

Mathematics Curriculum Rationale

At Tollerton Primary School, our aim is for all children to become fluent in the fundamentals of mathematics and to be able to reason and to solve problems so that they develop a deep and long-lasting understanding of what they have learned. By following the White Rose curriculum, we ensure that Maths is learned in a progressive way, ensuring each small step is understood before moving on to the next. The fundamental idea behind this curriculum design is to support children to be able to perform simpler tasks so they can then move on to perform more complex tasks. For example, we cannot expect children to add two numbers together before they understand what each individual number represents. Scaffolds – in many forms, including concrete and pictorial representations – are provided and gradually removed to build children’s independence and deepen their understanding of what they are learning.

Our curriculum fully meets the aims of the National Curriculum, and by embracing the White Rose approach to the teaching of Mathematics, we can support our children to become competent Mathematicians so that by the time they leave for secondary school they are equipped not only with the knowledge they need to succeed, but also with early expertise in thinking as Mathematicians. We support children to think as Mathematicians in a variety of ways, which fall under three core areas:

- 1. Becoming Visualisers** – We encourage children to use and make connections between different representations (moving from concrete to pictorial and finally to abstract) so that abstract methods are fully understood and that quick methods, when used, are done so with a deeper understanding of why they work. This begins in Reception, where children learn to subitise (recognise numbers from visual patterns).

- 2. Becoming Describers** – We place emphasis on mathematical language and questioning so children can discuss the mathematics they are doing, which strengthens their ability to solve problems and articulate their understanding of methods and concepts.

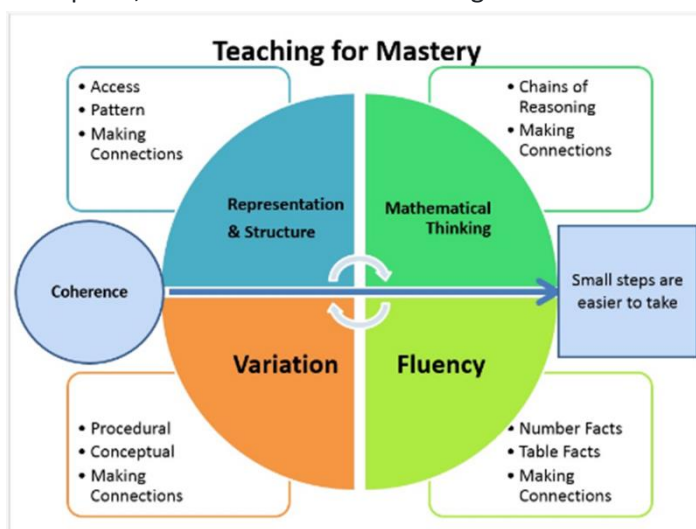
- 3. Becoming Experimenters** – As well as being fluent mathematicians, we also aim that our children develop curiosity and investigative spirit so that they can apply mathematical understanding to real life.

The White Rose Maths curriculum is structured into 'blocks', each of which is broken down into sequential, progressively challenging small steps. The small steps are taught and learned in this sequence so that children develop and secure their understanding of underlying concepts before tackling more challenging methods or applying what they have learned more abstractly. As a result, every small step (typically each one lesson, itself broken down into sequential steps) builds carefully from the previous step, building on children's prior knowledge to develop new skills, with nothing left out. Fluency, reasoning and problem solving are not bolt on blocks, but built into each unit throughout.

This Mathematics curriculum is a combination of 'mastery' and 'spiral' approaches. This means that children spend longer on units of learning to gain a deeper understanding and make connections by looking at a concept from all angles ('mastery'), and that key aspects are revisited and progressed year on year ('spiral'). As a result, there is a positive impact both on those children who are at risk of falling behind, as gaps in knowledge are less likely to occur due to mastery learning and continual revisiting, but also on those children who work at high ability levels, who are able to deepen their learning and apply it in different ways. White Rose has the motto #MathsEveryoneCan. This curriculum and mastery approach supports all children, no matter what their starting point is, to learn and improve at maths.

The mastery approach to teaching Mathematics has five core aspects, and these are woven throughout our Mathematics curriculum and lessons:

- 1. Representation and structure** is about starting with concrete representations (touching resources), moving to pictorial (where children visualise the resource and draw them) and then to abstract where the resources are so embedded they can move to the abstract and lay number sentences out and just calculate them.
- 2. Mathematical thinking** is where taught ideas are understood deeply due to encouraging children to think deeply and to reason and explain their answers. Children are active in their learning, engaging and discussing as they look for relationships, connect ideas, reason logically, explain, conjecture and improve.
- 3. Fluency** is where children have quick, efficient and eventually automatic recall of facts and procedures and the flexibility to move between different contexts and representations of maths. This isn't just about memorising facts such as times tables but about using them efficiently and with accuracy (e.g. knowing that $6 \times 6 = 36$ but equally knowing that 36 divided by 6 is 6). Quick and efficient recall of facts and procedures is important in order for children to think strategically and solve problems, as a level of automaticity supports their working memory to focus on solving the problem at hand rather than be distracted by performing individual calculations. An example of how fluency is supported in school is the use of Times Tables Rockstars, which enables KS2 children to develop quick recall of multiplication facts.
- 4. Variation** is where a concept is initially presented to students, by giving examples that display a concept as well as those that don't display it. Also, carefully varying practice questions so that mechanical repetition is avoided, and thinking is encouraged. It is important to draw attention to something by pointing out what is the same and what has changed.
- 5. Coherence** is the way in which we teach in small, connected steps. A lesson focuses on one key point, allowing for deeper learning. When introducing new ideas, it is important to make connections with earlier ones that have already been understood.



Use of different representations (concrete and pictorial) also supports our SEND children, as does the constantly revisiting approach – the multiple opportunities to look at concepts and methods helps to secure learning in long-term memory and establish links between what is being learned now and what has been learned before. It is our

ambition that all children have access to the Mathematics curriculum, but adaptations are made to support access to lessons so that children's learning needs are met.

In 2022-2023, our school is taking part in the Mastering Number programme. This programme provides teachers in Reception and KS1 with up-to-date professional development training on effective strategies for securing early mathematical knowledge. This involves children taking part in additional mini-lessons where they are taught key early mathematical concepts with the aim that all children are able to develop solid mathematical foundations on which future learning can build. Examples of concepts learned in these mini-lessons are stem sentences to develop their reasoning skills and mathematical articulation; subitising to develop quick visual recognition of numbers and their value; and effective use of concrete materials to reason and problem-solve.