Mathematics at Harpfield Primary Academy

* Plus a selection of other high quality resources e.g. Power Maths

Planning to be informed by selective use of...

NCETM spine materials

NCETM Teaching for Mastery

Ideas from White Rose Schemes of Learning

Oracy strategies
STEM sentences
Collaborative learning

Teaching and learning to follow the CPA approach:

Variation
Deepen understand-ing

Concrete resources

The following resources to be used at every opportunity:

Ten frames	Counting sticks	Place value cards	Counters/multilink/towers
Numicon	Dienes	Cuisenaire rods	Place value counters
Fraction & % sets	Double-sided counters	'Real-life' materials	2D/3D shapes
Clocks	Measuring equipment	Geoboards	Beadstrings

Reasoning and Problem Solving

Guided reasoning sessions

Use of key vocab

Accessed in every lesson

Mathematical thinking

Pictorial resources

Models and images as suggested by the **NCETM spine materials / White Rose resources** with an emphasis on:

Bar model

Part whole model

See: MathsBot.com

Abstract

With reference, when appropriate, to:

Harpfield calculation strategies + CET progression document

Wider problem solving and reasoning resources to be used so children experience problems provided in several different ways

Fluency — Number facts / Number sense / Efficient procedures

Building on previous knowledge

Variation & relationships

Make links and connections

Rapidly recall maths facts (Numbots /TTRS)

Maths vocabulary

Teaching for greater depth

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

Multiple representations for all

All pupils, when introduced to a key new concept, should have the opportunity to build competency in this topic by taking this approach. Pupils are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols.

Concrete – Pupils should have the opportunity to use concrete objects and manipulatives to help them understand

Pictorial – Pupils should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.

Abstract – With the foundations firmly laid, pupils should be able to move to an abstract approach using numbers and key concepts with confidence.

Fluency, reasoning and problem solving

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 a secure understanding. Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience. Pupils combine different concepts to solve complex problems, and apply knowledge to real-life situations.

Reasoning The way pupils speak and write about mathematics transforms their learning. Mastery approaches use a carefully sequenced, structured approach to introduce and reinforce mathematical vocabulary. Pupils explain the mathematics in full sentences. They should be able to say not just what the answer is, but how they know it's right. This is key to building mathematical language and reasoning skills.

Fluency: pupils should be able to recall and apply mathematical knowledge both rapidly and accurately. However, it is important to stress that fluency often gets confused for just memorisation – it is far more than this. As well as fluency of facts and procedures, pupils should be able to move confidently between contexts and representations, recognise relationships and make connections in mathematics. This should help pupils develop a deep conceptual understanding of the subject. Frequent, carefully designed, intelligent practice will help them to achieve a high level of fluency.

Number at the heart: A large proportion of time is spent reinforcing number to build competency and fluency. Number is usually at the heart of any primary mastery scheme of learning, with more time devoted to this than other areas of mathematics. It is important that pupils secure these key foundations of maths before being introduced to more difficult concepts.