Supporting children's numeracy

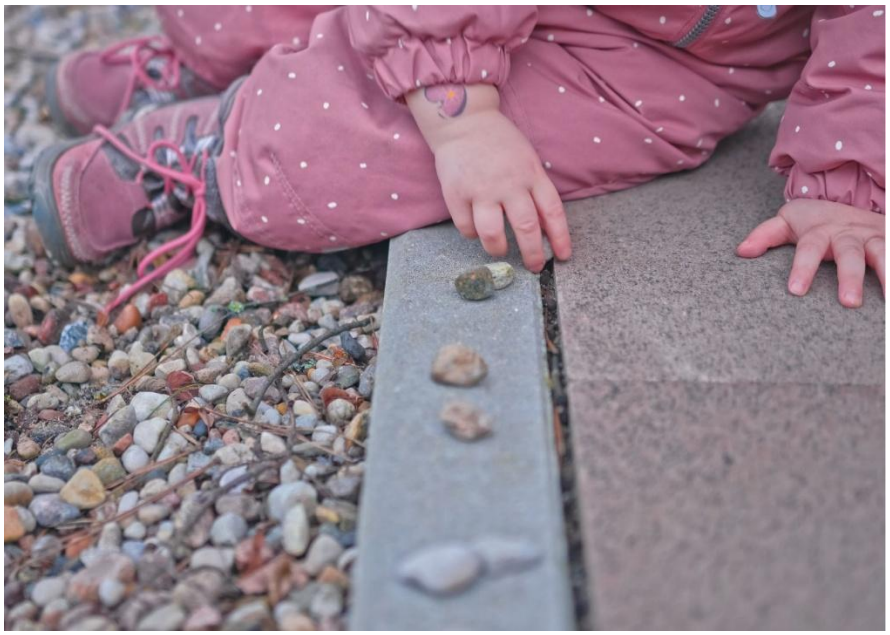
Exploring and combining some of the key points in this section will help as you evolve your space in a responsive way over time. Digest and use the ideas here to trigger questions, reflection and also new thinking as you continually notice and consider how well your environment is meeting the needs of children in your care.

As you explore the ideas in this resource consider documenting the process. This would be a really useful record of why you make the changes you do and of course the impact they have. It's always good to reflect back on the process over time and a helpful illustration to share with others.

Following the delivery of PACEY Cymru's 'Numeracy in early years' webinar series in partnership with Rhian Davies, Advisory Teacher for Ceredigion Local Education Authority, we have developed this resource to support you in considering the role of the environment in supporting the development of children's numeracy skills.

Numeracy is an integral part of children's everyday lives. It is the ability to see and use mathematical concepts in all areas of life. To help make numeracy concepts more relatable for children, and to help them develop confidence and curiosity we should provide them with numeracy rich, playful environments.

Children are naturally inquisitive and develop an understanding of mathematical language, concepts and skills through multi-sensory play and authentic experiences. Establishing good numerical skills helps children make sense of the world around them, interpret a situation, and solve everyday problems.



Sorting and grouping

Sorting, sharing and grouping are an essential part of a child's holistic development. It is often instinctive and will support the child to understand order and make connections.

Sorting is the ability to identify similarities and differences among a set of objects and group them accordingly and is one of the first skills that children can master. By offering an environment that's numeracy rich, this helps children develop their:

- Cognitive development
- Mathematical skills
- Visual perceptive skills
- Daily life skills
- Language development

Loose part play allows children to explore and look for similarities and differences in a range of objects, comparing sizes, colour, and textures.

Everyday tasks involve sorting items, examples of this include laying the correct number of knives and forks on the table for mealtimes and organising the environment when tidying up. Children love to group items by colour, type, size and should be encouraged to create their own categories.

Opportunities to share out items or resources naturally occur and is an essential part of a child's introduction to simple division and multiplication. Mealtimes can offer opportunities, for example sharing a jug of water can support use of numeracy skills and related vocabulary.

Counting and understanding numbers

Children need opportunities to count and recognise numbers. These can begin with daily routines, for example when putting on a coat counting the buttons.

Nature, however, offers fascinating, fun, and authentic learning experiences, where early numeracy skills can thrive. It provides a relaxed and enjoyable environment with hands-on learning opportunities. The scale can often be greater in the outdoors, and it will often add a sensory element to the play and learning.

- Mud kitchens allow for opportunities to count items like spoons, cups, and ingredients. The use of measuring cups introduces volume and quantity and comparing amounts. This can be a good time to introduce numerical vocabulary such as more, less, heavy and light.

- Children can use pots and pans for collecting the natural materials they find, for example pinecones and conkers. These collections can be a way to help children develop their counting skills, recognise patterns and scale and to teach children positional vocabulary e.g. on, behind, next to, left and right to name a few.

Shapes and patterns

There are shapes and patterns everywhere and children need opportunities to identify these. Patterns in nature like the symmetry of leaves or the spirals of shells, capture children's interests who often find delight, awe, and wonder in everyday occurrences. Children naturally explore these elements, asking questions and seeking answers, which promotes mathematical thinking and inquiry.

- Creating patterns with loose parts helps children recognise and predict sequences, which is a key aspect of mathematical thinking.
- Treasure hunts are a way to get children to notice the different shapes in their environment. When outdoors these shapes can be on a much bigger scale and at various levels, which can add to the curiosity and exploration.
- Items of various shapes and size in particular loose parts, provide opportunities for hours of uninterrupted engaged play allowing the children to develop a range of numerical skills. Children enjoy working out how different shapes fit together, this could include hanging curtain rings on a mug tree, keys in locks or even jigsaws.
- Recognising and creating patterns helps children predict what comes next, which is a fundamental problem-solving skill. For example, if they are making a bead necklace with a repeating colour pattern, they use their understanding of patterns to continue the sequence.
- Creating patterns with natural materials like leaves, stones, and sticks can be an opportunity for rich dialogue and exploration.

As the enabling adult we can offer invitations to play. These are a set of materials that encourage children to explore, create, and play in a non-directive way, provoking their curiosity. Follow the children's interests and make learning maths more engaging. Patterns and shapes in nature helps children see the relevance of numeracy in the real world.

Problem solving

Problems are things you do not know how to solve. In the early years even very simple activities may be a problem for one child but not another. Quality provision encourages

children to pose their own problems, with a range of flexible resources to allow for workable solutions. It is important to remember that if children are told the method or solution, they are not problem solving and therefore they are not challenging their thinking.

- Block play is one way to support numeracy and problem solving. It allows them to develop spatial awareness and reasoning, arranging blocks in different configurations and it also helps them develop an understanding of how objects fit together. It supports critical thinking such as how to balance blocks and create stable structures. Block play allows children to experiment with unique designs, evaluate their ideas and can often develop children's ability to mentally visualize relationships and explore symmetry.
- Experiences that link to the weather and gardening can offer a rich environment for learning and many problem-solving scenarios. These engaging experiences allow for the children to lead their exploration creating and solving problems. How much earth do they need to fill a plant pot? How high has the sunflower grown? How deep do we plant the seed? How much water does the plant need?
- Children need opportunities to explore space and solve problems for example: Will this object fit in this space. How do these shapes fit together? There are plenty of opportunities for this during a child's day.

Remember!

Numeracy rich environments as stated in the curriculum for funded non-maintained nursery settings, help children to become:

- ambitious, capable, learners who can use number effectively in different context.
- enterprising, creative contributors who think creatively to reframe and solve problems.
- ethical informed citizens who find, evaluate, and use evidence in forming views.
- healthy, confident individuals who face and overcome challenge and have the skills and knowledge to manage everyday life as independently as they can.

Providing a numeracy rich environment is only as limited to our imagination. Think of it as being more than just numbers and counting and don't be afraid to explore together.

There's a lot to digest in this section. You'll already be doing some of what's been featured. If there are changes you want to make, don't feel you need to do everything at once. Too much change can unsettle children and you also need to keep things

manageable for you. Make sure you celebrate and share the things that are going well and the impact you are noticing.

Reflect!

- Notice the spaces that aren't being used much in your setting. Why is this? How could you develop them? Sometimes a simple change or addition to a space is enough to re-inspire use and interest.
- Consider the way that your space supports individual children in your care and their needs. Do you offer scales of space? How might this help your children explore in a more focused way?

Further reading

- Maths in the outdoors
- Mud kitchen maths
- curriculum for funded non-maintained nursery settings - Hwb (gov.wales)
- Assessment arrangements for funded non-maintained nursery settings - Hwb (gov.wales)
- CEY smart – the numbers game (PACEY member resources)
- Early maths - PACEY