

Redhill Primary Academy

Mathematics Policy



Signed

A handwritten signature in blue ink, which appears to read "Fiona".

Mrs Fiona Seddon, Chair of Governors

Approved by:

Date:

Last reviewed on:

December 2023

Next review due
by:

December 2025

In the context of the National Curriculum Programmes of Study for Key Stages 1 and 2

This policy outlines the teaching and organisation of the mathematics learning at Redhill Primary School. It aims to establish the entitlement for all pupils to develop as confident, enthusiastic and thinking mathematicians.

REFERENCES USED IN DEVELOPING OUR POLICY

The following texts would make good background reading to give a flavour of the way we work and to the thoughts and ideas which underlie our philosophy and to support your teaching.

Mathematics Explained for Primary Teachers – Derek Haylock

What's Math Got To Do With It? - Jo Baoler

NCETM – Teaching For Mastery in Mathematics

(<https://www.ncetm.org.uk/teaching-for-mastery/mastery-explained/>)

Development in confidence and Capabilities in Primary School

(<http://dera.ioe.ac.uk/11154/1/DCSF-RR118.pdf>)

In addition:

Mathematics Programmes of Study – Curriculum 2014

Intent

At Redhill Primary Academy, we aim to ensure our learners become confident, efficient mathematicians who show an enthusiasm and appreciation for the subject as a whole. They will develop positive attitudes towards mathematics as an interesting and useful subject that has relevance in their own lives and in the world in general, recognising that mathematics will be relevant, used constantly and help them to solve problems they meet in everyday life. As well as teaching the objectives of the National Curriculum, it also allows the opportunity to embed knowledge through a balance of fluency, reasoning, and problem-solving activities in all year groups. Not only will children know more and remember more, but they will also be able to apply the different types of knowledge to real-life contexts and a wide variety of problems. As a result, children will develop their mathematical thinking and the accuracy of mathematical language needed for everyday life. Over time, children are expected to apply those values which we recognise in school as essential to developing good learners: independence, resilience, respect, communication, and collaboration. This will include the ability to think clearly and logically in mathematics with confidence, independence of thought and flexibility of mind.

Aims

- believe in themselves as mathematicians
- have an ever-increasing understanding and knowledge of number and number operations
- calculate accurately and confidently with written methods and show an accurate recall of number facts
- develop positive attitudes towards mathematics as an interesting and useful subject: showing an appreciation of the creative aspects of mathematics and an awareness of its aesthetic appeal (this may be demonstrated through art and design projects)
- recognise that mental, jottings, written and calculator methods all have a place and be able to make sensible and confident decisions about when to use them
- be able to apply their knowledge and understanding to real life contexts and a wide variety of problems
- develop the ability to think clearly and logically in mathematics with confidence, independence of thought and flexibility of mind
- develop as mathematical thinkers, through a process of enquiry, reasoning and communication, and as such be confident enough to take risks in their learning and make mistakes they can learn from
- be comfortable with talking about their work and the strategies they have used
- be able to formulate, test and revise hypotheses in their searches for mathematical patterns, sequences and rules
- perceive mathematics as a lively, dynamic and enjoyable subject
- understand mathematics as having relevance in their own lives and in the world in general, recognising that mathematics will be relevant, used constantly and help them to solve problems they meet in everyday life

Implementation

Within our curriculum, the 7 key areas are addressed: number and place value, addition and subtraction, multiplication and division, geometry, measures, statistics, and algebra. Wherever possible, we choose to make links to other subject areas. Our schemes of work ensure that each block is developed in greater detail over a longer period to ensure that the declarative knowledge (facts) and procedural knowledge (methods) are embedded in the long-term memory and allow opportunities for conditional knowledge to be developed (application). Knowledge and methods are sequenced so that pupils build on what they already know and can do, whilst allowing opportunities for consolidation and over-learning. This ensures all children are given the chance to master the different types of knowledge needed to deal with mathematics in real-life. In addition to this, they are given opportunities to apply their learning, in increasingly more complex problems, to ensure that the children have to think in more sophisticated ways about the maths they are using. As part of this, they are expected to reason: to communicate their understanding using precise mathematical vocabulary at an age-appropriate level. Each block is planned with small steps in mind – starting from what children already know and building towards the end of year expectations. This allows for consolidation of work from previous year groups to support all ability levels. However, to ensure that knowledge is not forgotten, opportunities are planned into later blocks to revise and revisit powerful knowledge whilst applying this in new contexts. In EYFS and Year 1, greater emphasis is placed on the understanding of number itself. Children are encouraged to read, write, count with, compare and order numbers, as well as developing a secure understanding of what each number is (eg: the fourness of 4).

In our day-to-day teaching, it is expected that mathematics will form a part of children's daily diet. This includes a retrieval activity: a revision of knowledge already taught and an opportunity to practise mental arithmetic to strengthen long-term memory. In the main part, a specific objective or aim will be taught. This may be a new piece of knowledge or a new method, the opportunity to consolidate previous learning or to apply in a different context. Children will have opportunities to try things for themselves, work in pairs or groups on an investigation, practise and consolidate key knowledge through fluency practice or reason and problem solve (conditional knowledge). At the end, children will reflect on their learning, considering what they need to remember for the next lesson/future work. Times are flexible: teachers will respond to the age and need of the children, as well as the content and context of the lesson.

In order to ensure our teaching of mathematics is to the highest standard, we focus on the importance of using models and images to support the learning of new concepts. We move from real-life objects to physical models to abstract images, before expecting children to work independently. We aim to use a wide range of models and images across school, recognising that some are more effective for different jobs and that children may have a specific preference. Indeed, children are often given opportunities to choose the model which is most beneficial for them. There are a wide range of resources available in all classrooms to support teachers and children, as well as a centralised resource area (in the main corridor) for more specialised resources.

Culture:

Staff will teach the children to manage their own learning; this includes taking risks, learning from making mistakes, developing a sense of resilience and perseverance, as well as developing as mathematical thinkers through a process of enquiry, reasoning and communication. This builds on the values that we recognise in effective learners across school. However, we do not want them to see themselves as failures, as this is the most impenetrable barrier to further learning in mathematics. Therefore, we need to distinguish between errors (a simple mistake which a child is able to identify themselves and correct) and misconceptions (where the child does not have the necessary understanding or concepts on which to build to understand the task in hand). We should encourage children to make judgements themselves, by saying for example – let's test this, that would mean that, what about if . . . as well as searching for patterns, sequences, and rules. We promote hard work and a positive attitude to learning and the success which comes from this. As well as having opportunities for quiet, uninterrupted focused independent work, there

will be time for paired work and group work across blocks, where children can learn from each other. We aim for children to feel comfortable talking about their work and the strategies which they have used.

Therefore:

- We should emphasise talking about the work and processes within the activity.
- We should encourage thinking aloud and recording stages in working as appropriate.
- We should always attempt to develop confidence in themselves as mathematicians.
- We should not criticise children's work nor should we allow other children to do so (however, we will challenge their thinking and methods to develop their learning further).
- We should encourage children to experiment with ideas and mathematical language.
- We should emphasise the thinking process of mathematics rather than correct answers and show that being able to explain how they arrived at the answer is clearly valued more than the answer itself.
- We should always work from what the children understand and can do. We should avoid presenting them with tasks for which they do not have the necessary concepts, ensuring that progression in teaching is clearly structured.
- We should plan activities which allow children to achieve their potential by extending the activity to the limits of their mathematical thinking (this may be an open-ended task, on-going investigation or line of enquiry).
- As far as possible, real-life contexts should be used to extend and enhance the mathematics curriculum so that children are dealing with actual problems as well as ensuring mathematics takes an important role in other curriculum subjects.
- We should take opportunities to model mathematics by carrying out mathematical tasks in the classroom whenever feasible. This could involve joining in with the children's investigations in class, praising use of mathematical skills in other areas or recognising mathematics in the world around us while out on trips.
- We should emphasise the child's own methods of calculating and solving problems and these should be considered and discussed, and later, possibly considered alongside more conventional ones **when there is a good reason for doing so and we are sure the children have the necessary understanding of how they work.**
- We should encourage children to test out their ideas, even when privately we know they may not be effective or mathematically correct.
- We should encourage children to reflect on past experiences and use it in helping them with the problems they are faced with.
- We should accept that some mathematical problems will require longer periods of uninterrupted time and plan for this accordingly.
- We should give emphasis to looking for patterns and relationships and reasoning and communicating (using practical equipment or models, verbally and in written form) about the mathematics that is done.
- We should provide pupils with opportunity to work together in different groupings so that they have opportunity to take on different roles and learn different ways of operating as well as working alone.

GUIDELINES

Mastery Teaching

Throughout school, we aim to use a 'mastery' approach to the teaching and learning of the mathematics curriculum. The children are taught knowledge and concepts, which they are given opportunities to practice, methods and strategies are refined for efficiency, and there are opportunities for application of the knowledge. Over the year, key knowledge will be repeated and reinforced with opportunities to work

in a range of contexts, real-life situations, and problem-solving activities, including opportunities for reasoning and communication, to ensure that there is greater depth in learning and not just coverage of the curriculum.

Mental Arithmetic

Mental agility is highly valued at Redhill. We believe that this is an essential basis for much of the work in mathematics and therefore give plenty of opportunities to develop confidence and ability in mental calculations, both in school and through homework activities. In particular, children are encouraged to develop knowledge of number bonds, times-tables, doubles/halves and place value facts. Dedicated time is given to develop these facts, in addition to the daily maths lesson, in all year groups (for specific details, see mental arithmetic policy). Each half term, all children in FS, KS1 and KS2 will have targets linked to their key curriculum content. These focus on number bonds, doubles and halves, multiplication and division facts, addition and subtraction and time. Key knowledge for each year group is taught in school and children are expected to spend time practising their personal target each week as part of their homework. Parents and carers are provided with a support sheet to give examples of what children should be able to do, tips to help support their child and supporting online activities (where appropriate). As a result, children are expected to make good progress in mental methods across school as well as written methods for all four operations.

Marking

When marking work, we try to avoid using crosses/too much green highlighter as this may sap confidence, so prefer to give children a chance to review their work by asking questions or suggesting they check again. Usually, we prefer to discuss the work or comment on it, making reference to the learning objective/success criteria for that session. If a teacher can see that a child has been unable to carry out a task, then they will carefully plan next steps to ensure the child has a clearer understanding; this may be individually, with an adult, or in the form of a focus group. It is generally inappropriate to tell a child they were wrong if their understanding of the concept was incorrect; it is more appropriate to say, "you found this tricky". For independent groups, teachers will mark work completed and identify a close the gap (CTG) to help children to move towards their next steps. This may be a correction, a further challenge, or a way of applying their knowledge to a new context or situation. Children are then given time to respond to these comments (see marking policy).

Planning

No written planning is required for daily maths lessons. Overviews for each block may be produced by teams where needed. A detailed AB should be provided by the planner to support the teaching and learning: this should include a retrieval activity, learning objective, success criteria, teaching input with models/images/challenges as appropriate, and a suggested plenary. These are guidelines only and will be adapted and changed by teachers as needed.

INCLUSION

As part of our inclusion policy, we ensure that every child, regardless of their ability, race, gender, religion, social background, culture or disability, receives a broad and balanced mathematics curriculum through inclusion in the daily mathematics session. At times, children may come out of a session to receive additional support or to challenge their thinking further. During each session, teachers will use a mixture of questions directed at the whole class and some questions adapted for particular groups or individuals, in order to ensure the involvement of all pupils. Work during the activity time should be pitched to ensure all learners are meeting the age-appropriate expectation (with the exception of our most vulnerable learners). These activities may need additional supports of scaffolds or support from an additional adult. At times,

children may need work to be differentiated to close gaps in learning and children will then be provided with additional teaching time to aim for them to keep up. All children will have opportunities to work with adults to develop their mathematical knowledge and understanding further.

To ensure we have high expectations across school, we set challenging targets for end of Key Stage levels; this also includes the number of children working at greater depth. This is based on previous attainment as well as expecting that children will make excellent progress across school.

SEN

Children with special education needs may have work which is adapted to match their ability level and to focus on their specific targets. This may involve tracking back to objectives from previous year groups where appropriate. They may also have additional support from the teacher or teaching assistant, which is again focused upon their particular needs, in lessons or as part of additional intervention. These should have strong links with targets on provision maps, educational health care plans (EHCPs) or reports from other experts (eg: LSAT, screening tests) In addition to this, children will be targeted when misconceptions are identified, either in a session or through marking. This will be addressed as soon as possible to ensure the child's learning is not hindered over a longer period. (For further information, please see SEN policy.)

Many staff have received training to support children with specific learning difficulties in mathematics (dyscalculia) and have a wide range of practical resources in the classrooms to make learning more accessible. Further practical resources are available in a central maths resource area (situated outside the library) There are also a number of useful books to support teaching, including The Dyscalculia Assessment and The Dyscalculia Tool Kit (which are used by our highly trained TAs to screen for specific difficulties), as well as the Numicon Resource Box, Abacus Books and Number Kit Box.

RESOURCES

All class bases have a general stock of equipment to use as mathematical models/images: numicon, counters, multi-link cubes, diennes blocks and bead strings. Foundation Stage, KS1 classes and Year 3/4 classes have further resources to support key areas, including number fans, clock faces, money, counting equipment, place value counters, a bead bar and a large hundred square. General support materials, such as hundred squares, digit cards, number lines, times-tables squares, place value mats, maths mats and operation mats, are used in classes to support learning. A master version of these is available for staff in the resources folder in the maths curriculum subject folder (on workgroup). Additional resources, such as fraction walls/squares, shapes, measuring equipment and construction resources, are stored in a central Maths Resource Area, situated in the main corridor. Children have access to the central resources and individual teachers are responsible for ensuring they are replaced tidily in the correct place at the end of their use.

ICT Resources are also to be found on the internet as well as additional suggestions on the school website. The school also has a paid subscription to My Maths (used for homework and booster revision), Times Tables Rockstars/NumBots (for developing number bonds and times tables) and Maths Frame (Y2-Y6 – linked to curriculum objectives). Where teachers use internet sites, they are responsible for checking the value of the site as an aid to mathematical learning.

HOMEWORK

Mathematics homework is set as appropriate and may be weekly according to the age of the child. We focus on key knowledge and their application to practical situations, linking to personal targets where appropriate. Some homework may be worksheet based whereas other homework might involve more practical work such as shopping or making recipes/models. We also subscribe to the 'My Maths' website

which is used to provide homework activities, to reinforce teaching and provide booster revision. Feedback on homework will be provided to the children in oral or written form and house points given as appropriate (see homework policy). Additional work on times tables is given for all children in years 3 and 4 and, from Spring Term, children in year 2 as well. Children are encouraged to make use of the website, Times Tables Rockstars, to develop their knowledge further.

ORGANISATION OF MATHS WORK

RECORDING WORK

In the Early Years, work is recorded in a variety of ways. Photographs and observations are used to provide evidence as well as some written recording where appropriate. In Nursery and Reception, adult focused tasks are recorded in their daily maths books, whereas maths activities that the children have chosen to do during child-initiated time are recorded in their learning journeys. These are used to support the on-going assessments which make up the Early Years profile.

In the rest of the school, all work is done in a maths book with squared paper (although some year 1s will continue to use a larger book in the autumn term when it is more appropriate for their particular needs). Additional activities may be photocopied and stuck in. In each session, children will be given a learning focus sheet which contains the objective and success criteria for that session (these will contain a number of "I can" statements to enable children to aspire to achieve to the highest possible level). At the end of the session, children are encouraged to assess their work/their partner's work against the success criteria and are encouraged to add comments to their work for teachers to respond to. (For further information, please see teaching and learning policy.)

Use of ICT

We aim to have an ICT element in all maths sessions where it is appropriate to do so. We use interactive whiteboards for the majority of teaching sessions and make use of an extensive range of on-line resources for class/group activities and teacher created Activ boards. When activities are ICT based, these should be evidenced in children's books. This may be a photograph, screen shot of the website or print out of an activity. Often a CTG question will be included to ensure understanding which the teacher will monitor.

ASSESSMENT and RECORD KEEPING

Assessment in mathematics is carried out informally on a daily basis by watching/interacting with the children as they work, marking written work at the completion of a session, as well as during discussions at the beginning/end of sessions. We feel that this type of assessment has a vital role in providing information on the children's ability so that we can ensure that we are matching work appropriately and challenging the children's thinking further. In each maths session, the objective and success criteria for a particular activity is shared with the children; this will be done orally, shown through the AB session and on sheets put in each child's book. Children are encouraged to evaluate their own learning and that of others. At the end of each session, they will use the success criteria to self-assess their own work. The teacher (or other adult) will then use the success criteria to evaluate the learning as well and set CTG tasks or further challenges as required.

Teachers use the yearly assessment grids to assess children's progress towards age related expectations (ARE), using evidence from mathematics lessons as well as other mathematical activities (for example, early morning activities or quizzes, as well as cross-curricular work). During each assessment period, we will also assess children's ability more formally using tests in most year groups. These enable children to become familiar with a test format and also help to confirm teacher judgements. (For further information, please see assessment policy.)

Impact

What do we expect by the end of Key Stage 2?

- Children who enjoy maths and are increasingly confident in themselves as mathematicians.
- Children have a secure understanding of place value, with numbers up to and including ten millions (reading, writing, comparing, ordering, rounding).
- Children who can calculate confidently, with whole numbers, decimals and fractions, using a range of mental and written methods effectively, being able to make appropriate decisions about which method to use and why.
- Children who understand fractions, decimals and percentages and can convert between them and have an understanding of the link to ratio and proportion.
- Children who have a simple understanding of algebra and how it can be used in different ways.
- Children who can use and convert between different units of measure, including the metric and imperial systems, using abbreviations where appropriate.
- Children who understand and can calculate perimeter, area and volume.
- Children know a wide range of 2D and 3D shapes and can identify their properties, using these to classify them in different ways.
- Children have a secure knowledge of angles, including right angles, straight lines, whole turns and angles in shapes.
- Children who understand position and direction: can reflect and translate shapes in different ways and can use co-ordinates to describe their position.
- Children who can represent and interpret data sets presented in different forms, including bar graphs, line graphs, pie charts and a range of tables.
- Children who can solve increasingly more challenging problems in a range of contexts.
- Children who can reason using appropriate and precise mathematical vocabulary in a range of contexts.

We measure the impact of our curriculum through the following methods:

- Marking of written work
- Observations of children working/practical activities
- Discussion/questioning/explanations of ideas and concepts
- Assessments (pre and post assessments, on-going AFL through lessons, written assessments each term – including the analysis of tests, SATS)
- Analysis of data – looking at progress over the term/year/phase/school
- Moderation of work (eg: through team meetings)
- Book looks – completed with staff
- Learning walks and observations of lessons
- Pupil voice interviews/discussion
- Annual reporting of standards across the curriculum to parents.
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The maths subject leader, alongside members of SLT, will continually monitor the impact that maths teaching is having on the children's learning, through learning walks, lesson observations or drop-ins and work scrutinies, to ensure that knowledge and skills are progressively taught across school. They will also ensure the knowledge taught is retained by the children and continually revisited and that the learners are able to apply the skills they have been taught to a variety of different contexts,

showing independence with their learning. Impact will also be measured through key questioning skills built into lessons, learning objectives and success criteria and summative assessments aimed at targeting next steps in learning.

SUCCESS CRITERIA

The success criteria for the policy are as follows:

- Children are not only competent in mathematics but also confident about the mathematics they do.
- All areas of mathematics are being covered in an academic year.
- There is progression and continuity from year to year.
- Children's progress and achievements are monitored systematically, and interventions are used to ensure more rapid rates of progress where required.
- The majority of our mathematicians in Year Two and Year Six are reaching at least national levels of achievement (ARE), with many achieving above expected levels (greater depth)
- Some of our mathematicians, in some areas of maths, are working well above average expectations.

Our main criteria for success would be to have all children, whatever their level of achievement, enjoying their maths and having a real 'feel' for the subject. We want to feel that we enable all the children to achieve their full potential.

REVIEW DATE

Assessment and recording procedures are reviewed regularly to ensure that they are working and workable. Review of our long terms schemes of work will be undertaken as we go along and games, ideas and individual units of work are evaluated as they are done so those which work particularly well can be recognised.

The maths policy is reviewed at intervals and was last reviewed in December 2023.