



How to teach times tables so pupils learn instant recall.

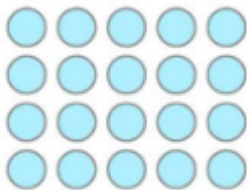
A recurring theme across Mathematics teaching in primary schools is the lack of instant recall of times tables and multiplication.

Developing pupils' reasoning and understanding for instant recall

If we can develop children's working memory with greater reasoning and understanding, there will be an increased transition to their long term memory and times tables can become an instantly recallable fact. All children need to go through these cognitive steps in order to achieve this:

1. Repeated addition

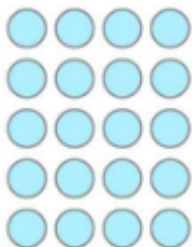
4 x 5 is the same as 5 + 5 + 5 + 5.



Children need experience of [using concrete manipulatives](#) such as counters or multilink cubes and pictorial representations of objects, forming arrays.

2. Multiplication is commutative

4 x 5 is the same as 5 x 4.



Children build on their existing understanding using arrays, turning the arrays around to show that you now have 5 groups of 4 and they will still total 20. This can then be linked to recalling multiplication facts, i.e. if they know their 5 times table as facts but not their 4 times table, they can use 4×5 to work out 5×4 . This link needs to be made explicit.

3. Multiplication is the inverse of division

$20 \div 5 = 4$ can be worked out because $5 \times 4 = 20$.

Again, the use of arrays is key. Children need experience of pulling arrays apart into groups or sharing. After basic experience has been gained, the children should start to 'see' an array structure as 5 groups of 4 equal 20 **and** 20 can be split into 5 groups of 4.

4. Number families

$4 \times 5 = 20$, $5 \times 4 = 20$, $20 \div 5 = 4$, $20 \div 4 = 5$

Due to their commutative understanding, by now children should also be able to see whole number families. For many children this will need to be pointed out and discussed. Most children will be able to explore this in its abstract form but if in doubt, go back to arrays.

From here it is only a short jump to understanding that any missing number can be worked out through knowledge of number families, e.g. $4 \times [] = 20$ or $[] \div 4 = 5$. There are other methods children can use to work out missing numbers but our goal is to increase working memory in order to increase instant recall from long term memory. Being able to bounce around a number family will achieve that.

1,2,3... Counting is key

Counting will start before beginning to develop understanding and reasoning but will continue long after, until all times tables can be counted through sequentially at speed.