



Mathematics Policy
September 2020

At Woodthorne we promote an inclusive curriculum where every child has the right to achieve their potential.

We strive to inspire so children aspire and have ambition, offer children experiences relevant to the curriculum and enrich their language in all we do. We will continue to interweave our school motto and core values into everything we do:

With this, at Woodthorne Primary School, we believe that Mathematics makes a valuable and distinctive contribution to pupils' education. The basic skills of mathematics are vital for the life opportunities of our children.

INTENT

At Woodthorne Primary School, we believe mathematics is an important part of children's development throughout school, right from an early age. Our aim is for all children to think mathematically, enabling them to reason and solve problems effectively- experiencing a sense of awe and wonder as they solve a problem for the first time, discover different solutions and make connections between different areas of mathematics.

We intend on delivering a curriculum which:

- Allows children to be a part of creative and engaging lessons that will give them a range of opportunities to explore mathematics
- Gives each pupil a chance to believe in themselves as mathematicians and develop the power of resilience and perseverance when faced with mathematical challenges.
- Recognises that mathematics underpins much of our daily lives and therefore is of paramount importance in order that children aspire and become successful in the next stages of their learning.
- Engages all children and entitles them to the same quality of teaching and learning opportunities, striving to achieve their potential, as they belong to our school community.
- Makes rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- Allows children to use and understand a wide range of appropriate mathematical language to discuss, explain and justify their mathematical thinking and reasoning.
- Provides opportunities for children to apply their mathematical knowledge to other subjects (cross-curricular links).
- Is in line with the expectations in the National Curriculum 2014.

Early Years Foundation Stage

Within the Early Years Foundation Stage there are 7 areas of learning:

- 3 prime areas- Physical Development, Communication & Language and PSED
- 4 specific areas- Knowledge and Understanding of the World, Literacy, Expressive Arts and *Mathematics*.

Mathematics is then split into two Early Learning Goals- Number and Shape, Space & Measure. By the end of reception, the aim is for all children to have reached these Early Learning Goal statements:

Early learning goal – 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. They solve problems, including doubling, halving and sharing.

Early learning goal – 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. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Year 1-6

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. Pupils who grasp concepts rapidly should be challenged 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, including through additional practice, before moving on.

Key stage 1 - years 1 and 2

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower key stage 2 - years 3 and 4

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word-reading knowledge and their knowledge of spelling.

Upper key stage 2 - years 5 and 6

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

IMPLEMENTATION

At Woodthorne, to help children become competent with and to gain a deep understanding of new mathematical concepts, we follow a concrete-pictorial-abstract approach:

Concrete- Children have opportunities to use concrete (practical) objects and manipulatives to help them understand what they are doing.

Pictorial- Alongside the concrete, children use pictorial representations (where they are exposed to a range of representations to help draw out mathematical structures). These representations then help children to reason and problem solve.

Abstract- Both concrete and pictorial representations support children's understanding of abstract methods.

This approach contributes to children's conceptual understanding and conceptual understanding supports retention, which is our ultimate goal.

Nursery

Within our Nursery provision, planned mathematical opportunities take place initially through rhymes (e.g. 5 little ducks, 3 cheeky monkeys etc), puzzles and stories (e.g. hungry caterpillar). Other mathematical opportunities continue to be provided through the enhancement of the continuous provision with maths resources. Within the nursery setting, there is also a dedicated maths area, where children are provided with the opportunity to complete planned maths activities and access maths manipulatives of their choice throughout the session. In addition to this, we aim to have aspects of mathematics flowing through the whole setting (e.g. scales in role play area, measuring jugs in water area). Adult led activities are also planned for, which may take place within the maths area or in any other area of the setting (e.g. counting conkers outside, finger painting numbers in the creative area, weighing babies in the home corner, etc.). All maths observations are recorded within the children's learning journeys.

Reception

In Reception, there is a greater focus on adult led activities (pitched in order for children to achieve the Early Learning Goals- see the statements above). Maths is still also heavily evident throughout the continuous and enhanced provision. Children are taught specific skills through practical activities and these are recorded according to the children's ability during an adult led activity. Children have opportunities to apply these skills to problem solving activities within the enhanced provision. All adult led sessions are recorded within a separate class maths book through photographs, child's voice and adult observations). Child initiated activities are recorded in the children's learning journeys.

Years 1-6

During each week, children have four maths lessons (Monday-Thursday) and 1 arithmetic lesson (Friday). Additionally, Monday-Thursday, 'keep up' and 'catch up' interventions take place.

To ensure consistency, we follow a school calculation policy when teaching the four operations. A child friendly version of this document is also stuck into children's books, which is referred to within lessons.

During every lesson, the tasks that children independently complete follow the structure of varied fluency, reasoning and problem solving. These three types of activities are evidenced in books daily.

In order to meet the needs of all children in Mathematics they may be grouped according to ability for some activities (differentiated by task). These groupings must be flexible and mixed ability groupings may be appropriate on other occasions which will lead to differentiation by outcome. Tasks should be differentiated to meet the needs of individual pupils through resource and support.

In accordance with our school's policy on differentiation and SEND, all children are given tasks suitable to their age, aptitude and ability.

In Mathematics, SEND pupils can:

- work on the same content at different rates and levels through open ended tasks matched to individual groups' needs.
- be taught concepts through discussion, concrete examples and practical activities.
- make use of stem sentences.
- be exposed to the pre teaching of vocabulary.
- when planning, use the identified broad area of need to support pupils independence and progress from their different starting points.

In Mathematics, exceptionally able pupils:

- will be exposed to open ended tasks which enable them to tackle and solve more complex problems.
- will be required to reason at a higher level.
- deepen and broaden their knowledge and understanding of mathematical concepts they are studying.
- choose the most efficient and effective methods– and can justify their choices.
- will have the opportunity to apply their knowledge and understanding whilst collaborating with other able mathematicians and fostering their love for the subject (i.e. Inter MAT maths challenge days)

Mathematics across the Curriculum

Wherever possible, we try to make links to Maths across the curriculum, providing children with opportunities to consolidate and enhance their maths skills. Applying and developing skills across the curriculum allow children to become more confident at tackling maths in any context, particularly real life situations.

STEM

All children are curious about the world around them and how things work. At Woodthorne Primary School we aim to nurture inquiring minds, logical reasoning, and collaboration to prepare them for a world where skills in science, technology, engineering and maths are increasingly important. We provide opportunities for pupils to engage in practical investigation making links between science, maths, technology and developing engineering skills. This helps to encourage critical and creative thinking and makes the acquisition of knowledge and skills relevant and interesting. As a school we try to integrate the STEM subjects, encouraging children to think independently and find solutions to problems.

CPD

Where appropriate members of staff, and/or the co-ordinator, are sent on relevant courses. This is determined by SLT, based on the needs of individual year groups and whole school priorities, and the suitability of courses offered.

SMSC within Mathematics

Children will have opportunities to:

Spiritual Education

Use their imagination and creativity to explore ideas while learning mathematics by:

- identifying and applying patterns and rules to everyday problem-solving;
- writing own problems and challenges that use those patterns or rules.

Moral Education

- Understand the consequences of actions, e.g. if you perform a particular action to one number, will the same outcome apply to other numbers? Is it always the case? 'Sometimes, always, never' statements.
- Apply the skills required to solve various problems and understand how decisions are made dependent upon the outcomes of the problem.

Social Education

- Develop personal qualities and use social skills.
- Work in pairs or groups to solve problems
- Persevere when struggling to answer questions;
- Take risks and not being afraid to try – it's ok to be wrong, it's not ok not to try
- Take turns when playing maths games.
- Questions types such as, 'X thinks ____, Y thinks ____, who is right?' Discuss.

Cultural Education

- Understand and appreciate personal influences, taking into account other people's views and understand how to express own views, e.g. How to explain to someone where they may have gone wrong in a question.
- Understand that mathematics is a universal language of the world
- Develop a realisation that many topics we learn today have travelled across the world and are used internationally.

British Values within Mathematics

At Woodthorne we ensure that through our school vision, values, rules, curriculum and teaching we promote tolerance and respect for all cultures, faiths and lifestyles. We have a duty to prepare our children for life in modern Britain and to keep them safe. We value, uphold and teach pupils about the British Values as directed under Ofsted guidance:

'ensure that they and the school promote tolerance of and respect for people of all faiths (or those of no faith), cultures and lifestyles; and support and help, through their words, actions and influence within the school and more widely in the community, to prepare children and young people positively for life in modern Britain'

Through mathematics we advocate and actively promote the fundamental British values:

Democracy

- Developing a love for the beauty of mathematics through the enjoyment of following rules to reach an answer.
- Taking into account the views of others in shared activities.
- Voting when collecting data.

The rule of law

- Following class rules during tasks and activities for the benefit of all.
- Understanding the consequences if rules are not followed.

Individual liberty

- Challenging ourselves to work independently to achieve personal success.

Mutual respect

- Take turns and share equipment.
- Review each other's work respectfully.
- Working with peers who appreciate maths and working collaboratively to solve problems.

Tolerance of those with different faiths and beliefs

- Trying to find mathematics everywhere regardless of the context.
- Use maths to learn about different faiths and cultures around the world, e.g. looking at patterns/shapes within Islam/Hindu religions.

Home/School Link

The link between home and school within Mathematics takes place in many forms:

- Termly curriculum newsletters are sent out informing parents of topic areas that are to be covered.
- In Key stage 1 and 2 weekly maths homework is provided for pupils to tackle- supporting the learning that has taken place within the classroom during the week.
- To provide a detailed outline of the child's progress and attainment, termly reports are sent out to parents/carers ahead of the parent consultations.
- Parent consultations take place each term, providing parents/carers with information on their child's progress and attainment. Children's targets are highlighted to parents/carers.
- Informal meetings are encouraged when needed.
- A variety of parent/carer workshops are held throughout the year, ranging from subject knowledge specific sessions to information sharing about statutory testing.
- Parents/carers are encouraged to join their children within the classroom on specific days throughout the year, helping to raise the profile of mathematics, e.g. World Maths Day, NSPCC Number Day, Rockstar Day (TTRS).

IMPACT

Each year group has a copy of the assessment grid for Mathematics. This grid lists the objectives to be covered. Three pieces of evidence are collected (dated on the assessment grids by staff) before making the judgement that a child is secure with that objective.

The Mathematics co-ordinator is responsible for monitoring curriculum coverage and will review medium term plans on a termly basis. Monitoring of classroom practice and children's work is carried out by the subject co-ordinator. The co-ordinator will carry out a review each term and produce a written review identifying targets for future action within the subject. The subject co-ordinator will also produce a report for Governors to inform where the subject is now and the intentions for moving forward.

Supporting Teacher Assessment

- Formative, ongoing assessment for learning is carried out by staff daily and used to inform subsequent sessions/interventions.
- Summative testing is carried at the end of each term- question level analysis activities are then carried out so that assessment outcomes directly inform future planning.

Outcomes of formative and summative assessments are used to regularly update individual pupils' target sheets.

Statutory Testing

- Baseline Assessment
- Y2 End of KS1 SATs Test
- Y4 Multiplication Check
- Y6 End of KS2 SATs Test