

## Table digital roots

*Children find the digital roots of multiples of 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. They identify patterns and relate these to what they know of numbers.*

## Skills practised:

- Recalling times tables facts to 12 x 12

**Conjecture:** *There are patterns in the digital roots of tables which relate to the properties of numbers.*

### What to do:

*Children work in groups of 3 or 4.*

*You will need circles with 9 dots on the circumference evenly spaced and numbered 1-9.*

1. Children share out the times tables from 1 to 12, having 2 or 3 or 4 each and making sure that everyone has at least one 'hard' table and at least one 'easy' table.
2. Write out the multiples from the 1st to the 12th.
3. Add the digits of each answer and keep adding until you have the digital root of each multiple up to the 12th.

8 → 8  
16 → 7  
24 → 6  
32 → 5  
40 → 4  
48 → 12 → 3  
etc.

4. Repeat this with another times table.
5. Check that, between you, you have covered every table from 1 to 12.
6. Compare patterns.

**CHALLENGE:** Which tables have the same patterns of digital roots? Can you spot the pattern? Together, make a hypothesis.

7. Draw the pattern of the digital roots by joining points on a circle where the circumference has 9 equally spaced marks.
8. Check your hypothesis.

### Aims:

- To understand more about divisibility
- To identify patterns in the times tables and relate these to the properties of numbers

### Minimum number of calculations expected

36

## Table digital roots

- Choose a times table.  
Write out the multiples from the 1st to the 12th.
- Add the digits of each answer and keep adding until you have the digital root of each multiple up to the 12th.
- Repeat this with another times table.
- Check that, between you, your group has covered every table from 1 to 12.
- Compare patterns.

<input type="radio"/>			
<input type="radio"/>	$1 \times 8 = 8$	$\rightarrow$	8
<input type="radio"/>	$2 \times 8 = 16$	$\rightarrow$	7
<input type="radio"/>	$3 \times 8 = 24$	$\rightarrow$	6
<input type="radio"/>	$4 \times 8 = 32$	$\rightarrow$	5
<input type="radio"/>	$5 \times 8 = 40$	$\rightarrow$	4
<input type="radio"/>	$6 \times 8 = 48$	$\rightarrow$	12 $\rightarrow$ 3
<input type="radio"/>	...		
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### Challenge

Which tables have the same patterns of digital roots? Can you spot the pattern? Together, make a hypothesis.

- Draw the pattern of the digital roots by joining points on a circle where the circumference has 9 equally spaced marks.
- Check your hypothesis.