



'Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.'

The National Curriculum, 2014

This Policy should be read alongside other related policies including our Calculation Policy and our Teaching & Learning Policy.

Our Aim

Well-being and achievement are at the heart of Grouville School so that we can all develop as lifelong learners. We aim for all of our children to:

- become fluent in the fundamentals of mathematics, so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately and ultimately enjoy the experience that Mathematics can bring
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- be able to 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 a variety of solutions.

Our Learning Values

Our learning values underpin the all of our children's experience at Grouville school. These have been recently updated by our children and staff and form the basis of our learning experiences at Grouville:

"Try, try, try; don't give up;
Challenge yourself; be the best that you can be
Be independent; stand on your own two feet
Work well together; look after each other
Believe in yourself; anything is possible!"

Throughout Maths we promote our learning values and we aspire for all of our children to apply these within their learning and take pride in all that they do – valuing their progress and misconceptions along the way.

What does Maths look like at Grouville?

Our teaching of Mathematics is richly supported by the National Centre of Excellence in the Teaching of Mathematics (NCETM) and underpinned by high-quality mastery maths resources including the Singaporean approach: Maths No Problem, and supplemented through UK based 'NRICH' Enriching Mathematics & White Rose Hub materials.



Grouville School Mathematics Policy 2018



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Teaching maths for mastery is a transformational approach to maths teaching which stems from high performing Asian nations such as Singapore. When taught to master maths, children develop their mathematical fluency without resorting to rote learning and are able to solve non-routine maths problems without having to memorise procedures.

To aid the understanding of mathematical objectives, objects are used in order for pupils to visualise the concept. Once children are able to solve problems using the concrete apparatus, we encourage them to draw it (pictorial) followed by being able to complete the problem using abstract methods- always aiming to develop the most efficient methods and calculations whichever stage of CPA the children are working within.

Students are given time to think deeply about the maths and really understand concepts at a relational level rather than as a set of rules or procedures. This slower pace leads to greater progress because it ensures that students are secure in their understanding and teachers don't need to revisit topics once they've been covered in depth.

Pupils explain their mathematical thinking when solving a calculation. Throughout all sessions, children work alongside a learning partners to discuss the concept and consider multiple ways to represent the problem and to solve it using the most efficient method. This process ensures that children understand not only the process, but more importantly, why they are doing it.

Curriculum

In Early Years Foundation Stage, teachers follow the guidelines in the EYFS Development Matters 2014 Document.

In KS1 and KS2 teachers are responsible for meeting the requirements of the Jersey Curriculum 2014 for their year group. Teachers formatively assess understanding at the beginning of each lesson and fold back or extend the learning where necessary, so that new learning is built on solid foundations and a thorough understanding. Where children have not developed prerequisite skills and understanding, teachers address this in their subsequent lessons and planning – this at times is supported by as LSA or through Maths Catch Up sessions.

Planning

Long term Planning

The Maths Subject Leader is responsible for mapping the long-term planning of the Mathematics curriculum across the school to ensure that objectives are covered across the school year. The long term plans govern termly assessments for achievement and progress tracking. Grouville School is currently following The White Rose Hub long term planning guidelines and these can be accessed within the TShared Drive. It is expected that Teachers do not alter the order of the blocking to ensure that coverage is carefully mapped across the school.

Medium Term Planning

Teachers are responsible for creating and maintaining their own medium term plans – these are to relate directly to the given long term plans. At the end of each half term, Year groups assess their coverage – highlighting in green when objectives have been covered. This is to assist with subject monitoring as it is

clear during our roll out year of 'Teaching for Mastery' embedding a CPA approach, aspects of the curriculum are taking more time and consolidation before children have mastered the skill. This is to be expected in our first roll out year.

Short Term Planning

Teachers primarily use Maths No Problem to plan and deliver their Maths sessions, however it is expected that this is richly supplemented by other high-quality resources, creative ideas and outdoor sessions in order to meet the needs of all learners and to engage them. Lessons are designed on flipcharts and saved centrally for subject monitoring and sharing between teachers. A cover sheet must be placed before each lesson that gives information on:

- The lesson objective
- The approach
- Support and extension
- Misconceptions
- Vocabulary and resources

It is expected that planning is followed by both teachers within the Year Group to ensure consistency. Should anyone have concerns regarding the progression or coverage between Year Group classes they are encouraged to discuss this with the Maths Leader who will advise and support where necessary.

Teaching and Learning

Quality Mathematics teaching in the Early Years lays solid foundations for continued learning. Child initiated learning should include regular mathematical opportunities.

In Key Stage 1 and 2 all learners should have a minimum of five hours quality Mathematics teaching a week. Lessons should be well paced with a clear focus on the children developing a thorough understanding of the mathematical concept. Children should be actively involved in a lesson to ensure greater opportunities to develop shared understanding and address common misconceptions. Children will frequently offer methods and conjectures and will 'teach and explain' using the CPA approach to support their reasoning where appropriate.

Individual Lesson Structure

At Grouville we have started to embed a two-part lesson structure to Maths – each part is designed carefully to ensure children grasp the curriculum content through exploration, conjectures and problem solving with varying degrees of CPA support and scaffolding as the sequence of lessons continue. Below is an overview of a typical class-based lesson.

Part 1: Anchor (in focus) Task (partners/small teams):

Open with a problem for children to discuss/investigate in partners or small teams. The problem must be displayed clearly on IWB or as a print out and must be developed to be accessible to all children in the class – but open enough to stretch and extend. Concrete resources are used during this stage for the children to investigate or demonstrate the problem. During this time, Teachers & TAs observe and assess children's methods – looking to spot a variety of strategies, misconceptions, and to ask quality questions to scaffold the task for some and take some learners deeper - if greater depth is accessible.

Let's Learn (episodic teaching): Ping Pong style of teaching & learning - sharing methods & misconceptions about the anchor task - getting children to prove their ideas. This will enable transition into pictorial representation and relevant variations of the question. Identify those who need greater

depth by asking 'what if' or 'how' questions. Link back to concrete resources for those needing support. Introduce variations of the question, or new methods for children to consider- do they work? – allow the children to explore when necessary. The Teacher and TA should reflect back to their observations and interactions during the anchor task to develop and structure this part to ensure pace and engagement.

Guided Practice Questions & or Journaling Task (independent):

This task will provide an informal assessment opportunity to highlight children who have grasped the concept and will highlight anyone who needs further support/greater depth).

This task will include either:

- key questions that include variation
- open journaling about the anchor task, or a similar new problem.
- expectations can still go deeper here - what depth can the children demonstrate? can they create their own version of the anchor task? how many methods can they show? what else could they apply?

Part 2: Intelligent Practice: (independent & supported)

This session can be opened with a review of the Journaling or Guided Practice task – were there any good methods to share? Were there any further misconceptions or patterns to discuss as a class?

Those who have grasped the first part of the lesson will readily apply their learning to complete a maths task – this could either be a linked MNP worksheet, an Nrich problem, or an NCETM Mastery question. The expectation during intelligent practice is that children work independently to apply their understanding to the task at hand. They can still use concrete if needed, but the majority of the class should be accessing the task through pictorial or abstract methods. This time allows Teachers & TAs to work with those who need further support, or greater depth extension.

Mental Mathematics & Fluency

Mental methods are emphasised from an early age. Children are directly taught and provided with regular opportunities to develop the different skills involved. These include:

- Learning and recalling number facts
- Using known facts to work out new facts
- Developing a repertoire of mental strategies
- Solving problems

Teachers will be expected to complete a daily 2-minute fluency task focussing on number facts across the 4 operations based on the strategy outlined in our Calculation Policy.

Quick recall of number facts, including times tables, enables children to grasp new concepts more easily, be more accurate in their calculations and become more proficient when solving problems. Children may use their fingers as part of the learning process but these should be quickly replaced by instant recall – children need to be fluent and confident with number and an over-reliance on fingers slows down this process.

Grouping and Differentiation

When teaching maths for mastery, the whole class moves through topics at broadly the same pace. Each topic is studied in depth and the teacher does not move to the next stage until the majority of the children demonstrate that they have a secure understanding of mathematical concept. Though there is still plenty of opportunity for differentiation. Pupils who grasp concepts quickly are challenged with rich and sophisticated variations of the task and are tasked with opportunities to make them think more

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deeply about the mathematics – they do not go on to the maths for the next year group. Those children who are not sufficiently fluent are provided with additional support such as more experience with concrete materials to scaffold their understanding to access the task, or Teacher or TA support.

Early intervention is important and same day, or assembly catch up is best provided by the class teacher. Where this isn't possible, teachers should begin their next lesson by picking up on misconceptions, common errors or points of interest that have been identified within a lesson, through marking or in children's journals.

Children who need significant additional support are identified and discussed at termly pupil progress meetings and scheduled meetings with the Maths Subject Leader. It is the teacher's responsibility to liaise with teaching assistants to plan and monitor any additional support that is provided. SEND children who are not able to access the Year Group curriculum will receive a differentiated curriculum linked as closely to the Year Group objectives as possible. At times where significant gaps are evident within their learning Maths intervention should be organised including: Numicon, 5 minutes Maths box, same day or assembly catch up sessions, and through home support materials including MyMaths. It is key any differentiated learning is outlined within children's ILPs and that parents are aware of strategies that they can use at home to improve target areas.

Teacher knowledge

It is vital when delivering quality first teaching of Mathematics that teachers have a secure understanding of the concepts that they teach and how to scaffold and extend those concepts with confidence to meet the needs of the children in their class. Quality CPD for **all** of our staff has been a priority throughout our 2017-2018 Maths Development Plan to ensure the mastery curriculum is delivered to the highest standard and that there is a consistent approach in the delivery of mathematics across the whole school.

Staff are advised to complete the NCETM self-assessment tool prior to delivering units of maths to ensure they have the necessary skills to deliver the unit – this tool provides instant support providing NCETM approved examples to enhance staff knowledge and understanding and subsequently their teaching.

Collaborative practice is a strength at Grouville School - teachers are actively involved in a range of internal and external peer observations throughout the year to ensure high quality practice is modelled across the school. The Maths Subject Leader ensures that all members of staff feel supported and are able to ask for further guidance whenever needed.

Mathematical Language

Pupils are taught and encouraged to use correct mathematical language and notation. Emphasis is placed on articulating and reading mathematical statements correctly. The meaning of the equals sign is fundamental to children's mathematical development and should never be viewed as "the answer is". Teacher's need to present children with a range of equations and inequalities: so that they develop a sound understanding of these concepts. (see Calculation Policy)

e.g. $3 + 4 \square - 2$

Useful mathematical language and notation should be displayed in all classrooms on working walls when it is relevant to the teaching and learning.

Pupil Voice

Throughout Maths lessons, particularly during Part 1, all children are involved in sharing ideas, solutions, methods and to demonstrate and explain their reasoning. Misconceptions are valued and are used as an opportunity for learning. Children are encouraged to ask questions and constructively challenge each other's thinking to demonstrate more efficient methods. With experience, children can be encouraged to use the language of conjecture and proof to explore mathematical principles relevant to their stage of development.

Learning Partners

A strong emphasis is placed on partner work in all lessons so that children have ample opportunity to discuss their thinking using appropriate mathematical vocabulary. Due consideration is given to seating and partnerships to best meet the needs of each learner across various lesson objectives.

Thought-provoking anchor tasks form a basis for each lesson and are the key to the development of problem solving skills and creativity. When presented with anchor tasks, children will always take the lead and consider ways to solve the problem - considering what to do first and where to go next, giving their reasons, with the teacher guiding children towards a more efficient approach through episodic teaching.

Books

Workbook Consistencies

- All KS1 & KS2 pupils will be given a maths exercise book and a maths journal. EYFS will start a class journal in the summer term and Year 1 will continue with a class journal until the spring where children will be given their own.
- Books should show name of child, class, subject, academic year and book number.
- Plastic jackets should be used on exercise books (not currently journals) to ensure books remain neat throughout the year. Children should be encouraged to take pride in their books and respect them.
- All learning is to be dated. Maths books should include the short date e.g. 05.09.17.
- All learning must have a Learning Question which is underlined using a ruler.
- Children should be encouraged to be aware of the visual impact of their learning, using margins where appropriate, and 1 square per number in maths books.
- Journals must be based on plain paper and do not need marginal structures. The children demonstrate their learning devising their own learning question when appropriate.
- Erasers can be used at the discretion of the Teacher.
- Children are not to leave whole pages blank. They should rule off from the day before.
- Worksheets must be trimmed to size in advance of lesson and stuck neatly in books.
- Both maths books will be passed on from the previous year for children to continue. A new book label must be added on the front of the book and a division title page must be inserted to show where a new year begins.
- Teacher's handwriting in books should be neat and model good handwriting.

Journals

Journals outcomes will demonstrate the depth of understanding and the preferred methods used by children. Teachers should not guide how the children demonstrate their learning within their journals during lessons as the journals will be used as an assessment tool to guide teaching and learning next

steps. Journaling will be modelled by the teacher to ensure children know how best to show their learning including the CPA approach and be shown how to demonstrate their depth of learning.

Types of Journal Writing

Descriptive: Writing/drawing of what they did showing how it is done.

Evaluative: Making choices – I chose method 3 because... The most efficient strategy for this problem is ... because...

Investigative: Looking for patterns and relationships, making conjectures, I noticed...

Creative: Making up their own problem, showing a new strategy of their own.

*Journaling, at times, will include aspects of all of the above especially for children in UKS2. It is key that each type of journaling skill is modelled by teachers to ensure children have guidance of how to journal effectively.

A list of sentence stem prompts will be stuck into the front of journals (September 2018 onwards) to guide students with their choice of explanation phrasing. Statements will be differentiated for KS1 and KS2.

Journals will include a range of practical, diagrammatic and written work reflecting the CPA approaches used within the lesson. The CPA representations are used to:

- Explore and develop understanding of concepts
- Informally support a mental calculation
- Assist visualisation of a problem...finding a way in.
- Explain the method used to solve a problem
- Develop an understanding of correct symbols, notation and layout
- Help learn, remember or practise the recall of number facts
- Carry out the working of a standard written method of calculation

Exercise Books

In the Foundation Stage, teachers use targeted observation, photographs, video and examples of recorded work as evidence of learning and progress in line with the Early Learning Goals.

From Year 1 onwards, pupils have an exercise book for recording their work. The majority of exercise books demonstrate coverage of the Maths No Problem workbook worksheets used in Part 2 based tasks. These worksheets include an excellent range of variation to ensure children are applying their understanding across a variety of contexts to extend their skill set. However it is imperative that teachers supplement worksheets with more problem based tasks to develop key reasoning skills in addition to the anchor tasks. Tasks may include Nrich, Mastery Documents and White Rose Hub problems and a greater range of practical problem solving.

Our spring INSET training has ensured that teachers are aware how to extend the worksheet tasks to show greater depth of skill and book looks will ensure that all classes are making progress in these areas.

Extension tasks should be prepared in advance of the lesson to ensure children exceeding the class-based task (to a greater depth standard – not just finding all of the answers). These tasks must be linked to the same learning objective and must be available to all children in the class. Children should stick these into their books or copy from the board including a (GD task) reference to show that they have aimed to cover a greater depth task option.

Metacognition & Tagging

Children actively reflect on their learning through a variety of ways and approaches during each Maths lesson. These reflections help to identify: confidence levels, stages of CPA, and next steps. A consistent method used across the school is tagging – children tag their learning at the end of each lesson to assess their learning:

Red/Pink – I'm finding this difficult and I need some help.

Yellow/Orange – This is still tricky. I need more practise and I may need some support.

Green – I can do it. I am confident.

Blue – I'm really confident and I could coach someone else.

Marking

Throughout each Mathematics session, work is reviewed interactively with the whole class. Pupils or the teacher give the solutions and the rest of the class agrees/ disagrees or suggests alternative solutions. Pupils can mark their own work using blue pen, whilst the teacher uses green pen. Although it is not necessary for teachers to mark every piece of work, it is important that they have an accurate picture of their learners. Teachers should be monitoring the pupil's marking and give them next step feedback to move their learning forward. This could be verbal or written feedback.

Books must be marked daily by children to ensure they are given instant feedback of their task outcome. Teachers will review books following sessions and books will include a variety of marking & feedback ensuring that marking has a direct impact on learning.

- Teacher Assessment (green pen)
- Self & Peer Assessment (blue pen)
- Verbal Feedback (stamp/marked)

* Teacher marking must follow Phase Marking Guidelines (see Teaching and Learning Policy)

Children must be given time to review marking and feedback – making corrections in blue. Unfinished tasks should be highlighted for children to go back and complete as expected.

Learning Checklists can be used where appropriate, but as these can often give methods away – these should be used at the discretion of the teacher.

Role of Technology in Maths

IT can be used to support teaching and to provide opportunities to consolidate learning and solve problems. Apple TV should be used to highlight interesting methods and misconceptions during anchor tasks and journaling skills. This is an effective and immediate tool to showcase learning across the class community.

IT should be used if it adds value to the lesson – using 'Hit the Button' or 'My Maths' to extend and support fluency and skill development.

Children must also be taught the technical skills involved in using a calculator at their level. They need to learn to make decisions about when best to use a calculator. Calculators can be used for additional

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support for SEND children to access the learning objective i.e. how to calculate perimeter and area, but not used when it directly completes the skills i.e. for addition sums or finding products in multiplication.

Mathematics across the curriculum

It is important to make links between pupils' experiences out of school and what they are learning in school. Within the maths lessons, teachers try to choose examples that link with everyday life.

Throughout the whole curriculum opportunities exist to extend and promote mathematics and teachers are encouraged to take advantage of these opportunities. *However, cross curricular work is generally in addition to the maths lesson – for example measuring as part of a science lesson enriches the day's mathematical experience but does not replace the maths lesson.*

Equal Opportunities

In line with the school's teaching and learning policy, teachers and the school leadership team are responsible for ensuring that all learners have equal access to quality teaching and learning of the full Mathematics curriculum at their level.

Teachers support children with English as an additional language in a variety of ways in order to best meet the needs of the learners. Strategies include: small group intervention, working with another child in their first language, repetition, emphasising key words, using visual and picture cues to make instructions clear and encouraging children to join in with oral and practical work.

Assessments

Assessment should be used to inform future planning. Teachers should reflect on their weekly lesson plans to identify differentiation and record relevant observations and assessments to inform future planning using the boxes at the top of the following week plans.

Learners should receive quality feedback, both verbal and written, so that they are aware of where they are in their learning and what their next step should be. Children reflect on their own learning, using tagging and journaling to annotate their work.

Formative assessment is central to the interactive nature of our lessons. Teachers monitor pupils during individual work, taking note of those who require more support, have an unexpected answer, have used an unusual method of solution or are making common errors. These misconceptions can either be addressed immediately or in a subsequent lesson.

Summative assessments are used to support teacher assessment and also to provide diagnostic assessment. Teachers in KS1 and KS2 are currently trialling the termly White Rose Hub assessments throughout the year to support their achievement and progress judgements. These tests will be evaluated at the end of the summer term to decide on the impact they have on teacher judgement and whether they should continue to be used, or be replaced by more regular end of unit assessments. Assessment outcomes are recorded on TShared and are monitored by the Maths Subject Leader.

Reporting to Parents

Parents receive a short written report during parent consultations in the autumn and spring term, which includes information on their child's maths learning and their target areas. A more detailed report is sent out in the summer term. This includes a statement about how their child is performing in line with age related expectations.

Homework

Homework should be varied, interesting and fun whilst still being enriching and challenging so that children are motivated. Homework should stimulate learning and foster different study skills. Activities should enable children to:

- practise and consolidate their skills and knowledge
- develop and extend their techniques and strategies
- prepare for their future learning through out of class activities
- share their learning with parents

Mathematics homework may not always be in the form of written activities. Short, focussed tasks may be given at the end of a lesson that do not need to be recorded, for example practising counting to 100 or rehearsing number facts. Teachers may also set activities for children to complete online, or with practical activities at home. The school subscribes to 'MyMaths' and it is expected that homework is regularly set from this site. Teachers need to make provision for children who do not have internet access at home to complete any given tasks at school. Whatever the nature of the work set, it is aimed that feedback will always be given.

Maths in the Community

We place value on the importance of parents understanding the way that their child is learning mathematics. We have an informative webpage on our school website outlining our vision for Maths at Grouville and the way in which it is taught. We have also created a Maths Booklet for Parents to ensure they have an overview of what Maths looks like at Grouville School.

We have also started to include Maths sessions within our programme of events for parents. This includes sharing learning events, workshops, presentations and open door Maths lessons where parents can learn alongside their children.

Resources

All classrooms must have an easily accessible area within the classroom dedicated to mathematics resources that are appropriate to the children's stage of development. In addition classes must have a maths working wall which includes relevant mathematical information to support and extend learning. Children should have access to practical equipment such as: number lines, small whiteboards and concrete apparatus. Some resources are stored centrally for use across the school - measurement equipment etc.

Monitoring and Evaluation

The Leadership team and Mathematics Leader regularly monitor and evaluate the effectiveness of maths teaching through lesson observations, book looks and planning scrutiny.

All teachers are responsible for assessing pupil progress, gathering evidence, identifying targets, reporting to parents and entering data on the school tracking systems. Phase leaders and the SENDCO hold termly meetings with class teachers to discuss pupil progress and individual need.

The Mathematics Subject Leader is responsible for supporting teachers and developing, monitoring and evaluating the quality and standards of mathematics throughout the school.

Role of Subject leader

The Subject Leader's role involves:

- Planning, organising and leading INSET
- Liaising with the Leadership Team and Teaching and Learning Advisor for Maths
- Supporting the Leadership Team in carrying out an annual audit of Mathematics within the school and subsequently producing an action plan
- Leading by example in the way they teach in their own classrooms
- Observing lessons, sharing good practice and providing support
- Ensuring teachers are familiar with the Jersey Curriculum
- Monitoring planning and pupil's work
- Working with Phase Leaders and SENDCO to monitor and support pupil progress and target setting
- Attending INSET provided by Education, Mathematics Consultants and Advisors
- Working with the Leadership Team in planning, organising and leading events for parents about Mathematics
- Regular discussion with the Leadership team and Teaching and School Advisor about the implementation of strategies to raise attainment within the school
- Annually updating the school policy

Policy last updated: June 2018

Debbie Buesnel