Mathematics Policy

Reviewed by Mark Day
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Statutory

1. INTRODUCTION

Mathematics equips pupils with the uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways. Mathematics is important in everyday life. It is integral to all aspects of life and with this in mind we endeavour to ensure that children develop a healthy and enthusiastic attitude towards mathematics that will stay with them.

The National Curriculum order for mathematics describes what must be taught in each key stage. Hanover Primary School follows the new 2014 National Curriculum for mathematics, which has been designed to raise standards in maths, with the aim that a large majority will achieve mastery of the subject.

2. RATIONALE

All school policies form a corporate, public and accountable statement of intent. As a primary school it is very important to create an agreed whole school approach of which staff, children, parents, governors and other agencies have a clear understanding. This policy is the formal statement of intent for mathematics. It reflects the essential part that mathematics plays in the education of our pupils. It is important that a positive attitude towards mathematics is encouraged amongst all our pupils in order to foster self-confidence and a sense of achievement. The policy also facilitates how we, as a school, meet the legal requirements of recent Education Acts and National Curriculum Requirements.

3. EQUAL OPPORTUNITIES

We incorporate mathematics into a wide range of cross-curricular subjects and seek to take advantage of multicultural aspects of mathematics eg. Islamic patterns in RE.

All children have equal access to the curriculum regardless of their gender. This is monitored by analysing pupil performance throughout the school to ensure that there is no disparity between groups.

4. PRINCIPLES

The principles of Hanover Primary School for mathematics are:

- policy and provision are evaluated and reviewed regularly
- resources of time, people and equipment are planned, budgeted for and detailed when appropriate.
- the governing body of Primary School discharge their statutory responsibility with regard to mathematics
- cross curricular links will be highlighted where appropriate
- planning of mathematics ensures continuity and progression across all year groups and key stages

5. AIMS

5.1 General

We aim to provide the pupils with a mathematics curriculum, which will produce individuals who are literate, creative, independent, inquisitive, enquiring and confident. We also aim to provide a stimulating environment and adequate resources so that pupils can develop their mathematical skills to their full potential.

5.2 Specific

Our pupils should

- have a sense of the size of a number and where it fits into the number system
- know by heart number facts such as number bonds, multiplication tables, doubles and halves
- use what they know by heart to figure out numbers mentally
- calculate accurately and efficiently, both mentally and in writing and paper, drawing on a range of calculation strategies
- make sense of number problems, including non-routine problems, and recognise the operations needed to solve them
- explain their methods and reasoning using correct mathematical terms.
- judge whether their answers are reasonable and have strategies for checking them where necessary.
- suggest suitable units for measuring and make sensible estimates of measurements

- explain and make predictions from the numbers in graphs, diagrams, charts and tables
- develop spatial awareness and an understanding of the properties of 2d and 3d shapes

6. PROVISION

Pupils are provided with a variety of opportunities to develop and extend their mathematical skills in and across each phase of education. Lessons may often follow the NNS format with a mental/oral starter, a main teaching activity and a plenary session, although they may also follow a more 'episodic' format, allowing for greater flexibility in the teaching and learning of mathematics. The teaching of mathematics at Hanover Primary School provides opportunities for:

- group work
- paired work
- whole class teaching
- individual work

Pupils engage in:

- the development of mental strategies
- written methods
- practical work
- investigational work
- problem solving
- mathematical discussion
- consolidation of basic skills and number facts

At Hanover Primary School we recognise the importance of establishing a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. Mathematics contributes to many subjects within the primary framework and opportunities will be sought to draw mathematical experience out of a wide range of activities. This will give children the opportunities to apply and use Mathematics in real contexts.
'It is important that time is found in other subjects for pupils to develop their Numeracy Skills, eg. there should be regular, carefully planned opportunities for measuring in science and technology, for the consideration of properties of shape and geometric patterns in technology and art, and for the collection and presentation of data in history and geography' (NNS).
We endeavour at all times to set work that is challenging, motivating and encourages the pupils to talk about what they have been doing.

6.1 Special Educational Needs

- All pupils take part in the daily numeracy lesson.
- Teachers plan lessons so that all pupils can be included and can make progress in the lesson.
- In oral work teachers plan a range of differentiated questions, with some targeted at specific pupils.
- Teachers also ask open questions that allow all children to take part.
- Teachers use a wide range of visual resources to illuminate meaning.

- During whole class teaching, discreet help is given to particular children by teaching assistants where available.
- During activities, children are supported by teaching assistants where available.

See **SEN** policy for further details.

6.2 Booster Groups

Specific and targeted 'Booster Groups' take place in Year 5 and 6, rather than following a particular scheme they are designed to be responsive to the needs of the children and support their learning in class. These groups are run in conjunction with the individual's maths teachers and the mathematics manager. The sessions take place weekly, for an hour after school (outside of the daily mathematics session).

7. PRINCIPLES OF TEACHING AND LEARNING

The expectation is that all teachers reinforce an expectation that all pupils are capable of achieving high standards in mathematics.

All pupils should become fluent in the fundamentals of mathematics, including through varied and frequent practice, so that pupils develop conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. When to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage.

Pupils who grasp concepts rapidly should be challenged through rich and sophisticated problems before any acceleration through new content. Those pupils who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

7.1 Mastery

Mastery is all about ensuring that all children understand what we are teaching them. It therefore means teaching concepts at a slower pace and dealing with each aspect of that concept step by step, rather than spending a week on one aspect and a few days on another. The common result of this is that often (and particularly the less able) children do not fully understand the topic fully, so when the topic is taught again at a later date they don't appear to remember what they have been previously taught. We want children to 'master' what we teach them and this will happen more consistently through step by step teaching and lots of (varied) practice **within** the context itself and **different** contexts. Pupils need variation, or intelligent practice that allows them to see connections in mathematics and also allows them to **deepen** their understanding.

7.2 Teaching resources

A coherent programme of high quality curriculum materials is used to support classroom teaching. We currently use the '*White Rose Maths Hub'* (Year 1 – 6) scheme of work and resources to plan and support of mathematical teaching. In addition to this we use the 'Maths Hub' mastery materials developed in association with the NCETM to challenge our most able mathematicians where appropriate.
Concrete and pictorial representations of mathematics are chosen carefully to help build procedural and conceptual knowledge together, preparing children to be ready for more abstract mathematical activities

and learning. Exercises have been structured with care to build deep conceptual knowledge alongside developing procedural fluency.

The focus is on the development of deep structural knowledge and the ability to make connections. Making connections in mathematics deepens knowledge of concepts and procedures, ensures what is learnt is sustained over time, and cuts down the time required to assimilate and master later concepts and techniques.

7.3 Teaching methods

Teachers are clear that their role is to teach in a precise way which makes it possible for all pupils to engage successfully with tasks at the expected level of challenge. Precise questioning during lessons ensures that pupils develop fluent technical proficiency and think deeply about the underpinning mathematical concepts.

7.4 Pupil support and differentiation

Taking a mastery approach, differentiation occurs in the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. The aim is for little or no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems which deepen their knowledge of the same content. Pupils should also be encouraged (where appropriate) to take responsibility for choosing their level of challenge, to develop independence of thought, improved engagement with and greater ownership of their learning.

Pupils' difficulties and misconceptions are identified through immediate formative assessment and should be addressed with rapid intervention – commonly through individual or small group support later the same day: The aim is for there to be very few "closing the gap" strategies, because there are very few gaps to close. 'Keep-Up rather than 'Catch-Up'.

7.5 Productivity and practice

Fluency comes from deep knowledge and practice. Pupils work hard and are productive. At early stages, explicit learning of multiplication tables is important in the journey towards fluency and contributes to quick and efficient mental calculation. Practice leads to other number facts becoming second nature. The ability to recall facts from long term memory and manipulate them to work out other facts is also important. Tables Challenge has been introduced from Year 1 to support this development of fluency.

8. ORGANISATION OF TEACHING AND LEARNING

- The Early Learning Goals have been adopted for children at the foundation stage. At this stage pupils experience some mathematics on a daily basis. This early introduction to mathematics will generally be undertaken orally and often in the context of a class theme, e.g. a particular story. Wherever possible, opportunities for mathematics are exploited such as when taking the register.
- The school has adopted the National Numeracy Strategy and in key stages 1 and 2 every child takes part in a daily numeracy lesson.
- The skills acquired in the numeracy lesson are applied across the curriculum.

Mathematics lessons normally take place each morning. Each lesson lasts between 45 and 60 minutes and may consist of the oral and mental starter, the main teaching activity, and the plenary, but may also follow a more episodic format to allow more mathematical discussion, reasoning and problem solving. Teachers spend as much time as possible in direct teaching and questioning of the whole class, a group of pupils, or individuals.

For a large proportion of the lesson children will be taught as a whole class with the teacher using a range of questions to develop mathematical thinking. Teaching strategies will be varied and will encourage a high level of interaction. Teachers place strong emphasis on the development of mental calculation skills. Children are asked to explain their methods and to check for reasonableness. There is also strong emphasis on the development of mathematical vocabulary. Key words are displayed and teachers ensure that they model the correct use of mathematical words.

Teachers value pupils' oral contributions and create an ethos in which all children feel they can contribute. Activities are planned to encourage the full and active participation of all pupils and teachers differentiate tasks (using the PRACTICE, EXTENSION, CHALLENGE format where appropriate) during the main part of the lesson in order to meet the needs of all abilities. Children normally sit in ability groups to enable focused teaching to one group during pupil activities.

At Key Stage 2 children we are moving away from ability based grouping into whole class teaching. Years 5 and 6 have made this shift (Sept 17) with Years 3 and 4 due to make this shift in the summer term (April 17). We are flexible with the grouping within the classes – sometimes working in more ability based groups, sometimes in learning partners or near ability partners. We continue to use a 2 45 minute session approach on a Friday in Years 5 and 6 to both make up the maths lesson time lost to BIG writing on a Thursday and to give an opportunity to develop open ended investigations, cross curricular work and engage in more talk-led mathematics (e.g. Beam Maths Buzz)

9. HOMEWORK

We recognise the importance of making links between home and school and encourage parental involvement with the learning of mathematics through parents' evenings, maths workshops and assemblies. Homework can provide opportunities for children

- to practise and consolidate their skills and knowledge,
- to develop and extend their techniques and strategies, and
- to share their mathematical work with their family

- to prepare for their future learning.

Homework activities will usually be short and focused and may help to form the basis of assessment, some tasks will be paper based and some set through online learning platforms such as 'Mathletics' and 'Skoolbo'.
Frequency for maths homework:
KS1: as appropriate to link with class work
KS2: Year 3 and Year 4: once a week
Year 5 and Year 6: once a week
*Please also see homework policy

10. THE ENVIRONMENT

The school aims to provide a mathematically stimulating environment:

- through displays that promote mathematical thinking and discussion
- through displays of pupils' work that celebrate achievement
- by providing a good range of resources for teacher and pupil use.

In every classroom, resources such as number lines, hundred square, place value charts and multiplication squares are displayed as appropriate and used as resources for whole class or individual work, for children to become confident in their use and understanding of the number system. Display has a vital role in the teaching and learning of mathematics and we aim to provide a mathematically stimulating environment. Every class will have a mathematics display board that can be used to display a range of resources/work that will support and stimulate children's mathematical thinking and celebrate achievement.

11. CURRICULUM PLANNING

Medium Term plans

- Teachers adapt the '*White Rose Maths Hub'* sample medium-term plans to meet the needs of their pupils. These plans give examples of fluency, reasoning and problem solving activities that can be used and adapted.
- Using these plans as a guide, and using information from assessment of pupil progress, teachers add **W.A.L.Ts** and **Success Criteria** and **Key Questions** in the white boxes at the top of their (as yet incomplete) daily plans to serve as half termly medium term plans. These will be working documents and adapted to suit the needs of the children over time.
- Teachers up-date concepts that are taught/achieved using target tracker

Weekly planning

- Using the agreed format for weekly planning, teachers write plans for their numeracy lessons
- Teachers teaching the phase same year group plan and evaluate together at a weekly meeting.
- Teachers make amendments to plans according to their on-going assessments of pupil progress.
- Teachers evaluate their weekly planning, adapting future plans where needed, making notes for example, on next steps required for groups or individuals
- Planning clearly shows which group the teacher and/or T.A will be focusing on each day, which group will be supported by the teaching assistant and how they will be supported.

Differentiation

In general, teachers plan a core activity for the majority of pupils and adjust the activity to make it appropriate for more able and less able pupils by the use of:

- The 'Practise', 'Extension' and 'Challenge' format of question setting.

- Aim for 'low entry, but high ceiling' activities to include all learners
- Specific and targeted use teaching assistants to support learning
- additional resources
- targeted questioning
- open ended questions.

12. INFORMATION AND COMMUNICATION TECHNOLOGY

ICT will be used in various ways to support teaching and motivate children's learning. ICT will involve the computer, calculators, and audio-visual aids. They will however only be used in a daily mathematics lesson when it is the most efficient and effective way of meeting the lesson objectives.

13. ASSESSMENT

Assessment is regarded as an integral part of teaching and learning and is a continuous process.
Assessment is carried out:

- orally through questioning
- by observation of children at work
- marking of children's work
- through planned assessment activities linked to the key objectives
- Informal assessment takes place continuously and teachers regularly up-date individual achievements using target tracker.
- Teachers and teaching assistants use their planning sheets to note/record attainment observed in lessons.
- We use Rising Stars half termly progress tests (mini-SATs style)to assess progress and inform future learning needs.
- QCA optional tests are used in years 3, 4 and 5. We also make use the termly assessment material that supports the ' White Rose Maths Hub' planning as an assessment tool
- Teachers compare children's work with the examples in QCA/ NNS booklet "Standards in Mathematics exemplification of key learning objectives from reception to year 6" We also take part in internal and external moderation activities (e.g. future zone)
- Target Tracker is used to record and track children's progress against key objectives.

13.1 Marking of written work

All work is marked – this may involve peer marking (and support) or personal marking in whole class feedback as well as marking by the class teacher.
Written feedback provides pupils with guidance on how to improve their work, it will also set challenges for children to respond to.
See **Marking Policy** for further details.

13.2 Record-keeping

- Children's attainment in the key objectives is recorded on target tracker.
- Teachers record the terms when key objectives are achieved.
- Termly overviews (Maths Hub) are highlighted to indicate coverage of whole class or groups.

13.3 Target setting

- Analysis of children's performance in class and assessments (tests) helps the school to identify and set curricular targets for groups of pupils.
- School targets are set for pupil attainment for the end of Key Stage.
- QCA optional tests and Maths Hub Assessment materials are used to help set end of Key Stage targets.

13.4 Reporting Procedures

Annual reports to parents include comments on:

- Pupil progress, knowledge and understanding
- Pupil effort and attitude
- Targets that need to be worked on
- Pupil strengths and weaknesses

14. MANAGEMENT OF MATHEMATICS

14.1 Role of the Headteacher

- Lead, manage and monitor the implementation of the Strategy, including monitoring teaching plans and the quality of teaching in classrooms
- With the governor, keep the governing body informed about the progress of the Strategy
- Ensure that mathematics remains a high profile in the school's development work
- Deploy support staff to maximise support for the Strategy

14.2 Role of the co-ordinator

The mathematics manager is responsible for co-ordinating mathematics through the school. Co-ordinators are expected to:

- Teach demonstration lessons
- Ensure teachers are familiar with the Framework and help them to plan lessons
- Lead by example in the way they teach in their own classrooms
- Prepare, organise and lead INSET, with the support of the headteacher
- Support the headteacher in carrying out an annual audit and action plan with staff and governors
- Work co-operatively with the SENCO in providing advice and support for staff
- Observe colleagues teaching from time to time, with a view to identifying the support they need
- Attend INSET provided by LEA maths consultants and advisors
- Work alongside the headteacher in planning, organising and leading events for parents about the Strategy and mathematics
- Discuss regularly with the headteacher and maths governor the progress of implementing the Strategy in the school.

14.3 Role of the class teacher

- To ensure progression in the acquisition of mathematical skills with due regard To the NNS Framework and consequently the National Curriculum for mathematics
- To develop and update skills, knowledge and understanding of mathematics
- To identify inset needs in mathematics and take advantage of training opportunities
- To keep appropriate on-going records
- To plan effectively for mathematics (with year group partners), liaising with manager when necessary. See NNS for details of short, medium and long term planning procedures.
- To inform parents of pupils' progress, achievements and attainment

14.5 Role of Governing Body

- To support staff in NNS training
- To attend relevant school INSET.
- To visits the school termly to talk with the head-teacher and subject coordinator.
- When possible, observes some daily mathematics lessons.
- To report back to the curriculum committee on a regular basis.

15 PERFORMANCE INDICATORS

Performance Indicators, which are the criteria for success of the school's mathematics policy at Hanover Primary School are:

- At KS1 and 2 we at least match national standards in mathematics (2016 70% at KS2 and 73% at key stage 1)
- children enjoy mathematics and make good or better progress
- 93% of children make expected or better progress.
- children talk confidently about what they are doing in mathematics

16. PARENTAL INVOLVEMENT

At Hanover Primary school we encourage parents to be involved by:

- Visiting them into school three times a year to discuss the progress of their child
- Inviting parents into school in the summer term to discuss the final report
- Inviting parents to curriculum evenings or circulating information via newsletters when significant changes have been/are made to the mathematics curriculum
- Holding workshops for parents focusing on areas of mathematics