

# Has inefficient counting strategies and/or insecure understanding of the number system

*Opportunity for: developing mental images*

### Resources

- Place value (arrow) cards
- Counting stick
- Sticky notes

### Key vocabulary

- |                        |                          |
|------------------------|--------------------------|
| count in tens/hundreds | ten/hundred more         |
| start at               | count forwards/backwards |
| next two numbers       | boundary                 |
| one before/after       | digit                    |

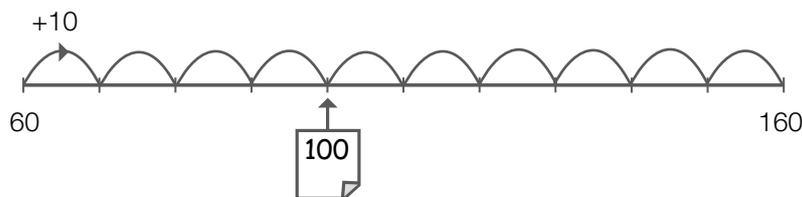
### Teaching activity

**Time** 15–25 minutes

‘We are going to do some work on counting, so that you feel confident with counting even with very large numbers.’

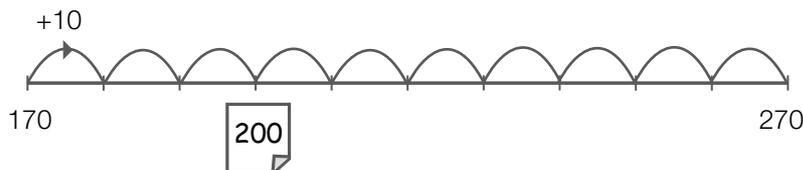
**?** Count with me in tens along the counting stick to one hundred. Now you count back to zero.

**?** What if I make this end of the counting stick 60 and the other end 160 and you count in tens forwards and backwards?



If the child gets stuck after 90 or 100, mark 100 with a sticky note and repeat the count with the child. Watch out for 90 being seen as 19 followed by 20 and/or the child not knowing that 110 is after 100.

Repeat, going backwards and forwards, with a start of 170 on the left-hand end. You could record some of the numbers on an empty number line so that you can come back to them later.



Make sure the child can count through the 190 and 200 boundary.

If the child needs more help with boundaries, repeat with more examples, recording some and maybe making some of the numbers with place value cards.

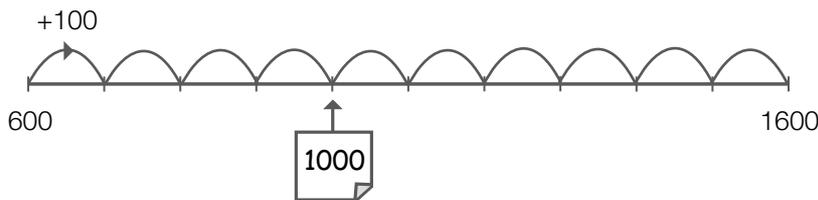


**?** If this end of the counting stick is zero and we count in jumps of one hundred, what do you think that end number will be?

Support the child counting to one thousand, then back again.

Repeat with other starting points, for example six hundred.

Listen carefully to make sure the child can deal with the one thousand to one thousand one hundred boundary. You could mark it with a sticky note.



Point to individual numbers on the counting stick.

- ? What is this number? How do you know?**
- ? What is a hundred more than that number?**
- ? How would you write this number?**

Repeat with jumps of one thousand on the counting stick.

You, or the child, draw an empty number line with six marks, starting with 70.

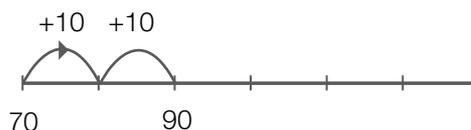


- ? Count up in tens and tell me what the end mark is. (120)**
- ? How did you work that out?**

If the child can't explain or count on and back fluently, help them to record the numbers on the empty number line.

Ask the child to record some jumps of ten, both backwards and forwards. For example:

$$70 + 10 + 10 = 90 \text{ and } 70 + 20 = 90$$



$$\text{or } 120 - 10 - 10 - 10 = 90 \text{ and } 120 - 30 = 90$$

Repeat this activity with another number line with six marks, but this time jumping in hundreds.

Support the child counting up and back with a range of starting numbers, listening carefully to check that the child can move confidently through the boundaries, and is able to draw jumps on a number line and express those jumps as calculations. For example, starting at 700 and counting in hundreds, they might record:

$$700 + 100 + 100 + 100 + 100 = 1100$$

Point to some of the marks.

- ? What is this number?**
- ? Explain to me how you worked that out.**

If the child can't manage this confidently, lay out place value cards and count along them in hundreds.

If this is still hard for them, you could go back to counting in tens and using place value cards, then do some more calculations, particularly focusing on boundaries (see also 1 Y2 +/-).

**? When you add forty and fifty, how many digits in the answer? (2)**

**? What happens when we add forty and sixty?**

Support the child to see that the answer has three digits.

**? Use the place value cards to do another addition where the answer will have three digits.**

If the child needs extra help with this, go back to the counting stick or use an empty number line to show a calculation such as sixty add sixty giving a three-digit answer.

Let the child draw hops of ten along the line.

Repeat with adding hundreds and the change from three-digit to four-digit numbers.

**? What shall we write down today that is important for us to remember?**



'Count in jumps of a tenth, from zero to one.'

## Spotlight 1

Has inefficient counting strategies and/or insecure understanding of the number system

**Opportunity for: working systematically**

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### How much money?

**Time** 20–25 minutes

#### Resources

- Forty-eight 1p coins, twenty-one 10p coins and two £1 coins
- Place value board, concealing column headings (Th H T U)
- Number cards 0–10 (Resource sheet 1)
- Place value (arrow) cards

#### Key vocabulary

- count in tens/hundreds
- start at
- next two numbers
- one before/after
- ten/hundred more
- count forwards/backwards
- boundary
- digit
- column

#### Teaching activity

'Today we are going to count up some money and we're going to use this place value board to help us.'

**? Have you used a place value board like this before?**

Thousands	Hundreds	Tens	Units
	3	3	3

? **When we do tens and units calculations, which headings could we give to these columns?**

Reveal the column headings.

Talk through with the child that ten units make one ten, then ten tens make one hundred and ten hundreds make one thousand.

Put a number card (e.g. 3) on one of the columns, for example the tens.

? **What is the value of the three when it is in that column? (*three tens*)**

? **Move the three so that it has the value of three hundred.**

Show the coins.

? **What do you think might be the best way to find out how much money we have here?**

Talk through the child's strategies. Then let the child start to count. Carefully observe what they do.

Encourage them to separate the coins into the three different kinds, then count first the 1p coins, in twos, and put them in either fives or tens so that the count can be checked. Watch out for inaccurate counting.

? **How can you check that you are right?**

If the child counts inaccurately, support them to be systematic, grouping the coins so that they can be checked (see also 1 YR +/-).

? **How many 1p coins?**

? **Which column could they go in on the place value board?**

Talk through how we write the number forty-eight, meaning four tens and eight ones, supporting with place value cards.

Thousands	Hundreds	Tens	Units
		40	8
		4	8

? **What could we do to these 1p coins so that we still have 48p but we have fewer coins?**

Support the child in exchanging ten 1p coins for one 10p coin.

If the child has found the counting hard, you might want to focus on just counting coins for the rest of the session.

Repeat the counting of the coins, placing appropriate numbers on the place value board, making the number with place value cards and writing the amount of money.

		4	5	8
Thousands	Hundreds	Tens	Units	
	4	5	8	

- ? **How many pennies in £4.58?** (*four hundred and fifty-eight*)
- ? **Do you think you did well with the counting?**
- ? **What could you have done even better?**



When we write a number as 4.58, what is the value of the five?

## Spotlight 2

Has inefficient counting strategies and/or insecure understanding of the number system

**Opportunity for: exploring mathematical ideas**

### Biggest, smallest

Time 15–20 minutes

#### Resources

- *Place value chart* (Resource sheet 39)
- Number cards 1–10 (Resource sheet 1)
- Tens number cards (Resource sheet 24)
- Hundreds number cards (Resource sheet 25)
- Thousands number cards (Resource sheet 26)
- Tenths number cards (Resource sheet 27)
- Base 10 equipment such as straw bundles

#### Key vocabulary

- count in tens/hundreds
- start at
- next two numbers
- one before/after
- ten/hundred more
- count forwards/backwards
- boundary
- digit

#### Teaching activity

Prepare the number cards all on the same colour of card and mix the cards up. (At first use just the tens, hundreds and thousands, but include 1–9 if appropriate.)

‘Today we are going to be reading some more numbers, sorting them and doing some more counting in tens, hundreds and thousands.’

Show the cards and ask the child to read the numbers on the first few, at least one of each kind.

- ? **Can you think of a way we could sort these cards into three sets?**

Support the child with sorting them into multiples of ten, one hundred and one thousand.

Observe the child as they sort and ask them for reasons why they are sorting or arranging in particular ways. As they sort, you could ask the names of a few more numbers.

Once the numbers are in three sets, ask the child to lay the tens out in order, and the hundreds below and the thousands below, as on the *Place value chart* (Resource sheet 39).

**? What is the biggest of all of these numbers on the cards? (10 000)**

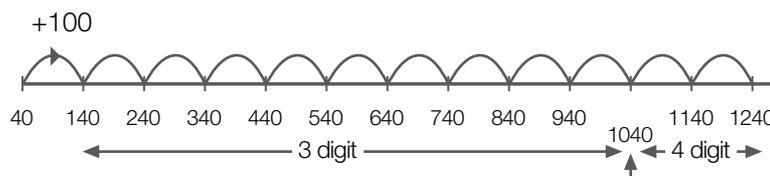
**Point to it on the place value chart.**

**? Which is the smallest number on the cards? (10)**

(When the child is more confident, you can extend the activity to include the decimal tenths cards.)

Using the Base 10 equipment, model some of the numbers. For example, show a thousand bundle of straws or a thousand Base 10 block.

Then do some counting in tens, hundreds and thousands, choosing one of the cards as the starting number, for example:



Starting from forty, count in hundreds: 40, 140, 240, 340, 440, 540, 640, 740, 840, 940.

Support this with number line jumps and adding a hundred bundle of straws at each jump.

**? What is going to happen after nine hundred and forty? (It will be 1040.)**

**? Can you write that number?**

Point out that the number of digits has changed from three to four.

You can support this with number lines or recording some of the calculations in a way the child chooses.

**? How shall we record this calculation?**

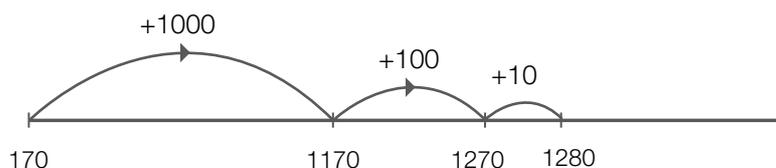
$$40 + 10 + 10 + 100 = 160$$

$$40 + 120 = 160$$

Encourage the child to draw number line jumps as well.

Repeat with other starting numbers, counting backwards and forwards.

You could mix some of the jumps, for example starting at 170, a jump of 1000 to 1170, a jump of 100 and a jump of 10. Remember to do some jumps backwards as well.



**? Are you feeling more confident with counting and adding with tens, hundreds and thousands jumps?**



'Start at five and count in steps of one tenth (0.1) until you get to six.'

# Spotlight 3

Has inefficient counting strategies and/or insecure understanding of the number system

**Opportunity for: making decisions**

## Hidden numbers

**Time** 10–20 minutes

### Resources

- Calculator
- Large book or screen
- Tens number cards (Resource sheet 24)
- Hundreds number cards (Resource sheet 25)
- Thousands number cards (Resource sheet 26)
- Tenths number cards (Resource sheet 27)
- *Place value chart* (Resource sheet 39)
- Place value board (Th H T U)

### Key vocabulary

- |                          |          |
|--------------------------|----------|
| count in tens/hundreds   | boundary |
| start at                 | digit    |
| next two numbers         | column   |
| one before/after         | add      |
| ten/hundred more         | total    |
| count forwards/backwards | equals   |

### Teaching activity

‘Today we’re going to do some more work on counting large numbers, and adding tens, hundreds and thousands. I’ve secretly written some numbers here and I want you to enter them into the calculator and add them together so that your answer on the calculator agrees with my total.’

**? Enter one hundred, then add forty, then press the equals key. What is your answer? (140)**

**? Does it agree with my answer? (Show the child your calculation.)**

Give support by repeating just with three-digit numbers for a while if the child needs this.

Enter two hundred, then add fifty, then add four. (254)

**? Read the number now.**

**? This time there are more numbers to enter. Put in one thousand, add on one hundred, then add forty. Now press the equals key.**

$1000 + 100 + 40 = 1140$

**? Can you read the number to me?**

**? How many digits?**

**? Is it the same as I have written?**

If the two totals are not the same, ask what the child did.

**? When I said one thousand, what did you key in? Show me.**

**? When I said forty, what did you key in?**

If the child needs more help with keying in numbers accurately, you might want to ask them to find each number they enter on one of the number cards from the resource sheets, or point to each part of the number on the *Place value chart* (Resource sheet 39).

3000    200    5

'My number is three thousand, two hundred and five.'

Try some more examples.

$$1000 + 40 + 600 + 2000$$

**? Why has the answer got four digits?**

Try some subtractions.

**? Key in four thousand, now subtract two thousand, five hundred, another five hundred and ten.**

**? Why has the answer only got three digits when we started with four thousand?**

**? Is there another way that you could start with four thousand and key in three numbers and get to the same answer of nine hundred and ninety?**

*(For example,  $4000 - 2500 - 500 - 10 = 990$ )*

**? Can you read this number? (Write down 2030)**

**? Which numbers could you key in to get to that answer on your calculator?**

Support with number cards and/or the *Place value chart* on Resource sheet 39 or a place value board.

Emphasise that there are no hundreds in the hundred column and no units; there is a zero in those columns.

Thousands	Hundreds	Tens	Units
2	0	3	0

**? Did you enjoy working with the calculator? What did you learn today about reading numbers?**



**? If the answer on my calculator is 6430, what four numbers might I have keyed in? (This can be done as an addition or a subtraction or a combination of the two.)**

# Spotlight 4

Has inefficient counting strategies and/or insecure understanding of the number system

**Opportunity for: developing mental images**



## Clever calculating

**Time** 15–20 minutes

### Resources

- Tens number cards (Resource sheet 24)
- Hundreds number cards (Resource sheet 25)
- Thousands number cards (Resource sheet 26)
- Tenths number cards (Resource sheet 27)
- *Place value chart* (Resource sheet 39)
- Number lines
- Base 10 equipment such as bundles of straws

### Key vocabulary

- count in tens/hundreds
- start at
- next two numbers
- one before/after
- ten/hundred more
- count forwards/backwards
- boundary
- digit
- column
- add
- total
- equals
- estimate

### Teaching activity

‘We’re going to do some adding and subtracting today in tens, hundreds and thousands.’ (Later you can extend it to decimals.)

**? Lay the cards out as they are on the place value chart. What is this number? Why does it go above three hundred?**

Ask the child to choose two number cards and to add them, for example, four hundred and one hundred.

**? If you were going to estimate the answer, how many digits would you expect it to have? Why?**

**? How many digits in the answer to thirty add forty? (two)**

**? What about sixty add seventy? (three)**

Go on picking up pairs of cards to add until the child is confident.

If the child still needs more help, you can use bundles of straws or show each calculation as hops along a number line.

Then you pick some cards for adding.

**? What is thirty add thirty? What is three hundred add three hundred?**

**? Which is the larger answer? (300 + 300 = 600)**

**? How is thirty add three hundred add three thousand different from the first two questions? How many digits in the answer? (four)**

**? Estimate the answer.**

You might want to stick to addition for the rest of the session and come back to subtraction at a later time.

Now do some subtraction.

? **What is seventy subtract thirty? ...seven hundred subtract three hundred? ...seven thousand subtract three thousand?**

? **How did you work it out?**

? **What is seven thousand subtract three thousand? ...seven thousand subtract thirty?**

End with:

? **If you added three two-digit numbers, would you estimate the answer to be above or below a thousand?**



'Write a subtraction calculation that has the answer ninety. You can use very large numbers, but you must know the names of the numbers.'

Encourage children to use decimals as well, if appropriate; for example,  $90.2 - 0.2 = 90$ .

## Spotlight 5: a learning check

Has inefficient counting strategies and/or insecure understanding of the number system

**Opportunity for: explaining and discussing**

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### How many digits?

**Time** 5–15 minutes

#### Resources

- Tens number cards (Resource sheet 24)
- Hundreds number cards (Resource sheet 25)
- Thousands number cards (Resource sheet 26)
- Tenths number cards (Resource sheet 27)
- Timer
- *Blank loop track* (Resource sheet 21)
- At least two children

#### Check: does the child use key vocabulary?

- |                              |          |
|------------------------------|----------|
| count in tens/hundreds       | boundary |
| start at                     | digit    |
| next two numbers             | column   |
| one before/after             | add      |
| ten/hundred more             | total    |
| count forwards/<br>backwards | equals   |

### Teaching activity

‘This game, **How many digits?**, will help you with counting and with adding tens, hundreds and thousands.’

Choose which cards are suitable for the children (for example, just the tens and hundreds) and put these in a bag.

Children could cooperate in pairs.

#### How to play

1. The children each take a card from the bag and put them on the table. For example, 200 and 60.
2. They must estimate the answer, add the numbers in their head and say how many digits there will be in the answer.
3. If they get the total correct, they score one hundred points. If they get the number of digits in the answer correct, they win one hundred points.
4. They then put the cards back in the bag and take two more, and so on.
5. They can play until they score a total of one thousand points. If you set a timer, you could see how long it takes to score one thousand points, then play again so that children can try to beat their personal best time.

#### Variations

- Play with the rules above, but instead of scoring points, move the number of digits in the answer around the loop track on Resource sheet 21.

So if cards 40 and 80 are taken, the answer is a three-digit number so move three spaces. You might want to turn this game into a race, with one pair racing to get around the track faster than another pair. (But remember it is a game of luck!)

- ↑ ● Play by taking more than two cards. This is harder.
- ↑ ● For a really challenging game, play with the decimal number cards from *Tenths* (Resource sheet 27) as well.

### ***Learning outcomes***

By the end of this set of activities children should be able to:

- tackle related learning tasks with increased motivation and confidence;
- use and understand connected mathematical vocabulary;
- count a large number of objects accurately using efficient counting strategies and check the count;
- count in tens, hundreds and thousands, including counting up and down through boundaries;
- add and subtract multiples of ten, a hundred and a thousand;
- read numbers up to nine thousand including those with zero place holders;
- understand the magnitude of the digits in a four-digit number;
- understand that the number system works in groups of ten.