Nines to zeros	**Skills practised:**
Children repeatedly add 9 or 19 to numbers until they get a multiple of 10, and look for patterns.	• Adding 9 and 19 to single-digit and two-digit numbers

Conjecture: If you carry adding 9 or 19 to a chain of numbers, you eventually get to a multiple of 10. We can predict which multiple of 10 we will end on.

What to do:

Children work individually or in pairs.

1. Choose a number less than 10, e.g. 4. Add 9 and write down the answer. Add 9 to the answer and write down the new answer. Carry on adding 9 until you get to a multiple of 10, a number that ends on zero.

<p style="text-align:center;font-size:2em;">4 13 22 31 40</p>

2. Start with a new number less than 10 and carry on adding 9 until you end up with a multiple of 10. Do you notice anything?

3. Choose other numbers less than 10 and see if the same things happens.

Can you guess which multiple of 10 will be the number you end up on?
Can you guess how many additions you will need to do until you end up on a multiple of 10?

4. Zak chose a number less than 10 and added 19. He added 19 to his answer, and added 19 to his new answer, and so on and ended up at 100!
    Work out which number he started on.

HINT: You don't have to try every number! Think about what you learned by adding 9...

5. Choose your own numbers less than 10 and keep adding 19 until you get to a number which is a multiple of 10.

Do you notice anything about the number you started on and the number you finish on? Does this always happen? Can you guess how many additions you will need to do until you finish on a multiple of 10?

6. Katya chose a number less than 10 and kept adding 21. She stopped at 99.
    Work out what number she started on.
    If she wanted to finish at 100, what number could she have started on?

CHALLENGE: Can you use what you have found out to subtract 9? Choose a multiple of 10. Keep subtracting 9 until you reach a number less than 10. Before you do this, can you guess which number you will finish on? How many times do you think you will need to subtract 9?

Aims:	**Minimum number of calculations expected**
– To spot relationships between numbers – To use patterns to add and subtract – To consolidate understanding of multiples of 10 – To begin to make and test predictions	12-15

Nines to zeros

1. Choose a number less than 10.
Add 9 and write down the answer.
Add 9 to the answer and write down
the new answer. Carry on adding 9
until you get to a multiple of
10, a number that ends on zero.

4, 13, 22, 31, 40

2. Start with a new number less than 10
and add 9 until you end up with a
multiple of 10. Do you notice anything?

3. Choose other numbers less than 10
and see if the same things happens.

   Can you guess which multiple of 10 will
be the number you end up on?
Can you guess how many additions you
will need to do until you end up on a
multiple of 10?

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added 19 to his new answer, and so on and ended up at 100!
Work out which number he started on.

5. Choose your own numbers less than 10 and keep adding 19 until you get to a number
which is a multiple of 10.
Do you notice anything about the number you started on and the number you finish on?
Does this always happen? Can you guess how many additions you will need to do
until you finish on a multiple of 10?

6. Katya chose a number less than 10 and kept adding 21. She stopped at 99.
Work out what number she started on.
If she wanted to finish at 100, what number could she have started on?

Challenge

Can you use what you have found out to subtract 9? Choose a multiple of 10. Keep
subtracting 9 until you reach a number less than 10. Before you do this, can you guess
which number you will finish on? How many times do you think you will need to subtract 9?