

## Maths

**“Mathematics is a creative and highly interconnected discipline...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 for financial literacy and most forms of employment. A high quality mathematics education provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.”** The National Curriculum 2014

At St Alphege Infant School, we believe that a deep understanding of key mathematical concepts is essential for our children’s future progress. In order to embed this, children require opportunities to use, apply and problem solve using mathematical knowledge and understanding. This can then also be used and applied within the broader curriculum.

To do this effectively it is essential that children develop a secure understanding of number and the four operations (+, -,  $\times$ ,  $\div$ ). Therefore, we are embracing many aspects of the **mastery approach** to mathematics and using some of the White Rose materials to support and facilitate this.

### **What are the principle beliefs of a ‘mastery’ approach to mathematics?**

Mastery is a journey and is about children gaining a deep understanding of a concept. Certain principles and features characterise and underpin the approach:

- High expectations and the belief that all pupils can achieve. Ability is neither fixed nor innate – it can be developed over time through practice, support, determination and hard work. This builds confidence and resilience to enable all to achieve, not just in maths but across the wider curriculum.
- A whole class approach so that **all** can access and master mathematical concepts.
- Differentiation is achieved through highly skilled questioning and scaffolded levels of individual support and challenge.
- There is a focus on the development of deep mathematical understanding.
- There is a focus on the development of both factual/procedural and conceptual knowledge.
- There is an emphasis on breadth and depth – longer time is spent on key topics, providing opportunities to go deeper and embed learning.

Whilst there is no single definitive definition of ‘mastery’, we can say that a concept is deemed ‘mastered’ when learners can represent it in multiple ways, can communicate it using mathematical language and can independently apply the concept to new problems in unfamiliar situations.

We also use a **Concrete, Pictorial, Abstract (CPA)** progressive approach to teaching new concepts. **What is the CPA approach?**



The CPA approach is a highly effective way of teaching that develops a deep and sustainable understanding of maths. Whenever a new mathematical concept is introduced, it is done so first through the use of concrete materials. These can be real objects or 'manipulatives' such as counters, Numicon or Dienes.



This will then progress to being represented by pictures and jottings, and finally by a number sentence.

CPA Approach	
Stage	Characteristics
Concrete	Refers to the use actual objects or manipulatives that the child will handle.
Pictorial	Refers to the use of drawings or jottings that the child makes.
Abstract	Refers to abstract representations such as numbers that the child writes.

Maths lessons are interactive, practical and fun! Photos, discussions and drawings capture learning and demonstrate children's next steps. As they progress through key stage 1, we continue to support learning practically, but also increasingly through structured written calculations.

Another key element of the Maths National Curriculum is to enable children to explain the way they are thinking about Maths. This is called **mathematical reasoning**, and is a focus throughout the school. Through this, we aim to develop children's higher order thinking skills, progressing from describing and explaining, to convincing, justifying and proving. To develop mathematical concepts and language, we model and encourage the use of full sentences when answering questions. Again, this has benefits far beyond Maths alone and can be used and applied across the whole curriculum.