



Mathematics Policy

Worlds End Junior School

Aims

Professional Development
Accredited Lead

National Centre
for Excellence in the
Teaching of Mathematics

What is mathematics and why is it important?

Mathematics helps us to make sense of our world. It is a powerful, universal language used to explain, predict and represent events and tackle everyday problems. Mathematics is of central importance to our modern society. It is an essential part of everyone's daily life and critical to science, technology, finance and engineering. Mathematics is necessary for any employment or independent life.

At World's End we aim not only to prepare our children for the next stage of their education, but also to lay the foundations for successful lives after school. Our aim is to prepare our children for the jobs of tomorrow, which will require greater mathematical skills than in the past, including thinking mathematically in order to use technology that doesn't yet exist.

The aims of our maths teaching at World's End Junior School are aligned with the aims of the National Curriculum: **fluency, reasoning and problem solving** – both in the mathematics lesson and across the curriculum. We recognise that pupils need to learn basic number facts and acquire **fluency in procedures**, alongside **developing conceptual understanding** if they are to be able to solve increasingly complex problems in life and later in the workplace.

A **mastery approach** to the teaching of mathematics has been adopted, so we have high expectations of all our pupils. We endeavour to make the mathematics curriculum accessible to all pupils; moving them through the programme of study at broadly the same pace, with opportunities to work on the objectives more deeply for those who rapidly grasp concepts. All children need a deep understanding of the mathematics they are learning in order that future learning is built upon firm foundations. Same day 'catch up' sessions with teachers and additional practice to prevent children falling behind.

Part of this approach includes adopting a '**growth mindset**'. Children at World's End are encouraged to believe they are all capable of learning and doing mathematics, given sufficient time, good teaching, appropriate resources and effort.

See footnote i for the principles of a growth mindset.

There are aspects of mathematics teaching which will be seen in every classroom at World's End:

- A positive attitude toward and sense of excitement about mathematics
- All children learn through active enquiry and experiment using concrete materials, represent their mathematical ideas through images and follow a clear progression toward recording abstractly
- Children learn to use multiple representations which ensures depth of understanding
- Mathematical skills are practised and applied across the curriculum
- A mathematically rich environment supports learning
- Communication, using precise mathematical language is an expectation
- Independence is encouraged
- Fluency and flexibility features strongly in every lesson

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- Adults use skilful questioning to reveal, probe and address misconceptions
- Children who grasp concepts rapidly are challenged to work more deeply through completion on rich and sophisticated problems
- Scaffolding is provided for children when required
- Skilful assessment identifies children who are struggling to grasp concepts leading to guided groups and catch up sessions with the teachers
- Use of high quality textbooks ensures a coherent, progressive journey through the curriculum

Planning

We believe that the key to success with all learners is quality first teaching (QFT – see footnote ii for details). This is promoted through ongoing bespoke professional development from the maths leader who is a Specialist Maths Teacher and a Mastery Specialist.

Objectives are taken from the relevant year band. In years 3, 4, and 5 NC objectives have been grouped to match the Maths No Problem chapters. In year 6, the White Rose Medium Term Plans are used.

Teachers in each year group plan together with the support of the Maths Leader. Planning must always be guided by sound *Assessment for Learning* strategies and teachers record information about the children in their 'Same Day Catch Up books'. High quality textbooks are used to support teachers in the breaking down the learning into small, coherent steps and to support them in making decisions about the most appropriate models and images. Maths No Problem is used after evaluating the findings of the National Textbook Project.

Lessons are planned directly onto ActivePrimary flipcharts which are saved together with other resources centrally. This allows the maths leader an opportunity to monitor them before lessons are taught in order to support the teachers. Each lesson in every year group is focussed around the concrete (model) – pictorial (image) – abstract approach as children learn new concepts. Teachers skilfully highlight connections between mathematical topics and support the learning of mathematical vocabulary.

Whilst years 3, 4, and 5 loosely follow the Maths No Problem textbooks, they supplement the lessons with further opportunities for problem solving from sources such as NRich. Activities are chosen which match the lesson objective and the needs and context of the cohort of children. Learning objectives are on flipcharts for the teacher but are not shared with the children at the start of the lesson in order to encourage the children to think carefully about anchor tasks and what they are learning.

Lesson Structure/Role of the Teacher/Teaching Assistant

Lessons are structured around the concrete – pictorial –abstract approach providing opportunities throughout for using mathematical vocabulary, developing mathematical thinking and using multiple representations. There should be opportunities to record in every lesson (in different ways).

The main teaching activity should be whole-class based with everyone covering the same content. Children are taught in classes, not setting groups in line with the mastery approach. Guided groups are led by qualified teachers, whilst teaching assistants may circulate during the main part of the lesson, or take the lead on some whole class activities. Whilst some teaching assistants have been trained to deliver the 'Catch Up Numberacy' programme, First Class @ Number and Success@Arithmetic, which we are still using to address gaps in learning, we are aiming for the 'same day catch up sessions' to be delivered by the teachers, based upon the teachers assessment of the learning which has taken place within the lesson.

Lessons are structured with assessment opportunities throughout. This provides opportunities to evaluate what has been learnt, review success and address misconceptions. It should also provide opportunity for

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peer/self assessment so children understand what they attained and where to go next. There are no specific time limits for the different parts of a lesson.

The aim of a mathematics lesson is to teach a child a skill or strategy that will provide a solution to a task. It is not simply to produce a page of correct number work, which is abstract to any real life situation.

Although maths is taught as a discrete subject, staff are encouraged to exploit any cross-curricular links and provide opportunities for children to demonstrate their mastery of concepts or skills in other subjects (eg: science, ICT, PE, topic).

It is the responsibility of teaching assistants supporting individuals or groups of children within a maths lesson to ensure they have read, and if required, discussed the planning with the class teacher and prepared any required resources. They are expected to provide feedback to the teacher on a daily basis for the children they have been working with. This feedback may be verbal or if preferred, written on their copy of the maths plan or on 'post-it' notes.

Learning in books is presented and marked in accordance with guidance in the marking policy.

Classroom Environment

The classroom environment should be mathematically rich and support current learning.

Maths working walls are used daily as a part of the maths lesson and so must be clearly visible and interactive. Key vocabulary, reference to the models and images that the children have been working with during the lesson, links to other areas of mathematics and sentence stems should all be included. Learning mats, maths dictionaries, iPad apps, and a range of concrete materials should be available.

Homework

In order to support the children in becoming fluent mathematicians we recognise the need for regular practice of key skills such as times tables, number bonds, doubling, halving etc. We therefore encourage the children to practice such skills daily at home via 'Minute Maths' homework. Appropriate questions are identified by the teacher's use of formative assessment. The children work with an adult each night to complete as many answers as possible in a minute. This is repeated every night. We expect that over the week, the children increase their score. This is monitored by the teacher and teaching assistants via the entries in the pupil planners and by work in the lessons. Where children are not able to complete the work at home, opportunities are made for them to complete it during the school day. Where teachers feel that it is needed and appropriate, the children are set homework on Mathletics.

Family Partnerships

It is vital that parents and carers are actively involved in their children's learning. Over the year, all parents are invited into a maths lesson to support their child. The parents can talk to the teacher about how to support their child at home and better understand the pitch and expectations for that year group. There is also support offered to parents via the Maths Centre and the school website.

Resources

Each class/year group has a range of general mathematical equipment (eg: dictionaries, base ten, dice, counting sticks, Numicon, Cuisenaire, etc). A wide range of additional resources are available in the Maths Centre and in the maths store.

Class computers have access to maths software for the interactive whiteboards. A further range of software is used, which teachers should be familiar with. Recommended websites are listed on the school website and shared with staff via email updates. There are additional resources via the Mathletics website to support teachers during lessons via the interactive whiteboard and for homework and assessment activities.

Equal Opportunities

The provision of maths teaching is regardless of race or gender and should allow all children to reach their full potential. In order to achieve this, activities should be set in a familiar context where possible. Children with special educational needs should be taught on an individual/small group basis when applicable (as guided by SENCO).

Record Keeping/ Assessment

Maths books provide evidence of progress, along with assessment information written in 'Same Day Catch Up' books. Learning should be recorded in as many ways as possible to provide the child with a range of experiences.

Assessment is an ongoing process in the classroom which forms the basis of future action. Formal and informal teacher assessments are based upon the practical, written and oral work completed by the children.

Summative assessment takes place half termly and at the end of the year written tests are analysed in order to support end of year assessment judgements.

Refer to the assessment guidance for further information.

Special Educational Needs/Gifted and Talented

We aim to provide a rich mathematical education, which will develop the potential of all pupils.

Any child who is assessed to have special education needs in mathematics will have maths targets created through use of Birmingham's Individual Target Plan process. When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors such as classroom organisation, teaching materials, teaching style, and differentiation so that we can take some additional or different action to enable the child to learn more effectively. Ongoing assessment for learning, and summative assessment allows us to consider each child's attainment and progress against expectations. This ensures that our teaching is matched to the child's needs. Where appropriate, specific strategies and intervention programmes relating to mathematics are implemented.

Children who regularly grasp concepts rapidly and have been assessed as having mastered objectives from their year group may be identified by their class teacher as Gifted and Talented. Planning for these pupils will focus on enrichment prior to acceleration and the development of mathematical thinking rather than

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covering content more quickly. Various enrichment activities are organised throughout the year for these pupils in addition to the daily mathematics lesson, many of which enable them to learn with mathematicians from other schools. The maths leader is available to advise on the type of challenging and stimulating problems and probing questions most likely to prepare these pupils for an exciting future in mathematics.

Next Policy Review: Sept 2017

Footnotes:

i) Growth Mindset features:

- Everyone can learn mathematics to the highest levels
- Mistakes are valuable
- Questions are important
- Mathematics is about creativity, pattern spotting and sense making
- Communication and making connections are vital components of mathematics
- In a mathematics classroom the focus is not on performing or giving quick answers
- Depth of understanding is more important than speed

ii) QFT includes:

- Highly focused lesson design with sharp objectives
- High demands of pupil involvement and engagement with their learning
- High levels of interaction for all pupils
- Appropriate use of teacher questioning, modeling and explaining
- An expectation that pupils will accept responsibility for their own learning and work independently
- Regular use of encouragement and authentic praise to engage and motivate pupils
- An emphasis on learning through dialogue, with regular opportunities for pupils to talk both individually and in groups