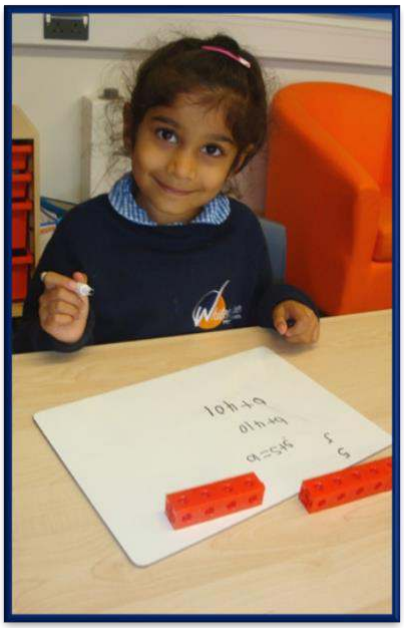
Mathematics at Whitehouse Primary School



Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary in most forms of employment.

At Whitehouse Primary we believe a high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject.

At Whitehouse Primary we teach mathematics for mastery, an engaging and accessible style of mathematics teaching. Our approach enhances mathematical understanding, enjoyment and achievement for every child. Children are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols. Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience.

We have a commitment that ALL pupils can and will achieve in mathematics by providing opportunities for all pupils to develop the depth and rigour they need to make secure and sustained progress over time.

We want children to have:

A secure understanding of each taught concept to help them make mathematical connections.
A broad range of skills in using and applying mathematics.
An understanding of the importance of mathematical skills in everyday life.
A fluent knowledge and recall of number facts and the number system.
A commitment to and passion for mathematics
The ability to show initiative in solving problems in a wide range of contexts, including the new or unusual.
The ability to think independently and to persevere when faced with challenges, showing a confidence of success.
The ability to embrace the value of learning from mistakes and false starts.
The ability to reason, generalise and make sense of solutions.
A wide range of mathematical vocabulary.
Fluency in performing written and mental calculations and mathematical techniques.

Teaching Mathematics for Mastery

Since mastery is what we want pupils to acquire (or go on acquiring), rather than teachers to demonstrate, we use the phrase 'teaching for mastery' to describe the range of elements of classroom practice and school organisation that combine to give pupils the best chances of mastering mathematics.

Mastering maths means acquiring a deep, long-term, secure and adaptable understanding of the subject. At any one point in a pupil's journey through school, achieving mastery is taken to mean acquiring a solid enough understanding of the maths that's been taught to enable him/her move on to more advanced material.

Our approach is based on key principles:

Problem solving
Mathematical problem-solving is at the heart of our approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without grasping the principles.

High expectations
We believe no child should be left behind. We focus on pupils 'keeping up over catching up'. By making high expectations clear – and emphasising the high value of mathematics education – learners are encouraged to build confidence and resilience.

Concrete, pictorial, abstract
Objects, pictures, words, numbers and symbols are everywhere. Our approach incorporates all of these to help pupils explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding. Together, these elements help cement knowledge so pupils truly understand what they've learnt.

Depth before breadth
All learners benefit from deepening their conceptual understanding of mathematics, regardless of whether they've previously struggled or excelled. We believe pupils must be given time to fully understand, explore and apply ideas - rather than accelerate through new topics. This approach enables learners to truly grasp a concept, and the challenge comes from investigating it in new, alternative and more complex ways.

Growth mind-set
We believe our 'abilities' are neither fixed nor innate, but can be developed through practice, support, dedication and hard work. 'Natural talent' is just a starting point and does not determine who has more or less potential to achieve. This belief encourages a love of learning and resilience that enables everyone to achieve.

Mathematical language
The way pupils speak and write about mathematics transforms their learning. We use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary. We always ask pupils to explain the mathematics in full sentences (not just what the answer is, but how they know it's the right answer). This is key to building mathematical language and reasoning skills.

What will I see in mathematics lessons at Whitehouse Primary?

Whole class together – we teach mathematics to whole classes and do not label children. Lessons are planned based on formative assessment of what pupils already know and we include all children in learning mathematical concepts. At the planning stage, teachers consider the scaffolding that may be required for children struggling to grasp concepts in the lesson and suitable challenge questions for those who may grasp the concepts rapidly.

Longer but deeper – in order to ensure children have a secure and deep understanding of the content taught, our plans have been adjusted to allow longer time on topics and we move more slowly through the curriculum. Lessons are planned using White Rose Maths, NCETM Progression documentation and DFE Ready to Progress documents. Other resources such as NCETM PD Material, Shanghai Project are also used to support teaching and learning. Teachers adapt each lesson to meet the needs of their children and add extra questioning / tasks which will allow children to learn the content more deeply. The learning will focus on one key conceptual idea and connections are made across mathematical topics.

Key learning points and misconceptions are identified during planning and a clear journey through the maths developed.

Questions will probe pupil understanding throughout and responses are expected in full sentences, using precise mathematical vocabulary.

Fluency – fluency is the key to support progression and mathematical reasoning and understanding. There is a whole school focus on developing an instant recall of key facts, such as 'route' number facts, times tables and unit + unit addition facts

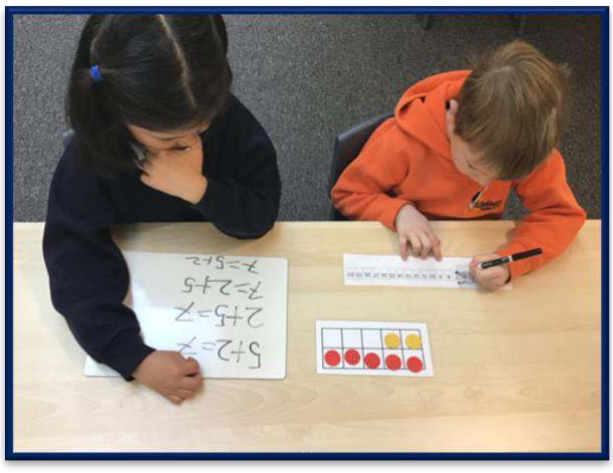
Early Years Foundation Stage

Children focus on the principles of counting and the ability to subitise as they develop their understanding of number, quantity and problem solving. Children explore each number to 10 including 0 in detail, focusing on one number at a time and then the number's relationship to other numbers. Thus enabling them to securely understand its value, the placement as well as to start to understand how each number can me made of other numbers.

Children use a range of everyday language as well as taught mathematical language to explore size, weight, capacity, position, distance, time and money when they compare quantities and objects to solve problems.

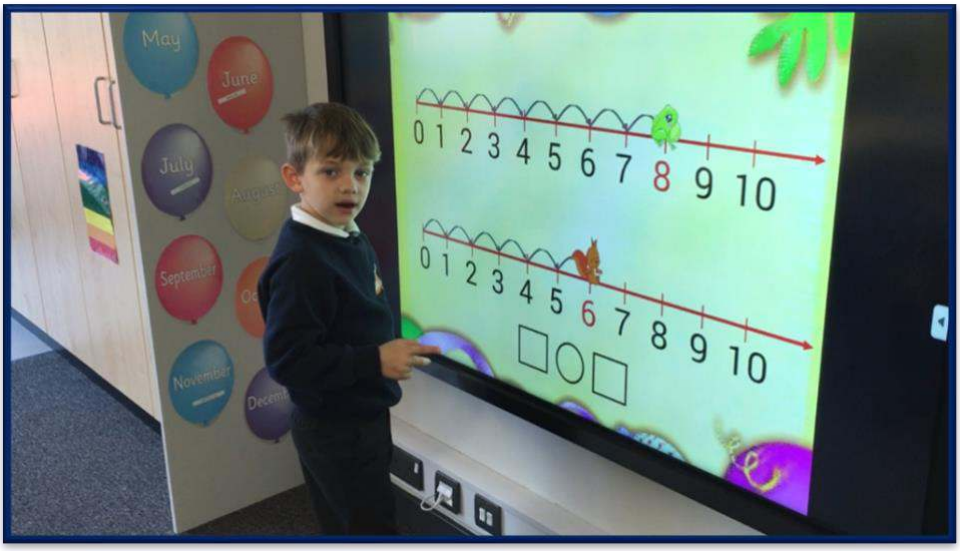
They explore the characteristics of everyday objects and shapes and use mathematical language to describe them.

Key Stage 1

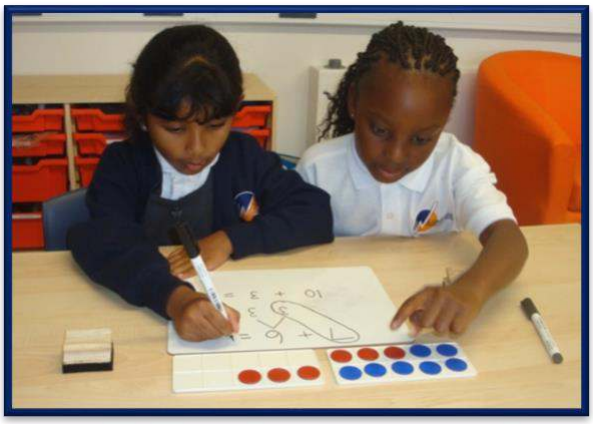


The principal focus of mathematics teaching in key stage 1 ensures that children develop confidence and mental fluency with whole numbers, counting and place value. The children work with numerals, words and the four operations, including practical resources [for example, concrete objects and measuring tools].

At this stage, children develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Children use a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, children have worked towards knowing route number facts, number bonds to 20 and precision in using and understanding place value. Children are using their phonetical knowledge to support them read and write age appropriate mathematical terminology.



Lower Key Stage 2



Building on from KS1, Year 3 and 4's children become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This supports their development in efficient written and mental methods, while also helping them to perform calculations accurately with increasingly large whole numbers.

Children start to develop their ability to solve a greater range of problems, including simple fractions and decimal place value. Children continue to develop mathematical reasoning in order that they can use measuring instruments with accuracy and can make connections between shape, space, measure and number.

By the end of Year 4, children have been taught all their multiplication tables to 12 and use a range of resources, including online learning platforms, songs, and class activities to memorise all their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Children continue to read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Upper Key Stage 2

Children extend their understanding of the number system and place value to include larger integers. This develops the connections that children made between multiplication and division with fractions, decimals, percentages and ratio. At this stage, children develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation.

With this foundation in arithmetic, children are introduced to the language of algebra as a means for solving a variety of problems. Geometry and measure is consolidated and extends their knowledge developed in number. Children classify shapes with increasingly complex geometric properties and learn the vocabulary they need to describe them. By the end of Year 6, children become fluent in written methods for all four operations, including long multiplication and division, working with fractions, decimals and percentages. Children further develop their skills as they read, spell and pronounce mathematical vocabulary correctly.

As children progress, their growing knowledge of mathematical reasoning should help to deepen their ability to be logical in their choices and understanding of real life problems.

Impact

As children progress through Whitehouse Primary School they develop a deep and sustainable understanding of number. The progression of the curriculum supports children to make connections to previous learning and further deepen their understanding and appreciation for mathematical concepts.