

Developing Mathematics at Madeley Nursery School (Policy statement)



At Madeley Nursery School we believe that all children are competent with an innate desire to learn. Children have this innate desire to understand the world using mathematical ideas and that it is not an imposition to work with numbers, shape, space and measurement as these are part of their everyday experiences of living, learning, exploring and playing (Gandini 2012).



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.

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 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, shape, space and measure occurs within relevant contexts in a rich and engaging environment. At Madeley Nursery School it is within our educational philosophy based on the values of encounter, enquiry, collaboration and expression; expressed in the school statements of:

A place of citizenship – being part of a strong community

Our school is an integral part of the community. It is a place where every child, family and educator has both a right and responsibility to contribute to and support their community. *We define community as being both immediately located around the school and stretching out to include the global community. We believe that citizenship encompasses people and cultures as well as environments and ecologies. That as citizens, children should be creators of culture not passive consumers.*

The researching School – working together to question and improve

Working together to question and improve, our school is a place where children, families and educators work together to improve the quality of learning and teaching experiences, therefore promoting high aspirations, levels of well-being, good dispositions and achievement for all. We

believe that a researching school relies on developing a 'listening pedagogy, where all protagonists collaborate and co-operate in reflective dialogue, respecting and encouraging different opinions and ideas, being open to change and innovation.

A belief in the competent child – with an innate ability to learn from birth

All children have an innate ability to learn from birth. We believe that every child has an incredible capacity to learn and develop through engagement with others and with the world. *This principle has inclusion and diversity at its heart and is made visible through the pedagogical approaches of the school. Where learning is seen as crossing the borders that separately define disciplines, curriculum and concepts.*

Partnership between children, families and school – learning in partnership

We consider that a genuine, respectful and active partnership between children, their families and the school are central to successful learning. *This principle is interrelated and underpins the other school principles and reflects our relational and community ethos. Partnership involves parents, families and staff working together to benefit children in relationships where each recognises, respects and values what the other does and says. Partnership involves responsibility on both sides.*

Mathematics is designated as a “specific area” of learning as part of the curriculum provision for Early Years Foundation Stage and we support the view that mathematical skills and knowledge are essential in enabling children to participate successfully in society.

Working in partnership with parents, we hope to set children on a 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.

During the first stage in this process we aim, through planned activities and spontaneous play, to 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.



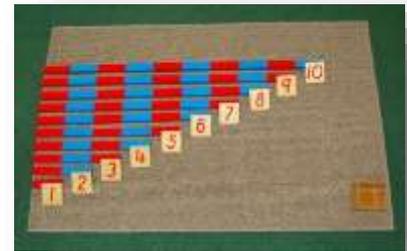
The teaching of Mathematics within our nursery is based on the Montessori approach to mathematical learning. This embodies our long held and central philosophy that young children learn best when given the opportunity to be independent and self-motivated learners, free to pursue interests and consolidate 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.

Numbers

The planned Mathematics Curriculum is introduced to the children through the carefully planned Montessori approach which helps the children develop the concepts of number using specialised Montessori resources. An example of our approach is given below.

- *Fixed quantity*

The children are introduced to the concept of number using specific Montessori number rods.



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*

Using the specific Montessori resources – ‘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 lesson 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 also 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.
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KEY FEATURES OF MATHEMATICS TEACHING

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** is the value 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.

Role of Educator

- Staff support children's learning through planned activities but also value and support self-initiated mathematical learning.
- Appropriate scaffolding and challenge is 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 tracking enables 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.

Measure is explored through many contexts as the children search for the size of wellingtons they need to play in the rain, to asking when the café is open to measuring sticks to build a 'bird ladder'

We understand that 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. Gandini, L. and Forman, G. (Eds) 2012. The Hundred Languages of Children 3rd Edition. Oxford PRAEGER

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