

<p>Resources</p> <p>Counters Multilink Ten Frame Number Lines Dienes Numicon Arrow Cards Bead strings Bar model 100 squares</p>	<p>R Read and understand</p> <p>I Important words and numbers</p> <p>C Choose a method</p> <p>H Have you checked your answer?</p> <p>1. Become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately</p> <p>2. Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language</p> <p>3. Can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions</p>	<p>Progression in number:</p> <p>1 and 2 digits to 20. Bonds to 20. 2 digits with ones, tens and 2 digits. Bonds to 100.</p> <p>3 digits with ones, tens and hundreds. Up to 4 digits.</p> <p>More than 4 digits. Decimals and fractions</p>
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Stage 1

Using numbers up to 10:

- Develop a mental picture of the number system using pictures
- Count backwards in familiar contexts
- Count back in 1's to find an answer
- Use practical apparatus to take away objects
- Find one less than a number

Three teddies take away two teddies leaves one teddy

10, 9, 8, 7, ...

Five fat sausages frying in a pan ...

Ten green bottles hanging on the wall

- Teacher models jumping back in one on a number line.

Counting songs and rhymes involving counting backwards

There are eight pennies in this bag. I spend 5p. How much money will be left? I want to save 10p. How much more money do I need?

Use counters or a number track to help you with these questions:
Bob has seven computer games. Anya has two fewer than Bob. How many computer games does Anya have?
There are 11 birds on a roof, six fly away. How many are left?

Stage 2

Using numbers up to 20:

- Count back on a structured number line or hundred square in ones (related to pictures)
- Count back in 10's on a number line or hundred square (multiples of 10 to 100)
- Know and use all number bonds up to 10 and 20
- Begin to find the difference by counting up from the smallest number

6 + ? = 10 ? + 6 = 10
10 - 6 = ? 10 - 4 = 6

The difference between 11 and 14 is 3.
14 - 11 = 3
11 + ? = 14

20 = 12 + 8 8 + 12 = 20
20 - 8 = 12 20 - 12 = 8

Know by heart subtraction facts for numbers up to 10 and 20

Find the missing numbers $7 + \square = 12$ $\square - 9 = 8$

There are some yellow and some orange flowers in a vase. There are 14 flowers altogether. Six are yellow. How many are orange?

Anna is two years younger than Henry. Anna is nine. How old is Henry?
To answer this problem, Kieran says he has to work out two take away nine. Is he correct? Explain why you think that.

Stage 3

Using numbers up to 100:

- Move to unstructured / empty number lines
- Subtract 10 from a 2 digit number
- Subtract 1 digit number from a 2 digit number bridging 10
- Partition the number to be subtracted (no exchanging) then use a Number line or hundred square to solve it

45 - 10

15 - 7 = 8

18 - 12 =

43 - 23

43 - 20 = 23
23 - 3 = 20

Sam is running a 50-metre potato race. He drops his potato after 18 metres. How much further does he have to go?

Write the missing numbers in this sequence.
53 48 43 38 23 18 Explain how you identified them.

Explain how you can use a number line to subtract 37 from 56.

Now show me how you could use a 100 square.

What number is 30 less than 64? Explain your method.

What is the missing number in the number sentence below?
 $57 + \square = 97$

Two snakes are 56cm and 83cm long. What is the difference in their lengths? Draw a picture that will help you solve the problem. What part

<p>Stage 4</p> <p>Number lines Dienes Arrow cards Bar model 100 squares</p> <p>Expanded Column Method</p>	<p>Using numbers up to 4 digits:</p> <ul style="list-style-type: none"> Partitioning second number $74 - 27 = 74 - 20 = 54 - 7 = 47$ (to support mental methods) Make decisions about whether to count on or back depending on the calculation <div style="text-align: center;"> $74 - 27 = 47$ </div> <ul style="list-style-type: none"> Expanded column method (no exchanging) (Concrete then Pictorial then Abstract) <div style="text-align: center;"> $\begin{array}{r} 60 \quad 7 \\ - 20 \quad 5 \\ \hline 40 \quad 2 \end{array} \rightarrow 42$ </div> <ul style="list-style-type: none"> Make counting on an unstructured number line more efficient <div style="text-align: center;"> </div>	<p>Paul says $72 - 15 = 63$. Write down an addition calculation that you could do to check this. Paul's working is: $70 - 10 = 60$ and $5 - 2 = 3$ so $72 - 15 = 63$. Where has Paul gone wrong?</p> <p>The difference between the heights of two children is 37cm. What could their heights be? Roughly how old do you think they would be?</p> <p>Two numbers have a difference of 185. One of the numbers is 478. What is the other? Is this the only answer?</p> <p>Work out $327 - 183$. Explain each stage to me.</p>
<p>Stage 5</p> <p>Dienes Bar model 100 squares</p> <p>Expanded Column Method</p>	<ul style="list-style-type: none"> Expanded Column Method (with exchanging) <div style="text-align: center;"> $43 - 27 = 16$ </div> <div style="text-align: center;"> $\begin{array}{r} 30 \quad 40 \quad + 10 \quad + 3 \\ - 20 \quad + 7 \\ \hline 10 \quad + 6 \end{array}$ </div> <div style="text-align: center; border: 1px solid black; padding: 5px;"> <p>Expanded method</p> <p>It is important that the children have a good understanding of place value and partitioning using concrete resources and visual images to support calculations. The expanded method enables children to see what happens to numbers in the standard written method.</p> </div>	<p>Using dienes here would give children a visual representation of the process of carrying.</p> <p>Nadia is working with whole numbers. She says if you subtract a 1 digit number from a 3 digit number you always get a 2 digit number. Is she right? Prove it.</p> <p>What is the difference between 1999 and 4003? What did you notice about the numbers? How did this help you decide which method to use?</p>
<p>Stage 6</p> <p>Dienes 100 squares</p> <p>Column Method</p>	<ul style="list-style-type: none"> Formal Written Method with numbers up to 4 digits <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p>Standard written method The previous stages reinforce what happens to numbers when they are subtracted using more formal written methods. It is important that the children have a good understanding of place value and partitioning.</p> </div> <div style="text-align: center; border: 1px solid black; padding: 5px;"> $\begin{array}{r} 3 \quad 4 \quad 13 \\ - 27 \\ \hline 16 \end{array}$ </div>	<p>Work out $3275 - 1837$. Explain each stage to me.</p> <p>How would you find the missing numbers?</p> <p>10, , 4, 1, , -5.</p> <p>What is the rule?</p>
<p>Stage 7</p> <p>Column Method</p>	<ul style="list-style-type: none"> Formal Written method with numbers with more than 4 digits and up to 3 decimal places Including examples with 0 as a place holder <div style="text-align: center;"> $\begin{array}{r} 4 \quad 5 \quad 1 \quad 6 \\ - 3 \quad 7 \quad 8 \\ \hline 1 \quad 3 \quad 8 \end{array}$ </div>	<p>Make up a question involving addition and subtraction that has the answer 0.04.</p> <p>Two numbers have a difference of 1.583. One of the numbers is 4.728. What is the other? Is this the only answer?</p> <p>Work out $32.75 - 1.837$. Explain each stage to me.</p> <p>Make up an example of an addition or subtraction, involving decimals, that you would do in your head. Now make up an example you would do on paper. Explain the reasons for using these two methods.</p>