4 the love of mathematics!
Strategies to develop positive attitudes and interests in early mathematics

By Sarah Wallace

Countdown to change

From September 2021, the revised *EYFS Statutory Requirements* will instigate changes to both the *Early Learning Goals* for mathematics, the level of development children should be expected to have attained by the end of the EYFS and the *Educational programmes,* the mathematical experience that reflect the skills, knowledge and attitudes, children need to build firm foundations for good progress.

The new *Early Learning Goals* for mathematics will involve a greater clarity in counting and comparing quantities through *Number* and *Numerical Patterns*, supporting children to focus upon a deeper understanding of numbers to ten. This is because these two areas are strong predictors for later mathematical outcomes and reflect a commitment to strengthen the teaching of early numeracy, with the aim that all children, particularly those from disadvantaged backgrounds, are able to start Year 1 with a strong and confident foundations in number. There will be no specific *Early Learning Goal* for shape, space, and measure, but practitioners will still be required to teach children this fundamental element of mathematics, as part of a well-rounded, holistic curriculum. To reflect the link between children's cognitive development and their social and personal development, a welcome additional within the reformed framework is the focus upon fostering a love of mathematics. *The Learning and development requirement* for mathematics highlights:

> *"It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes."*
> (Statutory framework for the EYFS, 2021)

Early years practitioners often see first-hand that a positive attitude can lead to positive outcomes.

In many settings*, Personal, Social and Emotional Development* and children's wellbeing remain key priorities to support children to progress and aim high within their achievements. It is therefore not surprising that mathematical development does not solely rely on specific mathematical knowledge and skills, but also upon children's interests, enjoyment, and attitudes towards their mathematical learning.

A study by Dowker *et.al* (2019) revealed that even in the early years, children's belief in their own mathematical abilities and their willingness to have a go at task, were fundamental factors in their attainment. Most recently, Catherine Gripton from the Primary Education Network (2020) included the love of maths as one of children's entitlements in mathematics, even for our youngest learners. Similar to Daniel Pennac's 'Rights of the reader' (2006), the 'Rights of the mathematician' provides an empowering view of mathematics, with a lifelong love of mathematics, at the heart of early years practice.

The power of positivity – Strategies to foster a love of mathematics

Follow these top tips to lay solid foundations for mathematical learning and offer a curriculum that also develops positive dispositions and attitudes for mathematics:

Ensure that mathematical opportunities are purposeful and based in a meaningful real-life context:

Consider carefully how the learning environment can act as a valuable context for mathematics particularly through areas of continuous core resources and within daily routines. For example families don't have number lines in their kitchens at home, but they do have lots of everyday and familiar mathematical objects that could be included in domestic role-play. Harnessing these real-life mathematical opportunities provides children with meaning and motivation, particularly as they explore new challenges, talk about and explain their reasoning and become physically involved and engrossed in their learning.

Play mathematical games:

Children of all ages enjoy mathematically based puzzles and games because they can be engaging, fun and motivating! Playing games inspires mathematical thinking as children find different strategies for solving problems. When games are played repeatedly, they also provide opportunities to practice, refine and consolidate, supporting children to build a deeper understanding of mathematical concepts. Games can be easily adapted for a range of abilities and when played together, children can talk and practice mathematical language in a meaningful and social context. Utilising homemade track games is great way to incorporate children's current interests and reflect their individual next steps in mathematical learning.

Emphasis mathematics as an open ended, enquiry process:

Maths involves many opportunities for exploring open ended investigations and practitioners should therefore value mathematics as a learning process. In the early years, mathematical development is intrinsically linked to the *Characteristics of Effective Learning,* as children play and explore, become active learners and create and think critically. An effective starting point for a mathematical enquiry is to use children's questions as a stimulus. This enables children to test out their ideas, problem solve together and to look for evidence to support their thinking. For example, *'To be tall, you must be old…Are all the oldest children in our class the tallest?'* or *'Are all the biggest apples in the snack bowl, the heaviest pieces of fruit?*

The ten rights of the mathematician

1. The right to enjoy mathematics
2. The right to have interests and preferences
3. The right to make jottings, drawings and working out
4. The right to use our own methods and approaches
5. The right to use manipulatives and resources
6. The right to reason, to talk about maths and be listened to
7. The right to make mistakes
8. The right to estimate, to guess and to conjecture
9. The right to ponder and take time
10. The right to be playful

(Grimpton, 2020)

Encourage children to have a go and make mistakes:

For children to be successful mathematicians, they need to feel confident about talking through concepts and making their own mistakes. To do this, they need a safe and secure learning environment, where adults acknowledge all contributions positively and value different ways of thinking. It is vital that early years practitioners foster a climate of growth mindset and use mistakes as a springboard to explore new knowledge and understanding. Practitioners can foster a positive mindset by promoting maths talk through open questions and by posing statements. When practitioners ask a closed question, a child is either right or wrong. However, if open-ended prompts are used, children can instead be invited to share and extend their mathematical thinking. Not only does this empower the child, but also helps to identify and address their conceptual misunderstandings.

Be positive about maths! Ensure that all adults model positive dispositions to mathematics at home and in the setting:

Practitioners with a passion for mathematics help children to question, challenge and think creatively. It is so important that adults ooze enthusiasm for mathematics and openly model these dispositions. Don't say things like *'I can't do maths,'* or *'I hated mathematics at school'*, children may start to think like that themselves and be adversely influenced by these negative views. Be alert to any children who explain that they *'can't do'* maths and promote a culture of '*everyone is a mathematician*'. Share top tips with parents and families to make sure they also model a love of maths too. Remind parents that even if they don't feel confident with mathematics themselves, they can still make a huge difference to how their child's mathematical confidence and ability will develop. The *Family Maths Toolkit* has some useful parental information that could be shared as part of an effective home-learning partnership: https://www.familymathstoolkit.org.uk/talking-about-maths

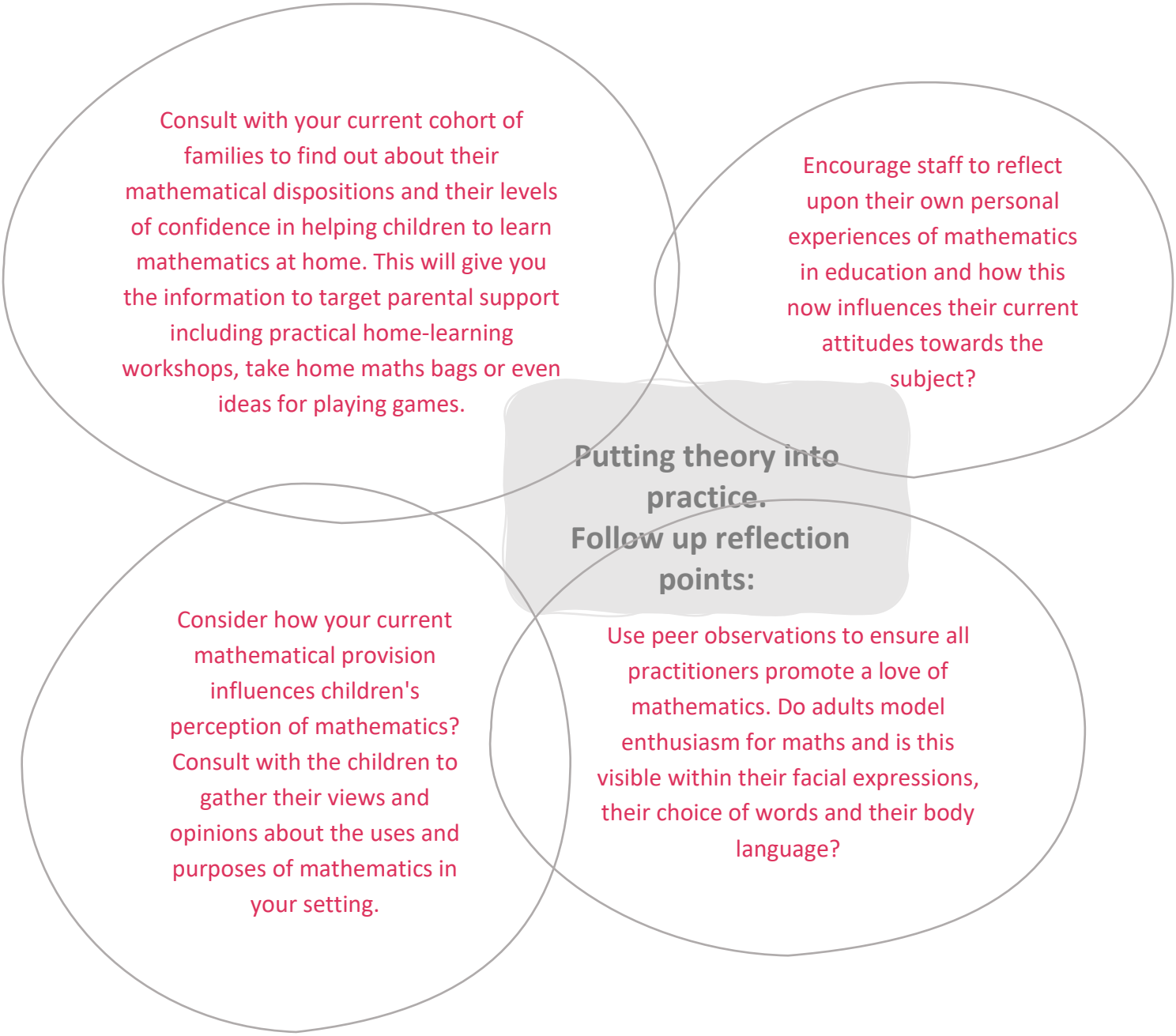
Remember your mathematical challenge is to use the power of positivity to encourage our youngest learners to become successful mathematicians, not because someone is making them, but because the actual process of mathematical learning brings them personal satisfaction, enjoyment and joy!

Every child can learn to speak the beautiful language of mathematics.

(www.mathcurious.com)

Celebrate mathematical learning and make maths visible throughout your setting:

Maths displays can have a significant role in feeding curiosity and promoting positive attitudes to learning. Displays that are interactive and are hands-on, support children to view maths as a memorable and meaningful process, that is important to their everyday lives. Giving mathematical displays a high profile within early years provision can also consciously and subconsciously demonstrate to children that maths really does matter! Try to celebrate children's mathematics by including examples of their direct speech during maths talk, alongside photos of them actively involved in their own maths learning.



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Statutory framework for the EYFS (2021)
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