

## Developing an approach to teaching and learning in mathematics

*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. NC 2014*

At Wormley CE Primary School, our vision and aim is to promote maths as a **social, creative and interconnected subject**. We believe that **everybody** is capable of being a successful mathematician. We aim to nurture a **love and curiosity** of the subject for all. The subject is **essential** to everyday life and provides a **foundation** for understanding the world. Our aim is to provide our learners with **rich opportunities** in maths to learn **independently and actively** in order that they:

- Become **fluent** in the fundamentals of mathematics;
- Are able to **reason** and justify mathematically;
- Can **solve problems** within a range of contexts.

We have adopted the **principles of mastery maths**, encouraging a breadth and depth of understanding by building conceptual understanding through intelligent fluency practice, addressing misconceptions through reasoning and solving problems.

**Mental maths** is highly valued and practised daily. Procedural variation is valued, explored and encouraged.

We believe **mixed attainment** groups and paired work is vital with a strong emphasis on 'talk' to allow children to 'think aloud' and build the skills necessary to be confident mathematicians. We encourage children to '**pause and notice**' to identify efficient methods, estimate answers and avoid careless mistakes.

**Mistakes** are valued and shared in our maths classrooms as teaching points and as evidence of the 'sparks' created in children's brains as they learn new concepts.

Children of every age and attainment level have access to **resources** (for example dienes blocks, number lines, Numicon, Cuisenaire rods, place value counters) to aid their understanding. Children are encouraged to make jottings to help their understanding.

Our curriculum meets the requirements of the National Curriculum 2014 for the teaching and learning of mathematics. Through **varied, engaging and open ended** scenarios, which

are **relevant** to the learner, we aim to **nurture a love and curiosity** of the subject. We teach maths across the curriculum and in different contexts.

We use Herts Essentials maths learning sequences as the spine of our maths curriculum, supplemented by additional intelligent practice materials drawn from NCETM and White Rose mathematics. We have identified high value objectives which are essential to pupils moving forward in their maths understanding.

Children are taught **at the pace appropriate to them**. Those who grasp concepts rapidly will be **challenged through rich and sophisticated problems** before being presented with new material; those who are not sufficiently fluent with earlier material will be **allowed to consolidate** their understanding before moving on.

### **A typical week of maths**

A typical week of maths will consist of:

- **5 x 1 hour-long lessons** (or equivalent). These lessons may, on occasions, be grouped to allow time for longer activities. Each lesson will provide opportunities to practise fluency skills, reason mathematically and to talk about mathematics. Planning is based on HfL Essentials planning adapted to suit the cohort and supplemented with other materials drawn, primarily, from White Rose, NCETM, Kangaroo maths or Nrich. We adopt a **mastery approach** to learning, so that each pupil has access to the same teaching. Children are not grouped by attainment. Maths investigations take place at least once per half term.
- **4 x Guided Maths in KS2**, lasting approximately 20 minutes each, in which children are grouped by attainment. The sessions will allow the teacher and TA to work with each group each week on a focussed activity to pre-teach, consolidate or extend learning or to address misconceptions that arise in class. In year 3 this starts in the Spring term.
- **Arithmetic test**. Children will take an arithmetic test every other week using either the Rising Stars test sheets or a test created by the teacher relating to a particular fluency focus, for example times tables. These will be used as a teaching opportunity allowing misconceptions to be addressed as well as 'pause and notice' techniques
- **Fluency 10**: each year group undertake 3 x 10 minute Fluency 10 sessions per week, often at the start of the maths lesson, in order to build children's fluency skills with an agreed focus. In Reception and KS1 these sessions will build fluency in number bonds up to and including 10, using a variety of targeted activities. In KS2, Fluency 10 sessions will focus on fluency in times tables and associated number facts, using a variety of targeted activities.
- **Chatty Maths** - daily opportunities for children to reason verbally through low threshold, high ceiling tasks. This could take place during guided maths, registration activities or the main maths lesson.
- **EYFS**: In **Reception**, from September children have a daily ten minute adult-led session building up to a daily twenty minute adult-led session in key groups (usually one adult to ten children). They follow these goals:

**ELG 11 Numbers:** Children count reliably with **numbers** from one to 20, place them in order and say which **number** is one more or one less than a given **number**. Using quantities and objects, they add and subtract two single-digit **numbers** and count on or back to find the answer.

**ELG 12 Shape, space and measures** Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns.

- In **Nursery**, a daily ten minute adult-led session in key groups starts in the Spring term. In both settings, we adopt a **mastery approach** to learning, so that each pupil has access to the same teaching. Children are not grouped by attainment. Focussed activities allow children the opportunity to use mathematical reasoning skills, consolidate or extend learning. Additional opportunities for mathematical learning is in place throughout both indoor and outdoor continuous provision and not solely restricted to a 'maths area' to embed the concept that mathematics is an integral part of everyday life in a broad range of situations.

## **Mathematics Policy**

All teaching staff follow the teaching sequence as laid out in our maths policy to ensure **consistency** in method and language used.

### **Curriculum coverage**

The HfL Essentials planning learning sequences are used as a base for lesson design. Teachers are encouraged to include other areas of the maths curriculum, e.g. measurement, within other subject areas. Guided maths and chatty maths sessions are also used to cover maths curriculum areas such as geometry. We have identified high value objectives which take priority and need to be secured by the majority of pupils. We use maths focus weeks and enrichment days to supplement this teaching and to encourage creativity.

Curriculum coverage is monitored through the completion of the formative assessment trackers within Insight Tracker.

In Early Years, the focus is on understanding number at the beginning of the school year, however within this focus other areas are incorporated, such as shape and pattern. Mathematics adult led teaching is planned in line with the EYFS Framework/Development Matters guidance and Early Learning Goals outcomes.

### **Learning Environment and resources**

Each classroom has a maths learning wall and display material such as vocabulary, a number line and a hundred square. Display materials are age appropriate. Maths resources are available and readily accessible by children in every lesson and in every year group.

Resources are kept in a central place for all to access. There are 2 maths displays in public areas.

### **Intervention**

Maths intervention will often be in direct response to teachers' assessment for learning in a lesson and take place in the afternoons or subsequent guided maths sessions, preferably by the teacher themselves.

We may, on occasions, use **rapid maths** to support small groups of pupils over a 6 week period. This consists of 3 sessions weekly. This is primarily targeted at children emerging in their year group's curriculum and those in receipt of pupil premium funding who have evident gaps which need addressing outside of the normal maths lesson..

After school **Booster groups** are run for year 6 pupils in preparation for the statutory tests in May.

Children who have been identified as having **dyscalculia** have dedicated support.

### **Assessment**

In years 1-6, assessment is recorded on an ongoing basis using our online tracking system **Insight Tracker** for their year group. These trackers are accessed by subsequent class teachers in order to provide a historic and complete picture of a child's progress. Progress in times tables is recorded on a separate tab on Insight Tracker.

At termly intervals, summative judgements are made, again using Insight Tracker.

Understanding of a concept is assessed using '**assessment pitstops**', such as those from Testbase or on HfL learning sequences, some time after the initial teaching.

We also use termly **diagnostic tests** in years 1,3,4 and 5 to inform summative judgements and identify gaps for future teaching (either whole class or intervention)

Progress is also assessed through arithmetic test scores, SATs practice papers (in years 2 and 6) and day to day assessment for learning.

In **Early Years**, assessment is recorded on an ongoing basis, through the recording of baselines and termly assessments on SIMS (AM7). Observations logged onto the Tapestry Online Learning Journal system also form part of the ongoing assessment process. These assessments are passed on to new teachers in order to provide a historic and complete picture of a child's progress.

### **Targets**

Teachers ensure that children know expectations of them in a year group and what they need to work on next. They are encouraged, and supported by adults where necessary, to achieve their target.

## **Marking and feedback**

Children are encouraged to provide collaborative feedback wherever appropriate. Teachers adhere to the school's policy on marking, ensuring that each piece of work is acknowledged and children are regularly provided with feedback, usually verbal, to help them make progress. This can be in the form of a development task for which children will be given time to reflect on and respond to.

## **Monitoring and Moderation**

Maths is **monitored** through a variety of means e.g. observations, learning walks, pupil consultations, planning reviews and book looks.

Termly **phase reviews** are also a source of information.

Phases are expected to **moderate** assessment at least termly. Teachers attend moderation clusters with local schools and we undertake a whole school moderation twice a year.

The subject leader holds a **maths surgery** termly to review progress and curriculum coverage as well as to provide support and advice to teachers.

## **Home Learning**

Children have the opportunity for extending their maths skills through maths based activities on the home learning choice charts / learning menus. This is usually delivered through the **Google classroom**. They are encouraged to play maths games to practise fluency skills each night at home. Teachers will communicate any fluency focus through this.

All pupils from YR-Y6 have a log-in to **Numbots** to develop their mental fluency in number. They also have access to **TT Rockstars** (used from the summer term of Y1 onwards) to develop multiplication tables.

## **Website**

This is an important interface with parents which has links to our maths policy, an overview of learning and curriculum overviews for each year group as well as curriculum foci.

## **Resources**

We base our lesson design on HfL Essentials planning and obtain resources from a variety of sources such as: White Rose, NCETM, Nrich, ATM and Convince Me Cards. On the Google Drive, within Curriculum - Maths, there is teaching and assessment materials to help with lesson design and assessment to inform our teaching and learning.

## **CPD and research**

Maths CPD for teachers is held at least termly, usually within school although external providers are used as required. Phases and individual teachers are also encouraged to ask for specific support from the maths leadership team when required. Materials from CPD sessions can be found on the Google Drive.

Teaching assistants CPD is delivered in the form of bite sized chunks each half term and they do attend external training from time to time. Many have also undertaken collaborative development projects in maths.

The school works closely with the Matrix maths hub and 2 members of staff are part of a Teacher Research Group (TRG). The school are currently working with HfL to trial their development of Maths Essentials for YR and has been involved in a range of research projects with Herts for Learning and The University of Hertfordshire.

In addition, one member of the maths team leads Matrix Maths Hub workgroups in Hertfordshire two are maths specialist teachers and two maths SLEs, both of whom have had articles published in educational publications about maths pedagogy.

Teaching staff are provided with academic articles and teaching ideas when appropriate and it is also suggested that teachers subscribe to the NCETM newsletter to keep abreast of current thinking in maths teaching and learning.