

# Addition

**Foundation** Children begin to record in the context of play or practical activities and problems.

Begin to relate addition to combining two groups of objects

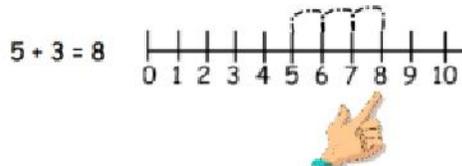
- Make a record in pictures, words or symbols of addition activities already carried out with practical objects.
- Construct number sentences to go with practical activities.
- Use of games, songs and practical activities to begin using vocabulary.

Solve simple word problems using fingers.



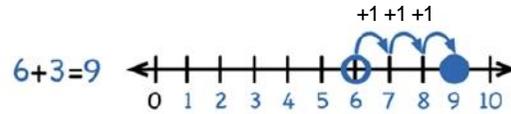
$$5 + 1 = 6$$

Can find one more to ten.



**Year 1** Add with 1 and 2 digit numbers up to 20  
(1c, 1b, 1a)

Use numbered number lines to add by counting on in ones. Encourage children to start with the **larger** number and count on.



**Children should:**

Have access to a wide range of counting equipment, everyday objects, number tracks and number lines and should be shown numbers in **different contexts**.

Read and write the addition (+) and equals (=) signs within number sentences.

Interpret addition number sentences and solve missing box problems, using concrete objects and number line addition to solve them:  $8 + 3 = \square\square$   $15 + 4 = \square\square$   $5 + 3 + 1 = \square\square\square$   $\square + \square = 6$   $\square$

This builds on from prior learning of adding by combining two sets of objects into one group (5 cubes and 3 cubes) in Early Years.

$8+5$

Bead strings or bead bars can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.



**Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line

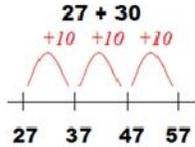
**Key skills for addition at Y1:**

- Read and write numbers to 100 in numerals, including 1—20 in words.
- Recall bonds to 10 and 20 and addition facts within 20.
- Count to and across 100.
- Count in multiples of 1, 2, 5 and 10.
- Solve simple 1-step problems involving addition, using objects, number lines and pictorial representations.

# Addition

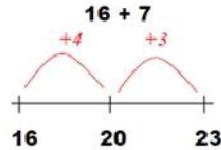
**Year 2** Add with 2-digit numbers. Develop mental fluency with addition and place value involving 2-digit numbers. Then establish more formal methods. (1a, 2c, 2b)

Add 2-digit numbers and tens

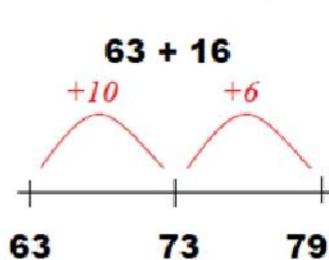


Use empty number lines, concrete equipment, hundred squares etc. to build confidence and fluency in mental addition skills.

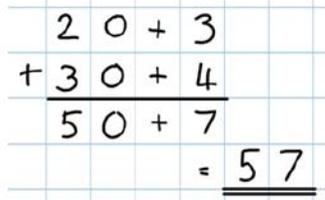
Add 2-digit numbers and units:



Add pairs of 2-digit numbers using a number line. Moving to the partitioned column method when secure adding tens and units:

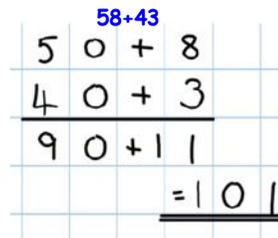


23+34



**STEP 1** Only provide examples that do **NOT** cross the tens boundary until pupils are **secure** with the method itself.

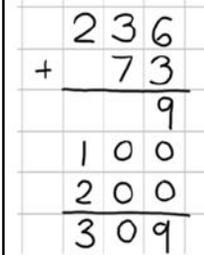
**STEP 2:** Once children can add a multiple of ten to a 2-digit number mentally (e.g. 80+11) they are ready for adding pairs of 2-digit numbers that **DO** cross the tens boundary (e.g. 58 + 43).



**STEP 3:** Children who are confident and accurate with this stage should move onto the expanded addition methods with 2 and 3-digit numbers (see Y3).

**Year 3** Add numbers with up to 3-digits (2b, 2a, 3c)

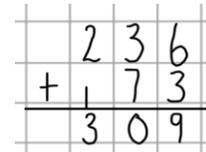
Add the **units** first, in preparation for the compact method.



In order to carry out this method of addition...

- Children need to recognise the value of the units, tens and hundreds **without recording the partitioning**.
- Pupils need to be able to add in columns.

Move to the compact **column addition** method, with 'carrying':



- Add **units** first.
- 'Carry' numbers **on top of the line**. Remind pupils the actual value is "**three tens add seven tens**" not "three add seven", which equals **ten tens**.

Children who are very secure and confident with 3-digit expanded column addition should be moved onto the **compact column addition** method, being introduced to 'carrying' for the first time.

Compare the expanded method to the compact column method to develop an understanding of the process and the reduced number of steps involved.

To support understanding carry out these calculations with concrete objects also. Pupils may physically make and carry out the calculation with Dienes Base 10 apparatus or place value counters, then compare their practical version to the written form to help them to build an understanding of it.

**Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary

**Key skills for addition at Y2:**

- Add a 2-digit number and units (e.g.  $27 + 6$ ). Add a 2-digit number and tens (e.g.  $23 + 40$ ).
- Add pairs of 2-digit numbers (e.g.  $35 + 47$ ).
- Add three single-digit numbers (e.g.  $5 + 9 + 7$ ).
- Show that adding can be done in any order (the commutative law).
- Recall bonds to 20 and bonds of tens to 100 ( $30 + 70$  etc.).
- Count in steps of 2, 3 and 5 and count in tens from any number.
- Understand the place value of 2-digit numbers (tens and units).
- Compare and order numbers to 100 using  $<$   $>$  and  $=$  signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.

**Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, **hundreds boundary, increase, vertical, 'carry', expanded, compact**

**Key skills for addition at Y3:**

- Read and write numbers to 1000 in numerals and words.
- Add 2-digit numbers mentally, including those exceeding 100.
- **Add a three-digit number and units mentally ( $175 + 8$ ). Add a three-digit number and tens mentally ( $249 + 50$ ).**
- **Add a three-digit number and hundreds mentally ( $381 + 400$ ).**
- Estimate answers to calculations, using inverse to check answers.
- Solve problems, including missing number problems.
- Use number facts, place value, and more complex addition.
- Recognise place value of each digit in 3-digit numbers (hundreds, tens, units.)
- Continue to practise a wide range of mental addition strategies, ie. number bonds, adding the nearest multiple of 10, 100, 100 and adjusting, using near doubles, partitioning and recombining.

# Addition

## Year 4 Add numbers with up to 4 digits (3c, 3b, 3a)

Move from expanded addition to the compact column method, **adding units first**, and 'carrying' numbers **underneath** the calculation. Also include money and measures contexts.

Introduce the **compact column addition** method by asking children to add the two given numbers together using the method that they are familiar with (expanded column addition—see Y3). Teacher models the compact method with carrying, asking children to discuss similarities and differences and establish how it is carried out.

e.g.  $3517 + 396 = 3913$

$$\begin{array}{r} 3517 \\ + 396 \\ \hline 3913 \end{array}$$

Add **units** first.

'Carry' numbers **on top of** the line. Reinforce correct place value by reminding them the actual value is 5 hundreds add 3 hundreds, **not 5 add 3**.

Use and apply this method to money and measurement values.

**Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, 'carry', expanded, compact, **thousands, hundreds, digits, inverse**

### Key skills for addition at Y4:

- Select most appropriate method: mental, jottings or written and explain why. Recognise the place value of each digit in a four-digit number. Round any number to the nearest 10, 100 or 1000.
- Estimate and use inverse operations to check answers.
- Solve 2-step problems in context, deciding which operations and methods to use and why.
- Find 1000 more or less than a given number.
- Continue to practise a wide range of mental addition strategies, ie. Using number bonds, add the nearest multiple of 10, 100, 1000 and adjust, use near doubles, partitioning and recombining.
- Add numbers with up to 4 digits using the formal written method of column addition.
- Solve 2-step problems in contexts, deciding which operations and methods to use and why.
- Estimate and use inverse operations to check answers to a calculation.

## Year 5 Add numbers with more than 4 digits (3a, 4c, 4b)

In context - money, measures and decimals with different numbers of decimal places. **Children should** understand the place value of **tenths and hundredths** and use this to align numbers with different numbers of decimal places.

$$\begin{array}{r} £23.59 \\ + £17.55 \\ \hline £31.14 \end{array}$$

Pupils should be able to add more than two values, carefully aligning place value columns.

$$\begin{array}{r} 23481 \\ + 1362 \\ \hline 24843 \end{array}$$

Numbers should exceed 4 digits.

$$\begin{array}{r} 19.01 \\ 3.65 \\ + 0.70 \\ \hline 23.36 \end{array}$$

The decimal point should be aligned in the same way as the other place value columns and must be in the same column in the answer.

Say "6 tenths add 7 tenths" to reinforce place value.

Empty decimal places can be filled with zero (place holder) to show the place value in each column.

**Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, 'carry', expanded, compact, vertical, thousands, hundreds, digits, inverse & decimal

places, decimal point, tenths, hundredths, thousandths

### Key skills for addition at Y5:

- Add numbers mentally with increasingly large numbers, using and practising a range of mental strategies I.e. add the nearest multiple of 10, 100, 100 and adjust, use near doubles, inverse, partitioning and recombining, use number bonds.
- Use rounding to check answers and accuracy.
- Solve multi-step problems in contexts, deciding which operations and methods to use and why.
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit.
- Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.

# Addition

**Year 6** Add several numbers of increasing complexity  
(4c, 4b, 4a)

Adding several numbers with different numbers of decimal places (including money and measures)

- Tenths, hundredths and thousandths should be correctly aligned with the decimal point lined up vertically including in the answer row.
- Place holders could be added into any empty decimal places, to show there is no value to add.

$$\begin{array}{r}
 23.361 \\
 9.08 \\
 59.77 \\
 + 21.23 \\
 \hline
 93.511
 \end{array}$$

Empty decimal places can be filled with zero/place holder to show the place value in each column.

$$\begin{array}{r}
 81059 \\
 3668 \\
 15301 \\
 + 120551 \\
 \hline
 120579
 \end{array}$$

Adding several numbers with more than 4 digits.

**Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, 'carry', expanded, compact, vertical, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

**Key skills for addition at Y6:**

- Perform mental calculations, including with mixed operations and large numbers using and practising a range of mental strategies.
- Solve multi-step problems in context, deciding which operations and methods to use and why.
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit.
- Round any whole number to a required degree of accuracy.
- Understand how to add mentally with larger numbers and calculations of increasing complexity.

**Beyond**

Extend to decimals with up to 2 decimal places, including:

- calculations with different numbers of digits;
- totals of more than two numbers.

e.g.  $76.56 + 312.2 + 5.07 = 398.83$

- balancing equations e.g.

$140,652 - 8,652 = 82,956 + \underline{\hspace{2cm}}$

Or

$179,256 - 3659 = \underline{\hspace{2cm}} + 32,569$

- Using the inverse operation to find the missing answer.

Use compensation by adding too much. Then compensating.

$$\begin{aligned}
 4.7 + 2.9 &= 4.7 + 3 - 0.1 \\
 &= 7.7 - 0.1 \\
 &= 7.6
 \end{aligned}$$

The following Calculations Policy has been devised to meet the requirements of the National Curriculum 2014 for the teaching and learning of Mathematics. It has also been designed to give pupils a consistent and smooth progression of learning in calculations throughout their time at Primary School. Please note that early learning in number and calculation in Foundation Stage 2 follows the Development Matters EYFS document although it is included in this calculations policy for your own reference. This Calculations Policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

## **Age stage expectations**

This Calculation Policy is organised according to age related expectations as set out in the National Curriculum 2014. **However it is important that pupils are taught according to the stage that they are currently working at.** Therefore, being given time to become secure and confident in methods before they are moved on. This document should also give you the guidance you need to be able to move your pupils on to more advanced methods as soon as they are ready.

## **Context for calculation:**

It is important that any type of calculation is given a real life context or problem solving approach to help build children's understanding of the purpose of calculation. Help them recognise when to use certain operations and methods when faced with problems. Let them see the purpose of calculation through practical applications of their learning.