

# The importance of early mathematics education in England

Policy briefing paper, March 2024

## Introduction

### The Early Years sector and mathematics: the current landscape

- Early Years practitioner retention crisis: In Jan 2024, practitioner vacancies were [up 146.2% on pre-pandemic levels](#). Staff turnover is [21% in private group-based provision](#).
- Expansion of the Early Years entitlement: An [estimated 6%](#) to [8%](#) increase in workforce is needed to meet the additional demand created by this new policy, at a time when it is reducing (-3% since 2019). New practitioners will need professional development, particularly in mathematics.
- Presence of negative societal attitudes to maths.
- Relative lack of mathematics professional development opportunities in Early Years (birth to 5), a sector with higher levels of mathematics anxiety.

### Research background: early mathematics education

**Early years education is more cost effective.** “for every £1 spent on early years education, £7 has to be spent to have the same impact in adolescence” ([Sutton Trust, 2024](#)). This is particularly true for children from disadvantaged communities ([Heckman, 2006](#)).

**Preschool maths is the strongest predictor** of later school achievement and success in entering the workforce ([EIF, 2018](#); more than reading and attention skills, [Duncan et al., 2007](#)). Maths needs to be a priority (language, communication and reading education is more developed) with benefits to individuals’ life chances and citizenship, to national attitudes and the economy. Maths education is an equity issue.

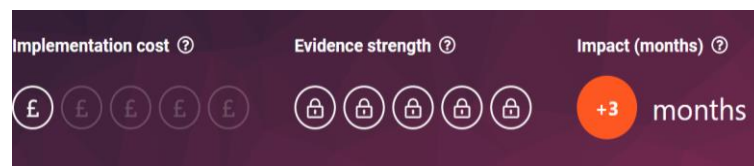
**The Early Years and primary mathematics curriculum needs to be broader** to include spatial reasoning and patterning, which predict mathematics outcomes more than number ([Rittle-Johnson et al., 2019](#)). Research shows spatial reasoning is key to problem solving, data science and STEM careers ([Farran, 2023](#)). In [PISA tests](#) higher achieving countries have relative strengths in shape and space, which is the weakest area for UK 15 year olds. Currently there are missed opportunities, denying children (particularly from disadvantaged backgrounds) routes to success through building fundamental skills and positive attitudes in mathematics.

**Professional development is essential** and needs to include knowledge of child development and high-quality playful pedagogy ([Sutton Trust, 2024](#); [Clements & Sarama, 2013](#); [Skene et al., 2022](#)). Instead, the current workforce is equipped to propagate maths anxiety, with practitioners no longer required to pass GCSE and maths-anxious student teachers choosing early years ([Skyrme & Hunt, 2022](#)). The Early Years sector has little capacity for professional development so funded online

programmes are essential ([EYPDP](#), [Child Development Training](#), and [Maths Champions](#)).

## Maths Champions: effective professional development in practice

Maths Champions (an online professional development programme) improves children's mathematics outcomes by building practitioner knowledge and confidence to support effective practice. [EEF's 2023 research](#) found that there is robust evidence that this low-cost programme leads to an average of 3 months additional progress in maths and language development for children (6 months for disadvantaged children). The government's Accelerator Fund is providing Maths Champions to 405 settings.



## Issues

### Key issue: Early Years curriculum and assessment for mathematics do not follow research evidence

- There are three key predictors of future mathematics success, according to research but these are not reflected in the balance and content of the curriculum and assessment requirements:

- **Pattern is misrepresented**

- **Number requirements are not age-appropriate**

- **Spatial reasoning is underrepresented**

They lack sufficient breadth as they are number-heavy and focus on recall rather than understanding of number. Problem solving is barely mentioned across all areas.

- **Shape, space and measures was removed from the Early Learning Goals** (the end of EYFS assessment) in 2021, despite the [government pilot](#) showing that this would reduce their being taught. The [Spatial Reasoning Toolkit](#) is a research-led response from ECMG to help practitioners and teachers continue teaching shape, space and measures.

- [Development Matters](#) curriculum guidance includes some developmentally inappropriate expectations and insufficient detail for practice with the youngest children. In response, a coalition of Early Years sector organisations published an alternative, [Birth to Five Matters](#) (over 237,000 downloads, 35,000 print copies sold).

- The **Reception Baseline Assessment** is bureaucratic, not supported by research and takes teachers away from children in their first few weeks in school. It is [a baseline without basis](#).

## Recommendations

1. **Revise the Early Learning Goals for the end of Reception** to include shape, space, measures, pattern and problem solving, and remove *automatic recall* and *numerical patterns*.
2. **Remove Reception Baseline Assessment** to release teachers from the burden, repurposing the financial savings to professional development.
3. **Prioritise mathematics professional development** to bring a step change in attitudes to mathematics and improve children's education and future lives.