

Preston Primary School

Curriculum Design for Maths



Intent

At Preston our intention is to ensure depth of conceptual understanding through progressive acquisition of mathematical fluency, problem-solving and reasoning skills. This helps children to know and remember more. The mathematics curriculum is planned and sequenced utilising small step progression through concepts as well as a concrete-pictorial-abstract approach.

We believe in the importance of building and developing pupil's character. Through our maths curriculum, we want all children to understand and love mathematics and develop a natural curiosity about the subject. We empower our children with a 'CAN DO' attitude in mathematics. We encourage all children to explore their own mathematical understanding, and in doing so, develop their arithmetical proficiency, reasoning and problem-solving skills. We want our children to be confident and competent mathematicians who understand the relevance of maths to everyday life. Our aim is to provide a maths curriculum that is fit for the future and prepares children for tomorrow's economy. Andreas Schleicher, Director for Education and Skills and Special Adviser on Education Policy to the Secretary-General at the Organisation for Economic Co-operation and Development (OECD) states:

'The challenge for education is not to develop second-class robots but to focus on those skills where humans have an advantage, which is perspective-taking, looking at problems from multiple angles and making judgments.' Through quality first teaching, collaborative learning and immediate intervention that all children have the potential to 'go deeper' and broaden their understanding of mathematical concepts.

How is our curriculum designed and implemented?

Our Year 1 mathematics curriculum builds upon the skills and knowledge the children have gained during their time in our EYFS. The children will have developed a strong grounding in number so that they have the building blocks to think mathematically and a strong base from which the mastery of maths is built. In the EYFS we provide children with many opportunities throughout the indoor and outdoor environment to develop and deepen their understanding as well as through discrete daily teaching. Maths has been developed in many ways in the EYFS, for example:

- Prioritising the teaching of composition of number. We plan a cohesive teaching sequence for all numbers up to ten and teach the structure of part-whole relationships, build fluency with number bonds, teach the concept of commutativity, and start to understand addition and subtraction and their inverse relationships.
- We are part of the NCETM Mastering Number project to support pupils to develop good number sense.
- We use a set of pedagogic practices for teaching mastery like the rest of the school. We provide different context for children to explore the same mathematical idea and multiple representations of this idea (including pictorial, informal jottings, and mathematical equipment). Children are encouraged to communicate their thinking with talk partners before showing and explaining to the class. STEM sentences are used for children to communicate their ideas with mathematical precision and clarity. We use misconceptions as key teaching points – what it is not? And use reasoning strategies and questions to encourage depth of understanding e.g., what is the same and what is different?
- Parental involvement is vital to the children's mathematical development therefore we provide online support for parents using Seesaw within the first half term to inform parents of how they can support math's at home.

Whilst teaching the National Curriculum, we use a range of materials to support our expectation that all children will master key concepts at the same pace. We primarily use Maths No Problem to underpin our pedagogical approach, but we do refer to the NCETM "spine" documents to offer further guidance on subject knowledge as well as the DfE Mathematics guidance: key stage 1 and 2 to provide small step learning so teachers can plan lessons that meets the needs of each class. For 2021-22, Preston will be following the Curriculum Prioritisation Overview as designed by the NCETM and are on our school website.

Teachers teach topics until they feel that an appropriate depth of understanding has been achieved by the vast majority of the group. Gaps in learning are identified in a timely manner by teachers and addressed in the lesson.

Children use concrete, pictorial and abstract models for each topic as appropriate to the learning context. Research conducted by the EEF underpins our expectation that a variety of manipulatives and representations will be used in all year groups and with children at all levels of attainment to support learning before procedural methods are used. This allows children to select from a range of strategies for both efficiency and to support success. Procedural methods for calculation are taught alongside mental and structural methods for fluency and variation.

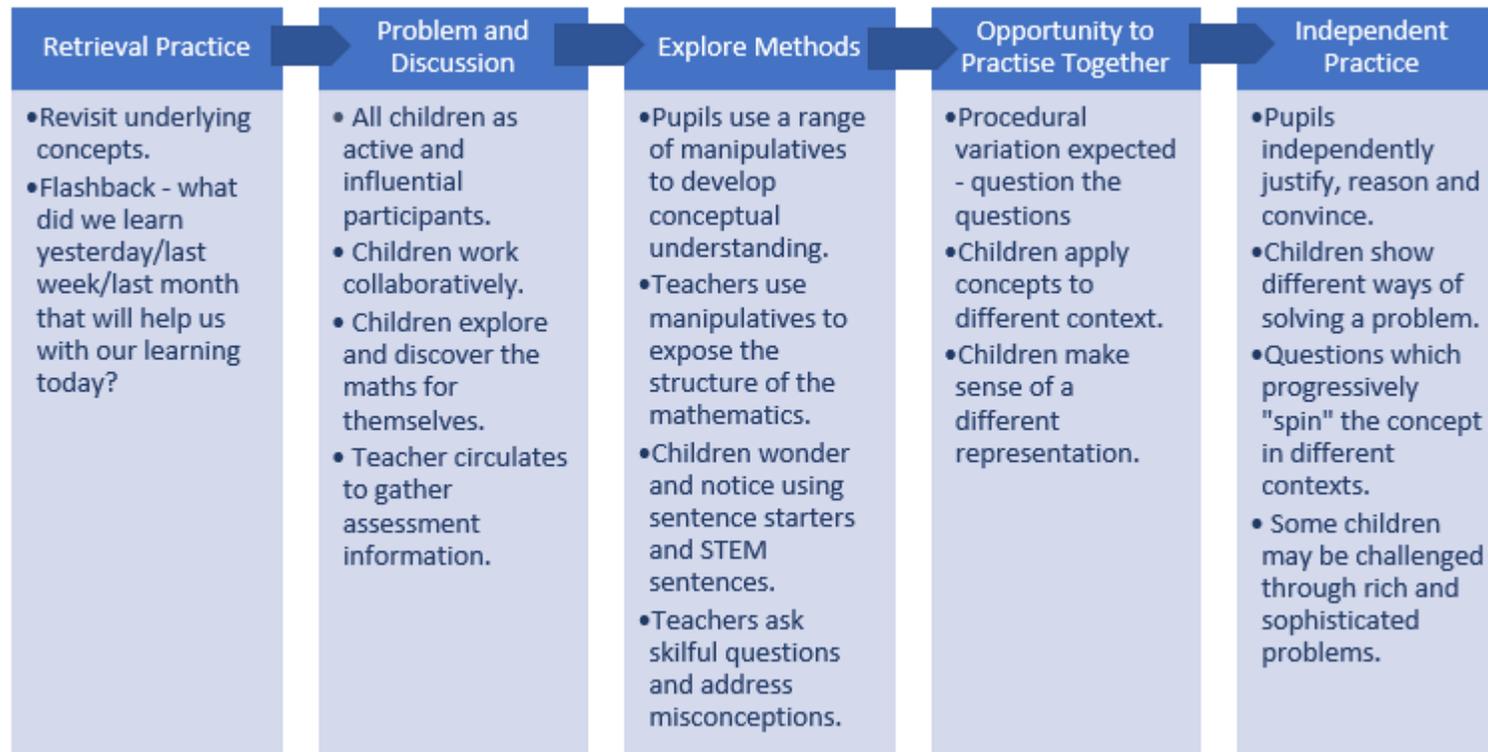
Teaching for Mastery; a Set of Pedagogical Practices

A typical maths lesson will usually include:

- All lessons begin with a short assessment to support retrieval practice and develop long-term memory.
- A “hook” problem or calculation on which the children work collaboratively enabling them to share initial ideas and strategies.
- A series of activities with a balance of direct instruction and collaboration and dialogue aimed at unpicking the small idea around which the lesson is based.
- Independent pupil application using questions similar to the lesson hook and one or two further questions which progressively “spin” the concept in different contexts and with different types of reasoning.
- If children can understand the concept in different ways, in different contexts and with different types of reasoning, the concept has probably been learned – changed in their long-term memory.
- Teachers will select or pupils will actively ask for more help. Some children may move on to problems of greater complexity and use more than just one skill to be able to answer the problems.
- Children work on the objective at whatever entrance stage they are assessed as being at.
- Teachers provide children with additional needs scaffolding and relevant support as necessary. For those children working below the year group curriculum, individual learning activities are provided to ensure their progress.

Mistakes are valued and celebrated. Unpicking misconceptions so that children evaluate their thinking is vital in scaffolding children towards greater independent evaluation and learning.

We use this lesson structure model to create a coherent journey through a typical maths lesson.



On a regular basis children will be given routine arithmetic questions or problems as a low stake recall of previous teaching on a range of topics. Depending on the outcome, more or less time in that lesson will be devoted to reviewing and correcting errors, but it does not take the place of quality teaching in that lesson based on the topic planned for. This is an example of well-timed repetition and leads to greater fluency. Repeated exposure and consideration of key concepts in different contexts leads to better understanding.

When teachers can, they offer timely, sometimes same day intervention to ensure gaps and misconceptions are addressed before moving on. Planned intervention for our lowest 20% mathematicians happens within each unit across the school. These interventions aim to strengthen the understanding of number and fluency with number facts.

Feedback and Assessment

Feedback is timely and allows children to complete, correct and go deeper with their learning. Pieces of work may not be marked in a child's book but marked on Seesaw. Seesaw is an online space for pupils to share their learning with their teacher. Seesaw is an innovative way to offer feedback to children so it is meaningful, manageable and motivating. Using Seesaw allows children to use the skills needed for a modern workplace.

Formative assessment within every lesson helps teachers identify the children who need more support to achieve the intended outcome and who are ready for greater stretch and challenge through planned questioning or additional activities. Teachers use the KPI's (Key Performance Indicators) to keep track of pupil's individual progress. Termly pupil progress meetings between teachers and the subject lead are a positive, professional discussion about the progress of pupils and of specific groups of learners. This moderation base approach is effective in getting a clear, actionable snapshot into the effectiveness of the maths curriculum and its implementation.

To support teacher judgements, children complete PUMA tests twice a year in most year groups. A gap analysis is used to target support and feeds into teacher's planning.

Impact

Reception

% of children achieving ELG in mathematics – number strand		
2017	2018	2019
82%	69%	78%

Key Stage 1

% of children achieving expected standard or above			
	2017	2018	2019
Preston	74%	76%	76%
National	75%	75%	76%

Key Stage 2

% of children achieving expected standard or above			
	2017	2018	2019
Preston	68%	83%	76%
National	75%	76%	79%

* There is no 2020 data due to Covid.

Using a mastery approach in mathematics has enabled our staff to:

- Be more confident and skilled. Teachers and teaching assistants now have a firm understanding of the principles of mastery.
- Be skilled at questioning the children so they can reason, justify, spot patterns, and make connections.

Using a mastery approach in mathematics has enabled our children to:

- Have a greater conceptual understanding of number and calculation.
- Become more secure in basic number facts like number bonds and multiplication tables.
- Become more flexible and fluent thinkers as they are exposed to the connectivity and relationships between ideas and concepts.
- Visualise and reason more readily due to a more in depth understanding of key concepts.

A few examples of maths provision within our EYFS setting...

