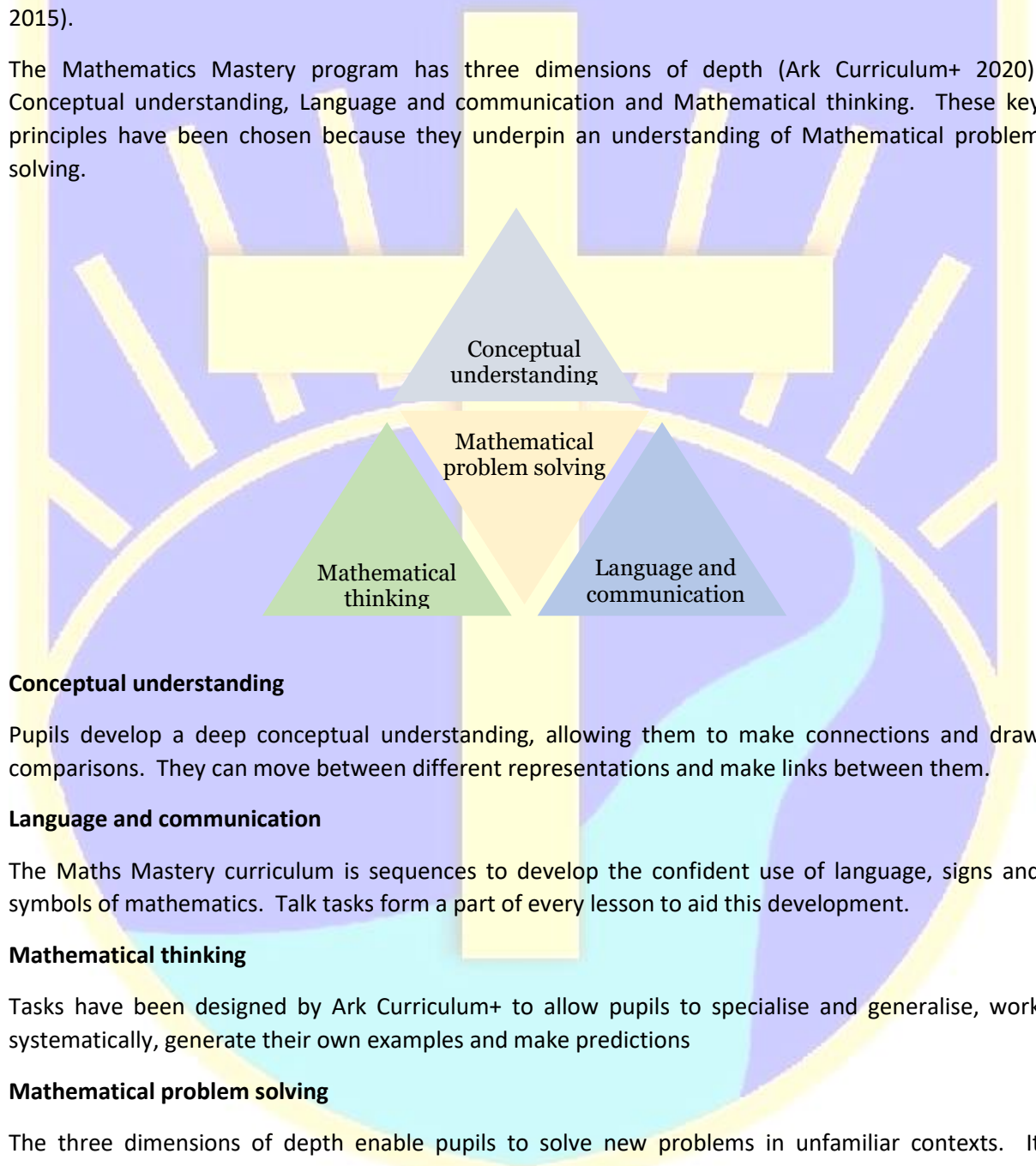


Mathematics: Pedagogy

At Emmaus, we want children to enjoy maths and be confident in their own ability. We want them to acquire fluency in all areas of mathematics and to use these skills to engage with problem solving and mathematical reasoning. Our maths lessons are based around 'Mathematics Mastery' (ARK Curriculum+ 2021), which focuses on children developing a growth mind-set and understanding by exploring and improving through our own efforts, engagement and interest. Mathematics Mastery is a cumulative curriculum that allows children to build connections across all areas of Mathematics. It has been identified as an effective whole school programme for teaching mathematics (Vignoles et al 2015).

The Mathematics Mastery program has three dimensions of depth (Ark Curriculum+ 2020): Conceptual understanding, Language and communication and Mathematical thinking. These key principles have been chosen because they underpin an understanding of Mathematical problem solving.



Conceptual understanding

Pupils develop a deep conceptual understanding, allowing them to make connections and draw comparisons. They can move between different representations and make links between them.

Language and communication

The Maths Mastery curriculum is sequences to develop the confident use of language, signs and symbols of mathematics. Talk tasks form a part of every lesson to aid this development.

Mathematical thinking

Tasks have been designed by Ark Curriculum+ to allow pupils to specialise and generalise, work systematically, generate their own examples and make predictions

Mathematical problem solving

The three dimensions of depth enable pupils to solve new problems in unfamiliar contexts. It identifies, applies and connects ideas, enabling pupils to tackle increasingly complex problems.

Maths Mastery is built on Bruner's Theory of Instruction (1963), which identifies three parallel systems for processing information: the concrete (or 'enactive'), the pictorial (or 'ikonic') and abstract (symbolic). Pupils explore and move between multiple interpretations of mathematical concepts so that a deeper level of understanding can be achieved.

Our Teaching Sequence

All pupils are encouraged to believe they can achieve and progress through engagement and effort. Mathematics is explored and discussed through 'trial and error', leading to a deeper understanding of the subject. Throughout the school year mathematics is divided into units that consist of a block of lessons, which cover all the skills needed for the relevant year group. In addition to regular lessons, maths meetings take place throughout the week, which allows different skills developed within the units to be revisited regularly by all pupils, supporting retention of skills.

Daily Six Part Lessons

- **Do Now Task** – The opening of the lesson starts with an engage task. This can cover a task that will help them later in the lesson or it can be a task that builds fluency in a key skill.
- **New Learning** – The mathematical language for this unit is displayed and discussed. The teacher will model using concrete manipulatives and the class will use words and symbols accurately. Misconceptions are anticipated and incorporated into the teaching.
- **Talk Task** – The pupils will talk in full sentences to explain their understanding and discuss the mathematics required to engage in the lesson.
- **Develop Learning** – References are made to previously learnt models/ representations/ skills/ concepts and the Independent Learning task is modelled.
- **Independent Task** - Everyone is engaged in completing the task and may use appropriate concrete manipulatives. All pupils undertake the same mathematical concept or skill. An appropriate amount of scaffolding is in place as required. The emphasis is on understanding and developing fluency through problem solving. Pupils can demonstrate mathematical thinking through the use of concrete manipulatives, drawing diagrams and explaining mathematical thinking through a range of questions and answers. Extension tasks can be added that involve deeper understanding of the same mathematical concept or skills.
- **Plenary** – Celebrating success through engagement within the lessons. Emphasis is based on the skills and learning not just on the attainment of a correct solution.

Mathematical Basic Skills and Fluency

In 2021-22, we concentrated on the use and acquisition of mathematical language across all areas of school. In 2022-23, we will support children's basic skills and mathematical fluency with the introduction of a daily skills or 'toolbox' lesson. These lessons are focused on identifying and addressing gaps in children's basic skills, particularly for children who may have been affected by national lockdowns due to Covid. These sheets are designed to allow children to make rapid and measurable progress, which can be then applied in our daily Maths Mastery lessons.

For more information, please read:

Ark Curriculum+ 2020 Primary Programme 2020-2021
<https://www.arkcurriculumplus.org.uk/cms/assets/files/mathematics-mastery-programme-guide-2020-21.pdf> Accessed 08.06.2021

Ark Curriculum+ 2021 Mathematics Mastery Primary <https://www.arkcurriculumplus.org.uk/our-programmes/primary/mathematics-mastery> Accessed 08.06.2021

Bruner J S 1963 Needed: A Theory of Instruction; *Educational Leadership* Vol. 20 No. 8 pp. 523-32

Vignoles A et al 2015 *Mathematics Mastery: Primary Evaluation Report February 2015*
[https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Reports/EEF Project_Report_MathematicsMasteryPrimary.pdf](https://educationendowmentfoundation.org.uk/public/files/Projects/Evaluation_Reports/EEF_Project_Report_MathematicsMasteryPrimary.pdf) Accessed 08.06.2021

