



# Mathematics Policy

Spring 2020



# DORRIDGE PRIMARY SCHOOL

## Dorridge Primary School Aims

1. All school staff, governors and parents work in partnership for the benefit of all pupils.
2. Teachers and support staff enable all pupils to achieve their full potential as independent life-long learners.
3. Our broad, balanced and enriched curriculum promotes challenge, enabling all pupils to make a positive contribution towards their own achievement.
4. We foster strong links with the community and encourage children to be responsible citizens, who are respectful and tolerant.
5. We encourage initiative within a happy, healthy and safe environment where all achievement is valued and celebrated.

Mathematics is an important tool for, and an integral part of everyday life; it helps us to make sense of the world around us. Mathematics is of central importance to our modern society; 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 and our aim is to prepare our children for the jobs of tomorrow, which will require greater depth of mathematical skills and understanding.

At Dorridge Primary School, we endeavour to ensure that children develop a healthy and enthusiastic attitude towards mathematics, and develop a level of numeracy attainment that gives them the skills, knowledge and understanding necessary to use and apply their numerical confidence to reason, problem solve, react and interact with the world they face each day.

We aim to ensure that Dorridge pupils are proficient, competent and confident with the tools of maths: the vocabulary & equipment we use; the use of numbers, shape and measures; data handling; logical reasoning, problem solving and analysis skills; calculating; mental arithmetic; and an increasing ability to think in abstract ways.

The aim of this policy is to set out Dorridge Primary School philosophy about the teaching and learning of mathematics. It should be a guide to staff, parents and Governors about what is expected in order to achieve and maintain the highest standards in mathematical teaching for all of our pupils.

### **The Aims & Intent of Mathematics at DORRIDGE PRIMARY SCHOOL**

The aims and intent of our mathematics teaching, at Dorridge Primary 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. All children need a deep understanding of the mathematics they are learning in order that future learning is built upon firm foundations.

At Dorridge Primary School, we intend our mathematical delivery to meet the following aims:

- To help children develop an awareness, positive attitude and fascination for mathematics so that it is more than a lesson but becomes an exciting aspect of daily learning
- To ensure that children develop confidence and competence in mathematical knowledge, skills and concepts
- To raise standards of achievement in mathematics so that our pupils develop greater depth of understanding of mathematical concepts
- To ensure that children are able to communicate using the vocabulary of mathematics
- To equip children with the ability to solve problems, to reason, to use logical thinking and to work systematically and accurately
- To support children in using their initiative and having an ability to work independently and in cooperation with others
- To ensure that children are able to use and apply mathematics across all areas of the curriculum and in their everyday life experiences
- To relate mathematics to the real world in every curriculum area through explicit reference so that pupils develop a sense of the importance maths has in human economic well being
- To ensure that pupils develop the complementary computing skills to support and enhance their mathematical awareness
- To equip pupils with the necessary skills and knowledge (through good teaching and mathematical environments) to help them know and understand when, how and why they use certain strategies to achieve the desired results
- To balance the development of mathematical skills so that pupils excel in all strands of the subject in order to create rounded mathematicians
- To ensure that all children who have a special educational need that affects their mathematical development have their needs met through a personalised approach to their maths teaching and the use of appropriate interventions
- To ensure that all have their abilities supported in a way that challenges them and maximises their development so that they reach their true potential

### **Mathematics Coordinator**

The Subject Leader for mathematics is Miss Gee, and all queries about this policy or the provision of maths should be addressed to her in the first instance.

### **IMPLEMENTATION: Teaching and learning styles & strategies**

The school follows the National Curriculum objectives, which is supported by using both published and teacher made materials.

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. To support this approach we **do not erase incorrect answers or approaches** as they provide a valuable clue to the path a child is taking and becomes valuable informal assessment.

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 (e.g. IPC, Science, ICT, PE).

A balance of practical, investigative, arithmetic, written and reasoning activities are used throughout the school. Children are given opportunities for investigative work and problem solving, at all ages and levels, to develop their ability to apply their mathematical skills to real life situations.

When recording their calculations, investigations and other mathematical work, children (Reception to Year 6) are encouraged to formulate their own ways of recording their results/ jottings teachers are modelling the children's verbal explanations teachers are demonstrating standard methods.

There are aspects of mathematics teaching which will be seen in every classroom at Dorridge Primary School:

- A positive attitude toward and sense of excitement about mathematics
- 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
- Mathematical skills are practised and applied across the curriculum
- A mathematically rich environment supports learning
- Communication, using precise mathematical language is supported
- Independence is encouraged
- Fluency and flexibility features in every lesson
- Adults use skilful questioning to reveal, probe and address misconceptions
- Children who grasp concepts rapidly are challenged through 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 qualified teachers and teaching assistants

Teachers plan lessons that engage pupils in reasoning and problem solving activities that challenge them to use a range of maths skills, whilst developing their personal qualities, including:

- motivation and willingness to 'have a go' at new concepts
- flexibility and creative thinking
- perseverance, reliability and accuracy
- willingness to check, monitor and control their own work
- independence of thought and action
- prediction, evaluation and reflection
- ability to co-operate within a group
- systematic work habits
- expectation to use a known facts to help work out unknown facts

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

## **Mathematics Planning**

The New National Curriculum provides the long term planning for mathematics taught in the school.

The framework has six main areas of study:

- Numbers (including place value, addition, subtraction, multiplication, division, fractions, Decimals and percentages)
- Ratio and Proportion
- Algebra
- Measurement
- Geometry
- Statistics

Mathematics termly objective overviews taken from WRM (White Rose Maths) indicate coverage of the Framework for Mathematics.

Each year group (Yr.1 to 6) adapts and uses the small steps suggested outcomes for each unit. These outline the small steps in learning that children need to achieve in order to meet the objectives set out in the NC. Teachers skilfully highlight connections between mathematical topics and support the learning of mathematical vocabulary and questions as set out in the WRM scheme of work. These questions and

activities are adapted each week as a short term plan. Staff annotate these plans where necessary and are a basic guide to follow.

Class teachers select the objectives to be taught each term and use their own judgement as to the order of delivery, and timing may be flexible in response to learning.

The school does not follow a set commercial maths scheme, but does have a wide range of resources available for teachers (including text books, practical resources, games and software).

These high quality resources 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. Teachers also use Classroom Secrets resources, Master The Curriculum resources, Hamilton planning and resources, whilst additionally supplementing the lessons with further opportunities for problem solving from sources such as White Rose Resources, NCETM toolbox and NRich; Activities are chosen which match the lesson objective and the needs and context of the cohort of children and may link to other areas of the curriculum, such as topic or real life problems. Planning must always be guided by sound Assessment for Learning strategies.

Lessons in all year groups, aim to structure the concrete (model) – pictorial (image) – abstract approach as children learn new concepts, 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). Teachers skilfully highlight connections between mathematical topics and support the learning of mathematical vocabulary.

The main teaching activity should be whole-class based with everyone covering the same content. Children are taught in setting groups in line with the mastery approach. Guided groups should be mostly led by qualified teachers, with teaching assistants circulating the room during the main part of the lesson, or if appropriate taking the lead on some whole class or groups activities.

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.

Lessons are structured with assessment opportunities throughout; these may be referred to as mini plenaries. This provides opportunities to evaluate what has been learnt, review success and address misconceptions. It should also provide opportunity for 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.

## **Mathematics in EYFS**

Pupils in our YR class at Dorridge Primary School, have opportunities to explore, create and investigate in the world of maths in a practical, stimulating and secure environment that develops their language and understanding of the basics of numeracy acquisition.

It is very important that children in the Early Years engage with maths and the nature of the curriculum in Year R means that children know maths is fun – from singing counting songs, to chanting rhymes, playing action games that involve numbers and shape, playing “What’s the time Mr Wolf”, using the assorted media available to paint/draw/mould numbers etc, sorting games, positional puzzles, role play with telephones/clocks/tills etc. In order to help parents to support their children we hold INSPIRE workshops with a maths focus so that parents can develop their confidence and make maths fun at home.

We teach maths in the foundation stage as an integral part of the school’s work. For these children provision is made for the ELG mathematics strand objectives. These are linked with the Y1 objectives, from The National Curriculum, where appropriate.

**“Developing a strong grounding in number is essential for providing children with the platform to excel mathematically. Children should develop a deep conceptual understanding of the numbers**

**to 10, the relationships between them and the patterns therein. By providing frequent and varied opportunities to build and apply this understanding, children will develop a secure base of knowledge from which mathematical mastery is built.”**

### **ELG Number:**

Children at the expected level of development will:

- Have an understanding of number to 10, linking names of numbers, numerals, their value, and their position in the counting order;
- Subitise (recognise quantities without counting) up to 5;
- Automatically recall number bonds for numbers 0-5 and for 10, including corresponding partitioning facts.

### **ELG Numerical Patterns:**

Children at the expected level of development will:

- Automatically recall double facts up to 5+5;
- Compare sets of objects up to 10 in different contexts, considering size and difference;
- Explore patterns of numbers within numbers up to 10, including evens and odds.

## **Assessment and Recording**

At Dorridge Primary School, continuous assessment of mathematical development contributes towards a personalised approach and helps teachers tailor their lessons, homework and resourcing to ensure that children reach their potential in mathematics. 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.

Each child should be involved in the review of their progress and be able to contribute to discussions about different aspects of their work.

### **Short term**

Children's classwork is assessed frequently through regular marking, analysing children's errors, questioning and discussion. Maths books provide evidence of progress, along with annotated planning where appropriate or required. Learning should be recorded in as many ways as possible to provide the child with a range of experiences. Children's work is marked and feedback is given with next steps as in line with the marking and feedback policy.

### **Medium Term**

Every term, pupils in each class, are assessed using a variety of assessment resources. These assessments are used to track pupils' progress, informing teachers of gaps in pupil understanding. These assessment results are then analysed and discussed by the Maths co-ordinator and SLT during termly pupil progress meetings.

- Year 1 (Autumn/Spring/Summer) White Rose Maths End of Unit Assessment & Termly Assessments
- Year 2 (Autumn/Spring/Summer) White Rose Maths End of Unit & Termly Assessment/previous SATS assessments
- Years 3,4,5 (Autumn/Spring/Summer) White Rose End of Unit/Half-Termly Assessments
- Year 6 (Autumn/Spring) previous SATS Assessment/White Rose Assessments

### **Long Term**

Long-term assessments are made against Age Related Expectations. The following tests are also carried out annually:

- SATs at the end of Y2 and Y6
- Standardised Maths tests in Y1, Y3, Y4 and Y5

The children are assessed in the early years using the Foundation Stage Profile continuously throughout the academic year using teacher assessment and observations.

Each maths lesson will have a learning objective/outcome and success criteria. The success criteria is the way in which pupils and teachers will measure success in that lesson – how will I know I understand the lesson/how will I know that I have succeeded today?

Pupils and teachers assess each piece of work using the traffic light system. The traffic lights should be used and the meaning of the traffic light colours should be displayed in all classes. Pupils should be able to tell a visitor to their class what their LO is and what they are learning. Teachers must traffic light each new LO and where there is a discrepancy between the pupil and teacher this can be discussed.

### **Marking, Presentation and Feedback**

The details for marking are detailed in the Feedback on Learning Policy 2015. There are agreed conventions for the layout and presentation of maths books.

KS2 pupils can use columns on their pages to get two sets of answers when doing jottings, pictorial representations and calculations. Best presentation, date, and LO are expected on every new piece of work.

Mathematics can generate a large quantity of marking and in line with school policy, teachers should use their professional judgement about what should be quality marked and what pupils can mark for themselves. Staff should refer to the NCETM guidance on marking.

The marking symbols have been agreed and both key stages should be using the same marking symbols. These should be displayed in class and pupils should be made aware of their meanings.

Pupil feedback in maths is vital in ensuring the development of a confident attitude to maths and also that the correct strategies are being used or mistakes are quickly addressed. Teacher comments should always be directed to the LO and comment on the success or not against the success criteria. If work is “very good” – why is it very good? Good practice involved closing the gap questions and comments that the pupils have to respond to (post its or directly on the page). If you expect a response make sure you get one!

As a school, we feedback to parents formally, about mathematical development, in two Parents Evenings and the annual school report. In these situations teachers have an opportunity to talk about more than the raw academic development but also the personal attributes and skills that their pupils are showing in the field of mathematics.

### **SEND/G&T in Mathematics**

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, in consultation with the SENDCo, within an Individual Educational Plan.

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.

We aim to fully include SEND pupils in the daily mathematics lesson so that they benefit from the emphasis on oral and mental work and by listening and participating with other children in demonstrating and explaining their methods.

If a child's needs are particularly severe they will work on an individualised programme written in consultation with the appropriate staff. When planning, teachers will try to address the child's needs through simplified or modified tasks or the use of support staff. Where appropriate a Group Educational Plan is developed with common objectives and learning targets for a group.

The aim is always to accelerate progress for the SEND so that the gap between them and the average pupil in the class is reduced or no longer exists. The Maths Coordinator and SLT will look for evidence of how differentiation (in its various forms) is allowing pupils to narrow the gap with their peers.

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 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.

## **Classroom Environment**

Teachers at DORRIDGE PRIMARY SCHOOL's strive to create classrooms that are rich in mathematical stimuli and support current learning - 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 examples how the maths could be used outside of the maths lesson, should be included.

Maths working walls are used as a part of maths lessons and so must be clearly visible and interactive. Every classroom will have at least one maths display that is interactive, informative, consolidates learning and has samples of pupil work to exemplify strategies. Learning mats, maths dictionaries, iPad apps, and a range of concrete materials should be available. Opportunities should be taken to relate maths work to the real world or famous mathematicians.

## **Resources and Display**

We value the contribution that support staff make to the learning of our pupils. We strive to plan for effective deployment of support staff to enhance their contribution while asserting that quality first teaching from the class teacher is the best means of accelerating, and consolidating progress.

- Teachers will work to ensure that support staff are deployed effectively during whole class teaching sessions – pupils will be identified for target and focus work with TA's and CT during lessons
- Support staff teach intervention programs and inform class teacher of progress through the program
- Support staff also work with children who do not have SEND, so that all children have opportunities for support and all are expected to work independently at some point.

The maths coordinator undertakes regular audits of maths resources in school and ensures additional activities and equipment are made accessible where there is an identified need. In 2019, all classes received additional maths resources to support their delivery of the curriculum. All maths resources are stored in the classrooms that use them for ease of access and monitoring.

Here is a list of ideal items to be available to pupils to support their maths:

- A range of models and images age appropriate equipment and practical mathematics equipment
- Numicon throughout FS, KS1 and KS2
- Year R and Year 1 need Number Bonds displayed in their rooms. Year R numbers to 10 and Year 1 bonds to 20, Year R will display numbers in a range of forms for the emergent mathematicians to access and develop their writing of digits and awareness of their value. Year 2 and Year 3 need bonds to 100 in tens.
- Years 1 – 6 need to display the four operations (in symbol and word) and the vocabulary associated with them.

- Year 2 – Year 6 need to make sure that times tables are displayed for access during lessons. Remember that you have access to the times table toons on Mathletics. Don't forget the INVERSE facts and make the connection between inverse calculations clear in display and lessons (same for add and subtract).
- Coins displayed and labelled in Years R – Year 4. Ideally add statements about number of pence in £, for example
- All classes need appropriate number lines and large 100 squares displayed – Lines to 10 in YR, to 50 in Y1, to 100 and above in Y2. Negative number lines in Years 4, 5 and 6
- Laminated 100 squares and X table squares should be accessible in all maths lessons for Year 1 – 6, except where you are expecting a mental or written calculation as an explicit part of the LO
- Fraction Walls displayed in Years 2 – 6. Equivalent percentage and decimal walls displayed in Years 3, 4, 5 and 6
- Weight, height, capacity and time facts displayed in Year 1 – Year 6
- 2D and 3D shapes on display and labelled. Year 4 – 6 ensure that all triangle forms are displayed as well as information about the angles in a range of 2D shapes. Year 4, 5 and 6 should display how to calculate the angles in shapes as soon as you cover this work
- Every room should have a range of measuring equipment for practical applications
- Years 3, 4, 5 and 6 should have written strategies displayed to support class teaching – all operations

### **Equal Opportunities/Inclusion**

Through the maths policy the school aims to provide every child with an equality of opportunity to access a broad and balanced curriculum regardless of gender, ability, attainment, background and ethnicity, through:

- Valuing the wide variety of experiences the children bring to school
- Providing a differentiated curriculum for gifted and more able pupils
- Providing Intervention programs
- Addressing the needs of children learning English as an additional language

### **Homework**

Pupils are set weekly online homework using the Mathletics software. This site offers year by year curriculum linked tasks and activities that pupils can do at school and more importantly at home. The system allows us to set homework that can be done online. In addition to the core activities are online global games that challenge children to compete in mental maths games at varying levels with children from all over the world. We are mindful that not all of our families have computers and teachers should ensure that all pupils have an opportunity via home or school to access the site.

Times tables tests are also set on a weekly basis. **It is very important that pupils learn their times tables by the Government timeline (end of Year 4) to allow them to make progress through the more difficult aspects of calculations/arithmetic.**

### **Role of the Coordinator**

The Mathematics Coordinator will lead and support the development and advancement of mathematics in the school. Working with the staff team, the coordinator will:

- Liaise with SLT, staff and Governors about the maths action plan and maths policy
- Ensure that teachers are aware of their obligations for planning, delivery, assessment and monitoring of maths
- Ensure that staff are kept up to date with innovations, legislation and pedagogy related to maths
- Observe the teaching of maths by all teachers, monitor their planning and feedback on quality of teaching to the SLT
- Contribute towards the INSET of staff in maths
- Conduct scrutinies of maths work
- Ensure that the maths policy is up to date and accurate (reviewed every 12 – 24 months)

- Ensure that there is a current Action Plan that reflects all aspects of maths in school and that this is reviewed and updated every 12 months
- Work with the SENDCo to ensure that SEND pupils have an equal access to the maths curriculum
- Encourage the appropriate use of ICT in the maths curriculum and liaise with the ICT coordinator about the purchase of effective learning resources
- Annually audit maths resources
- Collect data on the children's views about maths

### **Monitoring and Review**

Monitoring of the standards of the children's work and of the quality of teaching in maths is the responsibility of the maths subject leader in cooperation with the SLT.

The work of the subject leader also involves supporting colleagues in the teaching of maths and being informed about current developments in the subject. The SLT and subject leader provide the Mathematics Policy strategic lead and direction for the subject in the school.

Review Date: January 2021 (or earlier if legislation dictates)

Person Responsible: Miss M Gee (Maths Coordinator)