

## Extension ideas for the investigation "Tables without Tens"

The investigation can be extended in a number of ways:

1. Instead of using just the units try using the digital roots of the tables.  
(The digital root is the number you get from 1 - 9 when you add all the digits of a number together.  
For example, the digital root of 24 is 6 because  $2 + 4 = 6$  and of 49 is 4 because  $4 + 9 = 13$  and  $1 + 3 = 4$ .)
2. Compare the 'table square' with a standard 100 square. (Or one just showing units!)  
How many times does each digit appear in both of these? Explain.
3. What happens when you multiply diagonally opposite corners of a square drawn on a 'table square'? Compare this with the units-only square.  
Does it work with all rectangles or only squares?
4. The same process as the whole of this investigation can be done using a different Modulo such as 6, instead of using Modulo 10 (which is the same as units only).  
A whole lot of new predictions, patterns and reversals arise.
5. Behind this problem is an important kind of arithmetic called 'modular' or 'clock' arithmetic. A search for either of these terms on the NRICH website should yield some interesting problems and articles on this topic.