



'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

# Grouville School Mathematics Policy 2022

This Policy should be read alongside other related policies including Teaching, Learning & Assessment Policy, and our Maths Calculation Policy. Other resources to supplement this policy can be found on our school website <u>www.grouville.sch.je/maths</u>

# Our Aim for Mathematics at Grouville

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.

## Successful Learning Ingredients

Throughout mathematics, we actively promote our Successful Learning Ingredients and aspire for all of our children to apply these within their learning and take pride in all that they do – valuing the importance of their progress and misconceptions along the way.

# What does Mathematics look like at Grouville?

Our teaching of mathematics is underpinned by 'Power Maths' a DFE approved teaching resource. Teaching generally follows this resource to ensure consistency, high-quality teaching and resources, and clear progression within units. However, our teaching is richly supplemented by other high-quality teaching for mastery materials including the NCETM, NRICH and White Rose & I See Reasoning resources, amongst others particularly for problem solving and reasoning tasks.

Teaching mathematics for mastery is a transformational approach to mathematics teaching which stems from high performing Asian nations. When taught to master mathematics, children develop their





mathematical fluency without resorting to rote learning and are able to solve non-routine mathematics problems without having to memorise procedures.

#### The Concrete-Pictorial-Abstract Approach (CPA)

To aid understanding of mathematical objectives, real (concrete) resources are used in order for children to visualise and demonstrate abstract mathematical concepts. Once children are able to solve problems using real resources (concrete), they are encouraged to explain their thinking using drawings or diagrams (pictorial) followed by being able to complete the problem using more formal numerical and symbolic methods (abstract). This process is always aiming to develop the most efficient methods and calculations whichever stage of CPA the children are working within.

Our lessons enable children to think deeply and try to explain and understand concepts at a relational level rather than as a set of rules or procedures. We aim for all of our children to explain their mathematical thinking when solving a calculation. Throughout all sessions, children work alongside learning partners to discuss the concept and consider multiple ways to represent the problem and to solve it using the most efficient method. We also implement regular journaling (reasoning) opportunities to ensure children understand not only the process but more importantly, why they are doing it.

## Curriculum

#### Early Years

Throughout Early Years Foundation Stage, mathematics teaching adheres to the expectations outlined within the Early Years Foundation Stage framework. At Grouville, Teaching for Mastery is embraced within our EYFS settings and all practitioners enact the belief that all children are effective, competent and secure mathematicians. We ensure that quality play is essentially embedded within a mastery approach in early years. In addition to mathematics throughout continuous provision, all children experience the same shared mathematics together in short daily focussed sessions. At Grouville, our EYFS team also embrace the 'A REAL approach to Mathematics' project linking both home and school. This is an evidence-based approach, built on research around the importance of parents as children's first and most enduring educators. It builds knowledge, skills and confidence in early years practitioners to carry out work with focus children and their parents, so that they can support their child's early mathematical development at home.

#### KS1 & KS2

Throughout KS1 and KS2, teachers are responsible for meeting the requirements of the KS1 and KS2 Jersey Curriculum. 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 LSAs or through mathematics interventions or support groups.





# Planning

### Long term Planning

The Mathematics 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. These plans outline the expected time frame for a unit to be completed including any assessments but also include 'white space' lessons to allow teachers to adapt their units effectively to meet the needs of their learners – taking longer/shorter within a unit where necessary without impacting on the coverage of other units across the year. These plans can be adapted by teachers, with the guidance of the subject leader, to ensure units are being blocked effectively and that coverage is carefully mapped across the school.

### Short Term Planning

Teachers use Power Maths to plan and deliver the majority of mathematics lessons – focusing carefully on only one objective per lesson (the learning question). It is expected that lessons are adjusted by teachers to meet the needs of their learners and that lessons are richly supplemented by other creative ideas and outdoor sessions, where appropriate, in order to engage and enrich mathematical experiences.

Lessons are either designed on flipcharts or run directly from ActiveLearn. A cover sheet must be placed before each flipchart lesson that gives information on the:

- o Learning question (linked to the NC lesson objective)
- o SEN learning question (completed if appropriate)
- o Support and extension activities

It is expected that flipchart planning is completed by both teachers within the year group to ensure consistency in learning across the cohort and that the lesson has been crafted with all children in mind.

# **Teaching and Learning**

### EYFS

Children in EYFS learn and develop well in enabling environments, in which their experiences respond to their individual needs and there is a strong partnership between practitioners and parents and carers. Within a mathematically rich environment there are mathematical possibilities everywhere. There are timely opportunities to extend, apply and revisit learning in many different contexts and these are regularly selected by the children. Flexibility of approach, location and resources is encouraged. All children have continual access to opportunities to explore mathematical ideas in a concrete, pictorial and abstract way. Children are provided with opportunities for mathematical mark-making and access to a variety of formal and informal representations. Home and out of school mathematical learning is acknowledged and celebrated.

Children are leaders of their own mathematical learning and are supported by skilled practitioners and an enabling mathematical environment. Children develop mathematical mastery in the context of positive relationships and the environment around them. Mathematical learning is planned for in a range of ways including daily focussed mathematics sessions, continuous provision and focussed interventions. Assessment for mastery includes focused observations which is shared regularly between teachers, parents





and children. The focus within curriculum design is built upon exploring key content in considerable depth particularly at the earliest stages.

The characteristics of effective learning are the characteristics of effective mathematics learning:

- Playing and exploring
- Active learning
- Creating and thinking critically

#### KS1 & KS2

Throughout Key Stage 1 and 2 all learners should have a minimum of five hours mathematics learning each week. Lessons should be well-paced following the two-part lesson structure as outlined below. Each lesson features a clear learning question focus which is shared with the children. Children should be actively involved in a lesson to ensure greater opportunities to develop a shared understanding and address common misconceptions. Children are expected to contribute to share their methods and conjectures and will 'teach and explain' using the CPA approach to support their reasoning.

#### Differentiation

When teaching mathematics for mastery, the whole class move through units at broadly the same pace, however each session is highly differentiated through teacher questioning, scaffolding, extension, and development through the C-P-A approach. Mathematical thinking is highly valued with an emphasis upon the child's process within activities and tasks. Children who grasp concepts quickly are challenged with 'Go Deeper' opportunities to make them think more deeply about the learning question. Children who are not sufficiently fluent are provided with additional support and further access to concrete materials to scaffold their understanding.

Children are provided with high-quality problems that help them to make connections and relationships and are encouraged to approach mathematical challenges with positivity and confidence. Communication (verbal and nonverbal) is modelled and encouraged in a variety of ways including the careful and precise use of mathematical vocabulary.

Early intervention for those children who are finding concepts difficult is key, and each teacher can support those learners within part 2 of the lesson. Additional small group 'catch up' sessions are provided wherever possible by the class teacher, or if appropriate, a LSA. Teachers may also begin the next lesson by picking up on a common misconception, or points of interest that have been identified in the previous lesson, and relevant feedback should scaffold the process through in children's workbooks or journals.

#### Differentiation for children with SEN

Where children are working below the expectations for the year group, they will be supported by individualised tasks – tasks that have been specifically designed by the teacher to meet their needs and close identified gaps. SEN children who are not able to access their own year group curriculum will receive a differentiated curriculum linked as closely to the year group objectives as possible. Specific targets will be outlined on children's Learning Plans so that achievement and progress is carefully tracked, and these are discussed within children's termly reports and Parent Teacher meetings. SEN children may take part in





regular maths interventions run by trained LSAs or programs that support areas of need, such as fluency and number sense, to allow them to close knowledge and skill gaps and make progress to master more complex concepts as part of their year group curriculum.

#### KS1 & KS2 Lesson Structure

At Grouville we teach mathematics through a two-part lesson structure. Each lesson part is designed carefully to ensure children grasp the curriculum content through exploration, problem solving with varying degrees of support and independence.

Throughout each lesson, teachers are clear that their role is to support children to be confident and independent mathematical thinkers. This makes it possible for all children to engage successfully with a range of challenging tasks. Concepts are often explored together to make mathematical discoveries which make relationships explicit and strengthen children's understanding of connections in mathematics. Collaboration with peers is key within this. Relationships support emotional security and enable mathematical risk taking and resilience. Factual knowledge is developed through conceptual understanding and is rooted within concrete experiences.

#### Lesson Part 1

#### **Discover (5 minutes)**

The teacher opens with a problem for children to discuss/investigate in mixed ability learning partners. The problem is displayed clearly on IWB or as a printout and is designed to be accessible to all of the children in the class – but open enough to stretch and extend. Concrete resources are used during this stage (with some recording often on whiteboards) for the children to investigate and demonstrate the problem. During this time, teachers & LSAs observe and assess children's approach to the problem – looking to spot a variety of strategies, and misconceptions, and to ask quality questions to scaffold and fold the task back for some, and to extend, taking some learners deeper – still adhering to the LQ.

#### Share (Episodic teaching): (15 minutes)

This is followed by episodic teaching – a 'ping pong' style of teaching & learning – focusing on how children have approached the problem and identifying possible misconceptions. The use of Apple TV is recommended at this point to enable learners to share their methods efficiently via the IWB. This stage enables transition into pictorial representations and progresses to include greater variation and representation of the question. This task is designed to outline a variety of methods and children are given time to explore and discuss these relating back to the earlier approaches shared by the class. Teachers and LSAs reflect back to their initial observations and interactions during the 'Discover' task to develop and structure this part to ensure pace and engagement.

#### Think Together: (5 – 10 minutes)

Children use whiteboards (or journals) to apply their learning to solve similar problems/questions linked to the approaches outlined in the 'Share' stage. This part of the lesson provides an informal assessment opportunity which will highlight the children who have grasped the concept and also those who may need further support. The aspect follows the structure, 'I do, we do, you do' to encourage modelling whilst





facilitating independence. Teachers/LSAs circulate at this stage to oversee any misconceptions and support by referring to earlier parts of the lesson where necessary.

Teachers will encourage greater depth wherever possible during these tasks - what else can you show me? How many methods can you prove your answer using? What else is important – vocabulary etc.?

#### Lesson Part 2

#### Intelligent Practice: Independent & Support Groups (30 minutes)

Part 2 of the lesson opens with a review of the 'Think Together' task – 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 the relevant workbook activity independently. Children making repeated errors or were identified in part 1 as needing support can be grouped together at this point to work with the teacher or LSA for further support. The expectation during intelligent practice is that children work independently to apply their understanding. Children *can* still use concrete resources if needed and liaise with learning partners, but the majority of the class should be now be accessing the task through pictorial or abstract methods. Go deeper tasks are planned for in advance for those who need greater challenge. Go deeper tasks do not need to be additional tasks – they could just be a simple variation of the workbook tasks and completed either in journals or on the space available on the workbook page.

#### **Intelligent Practice**

In EYFS, assessment for mastery includes continual observation and action which is shared regularly through dialogue with practitioners, parents, and children. The focus within curriculum design should be upon exploring key content in considerable depth particularly at the earliest stages. Practitioners use EExAT as an assessment tool, linking observations, photographs, video, and examples of recorded work as evidence of learning and progress in line with the Early Learning Goals.

In KS1 and KS2, children use workbooks and journals. The workbooks feature high-quality variation in questions and problems to ensure children are applying their conceptual understanding to extend their skill set. However, it is imperative that teachers supplement intelligent practice with more problem-based tasks where necessary to develop reasoning skills.

#### Journaling

The purpose of journaling is to give children the freedom to solve mathematical problems in their preferred style – enabling teachers to gain an insight into the way process and approach problems and identify any misconceptions that they need further support with. Teachers should not specify how the children demonstrate their learning within their journals, but take time to model the process and demonstrate high-quality examples (WAGOLLs) to ensure children know how best to get started – journals may be kept by teachers from the previous year to use as WAGOLL examples.

Journals will include a range of practical, diagrammatic, and written work often reflecting the CPA approaches used within the lesson. Representations are used to explore and develop understanding of





concepts, informally support a mental calculation, assist visualisation of a problem, explain the method used to solve a problem, develop an understanding of correct symbols, notation, and layout to help carry out standard written calculations.

#### Journaling styles:

- **Descriptive:** Writing/drawing of a process- showing how a process is done.
- **Evaluative:** Making choices I chose method because... The most efficient strategy for this problem is ... because...
- o Investigative: Looking for patterns and relationships, making conjectures, I noticed...
- Creative: Making up their own problem, showing a new strategy of their own.

We follow the prompts 'Show it! Draw it! Write it! Check it! Explain it!' to help guide children when journaling their thinking and approach. These prompts are used in KS1 and KS2 and are referred to regularly by teachers.

#### 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 – unit resource lists can be accessed by teachers on Power Maths. In addition, classes must have a mathematics working wall which includes relevant mathematical information to support and extend learning for the unit being covered at the time.

Children should have access to practical equipment such as: whiteboards and concrete apparatus and feel able to select and utilise these when needed to scaffold and extend their own learning. Some resources are stored centrally for use across the school - measurement equipment etc. Should teachers require additional resources, they should liaise with the Mathematics Subject Leader.

#### Fact Fluency

Quick recall of number facts, including times tables, enables children to grasp new mathematical concepts more easily, be more accurate in their calculations and become more proficient when solving problems. Children need to be fluent and confident with number to be successful with the units outlined within the curriculum.

Fact fluency strategies and developing 'number sense' is encouraged and embedded within the Power Maths scheme. However, as a school we recognise the need to supplement this with additional teaching and practise opportunities to promote and consolidate these skills. EYFS make good use Numberblocks (early number skills), KS1 and KS2 are make regular use of Numbots and Times Table Rockstars (developing number sense) which teachers use to track progress. We are also in the process of trialing Maths Fact Lab (a fact fluency online resource) and also Dynamo Maths (an online resource built for SEN learners) to help build number sense.

### Metacognition & Tagging

In KS1 and KS2, children are encouraged to actively reflect on their learning through a variety of ways and approaches during each lesson. These reflections help to identify the children's perceived confidence levels





within a unit. 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 help.
- Yellow/Orange This is still tricky. I need more practise and some support.
- Green I can do it. I am confident.
- Blue I'm confident and am working at greater depth.

Teachers model what tagging should look like and mean – especially within KS1, to ensure children know that confidence and accuracy are both important when attributing a tagging colour.

#### 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 past School Improvement Plans, 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 watch the teaching overview videos on ActiveLearn prior to delivering units of mathematics to ensure they have the necessary skills to deliver the unit. The videos aim to enhance teacher knowledge and understanding and subsequently improving their ability to teach more complex units.

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

#### Vocabulary

Teachers and LSAs actively model and encourage the correct mathematical vocabulary and terminology use from EYFS to UKS2. A progression of key vocabulary terms are outlined in our Calculation Policy and are highlighted in each mathematical unit. Relevant vocabulary should be modelled on the working wall where relevant, and children encouraged to use this fluidly during mathematical discussion.

### Assessment

#### Formative

Formative assessment is a central to the interactive and episodic nature of our lessons. Teachers are constantly monitoring children's responses during each part of the lesson and actively review independent learning that follows - taking into account the children's own tagging and journaling. Through this formative assessment, teachers are able to recognise children who require more support and those who need extending and can adapt planning respectively to meet the needs of their learners.





#### Summative

Summative assessments are used as diagnostic assessments of children's ability across various mathematical units. Teachers in KS1 and KS2 will complete the end of unit assessments to support progress judgements. Assessments should be marked by the children and re-visited following to debrief difficult questions and use the assessment as a learning opportunity. Outcomes are recorded on a data tracking spreadsheet saved centrally which is monitored by the Mathematics Subject Leader. End of unit assessments are added to the pupil record folders which are passed on to the following year group. New teachers are also able to track progress across the units by reviewing the spreadsheets to gain a greater understanding of learning baselines. All children in KS1 and KS2 complete a mathematics PUMA assessment in Autumn and Summer which produces a standardised score to support with teacher assessment levels.

Year 6 children will also complete mock End of KS2 assessments in Arithmetic and Reasoning in preparation for End of KS2 island-wide assessments. The data of these assessments will be used by teachers to help to inform end-of-year judgements in addition to everyday mathematics learning.

#### Marking & Feedback

Marking and feedback follows the expectations outlined within the TL&A handbook. Feedback in mathematics can be given in a variety of ways – teachers decide which method of feedback would have the best impact on learning and progress for the individual children in their class.

Feedback includes:

- o Whole class feedback forms verbal feedback
- Teacher feedback (green pen) to scaffold or extend.
- o Self & peer assessment (blue pen)

Workbook pages are often self, or peer-marked following each lesson to ensure children receive instant feedback about their learning and allow them to identify their own next steps. Teachers will use workbooks and lesson observations to complete their whole class feedback. Overall, teacher feedback should be given only when it will have a direct impact on learning. Teachers must, however plan time for children to review and edit their work following any marking and feedback – making corrections in blue.

Teachers are encouraged to assess and give as much verbal feedback within the lesson and reduce their 'flick and tick' marking unless it leads to progress. Written comments for early readers are not recommended – spots to highlight incorrect answers, pictorial scaffolding and number corrections have a much greater impact on learning progress. Catch up groups based on tagging colours/teacher assessment are a much more effective way of improving learning progress than bulk written feedback.

### **Book Consistencies**

**EYFS** 

• Reception are currently trialling the implementation of a class journal to record their learning following their whole-class focused mathematics sessions. The journal is informally placed in the classroom following a class session and is added to by children who choose to record in it.





#### Year 1

- Children use a whole class journal in the autumn term and progress to their own journals in the spring term.
- Whole class journals are made available following the class session and are encouraged during continuous provision activities.
- In spring, children are expected to reflect in their journals after each class session enabling class teachers to assess learning and plan the next steps to ensure learning progression.

### KS1 & KS2

- Children work through workbooks (A, B & C) specifically linked to the individual lessons.
- Children work within a mathematics journal (either fully squared or alternate squared/blank).
- o Journals feature a specific front cover and names are added by class teachers.
- Plastic jackets are used on journals to ensure books remain neat throughout the year.
- Mathematics non-negotiables (created with children at the start of the year) are stuck on the inside front cover of journals and are signed by the children age appropriate.
- All learning is to be dated using the short date e.g. 05.09.2023.
- Learning questions are written and underlined in journals. Workbooks do not feature a LQ as they are already titled.
- Children should be encouraged to be aware of the visual impact of their learning, using margins where appropriate, adequate spacing on blank pages, and 1 square per digit in journals.
- o 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 (if being stuck in books) must be trimmed to size in advance of lesson and children are expected to stick these neatly in books not folded.

## End of year transitions

- A complete set of mathematics books for 3x children (secure, developing and emerging) will be handed up to the next year group, so teachers can understand baselines. These books can be sent home once new teachers feel they have served their purpose.
- Unfinished journals will be handed up to the next year group to review/continue. New covers and labels must be added. A title page must be inserted to show where a new year begins.
- SEN children's workbooks (not year group related) should be passed on to next year groups many units can be revisited and continued the following year.
- Finished journals and workbooks (other than the 3 to be kept) can be sent home at the end of the year.

## Pupil Voice

Throughout mathematics 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 to extend and challenge 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.

A strong emphasis is placed on learning 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 'Discover' tasks form a basis for each lesson and are the key to the development of problem-solving skills and creativity. When presented with 'Discover' 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 the next stage of the lesson during their episodic teaching.

The Mathematics Subject Leader will ensure that pupil voice is valued when completing subject audits. This will happen as part of subject reviews and will include children across the school and across a range of subgroups.

## Role of Technology in Mathematics

Technology should be used effectively to support teaching and to provide opportunities to consolidate learning and solve problems. Apple TV should be used to share children's learning – highlighting interesting methods and misconceptions during anchor tasks and journaling tasks. This is an effective and immediate tool to showcase learning and WAGOLLs across the class community.

Calculators can be used for additional support for SEN 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 calculations or finding products in multiplication.

## Homework

Homework should focus on fact fluency skills, or a consolidation of units covered in class. Tasks should be enriching 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 and share their learning with their parents or carers.

Mathematics homework may not always be in the form of written activities alternatives can include TTRS, Numbots, Complete Tutor, Maths Fact Lab. Teachers will need to make provision for children who do not have internet access at home to complete any given tasks within school, should technology be needed.

## Monitoring and Evaluation

The Senior Leadership Team and Mathematics Subject Leader continuously monitor and evaluate the effectiveness of mathematics teaching and learning throughout the year. Monitoring includes lesson observations, learning walks, learning environment checks, staff surveys, pupil voice groups, book and planning scrutiny – feedback is shared with teachers with clear targets set for improvement.





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 SENCO hold termly meetings with class teachers to discuss pupil progress and individual needs.

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

## **Reporting to Parents/Carers**

Parents receive short written reports during parent consultations in the autumn and spring term, which includes information on their child's learning across all 3 areas of the mathematics curriculum. It also includes a statement about how their child is performing in line with age-related expectations.

Teachers must ensure that they clearly communicate any concerns that they have about a child's learning with their parents/carers at the earliest opportunity to ensure and encourage greater progress.

### Mathematics 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 Mathematics at Grouville.

Policy last updated: February 2023 Debbie Buesnel

