

# **HOO ST WERBURGH PRIMARY SCHOOL AND MARLBOROUGH CENTRE**

## **MATHS POLICY**



Updated: 30<sup>th</sup> September 2019

Head of school: \_\_\_\_\_

Chair of Governors: \_\_\_\_\_

## **Curriculum Intent – what we are trying to achieve through our curriculum**

Mathematics teaches children how to make sense of the world around them through developing their ability to calculate, reason and solve problems. We believe it is a vital life skill as well as an academic subject. It enables children to understand relationships and patterns in their everyday lives. The demands of the New Primary National Curriculum (compulsory from September 2014) ensures that we now place greater emphasis on improving the fluency of children's mathematical understanding, with a corresponding increase in memorisation and daily practice.

At Hoo we believe Maths teaching should contribute to our pupils acquiring life-long skills and promote enjoyment and enthusiasm for learning through practical activity, exploration and discussion.

Through our provision we aim:

- to develop the ability to solve problems through collaboration, decision- making and reasoning in a range of contexts and see links between contexts and topics;
- to promote speed and fluency with number and calculating;
- to secure the learning of Key Instant Recall Facts (eg. times tables etc.); to promote confidence, competence and enjoyment in manipulation of number;
- to provide children with seamless progression from mental models and ways of working to abstract methods in an age-appropriate way;
- to develop a practical understanding of the ways in which information is gathered and presented;
- to explore features of shape and space, develop measuring skills in a range of contexts;
- to understand the importance of mathematics in everyday life.

Our schemes of work:

Mathematics is a core subject in the National Curriculum, and we use this document as the basis for developing our planning to meet the needs of every child. The emphasis on flexibility, fluency and memorisation of number facts has a number of implications for planning. Each year group has a yearly overview, which ensures coverage of the appropriate topics, with a focus on number. We block units of work together so that Mathematics lessons are planned as a series of lessons, which build children's understanding in small steps of learning. Our plans are a step-by-step conceptual journey through the mathematics, engaging children in reasoning and the development of mathematical thinking.

Each unit has an overview, which considers the key themes, National Curriculum objectives, key vocabulary to use and possible misconceptions, in order to fully support our staff in planning high quality maths lessons for all. Each unit is

Planning will carefully consider:

- the overall learning objective and where this lesson (small step) fits in the big picture
- formative and summative assessment opportunities and what they tell us
- important vocabulary to be used and explained
- specific questions to be used to extend and challenge thinking
- the use of concrete apparatus or visual models/representations eg. bar models, arrays, etc.

Differentiation and Challenge for all:

We differentiate through the amount of scaffolding we provide children. This means that differentiation occurs through the depth of understanding children need to use or show, rather than giving different children different tasks. We set tasks for all, with support layers planned and provided (for those who need it)

We support through a range of strategies:

- Immediate formative assessment – rapid intervention should lead to less gaps to close. Rapid intervention may be in the lesson or before the next lesson, led by the teacher or TA.
- Providing support in the form of concrete equipment or pictorial aides;
- TA or teacher working with a guided group;
- Buddy or paired working;
- Group discussion and investigative work (High Ceiling Low Threshold tasks);
- Variation theory, where only small changes are made to each question, which will scaffold and support their ability to link learning;
- TA or Teacher led booster or extension activities with small group/individuals;
- Prove it challenge tasks will deepen and enrich the understanding of the objective for those rapid graspers in the lesson – this may be through applying today’s understanding in new situations or problem-solving tasks, or through proving their reasoning.
- Where appropriate, children are involved in assessing whether they are ready for the deeper challenge tasks.

Building links and developing long-term memory:

We try to build links and connections so that they see the big picture. Links between topics and lessons will be made, to support pupils in seeing the links and connections in maths. We focus on including problem solving and reasoning tasks in lessons as much as possible. Children will be expected to apply their understanding in different situations and tasks – this ensures tasks help embed key concepts in their long-term memory.

## **Implementation – how our curriculum is delivered**

Teachers employ a variety of creative teaching and learning styles in mathematics, including strategies seen in Shanghai lessons. This may mean that some lessons seen will involve a lot of teacher- pupil talk, building children’s understanding and challenging understanding and misconceptions.. During daily lessons we encourage children to ask and explore inventively, as well as answer, mathematical questions. The focus is on children’s understanding and encouraging them to articulate this using accurate mathematical language and vocabulary. Precise questioning is used to ensure that children’s misconceptions are uncovered as a learning tool. This helps to develop a more fluent proficiency, thinking about concepts deeply. Questioning is also differentiated and used to challenge all pupils’ understanding.

In the Early Years and KS1, the children have the opportunity to use a wide range of resources, such as Numicon, bead strings, number lines, counting sticks, Base Ten, multilink cubes, 100 squares, digit cards and small apparatus to support their work. These continue into Lower KS2 until the individual child no longer needs to support their own learning and reasoning in this way. Some children will still need this type of support into secondary school. However, teachers in KS2 will consider how manipulatives, such as those listed above and place value disks, may support learning when introducing new concepts, helping the children to understand more abstract concepts.

Discussion, using high quality vocabulary and full sentences, has been a focus and our children are developing reasoning skills as they explain their thinking and prove their answers. Children are helped to see connections between topics and lessons, to support pupils in seeing links and connections in maths. We focus on developing fluency and applying their knowledge in problem-solving and reasoning tasks as much as possible.

Appropriate resources are provided; however, we aim to promote the independence of the child wherever possible, encouraging him/her to decide which resources they would like to use. Our aim is to ensure that resources are fully accessible for every child. Indeed, in lots of cases, children from KS1 and KS2 can draw their own representations to support their understanding.

In every primary class there will be a wide range of requirements. We recognise this fact and provide suitable learning opportunities for all children through considering how we can support all pupils to achieve within the learning objective.

We are working towards a mastery approach, as we believe that all pupils are capable of mastery in maths. This mastery approach means that we differentiate through the amount of scaffolding we provide children (differentiating depth of understanding; not giving different children different tasks).

- From Year 1 up to Year 5, we set the same task for all, with support provided through:
  - concrete or pictorial aides;
  - adult or peer support;
  - variation theory – small changes to support their ability to link learning;Prove it challenge tasks will deepen and enrich the understanding of the objective for those rapid graspers.
- In Year 6 we have a wider range of understanding within each class (as prior teaching was not following a mastery approach) so we provide differentiated tasks, which aim to progressively deepen understanding.

#### How assessment feeds into teaching and learning

A range of activities are used for effective maths assessment such as: Assessment for learning, where the teacher makes short-term assessments, often on a daily or weekly basis, in order to inform them of the next steps for a child or group of children. This allows the teacher to more closely match teaching and learning to the child.

PUMA assessments are completed in Terms 2, 4 and 6. These are tests which have been standardised nationally, giving us a better understanding of a child's attainment to an age expected standard. These tests are summative and aim to encapsulate the level that a child has achieved to date. These results are compared to yearly expectations and are also used to monitor a child's individual progress over terms, over the year and over the key stage. Accurate assessment allows for accurate target-setting. Targets for every child will be set on an annual basis and used to monitor progress and identify focus pupils and vulnerable groups.

#### How we support pupils

- Support can be provided through concrete or pictorial aides, or adult support.
- Rapid intervention before the next maths lesson is used to support children who have struggled with the learning objective, in order to ensure children do not fall behind. This will be led by the class TA, the class teacher or, in some cases, the maths subject lead.
- Where rapid intervention uncovers deeper issues for a child, the teacher may decide that more intense/regular support needs to be planned in for that individual or small group. If this issue can be seen for all, the class teacher will amend teaching for the next lessons, not moving on to the next step of learning, until they are happy this has been mastered.
- The impact of support measures is measured through learning walks, work scrutiny and pupil/teacher voice.

#### Number Fluency / Rainbow Numbers / Monkey Maths:

We have a number focus for our work, demonstrated in our yearly overviews and topic overviews, which highlight the non-negotiable curriculum statements children must demonstrate before being age appropriate.

In Key Stage 1, a really good understanding of number bonds within 10 will aid fluency in later years. In order to support our pupils in Year 1 achieve this, we are using 'Rainbow Number Fact Awards' to encourage the children to learn their number facts. The challenge focuses on rewarding children when they can recall number facts with speed and accuracy.

- Children work through the levels, starting at Red. They will move on from Red to Orange when they can complete the challenge in the time set, all the way up to Gold.
- Red: one more/one less (within 10)
- Orange: doubles of numbers to 5
- Yellow: number bonds within 5
- Green: number bonds within 10
- Blue: one more/less (within 20)
- Indigo: ten more (adding 10 to Ones numbers)
- Violet: doubles of numbers to 10
- Silver: near doubles (i.e.  $5 + 4$ ,  $8 + 9$ )
- Gold: number bonds within 20

A really good understanding and recall of times tables is the foundation of much of the maths work children will do at school and the curriculum puts a massive emphasis on knowing them early. In order to help us make sure this happens, we have created a times table scheme. Our scheme involves outwitting Monkeys in order to move on to the next challenge.

We use the following progression and certificate reward system:

- SPIDER MONKEY-  $2x$ ,  $5x$ ,  $10x$  (Expected to be achieved by the end of year 2)
- CAPUCHIN MONKEY –  $3X$ ,  $4X$  (Expected to be achieved by the end of year 3)
- MARMOSET MONKEY –  $7X$ ,  $8X$
- TAMARIN MONKEY –  $9X$ ,  $11X$ ,  $12X$
- LEMUR – All with division (Expected to be achieved by the end of year 4)
- CHIMPANZEE – All with place value- THU and tenths (Expected to be achieved by the end of year 5)
- ORANGUTAN – 2 digits X 1 digit (e.g.  $74 \times 7$ )
- SILVERBACK GORILLA – Fractions, decimals and percentages of quantities (e.g. 20% of 25,  $\frac{1}{4}$  of 50)
- We also use Times Table Rockstars as an online resource for practising recall of times table facts.

Feedback:

Feedback to children is given in a number of different ways, including:

- Marking of books. Children's work is marked on a regular basis against the learning objective, often providing support on developing their understanding. We try to complete a lot of marking within the lesson, with the child, to intervene rapidly, in order to fully support their understanding of the learning.
- Verbal Feedback. We use verbal feedback to develop their understanding, for example, to pose an extension activity for the child, or to ask a question for the child to think about which ensures understanding rather than adherence to a procedure. We try to give information to the child about how to improve their work, or offer an alternative 'way of thinking' about a particular problem.
- For further information please see our marking policy. We also encourage self and peer feedback. We recognise that verbal feedback is one of the most important ways to develop an individual's understanding and to correct misconceptions.

## **Contribution of mathematics to teaching in other curriculum areas**

### English

The teaching of Mathematics contributes significantly to children's understanding of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, in mathematics lessons we expect children to read and interpret problems, in order to identify the mathematics involved. They may not be aware of it, but children are developing their speaking and listening skills whilst they explain and present their work to others during learning discussions that take place frequently within maths lessons.

### Science

Science uses many mathematical skills and a range of knowledge. Children use measuring equipment with a range of scales, adapting their measurement skills and the expectations we have of them as they move through the primary age-range. This starts with, for example, non-standard measures such as hand spans, say, and develops to using measuring equipment with two decimal places during KS2. Their skills in presenting and analysing information also develops, through the use of a variety of types of charts and graphs.

### PSHE and citizenship

The teaching of mathematics supports the social development of our children through the way we teach them to work together during maths lessons. Daily buddy or paired work helps children to understand the importance of explanation and reasoning to help them solve real-life problems. They also tackle real-life problems such as money management.

### Computing

Information and communication technology enhances the teaching of mathematics significantly. Teachers can use software to present information visually, dynamically and interactively, so that children understand concepts more quickly. Younger children use ICT to communicate results with appropriate mathematical symbols. Older children use it to produce graphs and tables when explaining their results, or when creating repeating patterns, such as tessellations. When working on control, children can use both standard and non-standard measures for distance and angle. They can also use simulations to identify patterns and relationships.

## **Mathematics in EYFS**

Work undertaken within the Foundation Stage is guided by the requirements and recommendations set out in the Early Years Foundation Stage document.

Although all classes have children with different mathematical ability, we endeavour to give all children ample opportunity to develop their understanding of mathematics. We do this through varied activities that allow them to use, enjoy, explore, practise and talk confidently about mathematics. eg. Meaningful play activities allow a child to communicate their understanding of concepts such as 'more' or 'less'. This 'mathematics talk' and the richness of maths vocabulary can then be built upon this foundation, throughout KS1 and KS2.

## **Mathematics and inclusion**

At our school we teach mathematics to all children and have high expectations for all, whatever their individual needs. Mathematics forms part of the school curriculum policy to provide a broad and rich education to all children. Through our mathematics teaching we provide learning opportunities that enable all pupils to make good or outstanding progress. We endeavour to meet the needs of those pupils with special educational needs, those with disabilities, those with special gifts and talents and those learning English as an additional language, and we take all reasonable steps to achieve this.

When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style, differentiation – so that we can take some additional or different action to enable the child to learn more effectively. Detailed assessment allows us to consider each child's attainment and progress against expected levels. This ensures that our teaching is matched to the child's needs.

Intervention will lead to detailed provision planning to meet the needs of a child or a group of children with special educational needs. The progress of disadvantaged pupils is carefully monitored and Raising Standards meetings are used to measure the impact of interventions and to identify focus pupils and consider how best to support them.

## **Mathematics Coordinator**

The subject leader has a number of roles:

- To take a strategic lead in the development of maths within the school and feedback to leadership and governors when appropriate;
- To agree with colleagues a Progression in Calculation Policy to ensure in- school coherence for children, and to communicate this to the school community;
- To ensure that maths teaching is creative, skilled and up to date by ensuring that all teachers have access to regular and effective CPD;
- To monitor the quality of maths teaching by regular lesson observations;
- To give feedback to colleagues about their maths teaching;
- To advise colleagues about developments in best practice;
- To undertake regular book-monitoring to ensure that feedback to children is timely and challenges each individual child;
- To undertake moderation activities with colleagues, including colleagues from our local consortium and Kent and Medway Hub work, comparing samples of work with national exemplification materials;
- To encourage the focussed embedding of maths in cross-curricular topic work.
- To inform parents and carers about contemporary maths teaching methods so that they may support their child with confidence at home.

It is, therefore, important that the subject leader keeps up to date with current theory and practice in Maths, through research and action research, where appropriate.

## **Monitoring and review**

The subject leader evaluates the strengths and weaknesses in the subject, indicating areas for further improvement and reports this on an on-going basis to the head of school. The subject leader has allocated time in order to perform lesson observations and undertake book monitoring and pupil conferencing. A named member of the school's governing body is briefed to oversee the teaching of mathematics (curriculum governor).

This policy will be reviewed every two years.