# Same-Day Intervention: **Counting in Steps of 100 000**

**Children will learn to apply the pattern of counting on or back in steps of 100 000 from any given six-digit number.**

## Pre-Intervention Check

To access this intervention, can the children... *Tick as appropriate.

**...count fluently in steps of powers of 10 up to 10 000 from any given five- or six-digit number?***

**...represent any given six-digit number with concrete resources and on a place value chart?***

## Explaining the Gap in Mathematical Understanding

Working with five- and six-digit numbers is a significant leap for many year 5 children. As they may have had limited experience of counting with larger numbers, setting aside time to count aloud is important to foster fluency. Children may be hesitant when counting in steps of powers of 10 and make errors, such as changing the wrong digit or reciting the wrong number.

***For example, when counting in steps of 100 000 from 230 124, they may count 230 124, 330 124, 330 125, 330 126, stumbling at each step.***

Children need to be able to see the counting pattern for themselves, supported by the use of a place value grid or Gattegno chart, for example, so they can see that only the hundred thousands digit is changing each time. Identifying multiples of 100 000 and missing numbers in counting sequences will support children in mastering this skill, which is crucial for mental calculation.

## Preparation

- **Place value grid**
- Sticky notes
- **Place value chart** (laminated)
- Place value counters (up to 100 000)
- Whiteboards and pens
- **Counting in steps of 100 000: sequences activity sheet.**
- **Secret number grid**

## Key Vocabulary

- Ones, tens, hundreds, thousands, ten thousands, hundred thousands
- Digits
- Count on, count forwards, count back, count backwards.
- Increase, decrease

## Addressing the Gap

Children will use a **place value grid** to help them relate counting in steps of 100 000 to counting in steps of 10 000 and 1000. They will then work out which multiples of 10 00 and 100 000 are missing from the grid. Children will use place value counters in a **place value chart** to count in steps of 100 000 from different five- and six-digit numbers. They will explore the patterns they hear and will look carefully at what happens to the digits in the written numbers as they count forwards and backwards in steps of 100 000. They will then learn to make predictions about which numbers will or will not appear when counting in steps of 100 000 from a given starting number, by carefully observing the digits in the numbers. They will finish by finding the missing numbers in a variety of number sequences that count forwards and backwards in steps of 100 000.

## Key Questions for Deepening Understanding

Ask children to count forwards and backwards in steps of 1000 using the **place value grid** and identify what is happening to the digits. Cover a selection of numbers with sticky notes (see image below).


Ask children to count aloud in steps of 10 000 and 100 000 and then to write down the missing numbers.

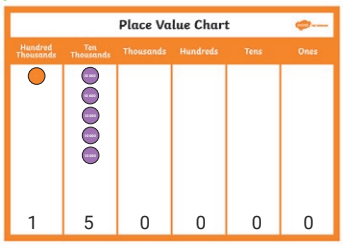
- **Which number is missing? How do you know? How do the numbers above and below each row help? How can you use place value to find the missing number? Can you write the missing number on the sticky note?**

Demonstrate the links between counting in steps of 1000, 10 000 and 100 000 by looking at the repeating patterns of the digits. Establish that the initial digit increases or decreases by one as they count from left to right or right to left. Draw attention to the change in place value as they move up or down a row (as the numbers become ten times larger or smaller). Focus on the ten thousands row and encourage children to practise counting forwards and backwards fluently.

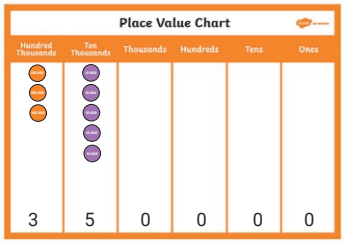
- **What patterns do you notice as we count? How does counting in steps of 1000 help you count in steps of 10 000 and 100 000?**
- **Which digits do you notice changing as we count? Which digits always stay the same? What is the value of the digit that is changing?**

Make 150 000 in the **place value chart**, using place value counters.

- **What is the value of the number I have made in the chart? Can you write it down?**




- **How many counters are in this column? What digit do I write in this column if there are ____ counters?**
- **What digit do I write if there are no place value counters in that column? Why is the placeholder zero important?**
- **Which digit do we need to change each time we add another hundred thousands counter? Which digits stay the same? Why do you think the other columns stay the same?**
- **Why does only the hundred thousands digit change when we count in steps of 100 000?**
- **Why is the 50 000 in the ten thousands column still important to remember when we are counting in steps of 100 000 from 150 000?**




Continue to use the place value chart and counters and introduce counting from five- and six-digit numbers that have digits in other place value columns, e.g. 294 000, 90 500 and 18 270. When children are fluent in counting from a given number, ask them to record the same count in their own place value charts and to look carefully at which digits change and which digits remain the same when counting forwards and backwards in steps of 100 000.

- **Which place value columns have counters in them? What is the value of each column? Can you say the number I've made in the chart?**
- **Can you say the number I will make when I add another hundred thousands counter to _____?**
- **Which place value columns change when we add 100 000? Which remain the same? Can you write the new number in the place value chart?**

## Key Questions for Deepening Understanding (Continued)

- Which digits change when I count back from _____ in steps of 100 000? How do the digits change?
- When you write the count in your place value chart, what patterns do you notice about the digits?
- What is 100 000 more/less than 194 000? Prove it.
- What happens when we add 100 000 to 90 500? Which column now has a place value counter in that did not before? Have the other columns changed? Why not?
- What number will come after 18 270 when we count on one step of 100 000?

Make a six-digit number using counters in the place value chart, e.g. 106 800. Ask children to predict if certain numbers will appear when counting forwards or backwards in steps of 100 000 from that given starting number. Encourage them to identify which digit in the number will change to fit the count.

- If I count forwards in steps of 100 000 from 106 800, will I say 406 800? How do you know? Which digit should have changed? Have the correct digits remained the same? How could you check using the equipment?
- If I count backwards from 806 800, will I say 6800? How do you know? How could you test your prediction by counting back? Can you use the equipment to help? Can you predict another number I will say if I count backwards in steps of 100 000 from 806 800?
- Will I say 905 000 if I count forwards in steps of 100 000 from 50 000? What about 450 000? How did you know which one was incorrect? Which digits changed that should not have? Prove it using the equipment.
- Will I say 193 050 if I count backwards in steps of 100 000 from 993 500? What about 793 500? How do you know? Prove it.

Show children the counting sequences from the **Counting in steps of 100 000: sequences activity sheet**. Discuss which numbers could be missing in each sequence, using the equipment to support.

- Which direction is the count going in? Is the sequence increasing or decreasing by 100 000 each time? How do you know?
- Which digit is changing? Which digits are staying the same?
- How does the next/previous step in the sequence help you work out the missing step?

## Additional Opportunities to Reinforce Learning

Give each pair a copy of the **secret number grid**. Player one secretly chooses a number on the grid without revealing that number to player two. Player one then says out loud the number which is either 100 000 more or 100 000 less than their chosen, secret number and writes it down. Player two points at the number which they think is the 'secret number' that player one has chosen. If they are correct, they win a point. Players swap roles. The first player to ten points is the winner.

As an extra challenge, the game can be played as above but with player two now also having to say the next three numbers that would come after the secret number when counting in steps of 100 000.

## Home Learning Slip

Today, at school, your child has been learning to count fluently in steps of 100 000 using any six-digit number as a starting point, e.g. 150 000, 250 000, 350 000, 450 000 and so on. To support your child further with this concept, you could play the 'secret mistake' game together. Start with a six-digit number (e.g. 160 500) and take it in turns to say the next number in the sequence, e.g. 260 500, 360 500, 460 500 and so on, in this case up to 950 500. Then, count backwards in steps of 100 000, returning to 60 500. When your child is confident with this, tell them that, at some point during the counting, you are going to say a number which is not in the sequence – this number is the secret mistake. If they hear a secret mistake number, they should stop counting and call out 'Mistake!' For example, '260 500, 360 500, 460 500, 570 500… Mistake!' Repeat with a variety of five- and six-digit numbers until your child has gained in confidence and fluency.

**Thank you for your support with this. Your help will really make a difference to your child.**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