

# Unit 1: Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000

Content domain reference: 5N1

## Prerequisites for learning

- Count forwards or backwards in multiples of 10 and 100 for any given 3-digit number
- Use place value to add and subtract 10 and 100 from any 3-digit number
- Understand the place value of 7-digit numbers

## Learning outcomes

- To count forwards and backwards in steps of 100, 1000, 10 000 and 100 000
- Work out 100, 1000, 10 000 and 100 000 less than / more than mentally

## Background knowledge

- Pupils often want to use a column method to add or subtract what they see as large numbers, such as 100, 1000, 10 000. This lesson encourages pupils to use place value to just change the relevant digit(s).
- Care needs to be taken over the place value bridges of 1000, 10 000 and 100 000, helping pupils to understand, for example, that 9 hundreds + 1 hundred = 10 hundreds = 1 thousand. Practice in counting over these bridges, forwards and backwards is an important skill.

## Teaching Activity 1a 10 minutes

### Count forwards or backwards

- Count on and back in jumps of 100, 500, 1000, 5000 and 10 000 over the 'bridges':  
1459, 1559 ....1959, 2059....  
750, 800, ....., 1000, 1050...  
97 000, 98 000, 99 000, 100 000, 101 000....  
370 000, 380 000, ... 410 000....  
1234, 1134, 1034.....  
4500, 4000, 3500....  
6589, 5589, 4589....
- Ask pupils to suggest a 4-digit or 5-digit number and another pupil to suggest what the steps forward or back or use the cards suggested in the resources to generate both the number and the function.

## Key vocabulary

Number sequence; function, function machine

## Resources

0–9 digit cards (1 pack per pupil); calculators; large teaching calculator; box to represent a function machine; 8 cards with 100, 1000, 10 000, 100 000, forwards, backwards, less than, more than written on them (optional)

## Teaching Activity 1b 10 minutes

### Count forwards or backwards

- Make a 4-digit start number out of digit cards. Start with 'adding' 100 by changing the hundreds digit by 1 each time. Continue until a thousand bridge is crossed, changing then both the hundreds and thousands digits. Why do we need to change two numbers now? [Because the 9 becomes 10, so we need to change the next column as well.] Say each number, write the numbers as a sequence, then say the whole sequence together: 3756 3856 3956 4056 4156...
- Repeat, counting back in steps of 100. Why do we only need to change one digit? [because only the hundreds are changing]When will we need to change 2 digits? [when the thousands change]
- Repeat, starting with a 5-digit number, adding /subtracting 1000: 12345, 13345 etc.
- Repeat with 6-digit number, adding / subtracting 10 000.

- Check understanding by counting on and back in steps of 100 in 5 and 6-digit numbers and of 1000 in 6-digit numbers. Can you say the next number before I change the digit card?

## Teaching Activity 2a 15 minutes

### Work out 100, 1000, 10 000 and 100 000 less than / more than

- Shuffle two packs of digit cards to generate 5 and 6 digit numbers. Explain that they are going to work out 100, 1000, 10 000 and 100 000 less than / more than this number by just changing one digit (although sometimes you may need to change two digits – can you spot the pattern of when this is likely to happen?)
- Use another set of digit cards to change the relevant digit. What is the number 1000 less than this one? Which digit needs to change? What is the number 10 000 more than this one? Make the link with addition and subtraction: 10 000 more than is the same as adding 10 000; 1000 less than is the same as subtracting 1000. Why do you not need to write this down to add /subtract it?
- Check whether they can identify the numbers without using the digit cards. If they cannot, they should use the digit cards to complete the practice page.

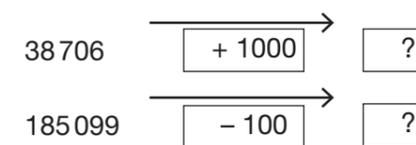
## Teaching Activity 2b 15 minutes

### Work out 100, 1000, 10 000 and 100 000 less than / more than.

- Use digit cards to generate 4–6 digit numbers, placing them to the left of the 'function machine box'. A tissue box or similar will do. Place the large calculator on top of the box, explaining that this machine, which we call a function machine, is going to change the number in some way. Start with 100 more / less. The function machine is going to swallow this number and when it comes out, it will be 100 more. Enter the number on the calculator and add 100. Show the output number, e.g. 27 435 goes into the machine and 27 535 comes out. Repeat with other input numbers
- Repeat for 100 less, 1000 more / less, 10 000 more / less.
- Now put an input number on the left of the box and an output number on the right to challenge pupils to work out what the calculator has done, e.g. 45 692 and 44 692 means the calculator has subtracted 1000. Challenge them with some that go over place value bridges but the children could also practise more straightforward ones if necessary:

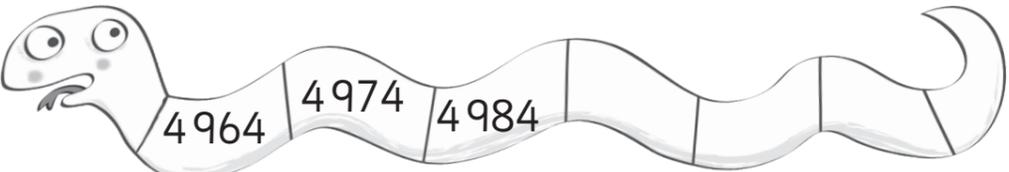
Input	Output	Function
2996	3096	+ 100
23 908	24 008	+ 100 (not + 1000)
399 800	400 800	+ 1000
502 375	492 375	- 10 000

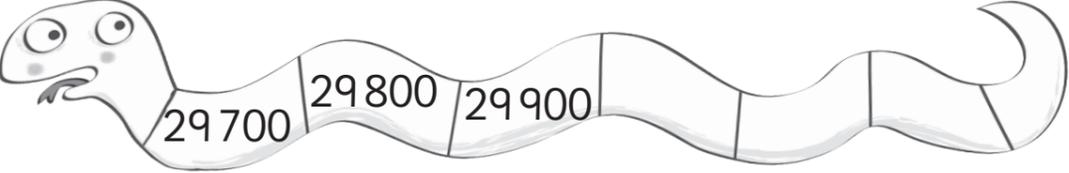
- Finally, draw some function machines, like the ones below, to prepare them for the practice sheet, working out the output number.

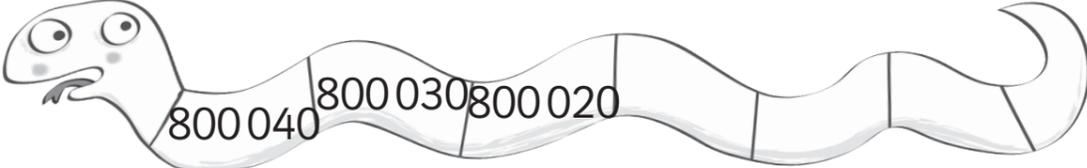


**Unit 1:** Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000

1. Fill in the snakes to complete the number sequences.  
Identify the size of each step.

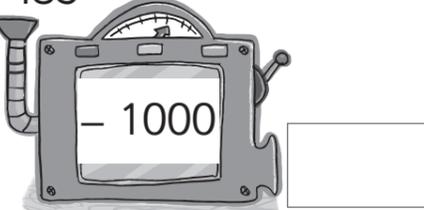
a)  4964 4974 4984

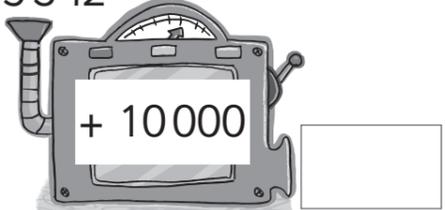
b)  29700 29800 29900

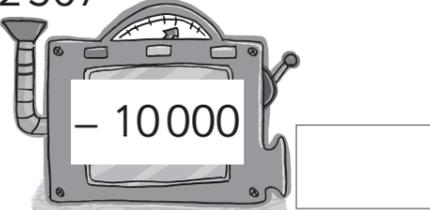
c)  800040 800030 800020

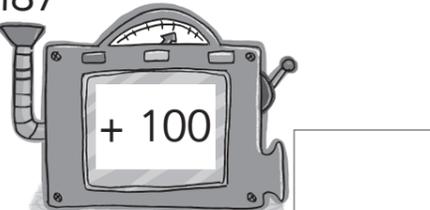
2. Work out which numbers come out of the machines

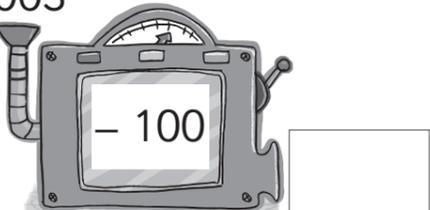
a) 23567   **Hint:** 1000 more than 23567

b) 34985 

c) 265392 

d) 892507 

e) 987 

f) 1003 

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1. In these pairs, how much more or less is the second number?  
The first one has been done for you

- a) 83 450 84 450 1000 more
- b) 712 900 702 900 \_\_\_\_\_
- c) 80 754 79 754 \_\_\_\_\_

2. Complete each number sequence

- a) 87 490 87 590 87 690
- b) 24 875 23 875 22 875
- c) 235 600  $\frac{1}{2}$  245 600 255 600

3. Work out

- a)  $23\,870 + 1000 =$
- b)  $48\,921 - 1000 =$
- c)  $67\,200 + 10\,000 =$
- d)  $145\,892 - 10\,000 =$

4. a) Which number is 1 000 more than 129 300?

b) Which number is 10 000 less than 205 650?