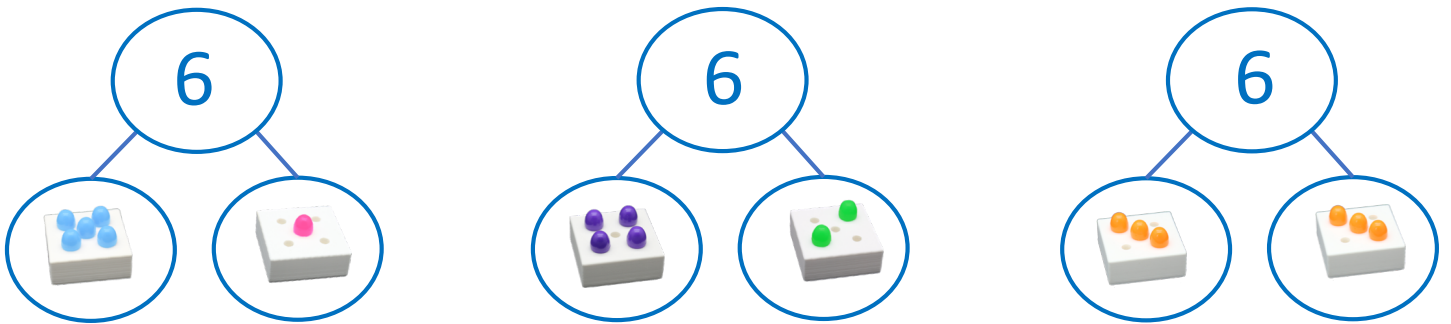


## Spot On With Numbers Encourages Flexible Partitioning of Numbers

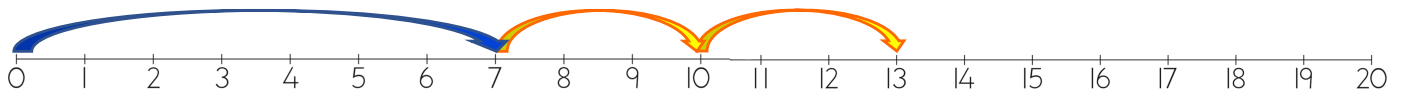
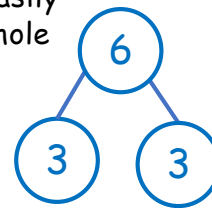
The pegs and boards enable children to make numbers in any way they choose, using a range of colours and patterns. Numbers can be arranged over two or more boards, showing how a number can be partitioned.

Fluency has been defined as 'knowing how number can be composed and decomposed and using that information to be flexible and efficient with solving problems' (Fosnot and Dolk, 2001).

Flexibility therefore comes from recognising that numbers are made up of their component parts. The fact that with the five formation, all numbers above five have to be seen as parts combining to the whole emphasises this critical phase of learning.

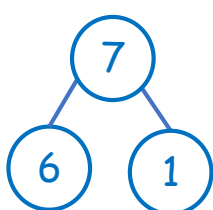
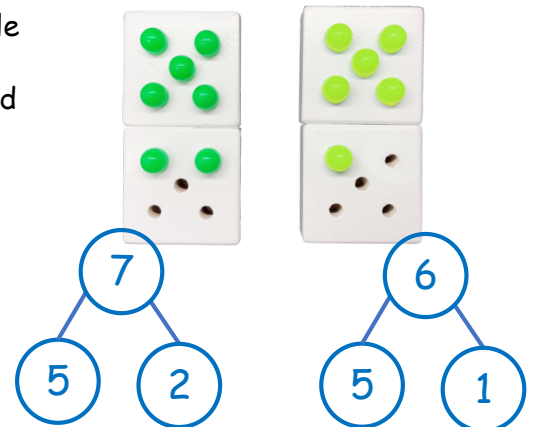


As seen, this representation is highly visual and children can easily generalise between addition and subtraction. The part part whole model is also used for bridging the tens, for example in the calculation  $7 + 6$  (where 6 can be composed of  $3 + 3$ ).



The work of Gray and Tall from Warwick University concluded that it was the flexibility in which young children (aged 7-12) performed their calculations that led to their attainment in mathematics.

If children are encouraged to be flexible by asking for multiple methods for working out the above calculation and a child who sees 7 as  $5 + 2$  and 6 as  $5 + 1$ , may conclude that as 5 and 5 add to 10, and 1 and 2 add to 3, then the total of 10 and 3 is 13.



Another child may argue that they already know that 6 add 6 is 12, so 6 add 7 must be one more than 12. These discussions are beneficial in developing flexibility, fluency, reasoning and seeing connections.