Stocks Green Primary School

Learning to Live , Living to Learn

Mathematics Policy.

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Last review	**November 2020**
Review	**September 2022**
School staff / team responsible for policy	**Joe Endersby**
Designated Governors/committee	**S&C committee**

Stocks Green Primary School

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Rationale

This policy describes our values and philosophy in relation to meeting the needs of all mathematical learners at Stocks Green Primary School. It outlines the framework within which all staff work and gives guidance on planning, teaching and assessment. It is designed to describe how the school intends to meet the needs of mathematics learners of all ages.

In the first instance this will be through working within the Foundation Stage Curriculum using the Early Learning Goals. From Y1 to Y6 statutory requirements of the National Curriculum in Mathematics will be met by fully implementing the New National Curriculum objectives through the use of the White Rose Maths Hub Mastery planning documents.

The policy is intended to be read in conjunction with the calculation policy which illustrates strategies and methods outlined in the national curriculum and that are taught from Reception to year 6. It is also important to read the Foundation Curriculum Framework which highlights the Early Learning Goals and the guide of progression in the Reception year.

Mathematics is a broad structure that provides a way of viewing and understanding the world. Through the use of Mathematics, information can be

- organised
- manipulated
- predicted
- described
- explained
- communicated
- questioned

Mathematics should be taught across the curriculum to develop pupils' mathematical fluency. Confidence in numeracy and other mathematical skills is a precondition of success across the national curriculum, which we hope to achieve at Stocks Green

Through fully adopting the mastery approach of Maths hub, alongside meeting the three main aims (fluency/ reasoning/problem solving)of the new national curriculum for Mathematics, we want all children at Stocks Green to develop into confident and competent mathematical thinkers, who are able to use maths in real life situations.

At Stocks Green we recognise the importance of establishing a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. We use the school calculation guidance document to teach a clear progression of both written and mental calculation.

In line with the Homework policy, Maths homework is set on a weekly basis

Scope

This statement of policy relates to all pupils, staff, parents and governors of Stocks Green. The age range of pupils from 4-11 must be acknowledged in the creation of policy and the development of the mathematics curriculum at Stocks Green Primary

Principles of Teaching and Learning

It is our aim to develop numerate pupils who have an ability and inclination to solve numerical problems in a range of contexts.

Curriculum and planning
The Long term plan (LTP) is taken from the White Rose maths hub overviews and their lesson overviews are used to inform Medium Term Plans. The LTP is used as a guidance tool in order to pace out coverage of the curriculum throughout the year. Teachers are encouraged to use professional discretion when deciding on how long is needed on particular curriculum area whilst ensuring all objectives are covered by the end of the academic year.

Short term planning (STP) is recorded for each strand on standard planning sheets. These plans outline the topic area /focus with specific learning objectives to be taught that week. Specific representation, mathematical talk, fluency, reasoning and problem solving columns identify the focus area, activity and support children will be carrying out/receiving. Books are scrutinised by subject leaders twice a year with a report for governors in the end of the year report.

Lesson Aims

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.

Lessons are delivered in a format that challenge, motivate and engage the pupils to make progress using a **wide range of teaching strategies to stimulate all pupils' active participation in their learning drawing on innovative and imaginative resources that include practical activities and ,where appropriate, the outdoor environment (OFSTED Outstanding criteria for Quality of teaching).**

Stocks Green does not enforce a specific lesson structure but expects each lesson to provide opportunity for the development of mental maths, reasoning and problem solving as well as realistic links to the wider curriculum and real-life. When mathematical procedures are taught a clear link to concepts and understanding should be structured e.g through the use of manipulatives.

The teaching of mathematics at Stocks Green 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

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In line with the 2014 National Curriculum, 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
- Understand the concept of fractions and calculate with them accurately
- Read and spell mathematical vocabulary correctly and confidently
- Calculate accurately and efficiently, both mentally and in writing, drawing on a range of calculation strategies
- Recognise when it is appropriate to use ICT and be able to do so effectively
- 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

Problem Solving and Reasoning

Within the maths curriculum, there is now a strong emphasis on providing children with opportunities to use and apply their skills in a range of problems, investigations and puzzles. Maths is not just about knowing how to add, subtract, multiply and divide, it is more about using these skills out of context to solve a range of different problems. Through our maths lessons, we are providing children with the opportunity not just to talk about maths but to talk maths. These are two quite different skills; children can talk about what they are doing in maths but talking about, 'why, why not and what if' is something else. At Stocks Green, we use a range of resources to support the children in developing their use of maths talk:

- White Rose Hub Materials,
- NCETM Oxford Owl Mastery Materials,
- Isee Reasoning (Gareth Metcalfe)
- Primary Solutions -Reasoning resources
- Resources from NCETM,
- Resources from NRICH,

Reasoning

There are many different ways to reason about something in maths but below is an example of what reasoning looks like in Stocks Green. Using a Reasoning progression developed by NRICH (Nrich Primary Team (2014) "Reasoning: the Journey from Novice to Expert",)

Step one: ***Describing:*** *simply tells what they did.*

Step two: **Explaining**: offers some reasons for what they did. These may or may not be correct. The argument may yet not hang together coherently. This is the beginning of inductive reasoning.

Step three: **Convincing**: confident that their chain of reasoning is right and may use words such as, 'I reckon' or 'without doubt'. The underlying mathematical argument may or may not be accurate yet is likely to have more coherence and completeness than the explaining stage. This is called inductive reasoning.

Step four: **Justifying**: a correct logical argument that has a complete chain of reasoning to it and uses words such as 'because', 'therefore', 'and so', 'that leads to' ...

Step five: **Proving**: a watertight argument that is mathematically sound, often based on generalisations and underlying structure. This is also called deductive reasoning.

These progressions/strategies are used to promote deeper understanding and application of a skill in all domains of the maths curriculum. These challenges can be found within the daily maths lesson, many included via the class teachers questioning during lessons.

Strategies include:

- Questioning – Mathematical Talk during lessons
- Spot the mistake / Which is correct?
- True or false?
- What comes next?
- Do, then explain
- Make up an example / Write more statements / Create a question / Another and another
- Possible answers / Other possibilities
- What do you notice?
- Continue the pattern
- Missing numbers / Missing symbols / Missing information/Connected calculations
- Working backwards / Use the inverse / Undoing / Unpicking
- Hard and easy questions
- What else do you know? / Use a fact
- Fact families
- Convince me / Prove it / Generalising / Explain thinking
- Make an estimate / Size of an answer
- Always, sometimes, never
- Making links / Application
- Can you find?
- What's the same, what's different?
- Odd one out
- Complete the pattern / Continue the pattern
- Another and another
- Ordering
- Testing conditions
- The answer is…
- Visualising

These strategies are a very powerful way of developing pupils' reasoning skills and can be used flexibly. Many are transferable to different areas of mathematics and can be differentiated through the choice of different numbers and examples.

Differentiation and special educational needs:

Teaching is organised to enable pupils of all abilities, to be able to access the learning of mathematical skills. Within the lesson pupils may work in groups on tasks linked to the learning objective of the lesson. Lessons are differentiated in groups – more able, average and less able.

Differentiated activities across the school will take account of the children's differing needs and abilities (working toward national standard, at national standard and mastery standard) ensuring all children have access to the mathematics curriculum at the appropriate standard. Children with special educational needs in mathematics are supported to enable them to achieve the learning objective. (see the Special Educational Needs Policy and the Equal Opportunities Policy for details)

Agreed principles for mathematics.

- The numerical date will be placed at the top of the page, with the day, month and year e.g. 19.01.15 (Key Stage 1 / 2) and underlined
- The learning objective (LO) will be written underneath and underlined. (Key Stage 2)
- Children will learn to work in cm squared paper during Year 1 to facilitate a smooth transition into recording their work in books in KS2. One digit/symbol per square is the agreed rule.
- Wherever possible, the checking or marking of work will be done with the child who will be given the opportunity to ask questions and self-correct.
- Generally mistakes will be identified.
- Children's responses to their teacher's marking should be encouraged when it is appropriate. They should be encouraged to use different purple pens for self-correction and peer marking.
- Peer assessment and self-assessment will be encouraged and assessments recorded in the books against the dated learning objective.
- There will be gradual progression through the key stages, according to the child's needs, towards independence.
- The teaching staff will plan for and encourage mathematics to be utilised in other curriculum areas.
- Weekly homework will be set
- There will be a working maths wall

Spiritual, moral, social and cultural development

When planning, teaching and assessing mathematics it is important that we include aspects of spirituality, morality, society and culture. In mathematics we can encourage children's independent, creative thinking and even a sense of personal achievement in areas such as problem solving. Mathematics can help children to appreciate order and pattern in the world and also requires children to make their own decisions and then evaluate the strategies they have used. Mathematics, like all subjects of the curriculum, should help to prepare children for the responsibilities, experiences and opportunities of adult life. Therefore teachers should contribute to the children's moral development by setting a good example in the way in which we treat them and encourage them to treat others.

Equal Opportunities

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

All children have equal access to the curriculum regardless of their race, gender or disability. This is monitored by analysing pupil performance throughout the school to ensure that there is no disparity between children and ensuring, in the preparation and teaching of maths, consideration of the needs of the children in these areas.

We believe that educational inclusion is about equal opportunities for all learners, whatever their age, gender, ethnicity, impairment, attainment and background.

Assessment, recording and reporting

Teachers are expected to make regular assessments of pupils' progress and record them systematically. This involves:

- Informal testing of mental recall and mental calculation, given orally
- Ongoing Teacher Formative assessment /evaluation of group and individual progress against termly plans
- Summative assessment at the end of the year for all years
- SATS testing for year 2 and 6 in May.
- Optional Testbase tests for year 3,4,5
- CATS tests for Year 4 and 5 January/February time
- Progress (Test base) tests are used for Year 6 across the year.
- Reports to parents annually in July.
- Parent consultations twice a year.

Resourcing
An annual review of resources is overseen by the subject leader for mathematics in discussion with the Head Teacher. Priorities are identified on the School Improvement Plan.

British Values
Please refer to our Teaching and Learning Policy

Review
This policy will be reviewed by the mathematics subject leader in September 2021, following discussions with the head-teacher and other colleagues. Any amendments will be presented to the whole staff and to the Standards and Curriculum committee of the Governing Body before implementation.

Appendix 1: Calculation Policy- written and mental calculation

Signed

Date

Related Policies
Teaching & Learning
SEN & D
Equal opportunities
Health & Safety
EYFS marking & Feedback Policy