

**Mathematical moments: 3 & 4 year olds**

**Spatial reasoning**

**Construction: Builder and Copier**



The nursery children loved playing in pairs at being the Builder and the Copier, with one making a construction and the other copying it. Sharon, their teacher, gave them each six oblong wooden blocks, two square blocks, a smaller block, three figures and a mat to build on (video available [here](#)).

Sharon encouraged the Copier to follow the Builder one piece at a time. She was impressed by the children's attention to detail, and the way they looked closely and corrected themselves. She described what they were doing, using positional language like *on top of*, *on the side* and *in the middle* but found that the children needed a lot of nudging to describe what they were doing as they built. However this improved as they gained experience, and the children became keen to get involved with each other's turn, giving advice freely (including when they did not

approve of the construction they were copying!) They both checked carefully at the end, to make sure the copy was exact.



The children also enjoyed making large scale constructions with big blocks outdoors, each in a space chalked on the ground, with four square blocks, one long block, one long plank, one short plank and three toy animals.

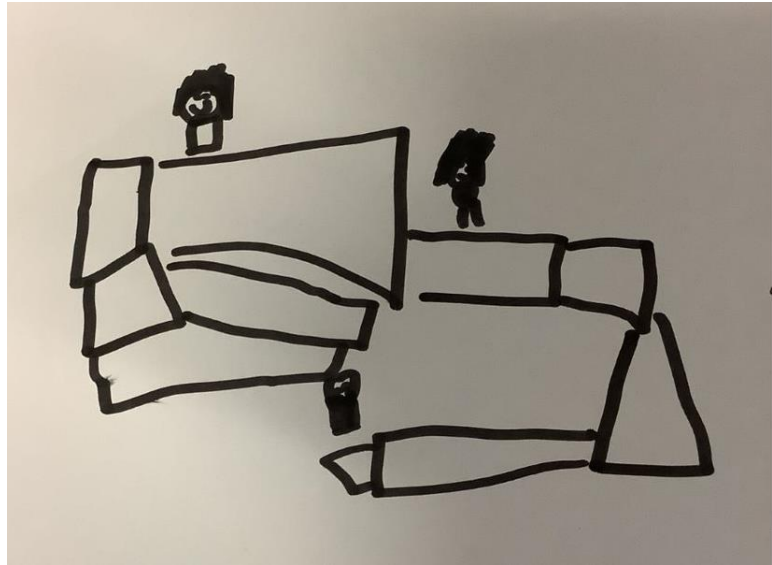
The language involved was often not mathematically precise: for instance, *Put that there*, was accompanied by gestures and pointing. More challenging were relative terms like, *at the back*, which depended on the viewer's position. It was interesting whether the children were doing a copy in the same orientation or as a mirror image, and some constructions included both.

Sharon found that the younger nursery children tended to just pile the blocks up and were not interested in copying another's actions, but the older ones were keen to take on a role, chatting to each other as they worked. While this was not the language-focused activity she expected, it engaged young children in a lot of noticing about shapes and spatial arrangements in a very socially collaborative way.

Later, children chose a photograph of another child's construction and tried to make it. This presented the challenge of working out which blocks were used and how they fitted together at corners, especially if they were not completely visible in the photo. This involved them in translating a 2D image into a 3D model.

Some children had a go at drawing the constructions: this was even more challenging because it involved distinguishing the different size blocks as well as showing their positions from an overhead viewpoint. Some children preferred to show the figures from a side view, next to the blocks, rather than the view from above, with figures superimposed on the block outline, so they combined aerial and side viewpoints. Representing 3D models with 2D images presents children with sophisticated issues of perspective, which many artists have grappled

with over the years. This simple activity therefore provided young children with rich opportunities for spatial reasoning, in noticing, visualising and representing shapes and positions, in a range of engaging ways.



Acknowledgment: Sharon Palfreyman and the children of Corrie Primary and Nursery School