

**Mathematical moments with 3 and 4 year olds:**  
**Spatial reasoning**  
**Knot tying investigation**

This activity and other knot tying activities and playing with ropes are under adult supervision at all times.

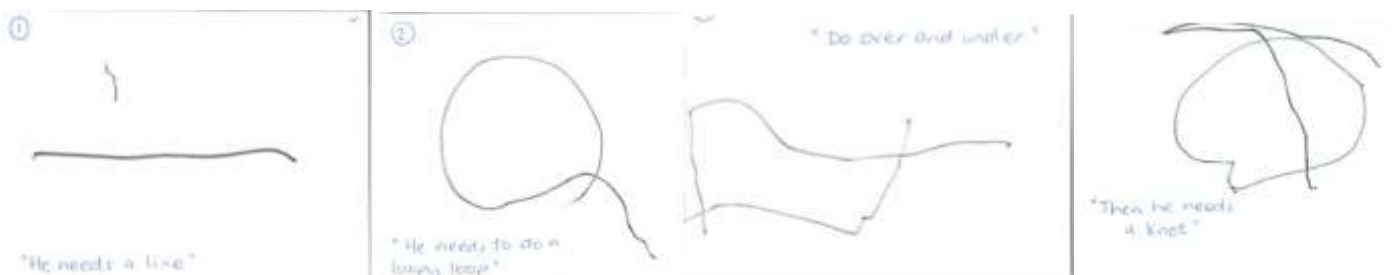
In nursery life, children often have to stop their play to ask for their shoelaces to be tied by an adult. I think this is part of the appeal of knot tying to young children. It is a skill they know is useful and typically something done by the role of the adult.



Ben has been fascinated by learning how to tie a knot. He repeated the sequence until he could do it independently. Initially Ben would make physical movements with his body copying the shapes of the rope before he could more quickly manipulate the rope into the shapes needed.



Like most children, whilst Ben was focused on learning the skill of tying a knot, this was often a silent process. As he got more confident and developed his muscle memory, he began to use language to describe the process.



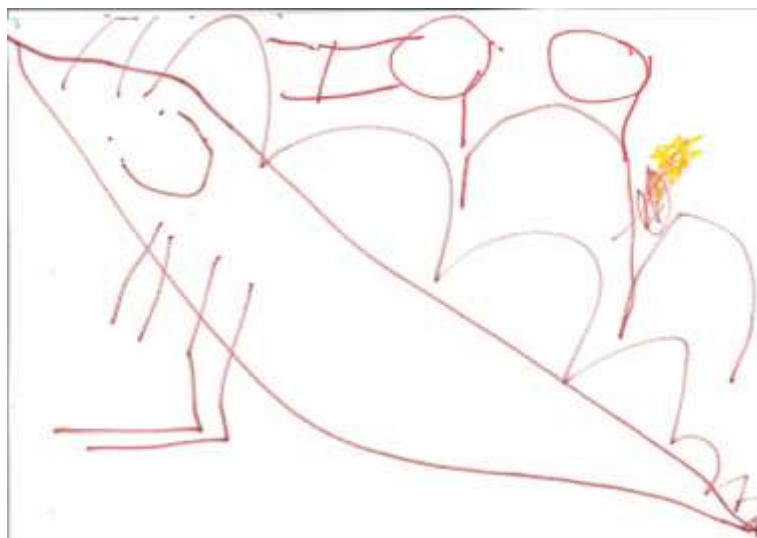
1. "He needs a line"
4. "He needs to do a loopy loop"
3. "Do over and under"
2. "Then he needs a knot"

Ben made these instructions to help his friend learn how to tie a knot. He wanted to see if an adult could follow the instructions.



Ben demonstrating to his peers. He was very proud of this new-found skill and demonstrated to lots of his peers, many have learnt the skill directly from him.

Ben began his knot tying sequence by laying the rope across the table diagonally from corner to corner. He did this movement repetitively and it seems to have linked to a schematic interest in the diagonal. Straight after the knot tying focus he began to make these dinosaur drawings, always creating a diagonal shape across the page.



## Knot tying: learning how



After watching Ben, Miles set about learning how to tie a knot himself. He carefully copied the instructions making the right shapes with the rope. We have left this activity out for children to return to, children who have mastered the art of knot tying have been keen to teach their friends.

Eden watched her friends learning how to tie knots and wanted to have a go. Initially (see left) she would make random movements and expected a knot to appear! When this didn't work she slowed down and became more focussed copying the shapes on the instructions and trying to work out how to follow them.



## Knot Joy!



“Do loopy loop”  
Eden



“Streeettccchhh!” , Eden, commenting on the first step.

Eden returned to observe every time she noticed knot tying going on. She can tie a knot by herself now - a real demonstration of perseverance! And now she is the one that demonstrates to her friends!



Iris' knot instructions



"I made a straight line"

②

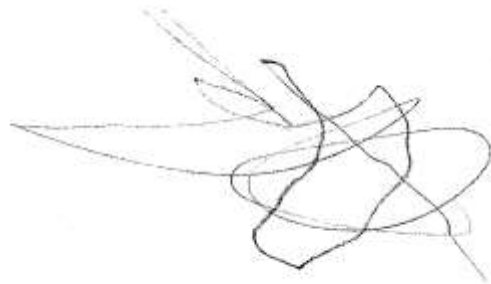
"Then a loop"



③ "And then pull and I drew someone pulling"



④



"And then here's knot"

**Acknowledgement: Jo Henley and the children of Balham Nursery School.**