Spatial Thinking Network

DECEMBER 2025 NEWSLETTER

We will continue to update our spatial reasoning platform - please share it with your networks.

Overview

The Make Space event took place at the University of Surrey in May 2025. It took place in the context of the change opportunity brought about by the 2025 Curriculum and Assessment Review in England and growing recognition of the value of spatial reasoning for mathematics and STEM in national discussions. A resounding success, the group discussed the need to equip the next generation to meet the heightened demands for problem solving and data use, and that teaching children to think and work spatially is an evidence-based, inclusive route to achieving this goal. An agreed next step was to form the **Spatial Thinking Network** to continue discussion and influence.

Since the Make Space event, the Network has been busy raising awareness of the importance of spatial thinking for STEM, and translating research into practice.

If you would like to join the Network please contact Emily directly.

Contact: Professor Emily Farran (e.farran@surrey.ac.uk)

Spatial Thinking Network updates

Spatial Reasoning and the Curriculum and Assessment Review

The Curriculum and Assessment Review (CAR) was launched on 5th November 2025. Members of the Spatial Thinking Network highlighted the value of spatial thinking in their responses to the CAR maths recommendations.

Emily Farran, University of Surrey

In November, *Prof. Emily Farran* was invited by the Times Education Supplement (TES) to discuss how and why spatial reasoning is key to meeting the Curriculum and Assessment Review's (CAR) maths aims. In the article, she discusses why those drafting the new curriculum must recognise the foundational value of spatial reasoning, that spatial reasoning is not an add-on, but instead existing content can be 'spatialised', and that training children to think spatially is inclusive. Read the article here

Jane Brown, Head of Primary Maths, White Rose Education

In November, *Jane Brown* contributed to Understanding the Curriculum and Assessment Review from White Rose Education.

Jane wrote: "I welcome the call to strengthen fluency in number and to re-sequence the curriculum so that children have more time to master key concepts before moving on." With reference to spatial thinking, Jane commented: "One area not explicitly mentioned in the report is spatial reasoning, which research and classroom experience alike show to be a vital part of developing mathematical thinking. I hope this will be reflected when the programmes of study are written. Allowing more time for children to explore key concepts in depth, and to build on their spatial reasoning that helps them visualise and connect ideas, will help them apply their understanding in a range of contexts." Read the article here.

Helen Drury and Camilla Gilmore, Maths Horizons

The Curriculum and Assessment Review recommended that pupils should have opportunities for more complex problem-solving. In response to this, Maths Horizons are working with sector experts to build a map of the kinds of questions and activities that develop different forms of problem solving, and show how they can be taught, learned, and assessed. The first Maths Horizons Insight Forum, held on 1st December 2025, was attended by many members of the Spatial Thinking Network. At the Forum, Maths Horizons shared their latest thinking on problem solving and reasoning, for stakeholder input. They proposed characteristics of mathematical problem solving, and highlighted the importance of input from spatial thinking, among other thinking skills, for successful problem solving. Read their report here

Turner Kirk Centre for Spatial Reasoning opened in September 2025

Quintin Cutts and Jack Parkinson, University of Glasgow

The Turner Kirk Centre for Spatial Reasoning was launched earlier this year at the University of Glasgow by Prof. Quintin Cutts and Dr Jack Parkinson. The Centre, jointly funded by philanthropy and the Scottish Government, is a cross-disciplinary research centre seeking to explore spatial reasoning for improved outcomes in a range of contexts. The Centre has a vision of a world where spatial reasoning is understood and developed as a key to releasing human potential. The Centre's flagship project, the STEM SPACE Project, is rolling out spatial reasoning development to primary schools through a local authority and teacher network. This year, 16 local authorities are taking part with over 230 schools, reaching thousands of pupils.

The Centre's mission is to lead research into the understanding of spatial reasoning and its application in a wide range of contexts, working with national and third sector organisations, commerce and industry to radically enhance learning, creativity and productivity across the population.

From left: Prof. Quintin Cutts, Dr. Jack Parkinson, Dr. Ewan Kirk & Dr. Patricia Turner.

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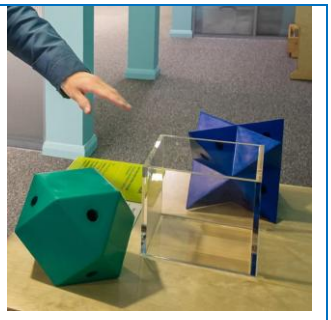
Maths World, London's first maths discovery centre, opened in October 2025

Margaret Brown, Chair of MathsworldUK charity trustees

MathsworldUK "aims to create the UK's first National Mathematics Discovery Centres, interactive spaces in which visitors enjoy and appreciate the power and importance of mathematics as a tool for understanding the world in which we live". MathsWorldUK have now launched two Mathematics Discovery Centres. Maths World opened in London in October 2025. Maths World is the second UK Mathematics Discovery Centre, joining Maths City, Leeds, which also moved to a new exciting space in October 2025. Both Centres feature many spatial thinking exhibits, including problem solving with 2D and 3D shapes, exploring reflection and discovering "what fits".

Ball pyramid at Maths World: Put the four pieces together to form a pyramid

Giant Kaleidoscope at Maths World: Step into the kaleidoscope. Is there a pattern to the rotations and reflections?



What fits in a cube at Maths World: Can you fit the blue Kepler Star in the cube?

Incorporating Spatial thinking into the Curriculum - Teach First Stretch Huddle, October 2025

Sarah McCarthy, University of Surrey and Roisin Philip, Teach First

Teach First recently hosted a stretch huddle for their trainees across Early Years and Primary to encourage them to explore their thinking around curriculum knowledge and development. Sarah McCarthy, Postgraduate Researcher at the University of Surrey, presented on the importance of incorporating spatial thinking into different curriculum areas including mathematics.
Sarah provided practical advice on how to 'spatialise' curriculum content, introducing concepts like visualisation, composition and decomposition, spatial scaling and perspective taking. The session allowed teachers to consider how they can exercise their agency in prioritising spatial reasoning as a foundational concept.

For more details about the presentation, contact Sarah: sm02954@surrey.ac.uk

Spatial Reasoning in Specialist provision

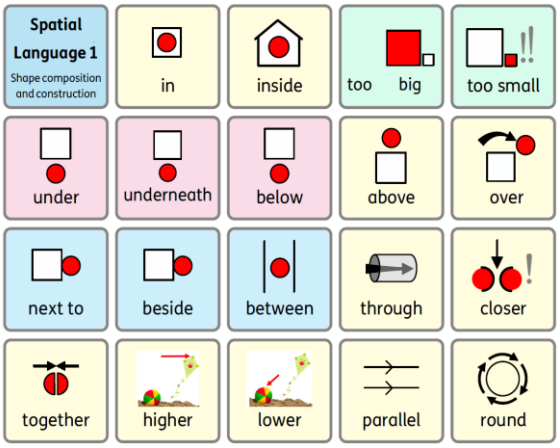
Sharon Kirk, Whole School Leader (Maths) and Regional Work Group Lead North-East Hants and Surrey NCETM Maths Hub, Specialist Provision

Spatial Reasoning training for Special Schools

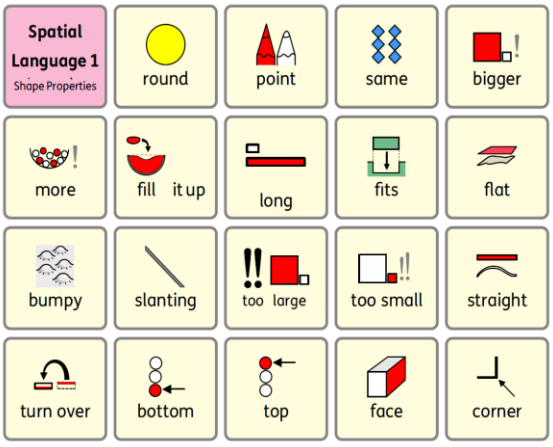
Since the Make Space Event, Sharon Kirk has run staff training at both West Hill and Fox Grove Special Schools about Spatial Reasoning. She has also run her Spatial Reasoning training regionally for NCETM Special Schools, as part of her role with the National Centre for Excellence in Teaching Mathematics (NCETM).

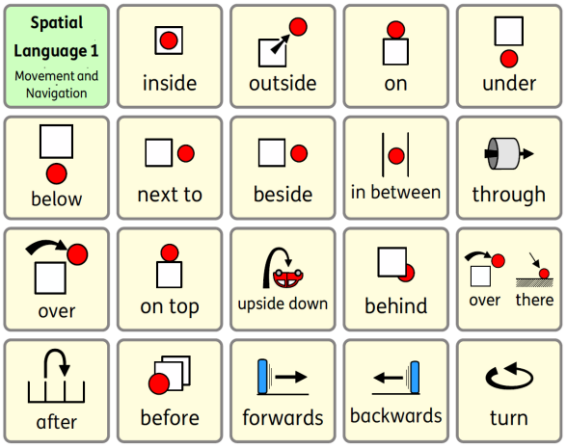
Spatial Language "Visual Mats"

At West Hill School (Specialist Learning and Additional Needs (LAN) setting) the children have a range of Language and Communication Needs, with some being pre-verbal so we try to find ways to support individual's understanding of spatial language and development of this vocabulary over time. These visuals have been produced to support staff and children alongside any spatial reasoning activity they are involved in, both inside and outside the classroom.



The vocabulary has been taken from the keyrings produced by the Early Childhood Maths Group. Sharon would welcome feedback on the images used, so that she can produce final master copies to be shared on a wider scale in the future. Please email: Sharon.Kirk@westhill.thpt.org.uk





Royal Society publication; Spatial Reasoning Trajectory

Sue Gifford and Alison Borthwick, Royal Society Advisory Committee on Maths Education, and Emily Farran, University of Surrey

The trajectory of spatial reasoning development for 7- to 11-year-olds is now available on the Royal Society web pages. The new trajectory complements the trajectory of spatial reasoning development for birth to seven years developed by the Early Childhood Maths Group (see ECMG Spatial Reasoning Toolkit). These two trajectories are informed by extensive review of research in this area and together offer activities for children from birth to 11 years.

This document forms part of a series of Royal Society publications on spatial reasoning which can be found at: Royal Society Curriculum and Assessment and accompanies our earlier work on the ECMG Spatial Reasoning Toolkit.
The series includes:

- RS ACME Primary and early years expert panel perspective: Spatial reasoning - June 2024 (royalsociety.org)
- Progression of Spatial Reasoning across age bands (Appendix 1 of document listed above)
- An evidence-based trajectory of spatial reasoning development for 7- to 11-year-olds.
- Whole-school approach case studies: Supporting Primary Children's Spatial Reasoning in Geography and Design & Technology

Collaborations between University of Surrey and GL assessment

Emily Farran, University of Surrey

Joint funded PhD studentship

GL Assessment and the University of Surrey are joint funding an interdisciplinary PhD studentship to investigate the role of spatial thinking in mathematics, science and engineering. The PhD student, supervised by Prof. Emily Farran, Dr Debbie Gooch and Dr Alireza Behnejad, will help deliver the largest UK studies on spatial–STEM associations and design a real-world spatial training programme for engineering students. More information here.

Non-Verbal Reasoning writing workshop

In November, the Cognition, Genes and Developmental Variability Lab (CoGDeV) members Prof. Emily Farran, Sarah McCarthy and Katie-Anne Costello completed a two-day item writing workshop at GL Assessment. They learned how to write Non-Verbal Reasoning items and will now be contributing to GL Assessment's item bank.

Berny Brzyska re-appointed as Visiting Research Fellow, University of Surrey

In November, Berny Brzyska, Head of Research at GL Assessment was re-appointed as Visiting Research Fellow in the School of Psychology, University of Surrey.

Collaborations between University of Surrey and White Rose Education

Jane Brown, Head of Primary Maths, White Rose Education

Spatial reasoning professional development

Jane Brown invited Prof. Emily Farran to White Rose Education in Leeds to talk to the Primary Maths team about spatial thinking and maths. It was a great day of knowledge exchange, with discussions about how to build more spatial thinking into existing content.

Key messages from the discussions:
1. Spatial thinking can be taught and improves with practise.
2. Improving spatial thinking improves maths attainment overall.
3. Key spatial skills such as visualising can be built into what we are already doing.

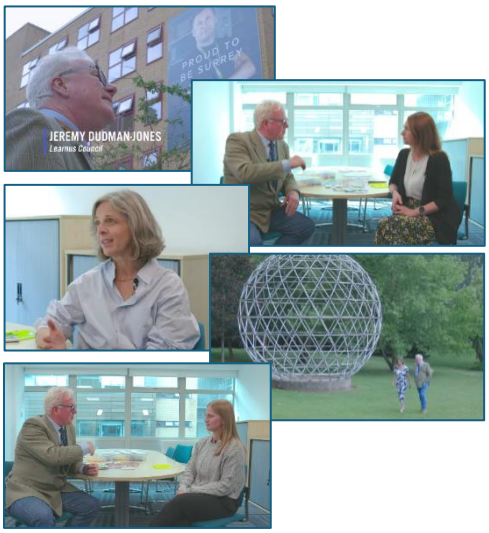
Bee Spatial Programme

Prof. Emily Farran and Jane Brown were successful in securing pilot funding to trial spatialised mathematics content with Year 3 children. Now joined by Kate McNally (White Rose Education) and Prof. Camilla Gilmore (Loughborough University) the team are developing "spatialised" versions of existing White Rose maths lessons and have named the programme "Bee Spatial". They are currently recruiting schools to deliver Bee Spatial in the Summer term, 2026. Aligned with the recommendations of the Curriculum and Assessment Review, the team will measure the impact on children's spatial abilities and maths, including mathematical Problem Solving.

If your school subscribes to White Rose Maths, is within travelling distance from Guildford (Surrey) and has a Year 3 class that would like to take part, please email e.farran@surrey.ac.uk

Learnus' Visit to the CoGDeV Lab, University of Surrey

Caroline Shott, CEO, Learnus



Learnus is a Think Tank dedicated to "communicating research to support the evolution of teaching". In July 2025, Learnus visited Prof Emily Farran's lab group, the Cognition, Genes and Developmental Variability Lab (CoGDeV), and interviewed Lab members as part of their roving reporter series. The film features Prof. Emily Farran, Dr. Debbie Gooch, Katie-Anne Costello and Sarah McCarthy, who discussed their research on spatial thinking and STEM, as well as the Lab's work with people with special educational needs and disability (SEND).

Watch the film from Learnus here

Webinars and talks about spatial thinking

Prof Emily Farran has given a number of webinars and talks about spatial thinking, including to Seedlings nursery, Woking, and the Howard Partnership Trust schools. She was honoured to receive the 2025 "Impact and Engagement" award from the British Psychological Society for her work on translating research on spatial thinking into practice.

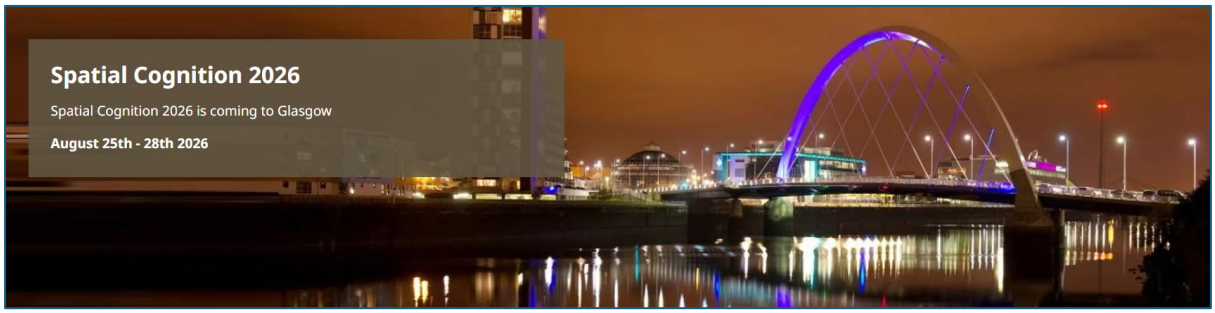
Recorded talks are listed below.

The importance of spatial reasoning for early education. *Early Education webinar. June 2025*

Spatial abilities and Mathematics; from the lab to the classroom. *Learnus Webinar. July 2025*

Future Events

Spatial Cognition 2026 - Save the Date!



The Turner Kirk Centre for Spatial Reasoning at the University of Glasgow is delighted to host the **2026 Spatial Cognition conference** from the **25th to 28th August 2026.**

Workshops, symposia, posters and papers on various aspects of spatial cognition are all welcome. The conference will be in-person only.

Spatial Cognition includes research from fields such as cognitive and developmental psychology, linguistics, computer science, geography, cartography, philosophy, neuroscience, and education. SC 2026 will bring together researchers working on spatial cognition from all these perspectives. The conference is single-track, and the final program will be the result of a selective review process. The program will include invited talks as well as oral and poster presentations of refereed papers.

For developing information, see https://www.gla.ac.uk/research/az/spatialreasoning/sc26

JOIN OUR NETWORK

We are a network of practitioners, academics, training and resource providers and advisors with an interest in spatial thinking and its importance for STEM.

If you would like to join the Spatial Thinking Network, contact Professor Emily Farran: e.farran@surrey.ac.uk