TIMES NINE

$$0 \times 9 + 1 =$$
$$1 \times 9 + 2 =$$
$$12 \times 9 + 3 =$$
$$123 \times 9 + 4 =$$
$$1234 \times 9 + 5 =$$
$$12345 \times 9 + 6 =$$
$$123456 \times 9 + 7 =$$
$$1234567 \times 9 + 8 =$$
$$12345678 \times 9 + 9 =$$
$$123456789 \times 9 + 10 =$$

Complete these calculations.

What do you notice?

To explain how the patterns of numbers arise:

Either change from multiplying by 9 to multiplying by (10 – 1)

or use the table below first completing the calculations on each line.

The picture shows the pyramids in the background because this number pattern, and others like, it were known to the ancient Egyptians.

100 000 000 × 9 =	
20 000 000 × 9 =	
3 000 000 × 9 =	
400 000 × 9 =	
50 000 × 9 =	
6 000 × 9 =	
700 × 9 =	
80 × 9 =	
9 × 9 =	
123 456 789 × 9 =	

HELP

The Game is to help you to understand how and why the pattern works – there is no competition here. Play with a friend if you can.

PLAY THE GAME: Cut out the strips on page 3.

Write down the multiples of 9 from 9 to 99 before you start.

Mix up the strips.
Fill in the answer in the last box on the right hand end of each strip.
Arrange the strips in order.
Talk about how the patterns come about and why they occur.

NEXT

What do you notice about this pattern of numbers?

Can you explain why the pattern occurs?

Work out the numbers to replace the ? marks.

$$? \times 9 + 7 = 88$$
$$? \times 9 + 6 = 888$$
$$? \times 9 + 5 = 8888$$
$$? \times 9 + 4 = 88888$$
$$? \times 9 + 3 = 888888$$
$$? \times 9 + 2 = 8888888$$
$$? \times 9 + 1 = 88888888$$
$$? \times 9 + 0 = 888888888$$

$0 \times 9 + ? =$	1	$? =$
$1 \times 9 + ? =$	11	$? =$
$12 \times 9 + ? =$	111	$? =$
$123 \times 9 + ? =$	1 111	$? =$
$123\ 4 \times 9 + ? =$	11 111	$? =$
$123\ 45 \times 9 + ? =$	111 111	$? =$
$123\ 456 \times 9 + ? =$	1 111 111	$? =$
$1\ 234\ 567 \times 9 + ? =$	11 111 111	$? =$
$12\ 345\ 678 \times 9 + ? =$	111 111 111	$? =$
$123\ 456\ 789 \times 9 + ? =$	1 111 111 111	$? =$