Garton on the Wolds
and
Barmby Moor CE Primary School
Mathematics Policy

June 2019

Our School Vision is to work as a community within the school's Christian ethos. We learn about world faiths alongside our Christian Values to work towards creating an Outstanding school where all can flourish. Through the provision of a broad and balanced curriculum we encourage every child to develop lively, creative and enquiring minds enabling them to become confident individuals who reach their full potential and succeed in Modern Britain.

Our school works in partnership with the church and the wider community to give a caring and nurturing environment. Together we enable and equip each child to "I have come that they may have life, and have it to the full" (The Gospel of John – Chapter 10, verse 10).

We will realise our Vision through the following aims:

- demonstrating, as a Church school, our Christian values in action
- consistently high standards of teaching
- providing a happy, healthy and secure environment where all are respected, valued and encouraged to contribute
- excellent leadership and governance
- encouraging a love of learning by participating in experiences full of opportunity and creativity
- pursuing excellence in every aspect of school life, supporting one another and celebrating the achievements of all
- a partnership of pupils, teachers, parents, governors and the local community
- targets are challenging and achievable.

INTRODUCTION

Mathematics is a core subject in the National Curriculum. This policy outlines the purpose, nature and management of the mathematics taught in our school. For any further information or confirmation, please contact **Toby Hone (Mathematics Co-ordinator).**

Assessment Without Levels

- Alongside the introduction of the new National Curriculum 2014, levels were removed for all year groups except Year 2 and Year 6 in September 2014
- No levels for any year group from September 2015
- At the end of KS1 and KS2 pupils will be given a scaled score and a 'performance descriptor' against the expected standard in Maths within their year group
- We will assess pupils' progress towards the end of year expectations for each year group using the terms: **Working Towards (WT), Expected (EXP) and Greater Depth (GDS)** within their year group. These will be further subdivided into three, for example **WT-, WT and WT+**

THE IMPORTANCE OF MATHEMATICS

As a school we want to enable the children to see that mathematics provides a way of viewing and making sense of the world. It can be used to analyse and communicate ideas and information effectively and to tackle a range of practical tasks and real life problems.

BARMBY MOOR CE PRIMARY SCHOOL INTENT, IMPLEMENTATION AND IMPACT

Traditionally, Maths has been taught by memorising key facts and procedures, which tends to lead to superficial understanding that can easily be forgotten. At Barmby Moor, we believe that children should be able to select which mathematical approach is most effective in different scenarios.

All pupils can achieve in mathematics! There is no such thing as a 'Maths person', that is the belief that some pupils can do maths and others cannot. A typical Maths lesson will provide the opportunity for all children, regardless of their ability, to work through Fluency, Reasoning AND Problem Solving activities.

INTENT

Maths is a journey and long-term goal, achieved through exploration, clarification, practice and application over time. At each stage of learning, children should be able to demonstrate a deep, conceptual understanding of the topic and be able to build on this over time.

There are 3 levels of learning:

- Shallow learning: surface, temporary, often lost
- Deep learning: it sticks, can be recalled and used
- Deepest learning: can be transferred and applied in different contexts

The deep and deepest levels are what we are aiming for.

IMPLEMENTATION

All pupils, when introduced to a key new concept, should have the opportunity to build competency in this topic by developing their fluency. Pupils are then encouraged to reason and problem solve within each topic once they have become fluent to deepen their understanding and apply knowledge.

To support children, concrete and pictorial methods are used to help children understand and become confident mathematicians when developing their knowledge within new concepts, before challenging pupils with abstract methods.

Concrete – children have the opportunity to use concrete objects and manipulatives to help them; visualise, understand and explain what mathematical task they are carrying out.

Pictorial – children then build on to a concrete approach by using pictorial representations, which can then be used to reason and solve mathematical problems.

Abstract – With the foundations firmly laid, children will move to an abstract approach using numbers and key concepts with confidence.

IMPACT

- Quick recall of facts and procedures.

- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics.

A mathematical concept or skill has been understood when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations.

Mathematics is categorised into the following areas:

- Number
- Measurement
- Fractions
- Geometry
- Statistics
- Ratio and Proportion – Year 5 and 6
- Algebra – Year 5 and 6

Opportunities for using and applying mathematics exist throughout all areas.

The mathematics curriculum is organised as a discrete subject, yet there are many potential cross-curricular activities. It is taught in mixed age groups, although there are some opportunities for both able pupils and those with special needs to work in separate groups aside from those who are attaining appropriate to their age.

The school will follow the requirements of the National Curriculum as set out in:

- *The National Curriculum in England framework document for primary teachers 2014*

SPOKEN LANGUAGE

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Staff must promote and use precise mathematical language at all times. Staff should display mathematical terminology for the aspect they are teaching upon the working wall. Staff should correct children when they use the incorrect terminology – e.g. "big hand" should be "minute hand"

SCHOOL CURRICULUM

The programmes of study for mathematics are set out year-by-year for Key Stages 1 and 2, however, flexibility does allow for content to be introduced earlier or later than set out in the programme of study.

ATTAINMENT TARGETS

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Key stage 1

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 (e.g. 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.

Pupils should be introduced to reasoning on an increasingly more frequent basis in preparation for LKS2.

Lower Key Stage 2

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

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.

TEACHING STRUCTURE

Early Years Foundation Stage

- Teachers follow the revised *Statutory Framework for the Early Years Foundation Stage 2012*. This outlines the knowledge, skills, understanding and attitudes children will need in order to achieve the Early Learning Goals in Mathematics. These goals are intended to be achieved by most children by the end of the Foundation Stage 2.
- In the Early Years, staff provide activities and experiences for children to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems and to describe simple shapes, spaces and measures. The children learn through planned, purposeful play experiences and through a mix of adult-led and child-initiated activity.

Key Stages 1 and 2 (Years 1 – 6)

Mathematics lessons follow the National Curriculum in England Framework Document, July 2013, with a structure of:

- Register maths (5minutes)
- Times table practice (5 minutes)

} Oral and mental starter

- Main activity for about 30 minutes in KS1 and 40 minutes in KS2 (Where required, mini plenaries will be used to clarify any misconceptions/new concepts.)
- Plenary session for approximately 10 minutes (this can be during or at the end of the lesson)

Mental arithmetic is a key feature, with children being taught a range of strategies to work out answers as well as demanding a quick recall of simple mathematical facts. The teacher gives demonstrations and explanations, with an emphasis on the use of appropriate mathematical language and engages in whole class interactive teaching, involving:

- Whole class and group discussions
- Practice to consolidate specific skills
- Reasoning activities to develop children's ability to explain and justify concepts and answers
- Problem solving and investigational activities in order to learn how to break down a problem and apply mathematics to real life scenarios
- Practical activities
- Mathematical games and puzzles.

The use and application of mathematical principles underpins the whole of mathematical teaching and learning. Opportunities are given so that pupils can apply their knowledge to a wide range of real life situations. They need to be able to choose appropriate equipment and methods for the task and to enable them to communicate and justify their findings in a manner appropriate to their age and ability, showing increasing concern for clarity and accuracy of meaning.

Reasoning

Regular reasoning activities allow children to further consolidate and develop their understanding within a particular mathematical concept. Being able to explain and justify their answers allows pupils to grasp aspects with a greater level of understanding.

Reasoning could be implemented in the following ways:

- as a discrete whole class lesson
- as a GDS extension task for children (who are secure in fluency) within each lesson
- in a mini plenary
- an application plenary

Reasoning resources can be found:

- online at White Rose's TES account https://www.tes.com/member/WRMathsHub
- in the Rising Stars resource 'More Reasoning and Problem Solving' files for each year group
- conceptual variation (fluency) for LA pupils can be found on White Rose's TES account fluency section https://www.tes.com/member/WRMathsHub

Multiplication

In response to the announcement that Year 4 pupils will take a statutory multiplication test. Children across KS1 and KS2 will take part in the 'Times Table Mountain Challenge'. This is a 5 minute timed activity in which children focus on a particular times table. They complete this fortnightly and keep attempting the same times table until they achieve full marks within the five minute limit. This is to build speed of recall.

KS1 pupils should only progress as far as x10,2 & 5 times tables (as per NC 2014). Children who are successful should then try to gain full marks on decreasing time limits. Children who are successful should then try to gain full marks on decreasing time limits.

Y3 pupils should only progress as far as x8 times table (as per NC 2014).

Y4 and UKS2 pupils should progress through all times table stages with no limit.

The times table mountain should move with the children up through school. For example, a Y3 child who managed to reach the x4 table stage should resume at this stage in Y4.

Class organisation

From Year 1, all pupils will have a dedicated daily mathematics lesson five days per week.

The full range of pupil attainment

Teaching will be planned to provide for the full range of attainment within each class. Throughout the lesson the teacher will have these needs in mind and will direct questions and provide activities to cater for this range of pupils. All children are challenged to think through the problem. The teacher or practitioner provides children with good support but requires independence as and when appropriate. The pitch and pace of the work is sensitive to the rate at which the children learn while ensuring that expectations are kept high and progress is made by all children.

Able pupils

Able pupils will normally work on the same topics as the rest of the class, but activities must be planned to stretch their abilities. This may be done by providing more demanding questions and investigations, often with a more open-ended approach. It may also include reasoning and problem solving activities in order to develop children's mastery of particular concepts. Children who are achieving the fluency within the lesson should be given reasoning and/or problem solving tasks to allow them to move on within the lesson.

Lower attaining pupils

Lower attaining pupils will normally work on the same topics as the rest of the class, but activities must be planned to enable them to succeed. They may at times be working from the related objectives for the year below their peers (pre-requisite objectives). They will often be working in smaller adult to child ratio groups, where the teacher or teaching assistant will be able to give each child extra 1:1 support. LA pupils who are achieving the fluency tasks within the lesson (but may not be ready for reasoning) should be challenged using conceptual variation to allow them to move on within the lesson.

Special Needs

Those children with an Individual Education Plan should have specific targets each term for mathematics where appropriate. Teachers and teaching assistants may work on these specific targets through lesson activities and through 1:1 interventions outside of main lessons.

Interventions

Interventions may take the form of:

- early morning maths groups before school
- intervention groups during collective worship
- after school booster groups for Y6
- mathletics groups

The maths coordinator can direct staff to suitable resources.

HEALTH AND SAFETY

Issues of Health and Safety in mathematics (to be read alongside the school's policy) include care and safety when using scissors and pairs of compasses.

EQUAL OPPORTUNITIES

All children have equal access to mathematical activities. We pay particular attention to ensuring there is no gender bias in materials or in access to resources, including Computing. Teachers should pay attention to the equal distribution of their questions across all groups. Any displays and references to mathematics in society, should show positive role models of gender, race, ethnicity and disabilities.

COMPUTING

The use of Computing is an integral part of mathematics teaching and learning. Teachers will use a range of internet based resources and programmes such as Mathletics, Interactive Teaching Programme (ITP) and other software such as 'Espresso' and 'Education City', to enhance their teaching. Teachers use interactive whiteboards to develop learning using websites such as 'Mathszone' (www.mathszone.co.uk), Abacus Maths (www.activelearnprimary.co.uk) and Primary games (www.primarygames.co.uk). There will also be the opportunity for children to use these sites and programmes individually while using our school laptops in their classrooms. Children will also have access to Mathletics at home by using individual passwords to access the programme.

Please contact **Toby Hone** for teacher Mathletics passwords. Passwords for pupils can then be printed by the class teacher once they have logged into their account.

HOMEWORK

Homework should be given as a consolidation or extension of work covered in school through mathematical problems, questions, games and puzzles as appropriate. Homework should be an activity which can be completed within 10 minutes. Homework does not need to be differentiated.

Key Stage 1 – Homework should be given twice a week.

Key Stage 2 – Homework should be given twice a week.

SPIRITUAL, MORAL, SOCIAL AND CULTURAL DEVELOPMENT

There are many opportunities to develop a sense of wonder in mathematics, e.g. in structure and patterns of shape and number, in concepts such as probability and infinity. Teaching should also emphasise that the mathematics we know and use today is the result of human activity over a very long period of time and in many diverse cultures across the world.

Misconceptions should be explored within lessons and children should be reassured and praised for trying. Staff should guide pupils to reflect on their misconceptions and learn from them.

CROSS CURRICULAR LEARNING

This is an important area where opportunities are made to ensure that appropriate mathematical activities take place in other curriculum areas such as geography, technology, PE and science.

PLANNING

Each class will write medium term plans for their mixed age group. This will follow the programmes of study in the *National Curriculum Framework Document 2013* and the Long Term Plan 2013.

Weekly and daily planning is completed, annotated and kept in the teacher's planning folder. Staff have access to Abacus planning which can be accessed at www.activelearnprimary.co.uk .

None of the above describes differentiation in any detail. It is expected that for each unit of work, the class teacher adapts, simplifies and extends the objectives and tasks for the specific needs of their class.

ASSESSMENT

Assessment will take place at four connected levels: baseline, formative, medium term and summative. These assessments will be used to inform teaching in a continuous cycle of planning, teaching and assessment.

Teaching a unit of work will need careful initial and ongoing planning, informed by an assessment of children's learning. A cycle that supports this process for mathematics is set out below:

assess – plan – teach – practise – apply – review

Formative Assessment (Teacher Assessment/Assessment for Learning) is carried out informally during the course of teaching by looking at the National Curriculum criteria. It enables the teacher to identify a child's understanding and progress in particular aspects, to inform their immediate teaching and to plan for their coming lessons. This can be used:

- to provide information to support progression in learning through planning
- to provide information for target setting for individuals, groups and cohorts
- to share learning targets with children
- to involve children with self-assessment
- to help pupils know and recognise the standards they are aiming for

- to raise standards of learning
- to identify children for intervention
- to inform parents and other interested parties of children's progress
- to complete a critical analysis and self-evaluation of the school in order to set challenging objectives for whole school improvement.
- to know when to provide pupils with reasoning or problem solving tasks within lesson

Assessment for Learning

Assessment opportunities, which are a natural part of teaching and learning, are constantly taking place in the classroom through discussion, listening, assessing and identifying the next steps in learning for the EYFS, assessing pupil progress to meet/surpass end of year expectations in reading, writing, GPS, mathematics and science, moderation of work, marking of work and formal assessments. It is essential that teachers know how well a child has progressed and that pupils understand how well they are doing and what their targets are to help them improve.

To achieve this at Barmby Moor and Garton on the Wolds CE Primary School we will:

- evaluate pupils learning to identify those pupils with particular needs (including those who are able) so that any issues can be addressed in subsequent lessons
- adjust plans to meet the needs of the pupils, differentiating objectives where appropriate and directing support staff accordingly
- ensure pupils are aware of the learning objective and the success criteria, and encourage them to evaluate their progress so that they understand the next steps they need to make in order to meet or surpass their end of year expectations
- set individual, challenging targets in maths on a regular basis and discuss these with the pupils so that they are involved in the process
- regularly share pupil's targets with parents at each parents' evening in order to work together in supporting their child's learning
- encourage pupils to evaluate their own work against success criteria based upon specific, key learning objectives
- mark work so that it is constructive and informative in accordance with the marking policy
- incorporate baseline, formative and summative assessment opportunities in medium and short term planning
- assess all subjects after the end of each unit in Maths against the performance descriptors and assess whether the child is working towards expectations, meeting National expectations or working above/mastering expectations
- analysing the data and acting upon the findings in order to extend the learning of each child
- Pass on the performance descriptors for Mathematics and class tracking grids to the next class teacher so children can continue to be tracked as they progress through the school
- Use Assessment for learning strategies such as:
    - working walls; children access the walls to extend their learning/add to the wall with their examples
    - individual target setting
    - success criteria
    - self and peer evaluation
    - discussion and talk
    - conditions for learning – display
    - learning journey – children know what is next
    - end of year performance descriptors
    - Marking and Feedback – tickled pink and green for growth

Assessment Books

Staff will complete baseline assessments at the beginning of each half term (which matches each year groups' Abacus MTP). Examples for baseline questions can be found on the schools' progression tracking grid. This allows staff to pitch lessons correctly, differentiate work and set ability groupings for lessons. <u>All assessments must be completed in maths assessment books.</u>

Throughout the half term, staff will complete 'summative assessment' (which can be found on Abacus to coincide with planning aka 'mastery checkpoints') to assess how well children are attaining and progressing at the **expected (EXP)** level for their year group. Example questions can be found on the schools' progression tracking grid or Abacus' mastery checkpoint can be used. In order to gain evidence for **greater depth (GDS)** staff will also include a reasoning and/or problem solving question related to the relevant statement. Example GDS questions for each statement can be found on the schools' progression tracking grid.

Half Termly Assessments are planned into the work as discrete assessment opportunities. Abacus end of half term assessments will be used. The arithmetic paper will be used to assess attainment at the **expected (EXP)** level, and the reasoning and problem solving paper will be used to assess attainment at the **greater depth (GDS)** level. The assessment must be carried out in the pupils' Maths Assessment Books. All teachers will then use these results, along with their individual knowledge of each child to provide an accurate teacher assessed level, in line with the National Curriculum end of year level descriptors.

School progression trackers should be placed at the front of each child's maths assessment book. Any assessment can be used to update these progression maps. If a child achieves a statement at the **expected (EXP)** level then this statement is highlighted pink along with the date of the assessment in which this statement is evident. If a child achieves a statement at the **greater depth (GDS)** level then the greater depth column to the right of the statement should be highlighted and dated. If a child has not achieved a statement although the content has been taught, a green dot should be placed on the statement along with the month it was covered in lesson. A teacher may assess a child using a statement from previous year groups to assess if the child is **working towards (WT)** the year group statement or not. This can also be highlighted to show if the child is making progress towards the EXP level.

Summative Assessment is carried out annually in KS2 using the end of key stage testing and the QCA optional tests. In KS1 there is baseline assessment and end of key stage testing.

Assessing Pupil's Progress towards the end of year expectations in Maths should be carried out regularly by all class teachers for each child in their class using the end of year Performance Descriptors. Progression slips should be placed in the front of each child's maths book to and updated each half term to allow the child to see how they are progressing towards their target over the academic year.

Self-Assessment where possible, children should be involved in assessing their own work. This might include:

- Traffic Lights – How did they find the work? (red/yellow/green)
- (What I'm Looking For) – linked to objectives/success criteria.
- Peer assessment – peers' thoughts will be discussed.
- During the mini plenaries or during the final plenary, children may be asked to discuss how they found the lesson and where they excelled or what they found difficult.

MARKING

Effective marking of pupils work identifies what they have done well and any misconceptions. It sees short term targets for what they need to do next and for improvement. Teacher judgements can be accurately made from an overview of a piece of work. Time is allowed for some marking to be done with the pupil, so that discussion and explanation can take place. Marking should be both diagnostic and summative and school policy believes that it is best done through conversation with the child but acknowledges that constraints of time do not always allow this.

Feedback is given to the children as soon as possible.

- This aims to encourage and to give guidance for future work.
- The display of children's mathematical work gives them pride in their achievements.
- Some marking will be immediate, depending on the activity and the age of the children.
- Tickled pink and green for growth must be used (see marking and feedback policy)

RECORD KEEPING

Records are kept of the extent to which each child in the class has achieved the key objectives. Teachers will also use the Performance Descriptors to accurately teacher assess and will show pupils' progress throughout the year by inputting their results half-termly on to the class tracking grid and submit to the Headteacher to be added to the whole school tracking grids. For a few pupils, additional records will be needed of the difficulties they experience or of exceptional progress made.

TARGET SETTING

All children will have a quantitative target for the National Curriculum end of year expectations which they are expected to achieve by the end of the school year. This will be based on the level at the start of KS1 and from their KS1 SAT results.

Teachers should also set qualitative targets for what they expect children to learn in the short term.

REPORTING TO PARENTS

Reporting is carried out through the regular parent / teacher consultation meetings and pupil progress written reports each term. Parents are given teacher assessment results at the end of each term and additionally from Years 2 – 6 the results of optional and statutory national curriculum assessments. They should be provided with information on children's areas of strength and weakness and on their rate of progress in mathematics.

MONITORING AND EVALUATION

The purpose of monitoring and evaluation activities is to raise the overall quality of teaching and levels of pupil attainment. The mathematics co-ordinator and the leadership team will monitor the quality of teaching and learning as part of the school's self-evaluation policy. Monitoring will include:

- Scrutiny of planning
- Quality of teaching through lesson observation and feedback
- Moderation of standards in children's work
- Discussions with pupils about their work
- Evaluation of children's attainment against targets

THE ROLE OF THE MATHS CO-ORDINATOR

- Take the lead in policy review and development

- Support colleagues in the development of weekly plans and in assessment and record keeping activities.
- Keep up-to-date on local and national initiatives and disseminate information
- Take responsibility for the purchase and organisation of mathematical resources
- Analyse pupils' test results to inform future policy, set school targets for mathematics in conjunction with the senior leadership team, and to assist staff in setting individual pupil and group targets.
- Take the lead in writing the mathematics section of the School Improvement Plan.
- Encourage the professional development of staff.

THE ROLE OF TEACHING ASSISTANTS

- In the oral and mental starters the Teaching Assistant should sit with an identified group of children and should model what the teacher is doing using similar or adapted resources.
- In the main activity they should be assisting a group of children to complete a piece of work planned by the teacher.
- In plenaries they should encourage pupils they have worked with to feed-back and contribute to the overall session.
- All the children have an equal entitlement to teaching time from the teacher. Therefore the teaching assistant should not always work with the same group of pupils. It may be appropriate on some occasions for a group to be withdrawn with the teaching assistant during the main activity group work. However, they should not be withdrawn for the oral and mental starter or for the teaching input of the main part of the lesson, or for the plenary.

Date: June 2019

Toby Hone (Mathematics Co-ordinator)