - demonstrating **respect** and **teamwork** – within a safe, secure learning environment.

Implementation

Subject pedagogy

At Windmill, the way we teach mathematics is based on **four key principles**:

- A dedicated **daily mathematics lesson**, with direct teaching, modelling and questioning - with the whole class and/or groups – at its heart.

- An emphasis on learning and **recalling key mathematical facts** and concepts that underpin all other areas of maths.
- Personalised **differentiation** so that all pupils are engaged in mathematics lessons and given support and challenge relative to their own developmental needs.
- Developing **positive attitudes towards challenge**: pupils understand that productive struggle is often necessary for learning new concepts and committing knowledge to long term memory.

Daily lessons

Mathematics lessons are planned and delivered so that all children receive a daily diet of varied fluency, reasoning and problem solving, using carefully chosen resources from White Rose, Nrich and NCETM, among others. Teachers use medium term plans to ensure the learning sequence has maximum effect: ensuring that it builds on prior knowledge, consolidating conceptual understanding and skills where possible. Direct instruction involves targeted questioning to probe thinking and high quality modelling of mathematical processes and strategies; learners are then supported to work independently through the optional use of modelled support sheets. Lessons are structured so that all groups are supported in their learning and are working on appropriately pitched tasks to ensure all children are challenged and make progress. We support the use of concrete resources and varied representations of number within lessons to guide learners through the concrete, pictorial and abstract stages of learning, ensuring our children gain a deep and sustainable understanding of mathematical concepts.

Active maths

Active maths sessions take place on a daily basis to ensure children's continuing development of fluency and calculation. Key skills that underpin ability in all other areas of maths, such as those involving times tables, doubling and halving, number bonds and place value, are practised in a fast-paced and engaging session. Children also practise their ability to complete arithmetical procedures at speed.

Number talks

Number talks sessions enable children to develop their confidence when exploring and learning about the number system. Number talks enable children to work collaboratively and creatively to develop their conceptual understanding of mathematical concepts, particularly in the four operations. This supports learners' confidence and competence in completing mental arithmetic as well as their ability to make connections and spot patterns in the number system.

Anchor tasks

An anchor task is a problem given to students at the beginning of mathematics lessons that provides an opportunity to activate prior knowledge and tackle misconceptions, requires students to collaborate and ask questions, and promotes an environment for students to productively struggle and persevere in problem solving. A teacher's role during an anchor task is to facilitate discussion and guide thinking through questioning.

Intervention

Interventions play a key part in the way we teach mathematics at Windmill. Interventions can take a number of forms and be carried out for a number of purposes: to ensure that all learners are

competent in using basic mathematical skills that allow them to be successful in their current year group's objectives, to pre-teach certain skills or concepts prior to a specific unit of work, or to follow up with particular learners to ensure that objectives are securely met. Interventions are carefully designed so that they are short and fast-paced, and planned based on Assessment for Learning and/or gap analysis from summative assessment, ensuring that children are targeted based on their personal needs.

Mathematics Curriculum Planning

Mathematics is a core subject in the National Curriculum and we use it as a basis for implementing the statutory requirements of the programme of study for mathematics.

We carry out curriculum planning in three phases: long-term, medium-term and short-term. The plans are sequenced in such a way to maximise opportunity for consolidation of mathematical understanding, skills and concepts through making connections between blocks of learning. Plans are kept and reviewed by the subject leader and Head teacher.

As part of a sequence of lessons, class teachers complete a plan or a Smartboard note book file for each mathematics lesson. These list the specific learning objectives and give details of how to teach the lessons.

We plan the activities in mathematics so that they build on the prior learning of the children. We give children of all abilities the opportunity to develop their skills, knowledge and understanding in the three strands of the subject: fluency, reasoning and problem solving. We use an adapted version of White Rose to support and deepen our planning and learning experiences for the children.

The Foundation Stage

We teach mathematics in both Foundation 1 and Foundation 2. As part of the Foundation Stage of the National Curriculum, we relate the mathematical aspects of the children's work to the objectives set out in the Early Learning Goals, which underpin the curriculum planning for children aged three to five. We give all children ample opportunity to develop their understanding of number, measurement, pattern, shape and space, through varied activities that allow them to enjoy, explore practise and talk confidently about mathematics.

Mathematics in Foundation Stage is initially developed through stories, songs, games and imaginative play using concrete resources. A positive approach to numeracy around the classroom helps the children to begin to relate mathematics to their everyday lives.

Pupils are gradually introduced to more formal aspects of mathematics through Numicon and other activities. Children are sometimes encouraged to record by representing their ideas in any way they see fit. Pupils learn to write numerals and begin to record number problems as part/whole diagrams.

At Windmill, our Foundation Stage uses the Number Sense programme to support our youngest children in understanding number, by working on the 'Four Cs': change, composition, comparison and counting. This develops their thinking and understanding as children learning to see numbers represented in many different ways. Through this thorough approach, we aim for our children to leave the Foundation Stage confident and competent with numbers to 20.

Contribution of mathematics to teaching in other curriculum areas

English

The teaching of mathematics contributes significantly to children's understanding of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, in mathematics lessons, we expect children to read and interpret problems, and present their work to others during lessons. Our learning focusses greatly on children's depth of understanding and we encourage our children to reason and explain their understanding both verbally and in writing. This supports children's development of English greatly as they learn to speak and write clearly and articulately.

Personal, social and health education (PSHE) and citizenship

The work that children do outside their normal lessons encourages independent study: it helps them to become increasingly responsible for their own learning and respect each other's views. We aim to link as much mathematical learning as possible to real life situations; for example, we present children with real-life situations on the spending of money.

Spiritual, moral, social and cultural development

At Windmill, we believe that through the mathematics curriculum, we are offering experiences that are both challenging and inspiring of the highest possible standards. These experiences are designed to ensure breadth, depth and relevance, as well as progression irrespective of gender, ethnic background, aptitude and ability. Children are encouraged in mathematics lessons to think creatively, use teamwork and discussion when solving problems; to be reflective about their own thoughts and opinions as well as respecting others'; and are taught that our mathematical knowledge is a result of a myriad of cultural inputs.

Computing

Computing enhances the teaching of mathematics significantly; computing is particularly useful in demonstrating mathematical concepts, and modelling ideas and methods. Younger children use computing to communicate results with appropriate mathematical symbols. Older children use it to produce graphs and tables when explaining their results, or when creating repeating patterns.

Children use the online resources Mathletics and Times Tables Rock Stars to support their learning both in school and at home.

Mathematics and Inclusion

At our school, we teach mathematics to all children, whatever their ability and individual needs. Mathematics forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our mathematics teaching, we provide learning opportunities that enable all pupils to make good progress. We strive to meet the needs of those pupils with special educational needs, those with disabilities, those with special gifts and talents and those learning English as an additional language, and we take all reasonable steps to achieve this.

When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style, differentiation – so that we can take some additional or different action to enable the child to learn more effectively. Assessment against the National Curriculum allows us to consider each child's attainment and progress against expected levels. This ensures that our teaching as matched to the child's needs.

Teachers identify areas of difficulty for children early to ensure pre teach interventions are put in place, ensuring children feel more able to tackle the maths during lessons. Post teach interventions ensure that any children within a lesson who need further support have a clear understanding of concepts taught.

Intervention through SEN Support will lead to specific monitoring and strategies put in place in order to help individual progress. Most children with Special Educational Needs will be monitored and tracked through class provision maps, and targets will be set accordingly. Some children with EHCPs (Educational Health Care Plans) may have specific targets around their learning.

Children who are identified as 'higher able' or 'gifted and talented' in mathematics are encouraged and challenged. This includes providing resources that enable them to explore all areas of mathematics in a variety of ways and explain their understanding.

Assessment for Learning

Teachers will assess children's work in mathematics from three aspects (long-term, medium-term and long-term).

We use short-term assessments to help us adjust our daily plans. These short-term assessments are closely matched to the teaching objectives.

Medium-term assessments to measure progress against the key objectives are carried out termly using Nfer mathematics tests. These results are analysed and then used to support planning for mathematics teaching in the next term.

We make long-term assessments towards the end of the school year, and we use these to assess progress against school and national targets. We can then set targets for the next school year and make a summary of each child's progress before discussing it with parents. We pass this information on to the next teacher at the end of the year to support in planning for the next year. We make long-term assessments with the help of end-of-year tests and teacher assessments. We use the national tests for children in Year 2 and Year 6.

Moderation of children's work supports teachers in making accurate judgements about a child's attainment and progress. Teachers meet regularly to review individual examples of work against the national exemplification material produced by the DfE.

Monitoring and Review

The monitoring of the standards of children's work and of the quality of teaching in mathematics is the responsibility of the subject leader. The subject leader reviews and evaluates their action plans and their budget annually. They also conduct 'deep dives' into their subject throughout the year to gather a range of evidence from interviews with teachers, pupils, work scrutiny, planning and analysis of data.

The role of the subject leader also involves supporting colleagues in their teaching, being informed about current developments in the subject, and providing a strategic lead and direction for mathematics in the school.

Maths books are monitored by the Maths Lead on a half termly basis. Learning walks are undertaken regularly. Areas of strength and development are reported to staff and the Head teacher, and used to inform further CPD within school.

Impact

We measure impact through learning walks, work scrutiny, formative and summative assessment, and pupil/parent/teacher voice.

The impact of our mathematics curriculum is that Windmill mathematicians:

- see the value in learning mathematical concepts and find learning mathematics an enjoyable experience,
- know that quick recall of facts, methods and terminology helps them to be successful in all areas of mathematics,
- feel safe and secure to be creative and ambitious without fear of failure, in the knowledge that the journey to the answer is what is most important.

Mathematics books will show that our children:

- complete a variety of tasks and activities involving fluency, reasoning and problem solving
- can recognise and understand number and concepts in a variety of representations,
- are competent in using and applying arithmetical procedures.