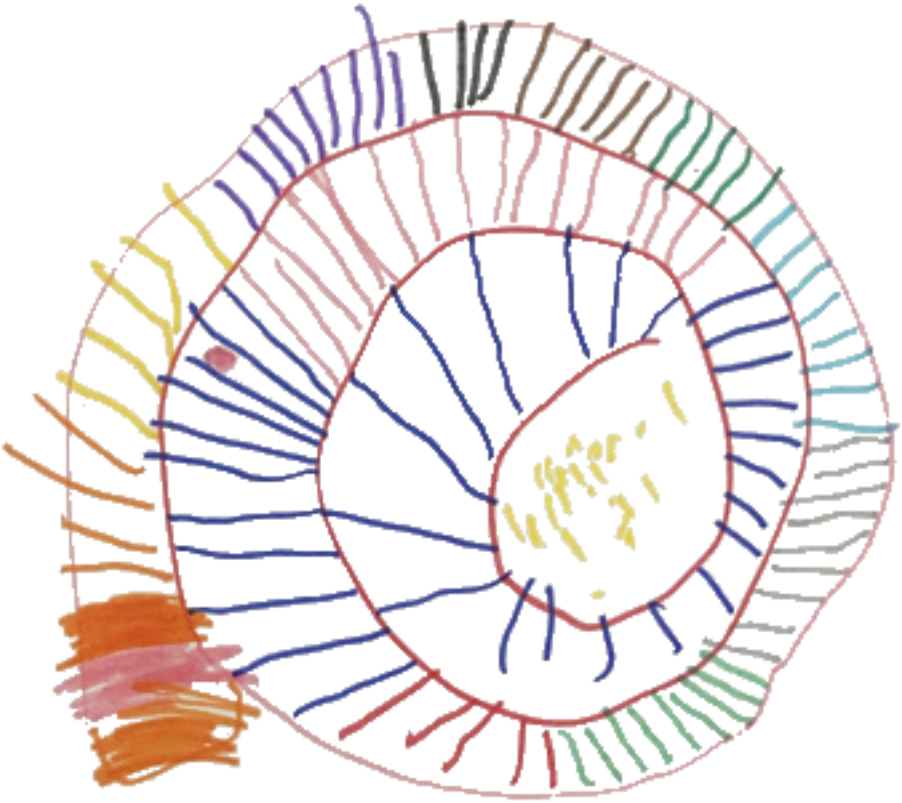
Developing Mathematics at Madeley Nursery School



(Policy statement)

Mathematics is a fundamental aspect of the way in which human beings make sense of the world. It is a way in which we analyse, organise, and interpret our daily experience. Young children grow and develop within this context and have innate desires to create order and pattern. Fundamental mathematical knowledge and processes form an essential part of the shared understanding of the world through maths.

Here at Madeley Nursery School we believe all children are competent with an innate desire to learn.

'We were then, and still are, convinced that it is not an imposition on children or an artificial exercise to work with numbers, quantity, classification, dimensions, forms, measurement, transformation, orientation, conservation, and change, or speed and space, because these explorations belong simultaneously to the everyday experiences of living, playing, negotiating, thinking, and speaking by children.'
Loris Malaguzzi in The Hundred languages of Children. The Reggio Emilia experience in transformation. Third Edition 2012

'Mathematics for young children involves developing their own understanding of number, quantity, shape and space. Babies and young children have a natural interest in quantities and spatial relations-they are problem solvers, pattern-spotters and sense- makers from birth'
Birth to Five Matters 2021

We support the view that this curiosity and enjoyment should be nurtured sensitively through their interactions with people and the world around them, drawing on their own interests and cultural experiences.

We aim, through planned activities and spontaneous play, to further stimulate children's interest in Mathematics and build their knowledge so that they are prepared for the fresh challenges and opportunities found in their next level of education.

Effective early mathematics experiences involve practical activities, creating and solving mathematical problems, seeking patterns, engaging with stories, songs, and games.

We believe that we must respond to this innate drive to use mathematics to make sense of the world and offer a rich curricular environment where skills of numbers, shape, space, pattern, and measure are practiced within meaningful contexts that motivate and engage children.

It is essential for young children that the direct teaching of skills and knowledge including early numbers, spatial awareness, shape, space, pattern, and measure, occurs within relevant contexts in a rich and engaging environment.

Working in partnership with parents, we hope to support children on their journey of mathematical development, as they explore many of the concepts, ideas, and theories through everyday meaningful experiences. We aspire for this to support a lifelong interest in mathematics which will play a key role in their daily life, further education, and employment.

In our provision for and teaching of mathematics we work towards the Early Learning Goals described in the Early Years Foundation Stage 2021. The early learning goals (ELGs) are what is assessed at the end of the reception year and should not be used as a curriculum. The ELG's for mathematics are:

Number ELG
Children at the expected level of development will:

- ***Have a deep understanding of number to 10, including the composition of each number,***
- ***Subitise (recognise quantities without counting) up to 5,***
- ***Automatically recall (without reference to rhymes, counting or other aids)***
  number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns ELG
Children at the expected level of development will:

- ***Verbally count beyond 20, recognising the pattern of the counting system,***
- ***Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity,***
- ***Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.***

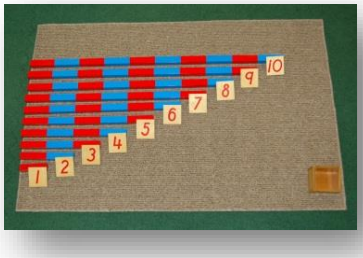
The direct teaching of mathematics within our nursery is based on the Montessori approach to mathematical learning. This embodies our long held and central philosophy that young children learn best when given the opportunity to be independent and self-motivated learners, free to pursue interests and consolidate learning over several days. Equal importance is placed on learning through planned adult-led activities and child-initiated learning which arises from a rich, stimulating, and accessible environment.

The Montessori approach helps children develop the concepts of number using specialised Montessori resources.

Number

Fixed quantity

The children are introduced to the concept of number using specific Montessori number rod. They can experience the qualities of each number and to learn their respective names. The rods show that each number is represented by a single object, as a whole, separate from others. When the child see's the number 5 rod they appreciate the quantity of 5 as a fixed quantity rather than a collection of 5 individual objects which appear as 1+1+1+1+1 to the child.



Loose Symbol

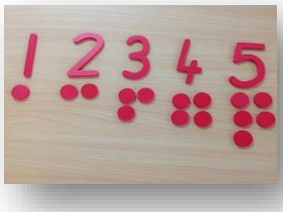
The next stage is to introduce the children to the sandpaper number symbols and to correspond the number symbol to the number rods. Along with other additional activities the child begins to build up the concept of number and the symbols used to represent the number.

Fixed Symbol and loose quantity

'The Spindle Box' - the child is introduced to the section wooden box where the number symbols are in their numerical order. The child removes the spindles from the box then replaces the correct number of rods in each section to match the number symbol. These Montessori resources have a 'control' of error so the child will know at the end of the exercise if they have completed the activity successfully.

This activity also introduces the child to the concept of '0'zero.

Loose quantity and loose symbol



During this stage, the child chooses the number symbol to create a number line and uses the counters to arrange the value of the number. The arrangement of the counters is built up of 2 lines. This introduces the concept of odd and even numbers and helps the child begin to visualise the concept of division within a practical task.

Through investigation and inquiry and planned and spontaneous play opportunities children will have the opportunity to:

- Count and develop numeracy skills
- Recognise and write numbers
- Develop mathematical strategies and problem solve
- Develop an understanding of shape and space
- Explore time, weight, size, and capacity and develop early understanding of the ways in which these can be measured.
- Develop an understanding of and use mathematical language
- Gain an understanding of early algebra and pattern in Maths through patterning and creating repeating sequences.

Role of Educator

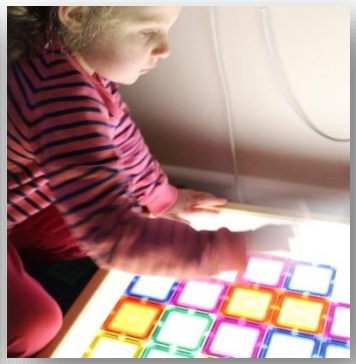
- Staff support children's learning through planned activities but also value and support self-initiated mathematical learning.
- Appropriate scaffolding and challenge are provided by all staff to support and extend children's learning.
- Staff model a rich mathematical vocabulary and use practical situations as they arise as problem solving exercises.
- Children who use a means of communication other than spoken English are supported in developing an understanding of mathematical language and concepts, through use of their home language and Makaton signing etc.

- Staff understand that some mathematical concepts, such as counting with 1:1 correspondence, are acquired slowly and many different methods may be used.
- Adult encouragement and the provision of opportunities to practise these skills throughout the nursery will ensure that they are eventually firmly embedded and provide a secure foundation for future learning.
- Differentiated activities meet the needs of children of different abilities and learning styles – for example number action songs to meet the needs of more physical or kinaesthetic learners.
- Careful observation and monitoring processes enable staff to monitor children's progress, and that of groups of children, and plan for the next stage in their learning.

Learning Environment

There are opportunities for children to use and develop their maths skills throughout the nursery (both inside and outside) – through both planned activities and the self-selection of accessible resources.

Children are just as likely to access the mathematics curriculum through cooking activities in the kitchen, building activities in the construction area, planting in the garden exploration with loose parts on the light box etc.



Whenever possible, children's interests are used as a vehicle for delivering the curriculum, for instance an interest in dinosaurs may give rise to sorting, counting, and recording the number of dinosaurs in small world play.

Children become immersed in space and shape from the moment they step into nursery. Almost immediately children encounter shapes in many forms and will engage with these resources in meaningful and purposeful contexts allowing them opportunities to interact, explore and discover the properties of 2 D and 3 D shapes.

Measurement is explored through many contexts, for example as the children search for the size of wellingtons they need to play in the rain, or asking when it is snack time to measuring sticks to build a 'bird ladder'

We are a researching school with a creative, ecological curriculum that promotes collaboration and active participation from everyone in the school community.

Our aims for the school are to create a vibrant, friendly school community for all, that engenders delight and enthusiasm in learning.

Learning is primarily developed through research projects focused on the local environment, that evolve from children's interests and observations by the staff. Nature and natural subjects are inherently inter-relational. Nature based subjects are underpinned by mathematics patterns and provide rich contexts for mathematical learning. The children see the patterns, structures, tonalities, and aesthetics of these relationships and then use them to create and elaborate ideas.

In teaching mathematics, we promote the school values, dispositions, and attitudes.

- **Prosocial behaviours** of sharing (dividing up or bestowing), helping (acts of kindness, rescuing, removing distress), and cooperation (working together to reach a goal) showing sympathy, showing positive verbal and physical contact, showing concern, taking the perspective of another person, cooperating and social problem-solving that enable children to be in dynamic interactions with other children and adults.
- **Self-regulation** which is the ability to monitor and control our own behaviour, emotions, or thoughts, altering them in accordance with the demands of the situation.
- **Collaboration** that is crucial to successful, independent learning. Through effective collaboration we begin to understand the importance of being reflective, of cooperation, of taking turns, of respecting difference and diversity, of friendship, of being fair, of sensitive listening, active discussion, and of unity.
- **Resilience and perseverance** to be determined to succeed, setting a goal, and sticking to it. We aim to foster a willingness to take risks and an acceptance of failure. We take positives from all that we do and learn from our mistakes. We are responsible for our own learning and develop high self-esteem.
- **Equality** incorporates aspects of tolerance, inclusion, and diversity. We expect children to have an awareness of the wider world, to celebrate difference and respect the rights of all individuals, both in the school community and beyond.
- **Compassion** is about kindness and concern, about friendship and love, about communicating effectively and understanding the needs of others. Through our focus on this value we expect to develop thoughtful, considerate children who are empathetic, respectful, and kind.
- **Creativity and innovation** are the values through which we hope to inspire children to appreciate their uniqueness, to be imaginative and inquisitive. We aim to nurture originality and dynamism in meaning-making.
- **Critical thinking** using purposeful judgment which results in interpretation, analysis, evaluation, and inference and include qualities, concepts, and processes such as creativity, imagination, discovery, reflection, empathy, connecting knowing, subjectivity, ambiguity, and inconclusiveness.
- **Confidence** to explore as active learners and to be adventurous, curious, and confident to take risks when experiencing new things. Exploring the world will help to develop curiosity and respect for nature and a love for the outdoors.
- **Effective communication** that enables children to express themselves, listen and respond to the ideas and proposals of others. Independence and self-organisation to be able to work with other children, not always seeking or needing the affirmation or direction of adults.

We understand that occasionally a few children may well achieve the Mathematics Early Learning Goals during their time in Nursery and familiarity with the National Curriculum allows us to plan for their future learning.

Transition from home into the nursery, from stage-to-stage within the Nursery, and then on to Primary school is carefully managed, with free exchange of information at all transition points, to ensure that children's learning is as seamless as possible.

This policy statement covers the provision of Mathematics teaching within all areas of Madeley Nursery School.

We encourage children to take appropriate risks in their learning; however adults are vigilant and ready to intervene to ensure children's safety. Health and Safety policies and risk assessments support us in maintaining a safe learning environment for our children.

Gandini, L. 2012 History, Ideas and Basic principles: An Interview with Loris Malaguzzi in Edwards,C. Ganini,L. and Formaan. G. (Eds) 2012. The Hundred Languages of Children 3rd Edition. Oxford PRAEGER

Status	DRAFT / FINAL
Agreed at:	Curriculum committee
Effective from:	May 2022
To be reviewed by:	Curriculum Committee
Responsible person:	Helen Torr