

Resources

Counters
Multilink
Ten frame
Number lines
Dienes
Numicon
Arrow cards
Bead strings
Bar model
100 squares

- R** Read and understand
I Important words and numbers
C Choose a method
H Have you checked your answer?

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
2. **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
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

Progression

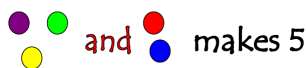
- 1 and 2 digits to 20.
- Bonds to 20.
- 2 digits with ones, tens and 2 digits.
- Bonds to 100.
- 3 digits with ones, tens and hundreds.
- Up to 4 digits.
- More than 4 digits.
- Decimals and fractions.

Stage 1

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Using numbers up to 10 and 20

- Develop a mental picture of the number system using pictures.
- Recognise numbers up to 10 and 20.
- Place the numbers 1 to 20 in order
- 1:1 correspondence
Each item is numbered as it is counted...first by touching and counting, then by seeing and 'mentally touching' The 6th item in a line relates to number '6'
- Count reliably objects to 20.
- If you rearrange a group of objects, changing the pattern doesn't alter the number (Conservation of number)
- Find one more than a number.
- Count in 1s and 10s.
- Begin to relate addition to combining two groups of objects
- Teacher to demonstrate number lines and practical resources to support calculation.



Counting songs and rhymes.

Pick up a handful of counters and put them down on the table. Count them to see how many you have picked up. Put all your counters into a pot. How many counters in the pot? Put another counter in the pot. How many counters are in the pot now?

Look at this group of toys. Are there more cars or trains? How can you find out?

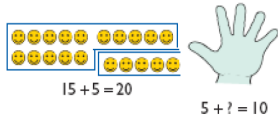
Look around the room. How many lights can you see?

I am going to drop some coins into a tin. Count how many coins I drop.

Stage 2

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- **Recognise and understand numbers to 100.**
- Know by heart all pairs of numbers with total up to 10 and 20.
- Count on in 1s and 10s on a hundred square or number line, relating to pictures, and from any number.
- Use a structured number line to count on from the biggest number
- Use number lines and practical resources to support calculation
Fully marked and fully numbered number line – counting on in ones (4 + 5 = 9)
- Use number bonds to add 1 digit number to 2 digit number (no bridge)



Show me a pair of numbers which total 10. Can you find all the pairs? How do you know you have got all the pairs?

At my birthday party there were three boys and five girls. How many children in total came to my party? Which words helped you to decide how to solve the problem? Write a number sentence to match this.

Say whether you would use addition or subtraction to solve these problems, explain how you know:
Jude is five years older than Mark. Mark is seven. How old is Jude?
There are some yellow and orange flowers in a vase. There are 14 flowers altogether. Six of the flowers are orange. How many flowers are yellow?

Explain how you would find the missing number: $\square - 8 = 25$.

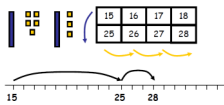
Find as many addition calculations as you can using these numbers: 26 18 8 10 16 34

Stage 3

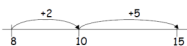
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- Use number lines and practical resources to support calculation
- Fully marked and fully numbered number line – counting on in steps of more than one
- Fully marked and partially numbered number line – counting on in steps of more than one
- Move to unstructured / empty numberlines
- Adding ten and then compensating when adding 9,11,19,21 etc.
- **Partitioning: to aid mental calculations**
- Add two digit numbers by partitioning one number (no bridge)
- Use number bonds to add 1 digit number to 2 digit number (bridge 10)

$15 + 13 = 28$



$8 + 7 = 15$



A number is partitioned like this: $200 + 50 + 13$. What is the number?
Show me how you partition it in different ways. How could you partition 408? Show me another way to do it.

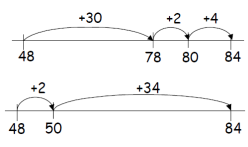
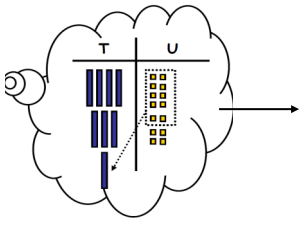
Explain how you can use a number line to add 37 to 6. Now show me how you could use a 100 square to add 37 to 56.

Molly drew a number line to find the answer $43 + 32$. What number is hidden under the card?

$$\begin{array}{r} 43 \\ +30 \\ \hline 75 \end{array}$$

Anna has a 50p coin and three 20p coins. How much is this altogether? Show how you worked out the answer. How did you decide what calculations to do?

$6 + 7 = 13$ Write three other facts that you can work out from this addition fact.

<p>Stage 4</p> <p>Number lines Dienes Arrow cards Bar models 100 squares</p> <p>Expanded Column Method</p>	<p>Using numbers up to 4 digits.</p> <ul style="list-style-type: none"> Add two digit numbers by partitioning one number (bridging ten) <p>Partitioning leading to expanded column:</p> <ul style="list-style-type: none"> - Partitioning the second number only can be done on a numberline and mirrors the subtraction method. - $47 + 76 = 47 + 70 = 117 + 6 = 123$ (informal strategy) <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;">$48 + 36 = 84$</div>  </div> <ul style="list-style-type: none"> - Partitioning both numbers into tens and units helps link with the column method where ones are placed under ones and tens under tens. <p style="text-align: center;">(Concrete then Pictorial then Abstract)</p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>T</td><td>U</td></tr> <tr><td>40</td><td>+ 8</td></tr> <tr><td>30</td><td>+ 6</td></tr> <tr><td>80</td><td>+ 4</td></tr> <tr><td>10</td><td>—</td></tr> </table> </div> </div> <div style="margin-top: 10px; border: 1px solid black; padding: 5px; font-size: small;"> <p style="text-align: center;">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> <ul style="list-style-type: none"> Make counting on a number line more efficient 	T	U	40	+ 8	30	+ 6	80	+ 4	10	—	<p>Top tip Using Dienes / Hundred square here would give children a visual representation of the process of carrying.</p> <p>Rick says $38 + 72 = 100$. Is he right? What mistake has he made?</p> <p>Will the answer to $£6.78 + £2.84$ be closer to £8, £9 or £10?</p> <p>Work out $56 + 27$. Explain what you did. What did you notice about the numbers that helped you choose how to do it? Repeat with other calculations.</p> <p>Show me how you would calculate $257 + 47 + 35$.</p> <p>Discuss how 47 is not only made up of $40+7$ but also $30+17$, $20+27$ etc.</p> <p>Which three numbers in this list have a sum of 190? 10 30 50 70 90 How did you work it out?</p> <p>I added three distances. Each was an odd number and my answer was 120km. Explain why I cannot be correct.</p> <p>In your group, consider the sum of five numbers in a straight line on the 100 square. What do you notice? Think about this problem and how to solve it. Take turns to contribute one idea for the group to discuss.</p> <p>Nadia is working with whole numbers. She says if you add a 2 digit number and a 2 digit number you cannot get a 4 digit answer. Is she correct? How do you know?</p>
T	U											
40	+ 8											
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10	—											
<p>Stage 5</p> <p>Dienes Bar model 100 squares</p> <p>Column Method</p>	<p>Formal column method with numbers more than 4 digits</p> <ul style="list-style-type: none"> no carrying carrying <div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 20px; font-size: small;"> <p style="text-align: center;">Standard written method</p> <p>The previous stages reinforce what happens to the numbers when they are added together using more formal written methods.</p> </div> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;"> <table style="text-align: center;"> <tr><td>48</td></tr> <tr><td>+ 36</td></tr> <tr><td>84</td></tr> <tr><td>1</td></tr> </table> </div> </div>	48	+ 36	84	1	<p>417 895 men and 176 243 women attended a football match. Roughly, how many people attended altogether?</p> <p>What could the two missing digits be? $_ 62 + _ 95 = 757$</p> <p>Would you use mental, paper and pencil methods or calculator to solve these?</p> <p>$36 + 17$</p> <p>$23.5 + \square = 32.7$</p> <p>$1245 + 678 =$ Explain your choices.</p>						
48												
+ 36												
84												
1												
<p>Stage 6</p> <p>Column Method</p>	<p>Formal column method with numbers more than 4 digits and with up to 3 decimal places.</p> <ul style="list-style-type: none"> Formal written method with numbers up to 1 000 000 and up to 3 decimal places. <div style="margin-bottom: 20px;"> <table style="text-align: right;"> <tr><td>136.4</td></tr> <tr><td>+ 128.2</td></tr> <tr><td><u>264.6</u></td></tr> <tr><td>1</td></tr> </table> </div> <ul style="list-style-type: none"> Extend to addition of more than 2 numbers. <div> <table style="text-align: right;"> <tr><td>237</td></tr> <tr><td>318</td></tr> <tr><td>+ 9</td></tr> <tr><td><u>564</u></td></tr> <tr><td>2</td></tr> </table> </div>	136.4	+ 128.2	<u>264.6</u>	1	237	318	+ 9	<u>564</u>	2	<p>Look at these calculations $23.45 + 34.21$, how could you work this out in your head? What other method could you use?</p> <p>What number added to 0.72 gives 1? How do you know?</p> <p>Make an example of an addition calculation involving decimals that you could do in your head and one you would do on paper. Explain why.</p>	
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