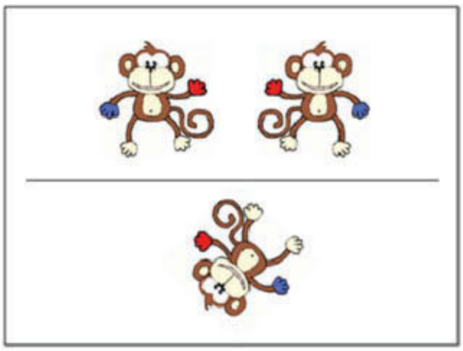
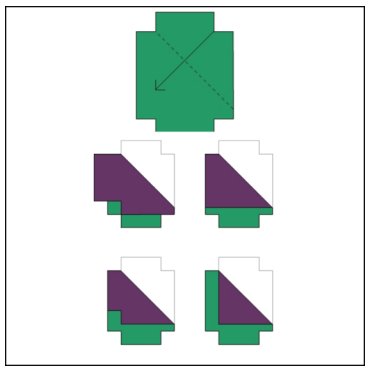
Summary of Research Findings:
Spatial Thinking and Children's Science Achievement

We would like to thank everyone at Preston Park Primary School who was involved in this project. We were interested in the relationship between spatial thinking and how well children learn and understand science. Spatial thinking relates to how we think about where shapes in space are, how we think about and manipulate shapes in our mind and about how objects move in relation to each other. Research with adults suggests that individuals who have strong spatial skills also tend to do well in science; this research investigated the relationship in children.

To investigate this, we worked with four classes of children in total: one in year 3, year 4, year 5 and year 6. Children in the class first completed two science assessments in their classes, which covered different topics. We then saw the children in groups and individually, where they did a measure of vocabulary and a number of different spatial ability tasks. For example, in the monkey rotation task, we asked children which monkey at the top was the same as the monkey at the bottom. To do this, the children had to rotate the monkey at the bottom in their minds. In the folding task, the children were asked to work out what the shape at the top would look like, once they had folded it in their mind, as shown in the picture.



Monkey rotation task



Folding task

Our results

We analysed the data to find out whether there was a relationship between how well children performed on the different spatial tasks, and how well they did on the science test. We found that all of the spatial tasks were related to how well the children did in the science tests. However, the folding task above, and also our scaling task, were the best predictors of performance in the science test. We found that spatial ability best predicted children's biology scores.

We think that being good at mental folding helps in questions where children need to visualise the movement of objects in their heads; for example, in physics when learning about forces or magnets. Being good at scaling might be useful in science because we often have to relate concepts at varying scales and formats. For example, a child might need to learn about the same concept (e.g, about the structure of a plant) from a diagram, a larger photograph, an actual object and a projection on the whiteboard.

We plan to do some further research into this by doing a classroom lesson study, where we investigate how children's' spatial skills impact how well they learn in a science lesson. We hope to use this in the future to support children in the science classroom.