



# Mathematics Policy

Last reviewed	January 2024
Review frequency	2 years
Next review date	January 2026
Approved by	Headteacher

## **Aims**

That children develop the knowledge, skills and understanding of mathematics that they need to succeed in life and prepare for their next steps in learning.

That children will develop their knowledge of mathematics cumulatively over time and complete the full programmes of study - linking mathematics to other curriculum subjects and extending beyond the academic or technical application and thus encouraging children to develop and discover their own interests and talents.

That children develop their character – including their resilience, confidence, and independence through mathematics – increasingly adopting a positive attitude to learning and a growth mind-set. We encourage children to foster a commitment to their learning, know how to study effectively, become resilient to setbacks and take pride in their achievements.

## **Rationale**

Our rationale is based on the mastery approach key principles being:

The expectation that most pupils will move through the programmes of study at broadly the same pace.

Pupils who grasp concepts rapidly should be challenged further through being offered rich and sophisticated problems before any acceleration through new content.

Those who are not sufficiently fluent with earlier material should consolidate their understanding, through additional practice before moving on.



## **EYFS**

We follow EYFS curriculum guidance for Mathematics which encompasses number and numerical patterns. We are committed to ensuring the confident development of number sense and put emphasis on mastery of key early concepts. Sessions have a concrete – pictorial – abstract approach to conceptual development. Teaching is augmented with Numberblocks, songs and rhymes and targeted activities in enhanced provision. White Rose Maths is threaded throughout daily sessions to support transition into Year 1 where children begin to explain their recording and problem solving.

## **Year 1- Year 6**

From Year 1 – Year 6, we teach children using White Rose Maths. Our approach ensures that when children are introduced to a new concept they build competency by taking the following approach:

Concrete – children should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

Pictorial- alongside this, children should use pictorial representations. These representations can then be used to help reason and solve problems.

Abstract- both concrete and pictorial representations should support children’s understanding of abstract methods.

## Our approach

White Rose is designed to support a mastery approach to teaching and learning and have been designed to support the aims and objectives of the new National Curriculum.

The overviews:

- Have number at the heart. A large proportion of time is spent reinforcing number to build competency.
- Ensure teachers stay in the required key stage and support the ideal of depth before breadth.
- Provide the opportunity for children to have their gaps closed through flexible and fluid groups.
- Provide plenty of opportunities to build reasoning and problem-solving elements into the curriculum.

We want pupils to become fluent in the fundamentals of mathematics, to be able to reason and to solve problems. Our curriculum embraces these National Curriculum aims, and provides guidance to help pupils to become:

**Visualisers** – we use the CPA approach to help pupils understand mathematics and to make connections between different representations.


**Describers** – we place great emphasis on mathematical language and questioning so pupils can discuss the mathematics they are doing, and so support them to take ideas further.

If I know the length and width of a rectangle, how can I calculate the perimeter? Can you tell me 2 different ways? Which way do you find the most efficient?

If I know the perimeter of a shape and the length of one of the sides, how can I calculate the length of the missing side?

Can a rectangle where the length and width are integers, ever have an odd perimeter? Why?


Which of these shapes are split into quarters and which are not?



How many more ways can you find to split a 4 by 4 dotted square into quarters?

**Experimenters** – as well as being fluent mathematicians, we want pupils to love and learn more about mathematics.

How might this sequence continue?



Describe the ways in which your sequences are similar and how they are different.

Dora says,

The taller you are, the longer your shoes are.



Measure the height of people in your class and measure the length of their shoes.

Is Dora correct?

To learn mathematics effectively, some things have to be learned before others, e.g. place value needs to be understood before working with addition and subtraction, addition needs to be learnt before looking at multiplication (as a model of repeated addition). You will see this emphasis on number skills first, carefully ordered, throughout our primary curriculum. For some other topics, the order isn't as crucial, e.g. Shapes and Statistics need to come after number, but don't depend on each other. We try to mix these so pupils have as wide a variety of mathematical experiences as possible in each term and year.

## Teaching Principles

1. Teachers believe in the importance of mathematics and that the vast majority of children can succeed in learning mathematics in line with national expectations.
2. Teachers assess competence in prerequisites before engaging with concepts to ensure children can access the learning.
3. The learning needs of individuals are addressed through a range of strategies; gap grouping, pre-teach, 1-1 tutoring, careful scaffolding, questioning and appropriate rapid intervention where necessary, to provide the appropriate support and challenge.
4. The reasoning behind mathematical processes is emphasised. Teacher/pupil interaction explores how answers were obtained as well as why the method worked and what might be the most efficient strategy.

5. Precise mathematical language, often couched in full sentences, is used by teachers so that mathematical ideas are conveyed with clarity and precision. At Queen Emma's, we value 'mathematical talk' and children have lots of opportunity to talk about and evaluate their mathematics during lessons.
6. Conceptual variation and procedural variation are used extensively throughout teaching. This helps to present the mathematics in ways that promote deep, sustainable learning.
  - a. Conceptual variation is where the concept is varied and there is intelligent practice. Positive variation is showing what the concept is, and negative variation is showing what the concept isn't. This clears away misconceptions at the very start. Within positive variation, both standard and non-standard representations are shown.
  - b. Procedural variation is where different procedures and/or representations are used to bring about understanding. For example, teachers may collect several solutions for a problem (some right, some wrong) before guiding the class towards the most efficient method. It also involves highlighting the essential features of a concept or idea through varying the non-essential features. Variation is not the same as variety – careful attention needs to be paid to what aspects are being varied (and what is not being varied) and for what purpose.
7. Sufficient time is spent on key concepts to ensure learning is well developed and deeply embedded before moving on.

### **Features of Lesson Design**

1. Teacher input gives ample time for independent practice whilst the teacher delivers rapid intervention should somebody require it. Independent practice includes reasoning, problem solving and higher-order thinking activities.
2. Lessons are sharply focused with one new objective introduced at a time.
3. Difficult points and potential misconceptions are identified in advance and strategies to address them planned. Key questions are planned, to challenge thinking and develop learning for all pupils.
4. The use of high-quality materials (White Rose Booklets) and tasks to support learning and provide access to the mathematics is integrated into lessons.
5. There is regular interchange between concrete/contextual ideas and their abstract/symbolic representation.
6. Making comparisons is an important form of developing deep knowledge. The questions "What's the same, what's different?" are often used to draw attention to essential features of concepts.

## **Assessment**

Teachers and leaders use assessment to help learners embed and use knowledge fluently or to check understanding and inform teaching. Teachers check learners' understanding systematically, identify misconceptions accurately and provide clear, direct feedback. In so doing, they respond and adapt their teaching as necessary without unnecessarily elaborate or differentiated approaches. Live feedback is completed using pink (for 'think') and green (for 'got it') highlighters by both teachers and learning support assistants.

Cornerstones assessments: There is a baseline Number and Arithmetic Progress Assessment and a further 7 progress tests to be completed throughout the year. Summative assessments are completed 3 x per year. Teachers respond and adapt their teaching based on the gap analysis tool produced from these assessments. The results of these assessments are shared with Cornerstones who then compare our results nationally to provide us with standardised data.

National Curriculum tests are used at the end of KS2; teachers use past and sample papers to inform their assessments as they prepare pupils for these assessments.

Teachers understand the limitations of assessment and do not use it in a way that creates unnecessary burdens for staff or learners.

## **Resources**

A bank of essential mathematics resources is available for all teachers, for example Cuisenaire rods. Additional resources for wider mathematics, such as weighing scales, are kept in the central storage area. Each Teacher has access to the White Rose platform where they can find schemes of learning to aid planning, teaching resources for concepts and/or specific lessons and assessment tools.

In addition to the daily teaching of Mathematics we also use the Complete Maths 1-1 tutoring platform to support the consolidation of mathematical concepts. This is an online platform that covers every level of maths from learning to count all the way up to calculus. Pupils have their own universe where they can follow a set course, or follow a programme designed to suit their needs.