



## The Oval School Maths Policy



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*“Without maths there is nothing you can do. Everything around you is mathematics.  
Everything around you is number.”*

Shakuntla Devi



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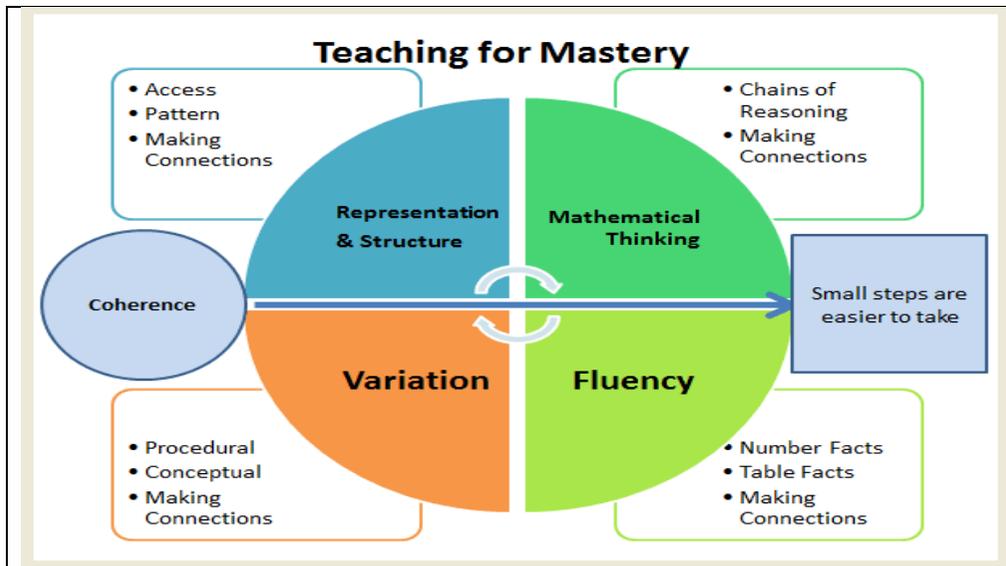
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# The Oval School Maths Policy

**Maths Policy** Mathematics equips pupils with the uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways.

**Maths rationale : Why do we follow White Rose and NCTEM sequences of lessons.** These assist teachers' professional development and enable them to deliver teaching for mastery with confidence. Materials provide subject knowledge, understanding and the order of the steps of the learning for mastery maths. NCTEM and White Rose have designed these materials with this in mind..



White Rose has blocked curriculum approach to the teaching of mathematics. This ensures that children are able to focus for longer on each specific area of Maths and develop a more secure understanding over time. This approach is also designed to enable children to progress to a greater depth

White Rose and NCTEM ensure the fluency, variation, mathematical thinking and representation and structures in the planning. These ensure consistent coverage and provide real life opportunities for pupils to make connections and apply their mathematical knowledge.

**Coherence** Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

**Representation and Structure** Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

**Mathematical Thinking** If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others.

**Fluency** Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

**Variation**



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of understanding. Subsequent blocks continue to consolidate previous learning so that the children continually practise key skills and are able to recognise how different aspects of Maths are linked. For example, when children have completed a block which has enabled them to master the multiplication of two-digit numbers, a subsequent block on area and shape might provide opportunities to use this understanding when calculating the area of shapes with 2 digit length and width dimensions.

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

### Mathematics Curriculum Intent, Implementation and Impact Overview

The intent of our Mathematics curriculum is to deliver a curriculum which is accessible to all and that will maximise the outcomes for every child so that they know more, remember more and understand more. As a result of this they will:

- Make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- Be able to apply their mathematical knowledge to science and other subjects.
- Realise that mathematics has been developed over centuries, providing the solution to some of history's most intriguing problems.
- Know that it is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment.
- Understand the world, have the ability to reason mathematically.
- Have an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

### Aims of Mathematics at The Oval School

The 2014 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.



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- 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 non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Intent

Implementation

Impact

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<p><b>Intention :</b></p> <p>At The Oval, we intent to build a curriculum which enables children to make connections across Mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.</p> <p>the intent of our Mathematics curriculum is to design a curriculum, which is accessible to all and that will maximise the outcome for every child so that they <b>know more, remember more and understand more.</b></p> <p>We intend for our pupils to be able to apply their Mathematical knowledge to science and other subjects. We want them to know that it is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment.</p> <p>We intent our pupils to use and apply the knowledge skills they have acquired from the Mathematics Curriculum. As our pupils progress, they will be able to understand the world, have the ability to reason mathematically, have an appreciation of the power of mathematics, and a sense of enjoyment and curiosity about the subject.</p>	<p>At the oval, teachers reinforce an expectation that all children are capable of achieving high standards in Mathematics. The large majority of children progress through the curriculum content at the same pace.</p> <p>Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to promote deep conceptual and procedural knowledge.</p> <p>Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts.</p> <p>All children are catered for within the maths lessons ensuring that the teacher offers the necessary support and challenge for each individual to make progress.</p> <p>In early years, children are using manipulatives to have deeper understanding of number and learning to subitise patterns for fluency.</p> <p>In KSI, children solve problems using concrete manipulatives.</p> <p>In KS2 children may also use the manipulatives.</p> <p>Teachers use questions to draw out children's discussions and their reasoning. The class teacher then leads children through strategies for solving the problem, including those already discussed. Independent work provides the means for all children to develop their fluency further, before progressing to more complex related problems.</p> <p>ICT is used widely across each year group to deliver the maths curriculum and to offer our pupils a range of exciting activities to</p>	<p>Children will make at least good progress in Mathematics from their last point of statutory assessment of from their starting point in Nursery.</p> <p>Children will use their Mathematics knowledge and skills, in all curriculum areas, to enable them to know more, remember more and understand more.</p> <p>The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Children can underperform in Mathematics because they think they can't do it or are not naturally good at it. The careful planning addresses these preconceptions by ensuring that all children experience challenge and success in Mathematics by developing</p>
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	<p>challenge and inspire.</p> <p>Each lesson provides the means to achieve greater depth, with more able children being offered rich and sophisticated problems, as well as exploratory, investigative tasks, within the lesson as appropriate. Mathematics is taught as an exclusive subject in order to promote fluency but children are also provided with real life problems so that they are made aware of the importance of mathematics in everyday life.</p>	<p>a growth mind set. Children will use their Mathematics knowledge and skills, in all curriculum areas, to enable them to know more, remember more and understand more.</p> <p>Children will recognise the importance of Mathematics as a facilitating subject to enable them to access other areas of learning and operate successfully in everyday life both now and in the future.</p> <p>Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child.</p> <p>These factors ensure that we are able to maintain high standards, with achievement at the end of KS2 above the national average and a high proportion of children demonstrating greater depth, at the end of each phase.</p>
	<p><a href="#"><u>Teaching Sequence in Mathematics (Implementation)</u></a></p>	



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In KS1 and KS2 maths is taught daily during the morning. When starting a new concept, a typical lesson starts with prior learning questions from previous year that are relevant and progresses to what they are learning. All maths lessons starts with what the children know, understand, are able to do and able to say.

It focuses on specify **key vocabulary** to be used and its meaning and how it links to real life.

Lesson has clear learning objective and learning outcome and children knowing which skills to be used. Children have opportunities to use manipulatives to understand the concepts and to solve problems. Children may also use manipulatives in KS2.

Teachers use fluency questions to draw out children's discussions and their reasoning and the children learn from misconceptions through whole class reasoning. This helps to promote discussion and ensures that mathematical ideas are introduced in a logical way to support conceptual understanding. Following this, the children are presented with varied similar problems which they might discuss with a partner or within a small group.

At this point, scaffolding is carefully reduced to prepare children for independent practice. Children might use white boards or their books to record their working out. Teachers also use this opportunity to assess and address any misconceptions. The class then progress to the questions which are designed to be completed independently. This practice uses conceptual and procedural variation to build fluency and develop greater understanding of underlying mathematical concepts.

A challenge question and links to other areas of Maths encourages children to take their understanding to a greater level of depth. Children who complete this are provided with further 'rich and sophisticated' problem.

During the week **problem solving** sessions enable varied and frequent

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practice of mathematical application through increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

Lesson includes direct teacher instruction; modelling of skills and techniques; demonstration. There are opportunities for children to work independently and in groups. It provides opportunities for children to critically review their own work and that of others. Children reflect on the learning and mathematical skill development that has taken place. They write their conclusion.

### **EYFS**

Foundation Stage The programme of study for the Foundation stage is set out in the EYFS Framework 2012. Mathematics involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shape, spaces and measures.

Eyfs Mathematics is an important part of learning for all children in the early years and receiving a good grounding in maths is an essential life skill. As well as numeracy, it helps skills such as problem solving, understanding and using shapes and measure and developing their own spatial awareness. It helps them to recognise, create and describe patterns, which is essential for early problem solving skills.

At The Oval School our Maths learning takes place everywhere! We offer the children a balance of Adult directed and Child initiated learning opportunities across the day. The children have the opportunity to consolidate maths skills, previously taught during adult led sessions, in a range of activities and experiences.

Staff ensure the setting's environment (both indoors and out) is full of mathematical opportunities and has exciting things for children to explore, sort, compare, count, calculate and describe. Our aim is to support them



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to be creative, critical thinkers, problem solvers and to have a go.

### Nursery

Mathematics is accessed through areas of provision with planned focused weeks.

Children have mathematics focus session with concrete resources in their family groups.

During the day pupils work with their class teacher and they also have opportunities to apply their skills independently indoors and outdoors. Teacher plan opportunities to revisit their previous week' learning. One piece of independent evidence is collected by the teacher over three weeks and there will be evidence of direct teacher focus activity in books.

Reception: one piece of independent evidence for each child will be collected by the class teacher over the two weeks. (evidence of applying the previously taught mathematical skills).

In mathematic books there will be one piece of evidence of direct teaching focus.

In Reception, mathematics is taught over 2 days. Mathematics focus is set up like a carousel where the same lesson is taught over the two days.

During these sessions, children have opportunity to be:

In the provision Area - Applying Mathematics outside -Working with the class teacher - Completing an independent task - Solving independent challenges

### Arithmetic:

Fluency in the fundamentals of Mathematics. At The Oval we define this as recall of number bonds and times tables, knowledge of the 4 operations - addition, subtraction, multiplication and division, and reliable methods of performing these that are appropriate to the age of the child. The school's Calculation Policy shows these methods in more detail. We see these skills as a key tool for learning. There is an expectation that these skills will be actively taught and practiced in school frequently,

### Arithmetic:

Intent for teaching these skills is to build a mathematics curriculum which develops learning and results in the acquisition of knowledge and skills so that all pupils know more, remember more and understand more.

### Arithmetic: Impact

Children will have a confident attitude towards mathematics. They will use arithmetic and timetables fluently and make connections in order to solve real life problems.

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in conjunction with other mathematical concepts taught. It is also common to ask children to practice these skills for homework.

At The Oval arithmetic skills are taught during the week in a one arithmetic focus lesson and children are assessed every week. Every week, children from Years 1 to 6 complete a weekly arithmetic test so that staff is able to measure their ability to perform basic **arithmetic** operations and to solve problems that involve fundamental **arithmetic** concepts. The aim is to get children used to completing weekly tests under timed conditions so that they develop quick mathematical skills to help them solve more complex problems.

See the detail non negotiable for mental maths.

Times tables, the systematic teaching of timetables ensures that children develop rapid recall which they can use as a tool to effectively and efficiently solve more complex problems.

All children from Year 2 upwards have access to Timetables Rockstars, which is a web-based ability appropriate timetables programme, which children access at home, and school.

EYFS:

Nursery:

Children have daily five minute session on subitising numicon and di patterns. They focus on number of the day to help them in number recognition. They are assessed every half term.

Reception:

Whole class focus: Children have daily subitising session focusing on number bonds to 5, 6,7,8,9 and 10. On Fridays children have test on number bonds. And scores are recorded to improve fluency.



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## School Curriculum - Programme of Study

### EYFS

Maths is one of the four specific areas within the [Early Years Foundation Stage](#) (EYFS). Each specific area is divided into Early Learning Goals, for maths these are:

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

### [KSI](#) and [KS2](#)

The Programmes of study for mathematics are set out year by year for Key Stages 1 and 2 in the new National Curriculum (2014). The programmes of study are organised in a distinct sequence and structured into separate domains. Pupils should make connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study

[KSI](#) The principal focus of mathematics teaching in Key Stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources (e.g. concrete objects and measuring tools). At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of Year 2, pupils should know the number bonds to 20 and relate to 100 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at Key Stage 1.

### [Lower Key Stage 2](#)



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The principal focus of mathematics teaching in lower Key Stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of Year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

### Upper Key Stage 2

The principal focus of mathematics teaching in upper Key Stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of Year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

### Assessment:

#### Assessment for Learning:

Children receive effective feedback through teacher assessment, both orally and through written feedback, and AfL is integral to the design of each lesson;

The structure of the teaching sequence, ensures that children know how to be successful in their independent work. Guided practice, which takes place within the

Maths lesson, provides further preparation for children to be able to apply the skills, knowledge and strategies taught during the 'Fluency' phase. Common misconceptions are addressed within the teaching sequence and key understanding within each 'small step' is reviewed and checked by the teacher and the children before progression to further depth.



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At the end of the lesson, the children review their work and self-assessment is used consistently as outline by the school 'Marking and Feedback Policy'. The children then indicate how confident they feel about their learning using a scale provided on a sticker alongside the learning objective and outcome for that lesson.

The confidence scale (traffic light dots on the LO stickers) is reviewed by the teacher during review of the children's work to inform where consolidation might be required. Opportunities for additional practice and correction are provided by the teacher, as appropriate, during marking.

### Formative Assessment:

Short term assessment is a feature of each lesson. Observations and careful questioning enable teachers to adjust lessons and brief other adults in the class if necessary. The lesson structure is designed to support this process and the reflect task at the end of each lesson also allows for misconceptions to be addressed.

At the **beginning and end of each** blocked unit of work, the children also complete the carefully aligned White Rose Maths 'End of Unit Assessment'. The outcome of this is used by the teacher to ensure that planning is adapted, any gaps in understanding can be addressed before the next unit is taught or as a starter question.

### Summative Assessment:

Teachers administer a termly arithmetic paper and reasoning and problem-solving paper which specifically links to the coverage for that term. The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers at Parents Evening. They are also used alongside the end of unit assessments and outcomes of work, to inform the whole school tracking of attainment and progress for each child in line with each objective.

Assessment data in maths is reviewed throughout the year to inform interventions and to also ensure that provision remains well-informed to enable optimum progress and achievement. End of year data is used to measure the extent to which attainment gaps for individuals and identified groups of learners are being closed. This data is used to inform whole school and subject development priorities for the next school year.

## Planning and Resources



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The use of Mathematics resources is integral to the **concrete - pictorial - abstract** approach and thus planned into teaching and learning. The school has a wide variety of good quality equipment and resources, both tangible and ICT based, to support our learning and teaching. These resources are used by our teachers and children in a number of ways including:

- Demonstrating or modelling an idea, an operation or method of calculation.

**Maths tool box resources** for this purpose would include : a number line; place value cards; dienes; place value counters and grids; money or coins; 5 bead strings; Numicon and related resources and software; multilink cubes; clocks; protractors; calculators; dice; number and fractions' fans;

Other resources also include measuring equipment for capacity, mass and length; the interactive whiteboards and related software; 3D shapes and/or nets; Numicon related software; individual whiteboards and pens; 2D shapes and pattern blocks, amongst other things

- Enabling children to use a calculation strategy or method that they couldn't do without help, by using any of the above or other resources as required.

Children use resources available to them in maths tool box and in the classroom which they feel would be beneficial to help them when completing Mathematics work.

### Displays:

Each classroom have a maths display relating to current work. The maths display is updated regularly to reflect the pace of learning. Displays include: children's work, teacher modelling, visual prompts and questions to develop reasoning skills under the headings of fluency, reasoning and problem solving and key vocabulary.

### Inclusion

Taking a mastery approach, differentiation occurs in the support and intervention provided to different children, not in the topics taught, particularly at earlier stages.

The National Curriculum states: 'Children 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.' There is little differentiation in the content taught but the questioning and scaffolding individual children receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems, which deepen their knowledge of the same content before acceleration onto new content. Children's difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention - commonly through individual or small group support later the same day. A range of inclusion strategies are embedded in practice and teachers are aware of the special educational needs of the children in their Maths class, as well as those who have English as an additional language.



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Although the expectation is that the majority of children will move through the programmes of study at broadly the same pace, the 2014 National Curriculum states: 'Decisions about when to progress should always be based on the security of children's understanding and their readiness to progress to the next stage.' If a child's needs are best met by following an alternative plan, including coverage of the content from a previous year, this will be overseen by the SENDCo, in collaboration with the class teacher and with the knowledge of SMT. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during SEND reviews.

### Links to Spiritual, Moral, Social and Cultural Development

At The Oval School, children's **spiritual** development is enhanced through Mathematics by:

- Understanding how Mathematics relates to the world around them.
- The skills of analysing data enables children to make sense of the vast amounts of data available in the modern world and around them.
- Develop a fascination about how currency can be used in everyday lives.
- Learning life skills such as telling the time, reading measurements and scales are taught in exciting contextual lessons.
- Explore shapes in the world around them and talk creatively using mathematical language.

At The Oval School, children's **moral** development is enhanced through Mathematics by:

- Recognise how logical reasoning can be used to consider the consequences of particular decisions and choices.
- Explore a range of mathematical investigations where they are challenged and made aware that there may be more than one solution.
- Proving or explaining whether an answer is right or wrong. This helps them learn the value of mathematical truth.
- Mathematical reasoning can be developed by group work where the children are encouraged to talk about their learning and listen to others viewpoints.
- Look at moral issues raised from a question and will investigate, often using statistics to find an answer.

At The Oval School, children's **social** development is enhanced through Mathematics by:

- Problem solving skills and teamwork through creative thinking, discussion, explaining and presenting ideas.
- Work together productively on mathematical tasks.
- Experimental and investigation work where children are encouraged to work collaboratively.
- Work collaboratively when completing outdoor learning tasks.



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At The Oval School, children' **cultural** development is enhanced through Mathematics by:

- Begin to get a sense of number systems around the world.
- Recognise that mathematicians from many cultures have contributed to the development of modern day mathematics.
- Counting and explore early counting ideas from other countries such as tallies.
- Explore more developed number systems such as Roman numerals, imperial and metric measurements.

Realise how the counting system has developed through the ages and shaped the decimal system we use today

### **Pedagogical approaches used in Mathematics:**

#### **Effective maths teaching**

**Step 1.** Review recent learning: a warm task to get the brain work quickly.

it could be a task children do independently at their tables that involves a recap of previous learning, a game based on learned skills or develop fluency of skills. (may be 5minutes)



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**Step 2.** Introduce: Introducing the main concept of the lesson.

'The Big Picture'

Main new learning is introduced with spotlight on the concrete and pictorial leading to the abstract.

full sentences pupils learn to express and explain concepts by always talking about maths in full sentences. This improves their understanding and helps them become more articulated.

**Step 3.** Practice: Practise the new learning and talk about maths.

The main focus here is on the children working together and talking in full sentences about maths. children are encouraged to use the key vocabulary of the lesson. as pupil are working teacher /ta walk around and check how they're doing. if anyone is behind they may need some small group attention for the next part of the lesson. (teacher may ask the ta to work with these children.)20 minutes

**Step 4.** Develop Learning:

In this part of the lesson pupils take their learning on a bit further. New resources are introduced and there is problem solving element. Deriving patterns and concluding their findings.

smart questioning is key. the right questions get pupils to explain themselves in different ways and encourage a deeper understanding of concept. pupils are encouraged to ask questions themselves.

Lesson involves direct teacher instruction; modelling of skills and techniques; demonstration.

- Inquiry-based learning through skill development
- Teacher modelling; questioning; mix of individual, paired and group instruction
- Pupil-led learning; opportunities and skill development
- Being introduced to the key vocabulary and mathematical skills relating to mathematics so that all children can perform and compete using the correct skills.