



Mathematics Policy

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Mathematics Policy

1.1 Aims

This policy aims to outline the teaching and learning of mathematics at Coldean Primary School. As such, it supports our overall curriculum aims for all children to become:

- successful learners who enjoy learning, make progress and achieve;
- confident individuals who are able to live safe, healthy and fulfilling lives;
- responsible citizens who make a positive contribution to society.

1.2 Why is Mathematical Understanding important?

Mathematics introduces children to concepts, skills and thinking strategies that are essential in everyday life and support learning across the curriculum. It helps children make sense of the numbers, patterns and shapes they see in the world around them, offers ways of handling data in an increasingly digital world and makes a crucial contribution to their development as successful learners.

Children delight in using mathematics to solve a problem and construct new connections. Children seek patterns and as their confidence grows, use logical reasoning, suggest solutions and try out different approaches to problems.

Mathematics offers children a powerful way of communicating. They learn to explore and explain their ideas using symbols, diagrams and spoken and written language. They start to discover how mathematics has developed over time and contributes to our economy, society and culture. Studying mathematics stimulates curiosity, fosters creativity and equips children with the skills they need in life beyond school.

Therefore, we aim for all learners to develop:

- a fascination with the world of patterns, shapes and numbers around them;
- competence and confidence in mathematical knowledge, concepts and skills;
- an ability to solve problems, to reason, to think logically and to work systematically with accuracy;
- an understanding of mathematics through a process of enquiry, experiment and risk-taking;
- initiative and an ability to work both independently and co-operatively;
- an ability to communicate their mathematical understanding verbally and through the use of concrete, pictorial and written representations;
- an ability to apply mathematical knowledge, concepts and skills across the curriculum in meaningful contexts;
- an understanding that successful independent living requires financial awareness and effective money management.

2.1 Principles

The principles of mathematics at Coldean Primary School are:

- policy and provision are evaluated and reviewed regularly;
- resources of time, people and equipment are planned, budgeted for and detailed when appropriate in the 'Raising Attainment Plan';
- the governing body of the school discharge their statutory responsibility with regard to mathematics;
- planning ensures continuity and progression across all year groups and key stages.

3.1 Equal Opportunities

Children are provided with a variety of opportunities to develop and extend their mathematical skills in and across each phase of education. All pupils at Coldean Primary have an equal right to develop and achieve their potential. Equality of opportunity underpins the school curriculum and the work of the school. Children at Coldean are treated as individuals with their own abilities, difficulties, attitudes, backgrounds and experiences.

We incorporate mathematics into a wide range of cross-curricular subjects and seek to take advantage of multi-cultural aspects of mathematics. In the daily mathematics lesson, we support children with English as an additional language in a variety of ways *e.g. repeating instructions, speaking clearly, emphasising key words, using picture cues, playing mathematical games, encouraging children to join in counting, chanting, finger games, rhymes, active teaching of mathematical vocabulary etc.* ICT is utilised to support children with disabilities.

4 Teaching & Learning

4.1 Teaching in the Foundation Stage

The children in the Foundation Stage are supported to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shapes, spaces and measures.

EYFS teachers follow the EYFS Statutory Framework¹ to ensure that children have the necessary mathematical understanding that will underpin future learning. Practitioners plan both structured activities, and time for child initiated activities, which enable the children to practise skills and gain confidence and competence in their use.

Within the planning for, and teaching of mathematics, staff ensure that there are opportunities for individual, supported, group and whole class learning and take into consideration the varying needs and levels of development of the children.

Mathematics in EYFS is made up of the following aspects;

- **Numbers** – Children count reliably with numbers from 0 – 20, place them in order and say which number is 1 more or 1 less than a given number. Using quantities and objects, they add and subtract 2 single digit number and count on or back to find the answer. They solve problems including doubling, halving and sharing.
- **Shape, Space and Measures** – Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Mathematical understanding is also developed within the setting through all early experiences including stories, songs, games and imaginative play and mathematical language during play and daily routines. Mathematical resources are readily available both indoors and in the outside learning environment.

4.2 Teaching in the Primary Phase

Mathematics in the Primary phase is taught for at least 1 hour per day, 5 days per week. Teachers plan use Maths Assessment Criteria sheets to ensure that all parts of the National Curriculum Programme of Study² are taught. This ongoing weekly planning forms the **scheme of work** for the school and takes into consideration the needs of our children.

The teaching of mathematics at Coldean Primary School is guided by the three core objectives of the National Curriculum and provides opportunities for individual, supported, paired and group learning, allowing children to engage in the three core areas:

Fluency

- using concrete apparatus to support enactive learning for new concepts (concrete stage)
- learning to recall additive and multiplicative number facts and key skills
- developing flexibility with number facts to promote greater application

¹ DfE, 2014, *Statutory Framework for the Early Years Foundation Stage*, London: Crown

² DfE, 2013, *The National Curriculum in England: KS1 and 2 framework document*, London: Crown

- playing games to develop both mathematical knowledge and understanding
- making connections between different mathematical concepts
- interpreting and using symbols, images, diagrams and models as tools to support thinking, problem solving, reasoning and communication from the iconic to the symbolic (pictorial stage)
- learning efficient written calculation methods

Reasoning

- pattern spotting with shape and number
- conjecturing relationships
- mathematical discussion, explanation and reasoning
- investigational work
- following a line of enquiry
- developing an argument
- using increasingly precise mathematical language
- assessing their own learning and suggesting what their next step should be

Problem solving

- applying their mathematics to a variety of routine and non-routine problems
- refinement of problem solving skills *e.g. breaking into simpler steps, finding all possibilities*
- developing resilience
- using ICT to model, present and solve mathematical problems and investigations
- the development of personal qualities and positive attitudes to mathematics

4.3 Planning

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

revisit – teach – practise – apply – review

However, it is advisable to mix and match these key features to ensure all children are engaged and learning to the best of their ability. Starting a lesson with a problem or puzzle that demands children **apply** learning is a valuable way of improving retention and encouraging resilience in mathematics; just as is **reviewing** prior learning.

Teachers plan using an agreed format suitable for their phase. Copies are printed off to enable annotation and assessment information to be recorded by the class teacher and support staff. Copies of plans and any resources are stored electronically on the teachers' networked drive. Most lessons will have planned use of an interactive whiteboard.

Teachers plan lessons that include:

- clearly identified and shared learning objectives in the form of "Can I...?" learning questions
- precise support/scaffolding so that every child knows what they are expected to learn and can set themselves challenging targets
- links to prior learning made explicit and explored with the children
- learning through pattern spotting, reasoning and generalising
- all children participating in whole-class activities *e.g. through the use of mini whiteboards, Learning Partners, interactive games*
- children using and developing success criteria / REMEMBER TOs to support their learning
- the development of mental methods of calculation
- the use of practical equipment to allow exploration and representation of mathematical concepts and ideas
- challenging, non-routine problems, open-ended tasks and investigations

- lively interactive teaching styles that differentiate for all learners in the class/group
- fun, engaging and well-pitched activities in a 'safe' environment where children are not afraid to make mistakes
- opportunities for individual, supported, paired and group learning
- the use of dialogic talk to enable children to 'think aloud' exploring and building on their own and others' ideas to develop coherent thinking, reasoning and generalising
- the use of visualisation to support solutions
- opportunities to communicate mathematical understanding verbally and through the use of concrete, electronic and written representations;
- clearly identified plenaries which give everyone the chance to evaluate and assess progress towards the lesson objectives, using individual and peer assessment strategies.
- an opportunity to develop and demonstrate their reasoning skills
- an opportunity to apply their skills in a wide range of contexts
- practice and consolidation sessions

4.4 Teaching Assistants and Individual Needs Assistants (TAs & INAs)

TAs and INAs support teachers with the delivery of lessons by encouraging all children to participate as fully as possible. They enable the children to maintain their focus throughout the lesson, through questioning, recapping and re-invigorating their enthusiasm for learning tasks when necessary.

They encourage thinking and independent learning as far as possible, using a range of models, images and apparatus and challenging children to 'have a go'. They have positive attitudes to maths, looking to promote mathematical understanding in everyday events including our outside learning environments.

TAs and INAs are given copies of plans that identify their role in lessons. They seek further clarification about concepts and expected misconceptions. They provide feedback to the teacher verbally (where time allows) and through annotation of plans and/or through the use of MAC sheets.

Strategies that TAs and INAs commonly use in class to support children are:

- ensuring that identified children understand the learning objectives for each lesson
- supporting identified children to engage with whole-class teaching and learning sessions
- being a *Learning Partner*, enabling discussion of the problem/task and develop reasoning. In doing so, encourage children to talk through using the language of mathematics
- working with small groups reinforcing the approach, methods and language used by the teacher
- delivery of Wave 2 intervention programmes/Same Day Intervention in class, enabling children to make accelerated progress and catch up with their peers *e.g. Visual Images, Models & Symbols; Springboard programmes*
- utilising a range of apparatus to support enactive learning *e.g. Numicon, Cuisenaire (Number rods), Base 10, bead strings, empty numberlines, 100-squares, multiplication squares, place value sliders, mini-whiteboards*
- encouraging children's "Can do" attitude, building their confidence as mathematicians
- emphasising the use of the success criteria/REMEMBER TOs when providing learning feedback to children
- enabling children to assess their own understanding and competence against the "Can I..." learning question and to consider what their next step should be.

4.5 Pupils' record of their learning

Children are encouraged to explore mathematical concepts in a practical, enactive way using apparatus to support their understanding. Children are taught a variety of methods for recording their work in an iconic way to elucidate both method and solution. There are occasions when it is both quick and convenient to carry out written calculations using taught symbolic methods. Children are encouraged to use mental strategies before resorting to a written algorithm. It is also important to record aspects of mathematical investigations.

School policy is for children to write in pencil using the following books:

- Years 1 – 3*: 1 cm squares
- Year 4*: 1 cm squares – *gradual move to 5 mm squares when individual children are ready*
- Year 5*: 5 mm squares
- Year 6*: 5 mm squares

*Where children's ability is significantly different from their Year group expectations, professional judgement should be used.

The *short date* (DD/MM/YY) is written at the top left of the new learning and underlined. The "Can I..." learning question should be on the next line down, centred and underlined. All children are encouraged to work tidily and neatly when recording their work. When using squares, one square should be used for each digit. A line should be drawn under the last piece of recording.

4.6 Home Learning

Home learning provide opportunities for children to master particular skills and knowledge. In the Primary phase home learning is set at the end of each week using MyMaths or a continuation of the projects children have been working on in class. Additionally, number facts cards are given to consolidate at home *e.g. number bonds to 13, table facts, deriving division facts from tables*.

4.7 Assessment

Assessment is regarded as an integral part of teaching and learning and is a continuous process. It is the responsibility of the class teacher to assess all children in their class. In our school we are continually assessing our pupils and recording their progress. We strive to make our assessment purposeful, allowing us to match the correct level of work to the needs of the children, thus benefiting them and ensuring progress.

In the EYFS children's progress is tracked through planned observations and other evidence is in a range of ways by practitioners. The information is collated in each child's online *Learning Journal*. At the end of Reception, this information supports assessment against the EYFS Early Learning Goals. This data is rigorously analysed and supports the identification of areas for development.

Information for mathematical assessment in the primary phase is gathered in a variety of ways: MAC sheets, through planned assessment tasks, by talking to the children and observing and marking their work. This formative information is recorded on planning and MAC sheets (please see the assessment policy for more information).

Termly, summative assessments provide data to enable the tracking of pupils' progress. This is rigorously analysed by both class teachers and the Assessment coordinator to ensure all pupils and groups of pupils *e.g. FSM, SEN, girls/boys, EAL* are making good progress. This assessment data is shared with children where appropriate to enable them to keep track of their own progress and set challenging goals. This data supports the identification of areas for development.

4.8 Learning Feedback

Work in mathematics can generate a great deal of marking and it is recognised that it is not always desirable to mark every piece of work. The children themselves can mark exercises which involve routine practice with support and guidance from the teacher. Please see the 'Effective Learning Feedback' Policy for more information on marking.

4.9 Feedback Code

A code to indicate how assessment and learning were managed will be used by all practitioners. It is important to highlight how the learning was managed and undertaken;

I = Independent **S** = Shared/ Paired **PA** = Partial adult support **A** = Adult support

Pupils will make a self-assessment at the end of each piece of work using an agreed symbol,



I tried.



I need more practice.



I understand and could teach someone else.

4.10 Correcting work

Alongside learning feedback, it will be necessary to correct some pieces of work. In mathematics, incorrect calculations should be indicated with a '?'. Where possible, time to revisit and revise calculations should be planned into lessons. Children should write their revised solutions *after* the '?' to show that it has been corrected.

5 Contribution of mathematics to teaching in other curriculum areas

5.1 English

Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, we encourage children to read and interpret problems in order to identify the mathematics involved. The children may explain and present their work to others during sessions. Younger children enjoy stories and rhyme that rely on counting and sequencing. Older children encounter mathematical vocabulary, graphs and charts when using non-fiction texts.

5.2 Computing

Children use and apply mathematics in a variety of ways when solving problems using ICT. Younger children use ICT to communicate results with appropriate mathematical symbols. Older children use it to produce graphs and tables when explaining their results or when creating repeating patterns, such as tessellations. When working on control, children use standard and non-standard measures for distance and angle. They use simulations to identify patterns and relationships.

5.3 Science

Investigative science demands a host of mathematical skills and knowledge to be employed. Most investigations and fair-tests require measurements to be made. In KS1, children measure mass and length using standard and non-standard units when recording observations. In KS2 children use accurately measured standard units of time, length, mass and capacity to quantify observations. Often these results are presented in the form of charts and graphs and are used to support the children's conclusions. In Y5/6 children find the mean of three results to ensure accuracy and consistency.

5.4 Personal, social, health and economic education (PSHE)

Mathematics contributes to the teaching of personal, social and health and economic education. The work that children do outside their normal lessons encourages independent study and helps them to become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views. We present older children with real-life situations in their work on the spending of money.

5.5 Spiritual, moral, social and cultural development

The teaching of mathematics supports the social development of our children through the way we expect them to work with each other in lessons. We group children so that they work together, and we give them the chance to discuss their ideas and results. The study of famous mathematicians around the world contributes to the cultural development of our children.

6 Special Educational Needs

Children with SEN are taught within the daily mathematics lesson and take an active role in the lesson. Where applicable children's Provision Maps incorporate suitable objectives from children's MAC sheets and teachers keep these objectives in mind when planning work. Resources that address specific needs are provided by class teachers and teaching assistants to support the learning *e.g. laptop software, visual prompt cards, Makaton signing*.

Within the daily mathematics lesson teachers not only provide support to children but also activities that provide appropriate challenges for children who are working towards a mastery level.

7 Parents & Governors

7.1 Parental involvement

Parents play an integral part in their children's mathematical education, not least of which is their own attitude and competence in maths. Parents often find supporting children at home fraught with the fear of "teaching them the wrong thing" as methods and approaches have changed over the years. To try and alleviate some of these issues we:

- Invite parents into school at least twice yearly to look at and discuss their children's learning.
- Hold meetings when significant changes have been/are made to the mathematics curriculum or send information via the school's newsletter.
- Where necessary, practical workshops aimed at particular year groups/phases are provided to teach parents the methods and approaches we use
- Invite parents of Year 6 pupils to a meeting in January on supporting their children with SATs
- Use *MyMaths online homework* which supports parents to understand the mathematical concepts and approaches being taught in school

7.2 Reports to Parents

Reports are completed before the end of the summer term and parents are given opportunity to discuss their child's progress on at least three separate occasions. Teachers use the information gathered from formative and summative assessments to help them comment on individual children's progress and report the stage of working to parents.

7.3 Governors

We have identified a governor responsible for mathematics who is involved in the quality assurance of mathematics teaching and learning.

8 Resources

8.1 Staff Development

Continuing professional development is essential in raising the standard of mathematics teaching and learning at Coldean Primary School. In order to address this:

- Termly audits of teacher's expertise and knowledge are monitored through Pupil Progress Meetings and lesson observations.
- Strategic development of mathematics is central to termly Raising Attainment Plans'
- Weekly staff meetings provide opportunities to address key issues in mathematics teaching, train teachers in the use of new materials/resources.

- Identified staff undertake approved training.
- Mathematics targets may be set as part of appraisal, when it fits with the raising attainment plan.

8.2 Practical resources

All teachers should organise an area within the classroom dedicated to mathematics resources. This area is easily accessible to all children and allows them to become familiar with all the clearly labelled resources. Teachers regularly review their use of resources and are able to request additional materials from the Mathematics Coordinator. Resources which are not used or required regularly are stored centrally.

8.3 Budgets

Budgets will be allocated in line with the Mathematics Development Plan.

9 Management and Coordination

- Monitoring of the standards of children's work and of the quality of teaching in mathematics is the responsibility of the mathematics coordinator. The work of the mathematics coordinator also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The mathematics coordinator reports to the head teacher and governors as required.
- The mathematics subject leader undertakes planning and book scrutinies, pupil conferencing, learning walks and lesson observations, which all feed into the school quality assurance for mathematics.

9.1 Duties of the Mathematics Co-ordinator

- To be a role model and demonstrate good practice.
- Keep the written policy document up to date and keep under review the scheme of work for mathematics in line with the requirements of the National Curriculum.
- Encourage and support staff in the implementation of the agreed procedures and closely monitor the progression of activities and consistency of approach across both year groups and Key Stages.
- Manage and organise all resources, ensuring they are readily available and well maintained.
- Monitor standards in mathematics across the school through classroom observation, work scrutiny, teachers' planning, discussion with pupils and data analysis.
- Contribute to whole-school curriculum improvement by advising the SMT and Governors' Curriculum Committee on areas of strength and weakness and identifying clear targets to improve and sustain pupil achievement.
- Lead the teaching of mathematics by example and afford colleagues the opportunity to share in good practice. Lead professional development in mathematics in accordance with staff development needs and support and guide staff by encouraging the sharing of ideas.
- Be aware of national development in mathematics through reading relevant materials and attending courses when appropriate
- Liaise with partnership schools in order to facilitate continuity of approach across schools.
- Further parental involvement and knowledge by facilitating support and advice through curriculum evenings and disseminating relevant information.
- Submit regular feedback on standards in mathematics to the SMT.
- Work to achieve equality of opportunity throughout the school.

9.2 Role of the Head teacher

- Lead, manage and monitor the implementation of the Primary Framework, including monitoring the quality of teaching in classrooms
- With the link governors, keep the governing body informed about the progress of the teaching and learning in mathematics
- Ensure that mathematics remains a high profile in the school's development work
- Deploy support staff to maximise progress and attainment for all pupils.