MANCHESTER COMMUNICATION PRIMARY ACADEMY

INTENT AND SEQUENCING

Maths Page Profile

Curriculum

MATHS AT MCPA

Intent

The intent of our mathematics curriculum is that children of all abilities can use and manipulate maths, applying it to a range of contexts and solving complex problems.

Implementation

Children's journeys to mastering maths begin in Nursery where children discover the early foundations of mathematics through play, songs, stories and structured provision. Children build knowledge around making sets, number sense, counting, number operations, patterns, measurement, spatial relationships and shape.

In Reception and Year 1 children use the mastery scheme White Rose Maths to develop their understanding of maths. Adopting a White Rose Maths approach is about building a deep understanding of topics, helping children become confident mathematicians who embrace mathematical challenges with a smile.

In Years 2 to 6 children are introduced more formally to mastery maths through the use of the Maths No Problem scheme of work, which is an evidence-based approach to maths that helps develop a deep, long-term and adaptable understanding of maths.

The subject is taught through mastery learning procedures. When taught to master maths, children develop their mathematical fluency without resorting to rote learning and are able to solve non-routine maths problems without having to memorise procedures.

Mastery learning breaks subject matter and learning content into units with clearly specified objectives, which are pursued until they are achieved. Learners work through each block of content in a series of sequential steps and must demonstrate a high level of success on tests, typically about 80%, before progressing to the next unit. Those who do not reach the required level are provided with additional tuition, peer support, small group discussions, or homework, so that they can reach the expected level.

The spiral sequencing approach of Maths No Problem ensures that prior knowledge is built on as new knowledge is introduced. Therefore, developing children's mathematical schemata.

mathematical vocabulary has been mapped out throughout the whole school to support knowledge and understanding and ensure progression

In addition to Maths No Problem, the curriculum generously provides opportunities for frequent retrieval practice through recapping prior knowledge in Big Maths (Year 2 upwards), which takes place once a week. This is in addition to daily maths starters which focus on previous learning.

Impact

Through engaging in our curriculum, children are able to remember and use a range of mathematical concepts to solve everyday problems. Our syllabus prepares our children for the next steps in their learning journey and equips them with a solid understanding of mathematical procedures and strategies.

Evidence/research - what is the theory or theories which underpin MNP curriculum design?
Impact - can you include outcomes?

Research

Singapore maths is an amalgamation of global ideas delivered as a highly effective programme of teaching methods and resources. The approach is based on recommendations from notable experts such as Jerome Bruner, Richard Skemp, Jean Piaget, Lev Vygotsky and Zoltan Dienes.

Jerome Bruner
Bruner studied how children learned and put forward the Concrete Pictorial Abstract (CPA) approach to learning. He also coined the term "scaffolding" to describe how children build on the information they have already mastered. In his research on the development of children (1966), Bruner proposed three modes of representation: concrete or action-based (enactive representation), pictorial or image-based (iconic representation) and abstract or language-based (symbolic).

Based on his findings, Bruner proposed the spiral curriculum: a teaching approach in which each subject or skill area is revisited in intervals at a more sophisticated level each time. Using this technique of a spiral curriculum, material is presented in a logical sequence. Initially a concept is enacted with "concrete" materials, later it is represented by models (pictures) and then by abstract notation (such a plus or equals sign). These learning theories are the basis of the Concrete Pictorial Abstract approach which runs throughout the Maths — No Problem! Programme.

Richard Skemp
Skemp wrote about instrumental and relational learning in his paper "Relational Understanding and Instrumental Understanding" (Richard R. Skemp Department of Education, University of Warwick. First published in Mathematics Teaching 7 in 1976).

Skemp distinguishes between the ability to perform a procedure (instrumental) and the ability to explain the procedure (relational) and argues that these are two different methods of learning – relational and instrumental. Singapore maths aims for pupils to progress beyond seeing mathematics as a set of arbitrary rules or procedures so that they have a relational understanding.

Zoltan Dienes
Based on Dienes' ideas (1960), systematic variation is used throughout the series. The idea is that you vary the lesson through a series of examples that deal with the same problem or topic. Variation can take the form of mathematical variability, where the learning of one particular mathematical concept is varied, and perceptual variability, where the concept is the same but the pupils are presented with different ways to perceive a problem and use different ways to to represent the same concept. The Singapore maths approach presents this in a systematic way to ensure pupils comprehend what they are learning.