



OVERCHURCH INFANT SCHOOL

Policy for the teaching of Mathematics at Overchurch Infant School

This should be read in conjunction with the OIS Calculation Policy.

Approved by FGB:	
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Signed:	Headteacher
Signed:	Chair of Governors

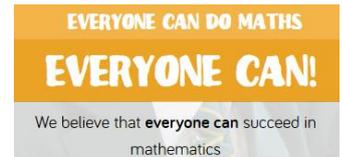
Rationale

Mathematics is a creative and highly inter-connected 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. (National Curriculum 2014)

Indeed, Mathematics is a whole network of concepts and relationships which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real-life problems.

Mathematics is therefore a tool **for everyday life** that can and should be available **for everyone**.

At Overchurch Infant school, we follow the aims and planning of White Rose Maths and the belief that



The White Rose Maths team is working hard to transform the teaching of maths and make change happen in our schools. Our aim is to develop a whole new culture of deep understanding, confidence and competence in maths – a culture that produces strong, secure learning and real progress.

Inspired and informed by robust, world-class research and global maths experts, we work with teachers and colleagues throughout the UK and internationally.

By building confidence, resilience and a passion for maths, we can show that whatever your prior experience or preconceptions, maths is an exciting adventure that everyone can enjoy, value and master!

With this in mind, at Overchurch Infant School we believe that Mathematical understanding is something that everyone can and should be enabled to 'master'. As such, we are currently taking part in a Cheshire and Wirral Maths Hub project entitled the 'Mastery Readiness Programme'. This is the first step in a three year programme which moves into a second year (Developing Teaching for Mastery) and then a third year (embedding mastery). The programme is for schools who have a commitment to developing a teaching for mastery approach long term, and although the participation involves two teachers attending events outside of the school, it is expected that these two teachers will lead development across the whole school. In line with our policy it is expected that all members of staff will develop a classroom which encapsulates the following norms-

Mathematical Classroom Norms.

1. Everyone can learn mathematics to the highest levels.
2. It's not that you 'can't do it', it's that you 'can't do it **yet**'.
3. Mistakes are valuable.
4. Questions are important.
5. Mathematics is about creativity and problem solving.
6. Mathematics is about making connections and communicating what we think.
7. Depth is much more important than speed.
8. Maths lessons are about learning, not performing.

Aims of Mathematics at OIS

When planning our Mathematical teaching at Overchurch Infant School, we use the National Curriculum Programme of Study along with the White Rose Schemes of work from Reception to Y2.

The national curriculum for mathematics aims to ensure that all pupils:

- *become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.*
- *reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language*
- *can solve problems by applying their mathematics to a variety of routine and nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.*

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

National curriculum in England: mathematics programmes of study July 2014 (DFE)

The National Curriculum sets out year-by-year programmes of study. This ensures continuity and progression in the teaching of mathematics. The EYFS Statutory Framework sets standards for the learning, development and care of children from 0-5 years old and supports an integrated approach to early learning. This is supported by the 'Development matters' non statutory guidance (p30-36).

The EYFS Framework (DFE March 2017) aims to provide children with mathematical opportunities to:

- develop and improve their skills in counting with numbers 1-20
- understand and use numbers, placing them in order and saying what is 1 more or less
- use quantities and objects to add and subtract two single-digit numbers and count on or back to solve problems including doubling, halving and sharing.
- use everyday language to describe shapes, spaces, and measures - to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

The purpose of Mathematics at OIS is to develop:

- A positive attitude towards mathematics and an awareness of the relevance of mathematics in the real world;
- A belief that mathematics is something that everyone can do;
- Competence and confidence in mathematical knowledge, concepts and skills;
- An ability to solve problems, to reason, to think logically and to work systematically and accurately;
- Initiative and an ability to work both independently and in cooperation with others;

- Confident communication of mathematical thoughts and ideas, where pupils ask and answer questions, openly share work and learn from mistakes
- An ability to use and apply mathematics across the curriculum and in real life;
- An understanding of mathematics through a process of enquiry and experiment.

EYFS

We follow the EYFS curriculum guidance for Mathematics along with the White Rose Maths Reception Guidance. We are committed to ensuring the confident development of number sense and put emphasis on mastery of key early concepts. Pupils explore the 'story' of numbers to twenty and the development of models and images for numbers as a solid foundation for further progress. Teachers use the 'Singapore Maths' concrete – pictorial – abstract approach to conceptual development. We aim to provide a stimulating and exciting learning environment that takes account of different learning styles and uses appropriate resources to maximise teaching and learning. Mathematics is developed through purposeful, play based experiences and will be represented throughout the indoor and outdoor provision. The learning will build upon the pupil's interests and current themes and will focus on the expectations from Development Matters / Early Years Outcomes. Mathematical understanding will be developed through stories, songs, games, imaginative play, child-initiated learning and structured teaching. Through our creative approach to teaching and learning we also seek to explore and utilise further opportunities to use and apply mathematics across all subject areas. As pupils progress, they will be encouraged to record their mathematical thinking in a more formal way.

Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure pupils develop confidence and mental fluency. The essential idea behind the mastery approach is that all children have a deep understanding so that future learning continues to build on solid foundations. If the subject is represented using concrete materials, pictorial representations and abstract symbols, it will allow children to visualise maths in varied ways, see connections and to independently explore and investigate a topic. Practical activities and resources offer the children a deeper mathematical understanding of more complex concepts. Providing children with visual representations also offers a scaffold when developing a more robust understanding of maths. Throughout Key Stage 1, it is important that children gain a secure knowledge of number and place value and become confident when using the four operations in both formal methods as well as problem solving where often the approach is not immediately evident. Alongside number work, pupils begin to identify fractions using shapes, objects and quantities and make connections to equal sharing and grouping. Pupils are taught to count to ten in fractions, recognise equivalent fractions and develop their understanding of fractions on a number line. At this stage, pupils will also develop their ability to recognise, describe, draw, compare and sort different shapes. Pupils have the opportunity to use a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money and are expected to use related vocabulary for all topics. Other subjects may have strong links to some maths topics allowing cross-curricular teaching. For example, shape through art or computing, measures through science or coordinates in geography. This is to ensure we continually maximise learning opportunities for all pupils across an entire curriculum.

Embedding a mastery approach

As part of our belief that **#OISMathseveryonecan** we focus on the meaning of 'mastery'. Teaching for mastery is based upon 4 main principles and the belief that coherent learning is based upon small connected steps. This is the basis of the White Rose units of work that we use to plan our mathematics.

COHERENCE

Teachers should develop detailed knowledge of the curriculum in order to break the mathematics down into small steps to develop mastery and address all aspects in a logical progression. This will ensure deep and sustainable learning for all pupils.

FLUENCY INVOLVES:

- Quick recall of facts and procedures
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics

REPRESENTATION & STRUCTURE

Mathematical structures are the key patterns and generalisations that underpin sets of numbers – they are the laws and relationships that we want children to spot. Using different representations can help children to 'see' these laws and relationships.

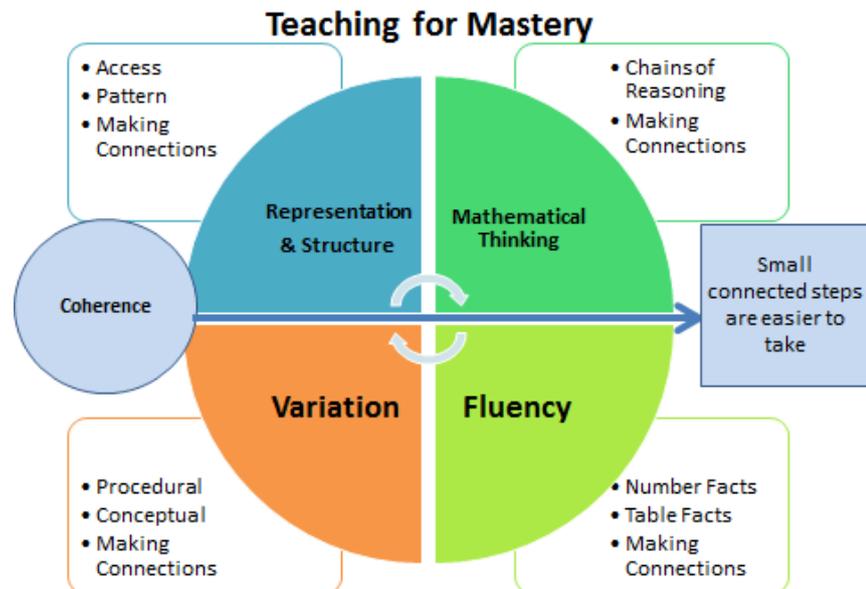
VARIATION

Procedural variation – This is a deliberate change in the type of examples used and questions set, to draw attention to certain features.

Conceptual variation – When a concept is presented in different ways, to show what a concept is, in all of its different forms.

MATHEMATICAL THINKING INVOLVES:

- Looking for pattern and relationships
- Logical Reasoning
- Making Connections



Planning and organisation of Mathematics at OIS.

- **Long term planning** - the National Curriculum for Mathematics 2014, Development Matters and the Early Learning Goals (Number, Shape Space & Measure) provide the long term planning for mathematics taught in the school. A long term structure for each Year Group has been created for all four year groups.
- **Medium term planning** - Years R-2 use the White Rose Maths Hub schemes of learning as their medium term planning documents. These schemes provide teachers with exemplification for maths objectives and are broken down into small steps and fluency, reasoning and problem solving, key aims of the National Curriculum. They support a mastery approach to teaching and learning and have number at their heart. They ensure teachers stay in the required key stage and support the ideal of depth before breadth. They support pupils working together as a whole group and provide plenty of time to build reasoning and problem solving elements into the curriculum.
- **Short term planning** - The WR schemes of learning support weekly lesson planning. Lessons are planned using common FS and KS1 planning formats and are shared weekly with the mathematics subject leader. EYFS planning is based on the medium term plans and delivered as appropriate to individual children with thought to where the children are now and what steps they need to take

next. All classes have a daily mathematics lesson. In key stage one lessons are 45-60 minutes and in EYFS consist of whole class inputs followed by activities during continuous provision. Teachers of the FS ensure the children learn through a mixture of adult led activities and child initiated activities both inside and outside of the classroom. Mathematics is taught through an integrated approach. Weekly planning will be shared with support staff each Monday morning at the latest.

The emphasis in lessons is to make teaching interactive and lively, to engage all children and encourage them to talk about mathematics. Lessons involve elements of:

- Instruction – giving information and structuring it well;
- Demonstrating – showing, describing and modelling mathematics using appropriate resources and visual displays;
- Explaining and illustrating – giving accurate and well paced explanations;
- Questioning and discussing;
- Consolidating;
- Reflecting and evaluating responses – identifying mistakes and using them as positive teaching points;
- Summarising – reviewing mathematics that has been taught enabling children to focus on next steps.

Daily maths in KS1

This involves all classes following the White Rose scheme of work which is a transformational, primary maths programme. Questions are carefully crafted to develop children's fluency, reasoning, and problem solving skills and conceptual understanding for mastery. It focuses on core topics to build deep understanding. The Maths Hub Project has led to the development of the following lesson structure at OIS.

- Mental warm up- this may involve fluency counting, tables, songs etc (5 minutes)
- Hook- children to discuss a problem that is displayed on the large screen. This problem needs to be accessible and can be solved without new learning. This may then involve a child explaining how they want to work on the problem Teacher to make notes as appropriate on large maths flipchart paper. This will enable peers so that others can use this to help them if they are struggling to get started – Question prompts can be given to move their learning forward. (5 - 10 minutes)
- Reflect / Record- Children to sit at tables to journal their responses to mini versions of the problem. This may then involve using a visualiser or iPad screen mirroring to show children's methods as they journal. This will enable peers to use these ideas to help them if they are struggling to get started. Allow children to feed back on the methods that they used to solve the problem. This will include concrete, pictorial and abstract methods. From the 'hook' task, you will be able to identify children who have used different methods successfully and can be asked to explain their working. You may guide the children in their recording to expand their journaling and show different ways of responding to the problem. E.G. Show me the method with base 10 (drawing) and Part, Part, Whole. (Allow 10 - 15 minutes to journal - encourage written explanations).
- Teacher Input- during the input, teachers explain the new concept and may allow children to 'have a go' on wipeboards. As teachers guide children through their learning this may involve the use of Powerpoints, songs, film clips and flipchart demonstrations. Teachers should refer back to prior learning on flipcharts on the Maths Learning wall. Sometimes the activity given is appropriate for them to work with a partner. (10 minutes)
- Independent working- teacher input should enable the children to work independently or in pairs. Different methods may have been explored. They should still have access to concrete and pictorial to help. If you are moving children onto a new concept that they are finding difficult,

then allow them to work out the answers to questions with a method they already know then give them the same questions but to use the new method. This allows the children to concentrate on the structure rather than the calculating and avoids cognitive overload. The children will then self-assess their work by filling in the header, to show what strategies they have used, how they worked and how they feel about the task. During the start of the independent work, teachers (and TAs) will mark some each piece of work to check understanding. Adult intervention can then be given to groups or individuals who require support during the session. (15-20 minutes).

Although this is a typical maths lesson, we know there are times when there needs to be flexibility within the lesson to meet the needs of groups or individual children, for example, mini plenaries throughout the lesson, additional mental and oral sessions, extended main activities, etc.

PM fluency session - after lunch all KS1 classes have a 10-20 minute fluency based session. This is planned for in Year groups and enables time to re-visit concepts and over-learn (e.g. counting forwards and backwards or in 2s, 5s, 10s, number bonds, doubling, tables etc). This may also involve an additional reasoning and problem solving focus.

Same-Day Intervention (KUCU)

Having marked all work, teachers can then see any children who require additional support to understand the session's teaching. During a KUCU 'Keep Up Catch Up' session in the afternoon, pupils who have not fully achieved the learning objective will work with a TA in a small group to improve and consolidate their understanding.

Resources

The following sources are used to guide and resource our planning.

- The National Curriculum Frameworks for FS <https://www.foundationyears.org.uk/wp-content/uploads/2012/03/Development-Matters-FINAL-PRINT-AMENDED.pdf> and KS1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/335158/PRIMARY_national_curriculum_-_Mathematics_220714.pdf
- The White Rose Maths schemes of learning <https://whiterosemaths.com/resources/schemes-of-learning/primary-sols>
- Mastery resources from the National Centre for Excellence in the Teaching of Mathematics website <https://www.ncetm.org.uk>
- The KS1 Singapore Maths textbooks.
- I see reasoning - KS1 by Gareth Metcalfe
- Numberblocks DVDs and corresponding NCETM resources <https://www.ncetm.org.uk/resources/52060>

In order to support the delivery of maths lessons to all pupils the school has a large range of practical resources available. Within the classroom each table should have a maths toolbox of resources available to children at all times, these include basic resources such as number lines, 100 squares, rulers, counters, tens frames, part whole models, numicon etc. Other specific resources (eg, balance scales, meter rulers, weighing scales, 3D shapes, clocks) are stored in our central resource cupboard next to Class 8 the conference room. There are also a number of applications to support mathematics through the use of iPads, including Numberblocks and ICT games <https://www.ictgames.com/mobilePage/index.html> .

Classroom organisation.

Each classroom in school will be slightly different according to the space and cohort. However, the following aspects should be evident in all rooms, both class and small group.

- a **maths learning wall**, which includes current focus and vocabulary, age appropriate reasoning stems, current squared paper flip chart with additional charts underneath to refer back to. This should be updated *daily* in KS1.
- accessible and well-organised **resources** and toolboxes for each table in KS1 - these should contain a range of age appropriate resources to enable the children to independently access equipment as required e.g. number lines, hundred squares, double sided counters, tens frames, wipeable part whole models and bar models,
- Communication **number formation rhymes** displayed (EYFS and Y1)
- **knowledge organisers** on all tables (KS1)

Inclusion and differentiation

All children at OIS have an equal entitlement to access the Maths curriculum and make progress in order to attain the best that they can in the subject. Teaching maths for mastery offers all pupils access to the full maths curriculum. This inclusive approach, and its emphasis on promoting multiple methods of solving a problem, builds self-confidence and resilience in pupils. Though the whole class goes through the same content at the same pace, there is still plenty of opportunity for differentiation. Taking a mastery approach, differentiation occurs in the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. There is no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with higher attaining children, or those pupils who grasp concepts quickly, challenged through more demanding problems which deepen their knowledge of the same content. Those children who are not sufficiently fluent are provided additional support to consolidate their understanding before moving on. Pupils' difficulties and misconceptions are identified through immediate formative assessment and addressed with intervention – commonly through individual or small group support later the same day: there are very few 'closing the gap' strategies, because there are very few gaps to close. We are moving towards a mastery approach throughout OIS, with Y2 currently having one class that has additional staffing to support children who have been assessed as having gaps in their current understanding.

In addition to this, pupils with special educational needs and individual education plans will have the following considerations:

- Within the daily mathematics lesson teachers or teaching assistants support children who find mathematics more difficult. Children with SEN are taught within the daily mathematics lesson and are able to take part at their level through the support of a Teaching Assistant and appropriate activities and resources.
- Where applicable children's IEPs incorporate suitable objectives from the Numeracy Framework.
- Intervention Groups will take place at times throughout the year particularly in F2 and Y2, in order to give further support to children working below national expectations.

Pupils' Records of work

Children are taught a variety of methods for recording their work and are encouraged and helped to use the most appropriate and convenient. Children are encouraged to use mental strategies and their own jottings before resorting to more formal written methods. Children's own jottings to support their work is encouraged throughout all year groups. In KS1 children now use journals to record responses to the hook problem. Additional recording in the lesson may be on wipeboards or games or as a more formal recording in squared maths books.

Number formation

Correct formation is one of the statutory handwriting requirements of the English curriculum "form digits 0-9". As such this should be taught and practiced outside of the maths lesson i.e. during

handwriting and morning challenge time. However, incorrect formation and reversals should be highlighted in green in maths books and children should practice correct formation in purple pen where appropriate. In EYFS correct number formation should be insisted upon as soon as numbers are being recorded. A range of handwriting activities should encompass correct number formation in both the indoor and outdoor environments. The following number formation rhymes are used in EYFS and Y1 to encourage correct formation without reversals.

<http://www.communication4all.co.uk/Numeracy/Number%20Formation%20Rhyme%20Cards.pdf>



Marking

Marking of children's work is essential to ensure they make further progress. Work is marked against success criteria, in line with the school marking policy, with a green pen used to indicate something that needs to be improved. Children are encouraged to self-assess their work and given time to and make corrections or improvements in purple pen. Responses to marking are made as close to the work as possible, ideally the same day.

Assessment

Assessment is an integral part of teaching and learning and is a continuous process. Teachers make assessments of children daily through;

- regular marking of work and hook problems
- analysing errors and picking up on misconceptions
- asking questions and listening to answers
- facilitating and listening to discussions
- making observations

These ongoing assessments inform future planning and teaching. Lessons are adapted readily and short term planning evaluated in light of these assessments.

In EYFS staff record observations regularly on Tapestry which are linked to the ELG and Development Matters statements. These are shared with parents. In KS1 White Rose end of unit assessments are used to identify progress and attainment. These are completed mid week, to enable teachers to analyse then re-visit any misconceptions or misunderstandings on Thursday and Friday before moving on to the next unit.

Staff will use the National Curriculum statements to assess half termly using the Insight tracking system and will also provide a teacher judgement for each child (below / just below / on-track / greater depth). Pupil Progress meetings are timetabled for all classes. Progress of pupils is discussed and appropriate intervention considered and put in place where appropriate.

Y2 complete the national tests (SATs) in May. These inform teacher summative judgements in the summer term.

Homework

Homework is currently under review.

Leadership, Monitoring and Review

Leadership in maths focuses on raising attainment and improving the provision in the subject. Through links to other areas of the curriculum the subject engages pupils and staff so that learning develops and improves. The monitoring of maths teaching and pupil progress is the shared responsibility of teachers, subject leader, maths hub advisor and the senior leadership team. The work of the subject leader includes

- supporting colleagues in the teaching and planning of maths;
- leading by example in the ways they teach in their own classroom;
- keeping up to date with current developments;
- providing a strategic lead and direction for the subject;
- preparing, organising and leading INSET;
- Attend INSET provided by LA numeracy consultants;
- monitoring and auditing the Mathematics provision at OIS;
- creating and implementing an action plan to ensure the subject moves forward.

The school's governing body receive regular updates to inform them of the vision for continually driving forward teaching for mastery and the subject leader meets regularly with the designated Maths governor, to monitor and share updates. Areas to be monitored will be explained at the end of each monitoring feedback so that staff are clearly informed. Results of any monitoring will be fed back to staff quickly so that any action required can be carried out effectively.

Class Teachers are responsible for delivering daily Maths sessions / activities to their pupils which are engaging and motivating and follow the requirements in this policy.

Pupils are expected to develop their skills, understanding and attainment in Maths through engagement with the lesson, behaviour conducive to learning, independent work and thought and confidence to challenge or ask for help.

Parents / Carers are expected to support their children's learning in maths by taking an interest in their child's progress and having a good relationship with the class teacher so that queries and problems regarding maths can be dealt with easily. They are invited into school three times yearly to discuss the progress of their child. Parents are provided with half termly information about the

Maths that is being covered in school and receive regular tweets about maths activities in school using the hashtag #OISMathseveryoncan. A maths workshop will be available to parents each year, usually linked in with NSPCC Number Day.