Makes mistakes when counting using teen numbers and/or crossing boundaries

Opportunity for: exploring mathematical patterns

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Resources

- Large digital clock or stopwatch that can be adjusted quickly and easily when both increasing and decreasing the display

Key vocabulary

what comes next?	count back	nine
pattern	forwards	ten
one before/after	backwards	eleven
count on	units changing	twelve

Teaching activity

Time 10–15 minutes

'We are going to look at some number patterns that we can find on clocks and the ones you might see on the video counter when I show you a taped programme.'

Show the clock or stopwatch with the time set at: `00:01`

(Alternatively, set the hours to represent the real time.)

With the child, count up in ones and change the time accordingly. Read the time as one minute or second, two minutes or seconds, and so on, whatever fits best with your timer.

Stop at: `00:09`

Establish that it says nine minutes or seconds.

? **What will the clock show after one more minute/second?**

If the child recognises it will be ten, confirm the answer and move on.

> If the child does not know, reset the clock to 00:01 and count together up to 00:10.
>
> Emphasise the change from 09 to 10.
>
> Repeat so that the child can predict what will happen.

Continue the count past 10 to 19, adjusting the clock with the count to show 00:19.

? **What did the clock show before 19?**

If the child recognises it was 18, repeat the question to identify 17, then 16, and so on back to 10. Emphasise the pattern in the teen numbers, with the 1 fixed and the units changing.

> If the child does not know 18 is before 19, reset the clock to show 00:10.
>
> Together count up to 19 adjusting the clock as before. For each of the numbers displayed say the numbers together twice.
>
> For different teen numbers, hide the clock face and ask the child what number was shown. Repeat this hide-and-show approach, then ask the child to adjust the clock and carry out the hide-and-show with you as the learner.

Set the clock to show 00:19.

? What will the clock show after one more minute/second?

If the child recognises it will be 20, continue the count to 29, crossing the boundary to 30 and move on to 40 and 50. Emphasise the pattern in the digits and the cross from 29 to 30, 39 to 40, and 49 to 50.

Give the clock to the child and ask them to adjust the clock, moving backwards in ones and identifying the numbers displayed.

Emphasise the crossover from 50 to 49, 40 to 39, and 30 to 29.

> If the child does not know that 20 is after 19, reset the clock to 00:09 and re-emphasise the change from 09 to 10 with the child.
>
> Quickly count up to 19 and adjust the clock to show 00:20.
>
> Say 'this is 20', and compare the patterns in the numbers from 09 to 10 and from 19 to 20. Count up to 29 and identify the common pattern in these numbers and the crossover from 29 to 30. Allow the child to adjust the clock and tell you the numbers displayed. Ask them to show you the number 19 and to say what the next number is and confirm it. Repeat using other numbers, with the child in charge of the clock.

? What shall we write down that is important to remember?

? Which number comes after 99? … 999? … 9999?

Spotlight 1

Makes mistakes when counting using teen numbers and/or crossing boundaries

Opportunity for: communicating mathematical ideas

Cross the boundary
Time 10–15 minutes

Resources

- Three sets of number cards (Resource sheet 1)
- Number strip (stick together numbers from Resource sheets 1 and 2)
- Bead string
- 100-square
- Cubes

Key vocabulary

what comes next?	count back	nine
pattern	forwards	ten
one before/after	backwards	eleven
count on	units changing	twelve

Teaching activity

'We are going to look carefully at the numbers from zero to twenty today.'

? Can you count up to twenty?

? Can you find those numbers on the 100-square?

> If the child is struggling with this counting, repeat it a few times before continuing.

Put the 0 card on the table.

? **What number comes after zero when we count up?**

? **Find the right card and put it on top of the zero.**

? **Keep counting with the cards.**

? **What happens when we get to nine?**

With two cards display ten. | 1 | | 0 |

? **What is this number?**

> If the child needs help at this point let them look at the 100-square, then relate that to the 0 to 25 number strip.
>
> They might also benefit from counting out nine cubes or beads on a bead string, then another one. You could also remind them of using 'ten trains' (or whatever Base 10 equipment you use).
>
> Then they could continue adding a cube each time for the rest of this session.

Clarify that making ten means making two piles of cards.

? **What comes next after ten?**

Cover the zero to make eleven. Clarify that you have two piles of cards.

? **What happens on a bead string after ten?** *(The colour of beads changes.)*

? **Can you count on using the cards?**

Make sure the child realises that each time they must put the next card on top of the previous card in the units.

When they get to nineteen, stop them.

? **What comes next?**

Make the twenty with two cards and ask the child to count on from twenty-one, placing the appropriate card on top of the units.

Encourage the child to describe what changes and what stays the same as they count up and what happens as they cross the tens boundary.

? **What is special about numbers nine and nineteen?**

? **What happens with the pattern when the units go from nine to the next number?**

? **What did you learn today that we could write down for next time?**

Spotlight 2

Makes mistakes when counting using teen numbers and/or crossing boundaries

Opportunity for: discussing and explaining

Up to fifty-five

Time 10–15 minutes

Resources

- Number strips 0–25, 26–35, 36–45, 46–55 (could be made from Resource sheets 1, 2, 3 and 4)
- 100-square
- Place value (arrow) cards

Key vocabulary

what comes next?	count back	bigger than
pattern	forwards	smaller than
one before/after	backwards	
count on	units changing	

Teaching activity

'We are going to look at some of those special number boundaries again, like nine and nineteen that we talked about last time.'

Put out a number 9 place value card and display other cards, including the 10 and 20, on the table.

? **What number comes after nine? …nineteen?**

> Identify the boundaries for the child and the change from nine to ten and from nineteen to twenty. If the child needs more help, go back to the 0–25 number strip and count through each boundary, also making the numbers with place value cards.

Show the number strip 26–35.

26 27 28 29 30 31 32 33 34 35

? **What number comes before twenty-seven?**

? **What number comes after twenty-seven?**

Emphasise the change in the units digit, the 7, but not the tens digit, the 2. Show this on place value cards.

? **What number comes after thirty-eight? …thirty-nine?**

Ensure the child sees that at this boundary the tens and the units digits change.

> If the child is still unsure, you might need to go back and repeat this Spotlight using bead strings or whatever the child is familiar with for counting and place value.

Repeat with other number strips.

If the child is grasping what is going on, you could add some challenge by not showing all the number strips but asking the child to imagine the strip and tell you what happens at the boundary.

Help the child to use a wide range of the related vocabulary.

Note: You might need to return to this Spotlight over the next few weeks, perhaps using different equipment such as an abacus, if the child is still unsure about boundaries.

Choose a number such as fifty-nine and ask the child, without looking at any number strips or 100-square, to tell you a number smaller than fifty-nine and a number larger than fifty-nine.

? **What should we write down today to remember for next time?**

Spotlight 3

Makes mistakes when counting using teen numbers and/or crossing boundaries

Opportunity for: developing mental images

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Teen numbers   **Time** 10–15 minutes

Resources

- Place value cards
- Number cards 9–20 (Resource sheets 1 and 2)
- 100-square
- Coat-hanger and twenty pegs
- Bundles of straws or other Base 10 equipment
- Bead string

Key vocabulary

what comes next?	count back	nine
pattern	forwards	ten
one before/after	backwards	eleven
count on	units changing	twelve

Teaching activity

'You are getting really good at understanding the patterns we have been looking at in counting when we get to a number that has nine in the units.'

? **What number comes after 9? … 19? … 29? … 39?**

? **Show me the numbers on the 100-square.**

? **Read me the numbers in the second row on the number square.**

? **Can you make ten with place value cards?**

> Support the child to read and name the teen numbers and make them with place value cards.

With the coat-hanger or straw bundles, help the child to show eleven, then twelve, then thirteen.

? **Can you make these numbers with place value cards?**

Demonstrate how the unit number changes and relate that to the coat-hanger, adding one more peg each time.
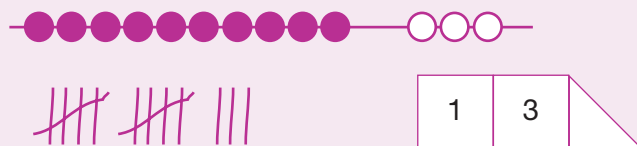
The bead string will show the ten in one colour and a unit added of another colour.

Help the child to count with the equipment up to twenty. Note if the child needs more support in doing this.

Hide all the equipment except the number cards 9–20.

? **Can you pick the cards up in order and tell me the names of all the numbers?**

If the child needs more help you might want to make an interactive display using Base 10 equipment that the child is familiar with, and other images, making each teen number.

? **Can you tell me how thirteen is different from thirty?**

Spotlight 4

Makes mistakes when counting using teen numbers and/or crossing boundaries

Opportunity for: reasoning about numbers

In betweens

Time 10–15 minutes

Resources

- Number cards to 100 that end in 9 (9, 19, 29 and so on from Resource sheets 1, 2, 3, 4, 5, 6, and 7)
- 100-square

Key vocabulary

what comes next?	count back	bigger than
pattern	forwards	smaller than
one before/after	backwards	
count on	units changing	

Teaching activity

'We are going to play a number game today with these cards, and we are thinking a bit more about what happens when the unit digit is nine.'

? **Can you put these cards in order?** *(9, 19, 29, etc.)*

| 59 | 29 | 79 | 99 | 9 | 69 | 39 | 89 | 49 | 19 |

Use a 100-square to support the child.

? **Can you tell me a number that is bigger than forty-nine but smaller than fifty-nine?**

Repeat, gradually building up speed.

When the child is confident, just point between two cards and ask the child to call out a number that goes between those two numbers.

If the child is finding this hard, you might want to make a display of the numbers with nine as the units digit, vertically as in a 100-square, and practise placing numbers using a 100-square to help. Do this over the next few days at odd moments. For example:

? **Tell me a number between thirty-nine and forty-nine.**

Say to the child that this time they are to point to a gap between two cards and you will say a number. Sometimes it will be a number between those on the two cards, but sometimes you will make a mistake. The child has to decide and say whether your number is in the gap or not. Encourage the child to ask the questions in full using the vocabulary 'bigger than' and 'smaller than'.

? **What have you learned today?**

? **What do you want more help with?**

'Write a number that comes between nine hundred and ninety-nine and nine thousand, nine hundred and ninety-nine.'

Spotlight 5: a learning check

Makes mistakes when counting using teen numbers and/or crossing boundaries

Opportunity for: discussing and explaining

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Run in the gap   **Time** 10–15 minutes

Resources   *Check: does the child use key vocabulary?*

● Enlarged number cards ending in 9 (Resource sheets 1, 2, 3, 4, 5, 6 and 7)

● At least eleven children or the whole class

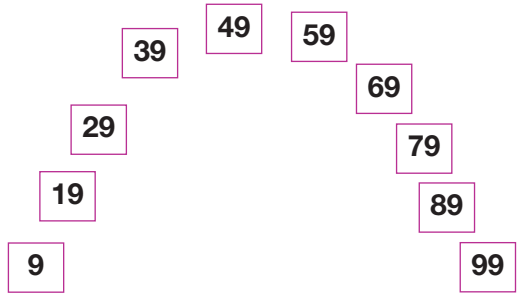| what comes next? | units changing | nine | bigger than |
pattern	count back	ten	smaller than
one before/after	forwards	eleven	
count on	backwards	twelve	

Teaching activity

'This game, **Run in the gap**, will help you with the work we have been doing on how the unit number nine changes when you count to the next number.'

This can be a whole-class game and can be played in a large space.

You might want children to hold hands in pairs, putting a less confident child with a more confident one.

How to play

1. Ten children hold a large number card each and stand in a horse-shoe shape.

2. Someone calls out a number, for example, 'forty-five', and one or more children must run between the gap where 45 would come, so between the child holding 39 and the child holding 49.

3. Everyone who runs between the right numbers wins ten points. Gradually gather speed.

Variations

● Extend the numbers up to two hundred, or further, using number cards 99, 999, 9 999, 99 999 and so on.

● Try playing it with some children hiding the number card they are holding.

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;

● name teen numbers and understand their place value;

● understand boundaries following numbers with nine in the units position;

● order numbers to one hundred and understand the value of the tens and units digits;

● name a number that is smaller or larger/bigger than a given number.