Mathematics Policy

> The laws of nature are but the mathematical thoughts of God
> - Euclid

Mathematics is a creative and highly interconnected discipline that has been developed over centuries, 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 therefore 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. (National Curriculum 2014)

Aims and Objectives

At Rimrose Hope CE Primary School we aim to develop mathematicians who have;

- A positive attitude towards mathematics and an awareness of the fascination of mathematics;
- Competence and confidence in mathematical knowledge, concepts and skills;
- An ability to solve problems, to think logically and to work systematically and accurately
- The ability to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- Initiative and an ability to work both independently and in cooperation with others;
- An ability to communicate mathematics;
- An ability to use and apply mathematics across the curriculum and in real life;

> Good mathematics is not about how many answers you know...It's how you behave when you don't know
>
> – Author unknown

Planning and Teaching Guidance

The content and objectives that form the basis of our planning are taken from the statutory National Curriculum for England. We follow the White Rose scheme of work while using other resources to add to our bespoke curriculum.

The Numicon programme provides a backbone for our teaching, although is not used exclusively. It was chosen to provide a model for the children to support their thinking. Other models and images should also be used, choosing the most appropriate for the purpose, these are referenced in the Calculations Policy.

Regardless of the level the children are working at, all Mathematics teaching should follow Bruner's theory of learning, which introduces concepts using concrete materials, moves onto pictorial representations and finally moves on to using symbols.

Concrete → **Pictorial** → **Symbolic**

The use of Bruner's theory of learning will support the development of the children's 'number sense'. Having an understanding of the quantity value of numbers is vital for approximating and checking an answer and truly understanding mathematics. The children need plenty of experience of seeing the size of numbers using concrete resources and experience of manipulating numbers in a variety of ways, not just through canonical partitioning, in order to develop their number sense. Encouraging the children to 'ping, ping, ping' every time they see a number will also support this development. 'Ping, ping, ping' is expecting the children to look at a number or calculation and identify three things about that calculation from a number perspective.

Counting should form part of every plan, at every level of ability, to develop fluency with number.

Planning will be based on current assessments and knowledge of the children's strengths and areas for development. Where necessary, adaptations will be made to the curriculum, to equipment and to resources to allow access to maths for pupils with SEN, including provision for pupils that are exceptionally able in mathematics.

To enable access to the curriculum for all pupils, we use dyslexia friendly strategies and resources throughout the school, including overlearning and consolidating learning. At Rimrose Hope we are aware that pupils with Specific Learning Difficulties (such as dyslexia and dyscalculia) may have difficulties accessing this subject. However, in line with the British Dyslexia Association Quality Mark, we will address these difficulties as they arise.

Planning should provide the children with plenty of opportunities for conceptual and procedural fluency. This moves on to applying knowledge through non routine activities. These could be putting work into purposeful real life contexts or by enriching and deepening knowledge through seeking solutions, exploring patterns and formulating conjectures.

> We cannot teach people anything, we can only help them discover it within themselves – Galileo Galilei

Problem solving will be an integral part of weekly plans. Skills of problems solving should be explicitly taught so that the children can then go on to use those skills independently. All 5 areas of problem solving should be covered – Word problems, Finding all possibilities, Logic, Describing rules and patterns and Visual puzzles and diagrams.

Vocabulary and spoken language

The national curriculum for mathematics reflects the importance of spoken language in pupils' development in Mathematics. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Children should be encouraged to use models images to support their thinking and to develop their ability to talk about their work. Asking the children to "say what they see" and "write what they say" will support the children with clear links between the models and images and their written work. Children will be expected to prove their answers using models and images and in spoken language as a way of checking their own and each other's work.

Vocabulary linked to the current topic should be displayed and referred to every lesson.

Developing enjoyment and confidence

In order to develop confident Mathematicians we must set the expectation that errors are welcome and part of learning. Teaching should encourage creative answers by giving lots of open ended questions that don't require a single answer and expect the children to think creatively and to give answers that no-one else has thought of. This way of questioning will also help reduce anxiety around mathematics.

> Anyone who has never made a mistake has never tried anything new
>
> – Albert Einstein

ICT

ICT should be used to enhance the maths teaching and used when it is more effective than other methods. It can demonstrate and model ideas to develop conceptual understanding. It can be used to present alternative representations and images and to test ideas. The use of ICT should allow dialogue between the teacher and children or between children with their peers.

Assessment

Assessment in maths is viewed as part of the learning cycle (Review/assess, teach, practise, apply). Learning objectives and steps to success are shared with the children. Children are provided with opportunities for self/peer-assessment and improvement. Marking is developmental and children are provided with next steps to extend their learning, in accordance with the marking policy. Teachers monitor the acquisition of skills, knowledge and understanding through appropriate teacher intervention, observations and discussions with groups and individuals, and records of achievement towards the National Curriculum objectives are kept for each child.