Addition.

Through discussion, children need to:

1. Read, understand and interpret the question.
2. Identify the calculation as a number sentence.
3. Think about skills that will help to solve the calculation (doubling, number bonds, partitioning, multiples)
4. Choose an appropriate method.
5. Record the number sentence and solution.
6. Interpret solution (rounding? units?)
7. Check calculation

Resources.
Number lines
Arrow cards
Bead strings
100 squares
Multilink
Dienes
Numicon

Context
Money
Measures

Using and applying question starters.

- What tips would you give to someone to help them with …..
- Which of these are correct? What has this person done wrong? How could you help them to put it right?
- Make up an example of an addition calculation _____ that you would do in your head and one you would do using paper. Explain why.
- Work out _____. Explain what you did.
- How would you explain to someone how to _____?

Progression in number:
U +U
TU+U
TU+TU
HTU+U
HTU + TU
HTU + HTU
ThHTU + U
ThHTU + TU
ThHTU + HTU
ThHTU +ThHTU
& decimals

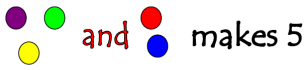
Stage 1

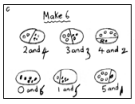
Using numbers up to 20

- Develop a mental picture of the number system using pictures.
- Recognise numbers up to 20.
- 1:1 correspondence
  Each item is numbered as it is counted…first by touching and count ing, 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 pebbles and put them down on the table. Count them to see how many you have picked up. Put all your pebbles into a pot. How many pebbles in the pot? Put another pebble in the pot. How many pebbles are in the pot now?

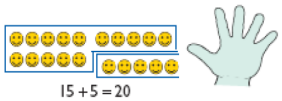
Look at this group of toys. Are there more cars or trains? How can you find out?

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

- **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 snake/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? Which number is left? What other number would you need to make another pair?

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.

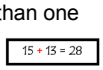
Say whether you would use addition or subtraction to solve these problems, explain how you know.
Jude is five years older than Mark. Mark is seven. How old is Jude?
There are some yellow and orange flowers in a vase. There are 14 flowers altogether. Six of the flowers are orange. How many flowers are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

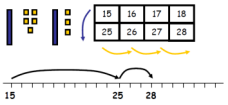
Explain how you would find the missing number: - ☐ 25.

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

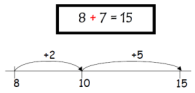
Stage 3

- 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





- 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)

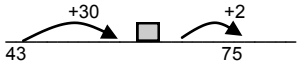


This requires children to know that 7=2+5 and that 2 is needed to make 10.

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?



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?

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

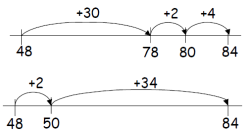
Stage 4

Using numbers up to 1000.

- Add two digit numbers by partitioning one number (bridging ten)

Partitioning leading to expanded column:
- 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)

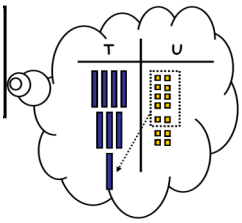
48 + 36 = 84



- Partitioning both numbers into tens and units helps link with the column method where ones are placed under ones and tens under tens.
47 + 76 = 40 + 70 = 110, 7 + 6 = 13, 110 + 13 = 123
Partitioned numbers are then written under one another

(This is also a useful mental method).

$$\begin{array}{rcl} 47 & = & 40 + 7 \\ +\,76 & & 70 + 6 \\ \hline & & 110 + 13 = 123 \end{array}$$



Expanded method

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.

T	U
40	+ 8
30	+ 6
80	+ 4
10	

- Make counting on a number line more efficient

Top tip
Using the informal strategy to teach partition for addition is the same strategy which will be used to partition in subtraction.
Using dienes here would give children a visual representation of the process of carrying.

Rick says 38 + 72 =100. Is he right? What mistake has he made?

Will the answer to £6.78 + £2.84 be closer to £8, £9 or £10?

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.

Show me how you would calculate 257 + 47 + 35.

Discuss how 47 is not only made up of 40+7 but also 30+17, 20+27 etc.

Give an example of a calculation where it is useful to change pounds into pence before you work out the calculation.

Which three numbers in this list have a sum of 190?
10 30 50 70 90 How did you work it out?

I added three distances. Each was an odd number and my answer was 120km. Explain why I cannot be correct.

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.

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?

Peter says that when you remove one square from the area of the shape, its perimeter gets smaller. Is this sometimes, always or never true? Explain how you know.

Stage 5

Formal written method with numbers up to 10 000

- no carrying

- carrying

Standard written method
The previous stages reinforce what happens to the numbers when they are added together using more formal written methods.

$$\begin{array}{r} 48 \\ +\,36 \\ \hline 84 \\ \hline {\scriptstyle 1} \end{array}$$

417 895 men and 176 243 women attended a football match. Roughly, how many people attended altogether?

What could the two missing digits be? _ 62 + _ 95 = 757

Would you use mental, paper and pencil methods or calculator to solve these?
36 + 17
23.5 + ☐ = 32.7 x + 23.5 = 32.7

1245 + 678 =
Explain your choices.

Stage 6

Formal written method with numbers with up to 100,000 and with up to 3 decimal places.

- Formal written method with numbers up to 100 000 and up to 2 decimal places.

$$\begin{array}{r} \mathbf{136.4} \\ \mathbf{+\ 128.2} \\ \hline \mathbf{264.6} \\ \mathbf{1} \end{array}$$

- Extend to addition of more than 2 numbers.

$$\begin{array}{r} \mathbf{37} \\ \mathbf{18} \\ \mathbf{+\ 9} \\ \hline \mathbf{64} \\ \mathbf{2} \end{array}$$

Look at these calculations 23.45 + 34.21, how could you work this out in your head? What other method could you use?

What number added to 0.72 gives 1? How do you know?

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.