



## Addition

### EYFS

#### Early Learning Goal:

- Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or less than a given number
- Using quantities and objects, they add and subtract two single-digit numbers and count on and back to find the answer
- Solve problems including doubling, halving and sharing

Children should experience practical calculation opportunities **using a wide variety of practical equipment, including small world play, role play, counters, cubes etc.** They should be encouraged to develop ways of recording calculations using pictures and enhance the learning experience of developing a mental picture of the number system in their heads to use for calculation.

Initially addition calculations will not cross the tens boundary but as children progress it will cross the tens boundary into teen numbers (as long as there is understanding of quantity value and the five strands of place value).

#### Finding 1 more than a number

**Subitising** (children can recognise an amount of objects without the need to count)

Once children are secure with subitising they can be moved onto one more and one less. How many are in the egg box?

Add 1 more. How many are there now?



It is vital children have access to a wide range of counting equipment, everyday objects, number tracks and number lines, and be shown numbers in different contexts.

## Numicon

If available, Numicon shapes are introduced straight away and can be used to:

- identify 1 more/less
- combine pieces to add.
- find number bonds.
- add without counting.

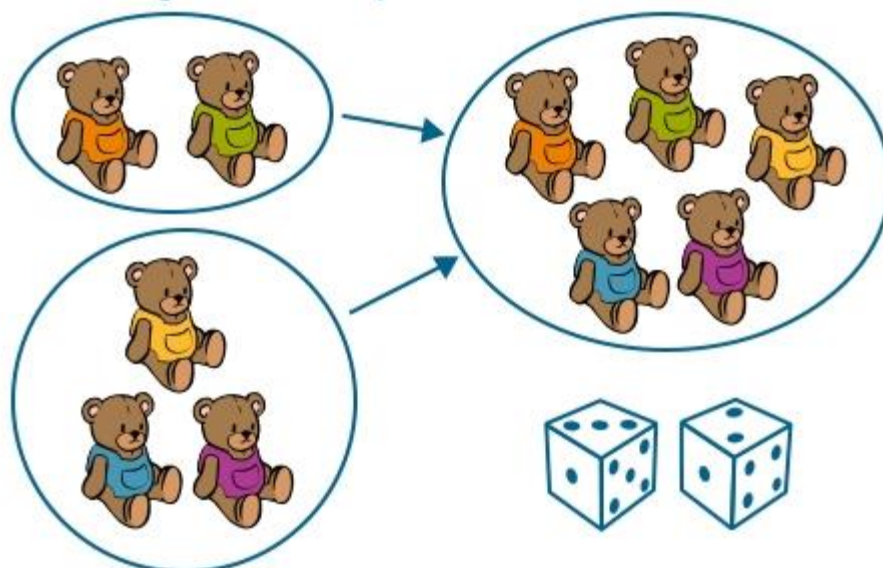


Children can record this by printing or drawing around Numicon pieces.

**Addition using aggregation** (combining two sets of objects and counting all method).

Children count one set, then count the other and finally count it all.

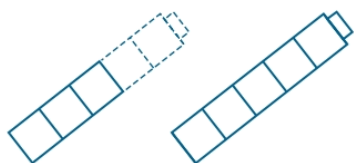
### 1. Combining two or more quantities



The use of practical equipment is vital to supporting children in developing their conceptual understanding.

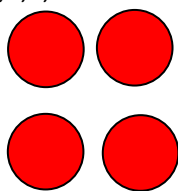
By touch counting and dragging in this way, it allows children to keep track of what they have already counted to ensure they do not count the same item twice.

**Adding using augmentation** (counting on method). This strategy requires fluency with counting from any number.

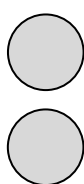


Have two sets of objects. The pupil will count the set of 4 objects then continue to count on the second set.

1,2,3, 4



5,6



There are 6 counters altogether

Some children may be ready to follow the abstract approach and record  
Their work as a number sentence:  $4 + 2 = 6$   $2 + 4 = 6$

Remember when adding the noun should be the same. You can use different coloured objects to support learning but the object itself must be the same. For example, 4 apples + 2 apples = 6 apples.

## Key stage 1

### Year 1

Key skills for addition:

- recall bonds to 10 and 20, and addition facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in written methods and mental calculation)
- solve simple 1-step problems involving addition, using objects, number lines and pictorial representations and missing number problems such as  $7 = * - 9$

#### Finding 1 more than a number

**Subtilizing** (children can recognise an amount of objects without the need to count)

How many are in the egg box?

Add 1 more. How many are there now?



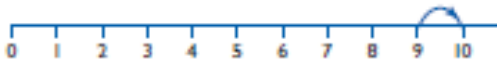
Children should be taught to recognise an amount without needing to count it. Start with recognising 10 and 5. Once children are secure with recognising amounts move onto one more one less.

**Using a number line**



It is vital children have access to a wide range of counting equipment, everyday objects, number tracks and number lines, and be shown numbers in different contexts.

9 and 1 more is 10  
 9 add 1 equals 10  
 $9 + 1 = 10$



**Combine groups of objects**

Practically combine groups of objects and then extend to recording.

Add by Using Number Bonds

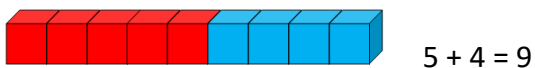
1

2 part + 3 part = 5 whole

2 part + 3 part = 5 whole

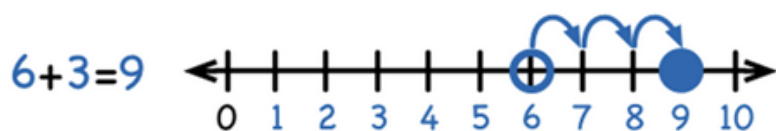


Children should be able to count forwards using a number square as support if needed.



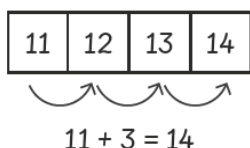
**Number Lines for adding by counting on**

Counting forwards on a number line starting with the biggest number.  
Recording by - drawing jumps on prepared lines



**Number Squares**

$11 + 3 = ?$



**Complete number sentences.**

This should be taught using the part whole diagram.

$7 = 5 + \underline{\quad}$

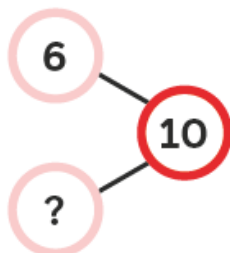
$\underline{\quad} + 1 = 7$

$5 + 2 = \underline{\quad} + 1$

**Part whole diagram:**



$6 + \square = 10$



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

## Year 2

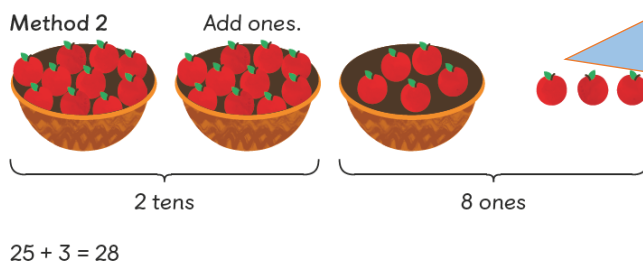
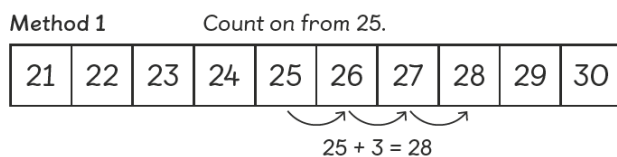
It is vital children have access to concrete and pictorial resources such as dienes, base ten, place value counters and cubes to carry out calculations.

### Key skills for addition at Y2:

- add a 2-digit number and ones (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.)
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
- solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.

### Adding by counting on

Add 25 and 3.



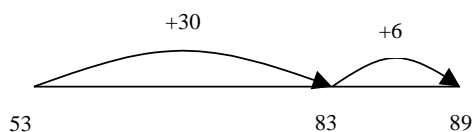
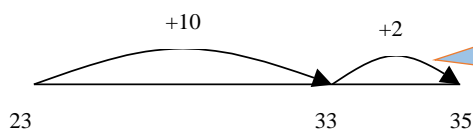
How many tomatoes are there altogether?

How many ways can you add the tomatoes?

### Written Methods

#### Constructing their own number lines

$23 + 12 =$



First adding the tens and then adding the ones. Use empty number lines, concrete equipment, hundred squares etc. to build confidence and fluency in mental addition skills.

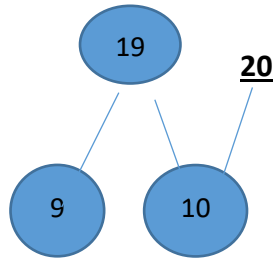
### Partitioning

Add 19 and 20

$$\begin{array}{r} 10 + 9 \\ 20 + 0 \\ \hline 30 + 9 = 39 \end{array}$$

$$10 + 20 = 30$$

$$9 + 30 = 39$$



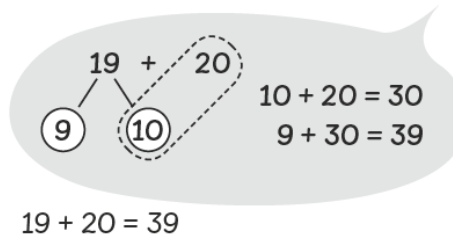
Once children can add a multiple of ten to a 2-digit number mentally (e.g.  $80+11$ ), they are ready for adding pairs of 2-digit numbers that DO cross the tens boundary (e.g.  $58 + 43$ ).

Add 19 and 20.

**Method 1** Count on in tens from 19.

$$19 + 20 = 39$$

**Method 2** Add the tens.

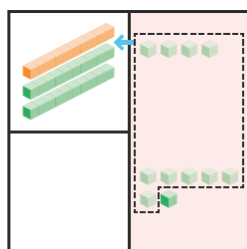


### Using dienes

Add 24 and 7.

**Step 1** Add the ones.  
 4 ones + 7 ones = 11 ones  
 Regroup the ones.  
 11 ones = 1 ten and 1 one

Use to help you add.



	tens	ones
	2	4
+		7
	1	1

$$47 + 25 = 60 + 12$$

# Key stage 2

## Year 3

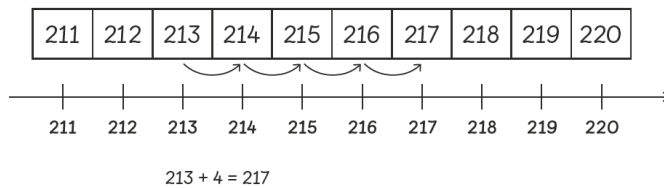
### Key skills for addition at Y3:

- Add 2-digit numbers mentally, incl. those exceeding 100.
- Add a three-digit number and ones mentally ( $175 + 8$ )
- Add a three-digit number and tens mentally ( $249 + 50$ )
- Add a three-digit number and hundreds mentally ( $381 + 400$ )
- Add numbers with up to three digits, using formal written methods
- Estimate answers to calculations, using inverse to check answers.
- Solve problems, including missing number problems, using number facts, place value, and more complex addition.
- Continue to practise a wide range of mental addition strategies, ie. number bonds, adding the nearest multiple of 10, 100, 1000 and adjusting, using near doubles, partitioning and recombining.

### Add by counting on

Add 213 and 4.

Method 1 Count on from 213.



### Adding using the part whole diagram

213 + 4 = 217

Children should use place value counters and interactive dienes to work out the answer then apply to written method.

There were 217 books in the bookcase.

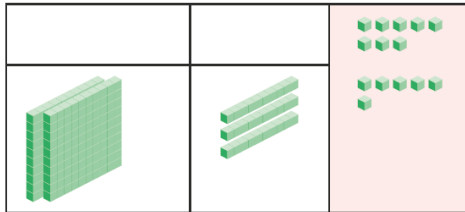


### Adding using the compact column method

This must be taught with alongside the Use of place value counters or dienes.

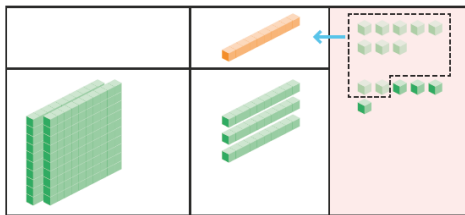
#### Use of dienes

Step 1 Add the ones.  
8 ones + 6 ones = 14 ones



	h	t	o
			8
+	2	3	6
			4

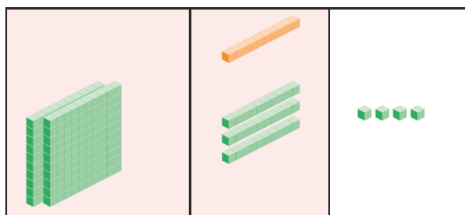
Step 2 Regroup the ones.  
14 ones = 1 ten + 4 ones



	h	t	o
			8
+	2	3	6
			4

14 is circled and split into 10 and 4.

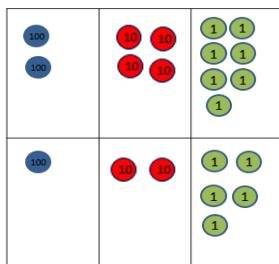
Step 3 Add the tens.  
1 ten + 3 tens = 4 tens  
Add the hundreds.



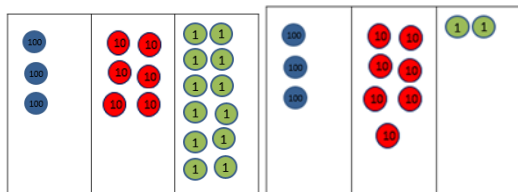
	h	t	o
			8
+	2	3	6
			4
	2	4	4

8 + 236 = 244  
There are 244 children altogether.

#### Use of counters



$$\begin{array}{r} 200 + 40 + 7 \\ 100 + 20 + 5 \\ \hline 300 + 60 + 12 = 372 \end{array}$$



$$\begin{array}{r} 247 \\ +125 \\ \hline 12 \\ 60 \\ 300 \\ \hline 372 \end{array}$$

**Renaming:** When using interactive dienes and place value counters for regrouping children should be taught how to cover the carried amount; 9+3=12, 2 ones stay in the ones column and 10 ones are regrouped into the tens column as 1 ten because 10 ones is the same as 1 ten.

Some children may begin to use a formal column algorithm, initially introduced alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not a new method.

$$\begin{array}{r} 247 \\ +125 \\ \hline 372 \\ \small{10} \end{array}$$

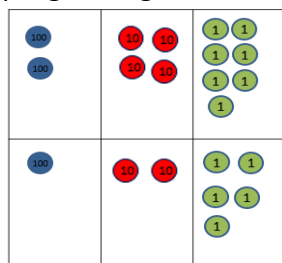
## Year 4

### Key skills for addition at Y4:

- Select most appropriate method: mental, jottings or written and explain why.
- Find 1000 more or less than a given number.
- Continue to practise a wide range of mental addition strategies, ie. 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.

### Written methods (progressing to 4-digits)

Expanded column addition modelled with place value counters, progressing to calculations with 4-digit numbers.

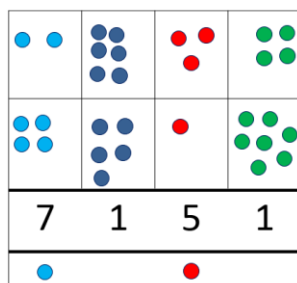


$$\begin{array}{l} 200 + 40 + 7 \\ 100 + 20 + 5 \\ 300 + 60 + 12 = 372 \end{array}$$

$$\begin{array}{r} 247 \\ +125 \\ \hline 12 \\ 60 \\ \hline 300 \\ \hline 372 \end{array}$$

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.

Compact written method - extend to numbers with at least four digits.



$$\begin{array}{r} 2634 \\ +4517 \\ \hline 7151 \\ \small{1 \quad 1} \end{array}$$

Always add starting from the ones. Carried numbers should be underneath the bottom line NOT above.

Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty.

Extend to up to two places of decimals (same number of decimal places) and adding several numbers (with different numbers of digits).

$$3587 + 675 = 4262$$

$$\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$$

$$124.9 + 117.25 = 242.15$$

$$\begin{array}{r} 124.9 \\ + 117.25 \\ \hline 242.15 \\ 11 \end{array}$$

Reinforce correct place value language by reminding pupils the actual value is 5 hundreds add 6 hundred, **not 5 add 6.**

## Year 5

### Key skills for addition at Y5:

- add numbers mentally with increasingly large numbers, using and practising a range of mental strategies ie. add the nearest multiple of 10, 100, 1000 and adjust; use near doubles, inverse, partitioning and re-combining; using number bonds
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Solve multi-step problems in contexts, deciding which operations and methods to use and why
- add numbers with more than 4 digits using formal written method of column addition
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

### Written Methods

#### Compact method

$$1247.97 + 3416.248 = 4664.218$$

$$\begin{array}{r} 1247.97 \\ + 3416.248 \\ \hline 4664.218 \\ 111 \end{array}$$

Empty decimal places should have a 0 in to show place value in each column.

Reinforce the correct language and place value; 9 tenths add 2 tenths **not 9 add 2.**

1	9	.	0	1
	3	.	6	5
+	0	.	7	0
<hr/>				
2	3	.	3	6
1	1			

The decimal point should be aligned in the same way as the other place value columns, and must remain in the same column in the answer row. Numbers should exceed 4 digits. Pupils should be able to add **more than two values**, carefully aligning place value columns.

Place value counters and other concrete resources can be used alongside the column method to develop understanding of addition with decimal numbers and should be used to support struggling learners.

## Year 6

### 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
- use their knowledge of the order of operations to carry out calculations involving the four operations pupils understand how to add mentally with larger numbers and calculations of increasing complexity

### Written Methods

Use the compact method as shown in year 4 and 5.

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.

81,059	23.361
3,668	9.08○
15,301	59.77○
+ 20,551	+ 1.3○○
120,579	93.511
1 1 1 1	2 1 2

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

**Mental methods** should continue to develop, supported by a range of models and images, including the number line. The bar model should continue to be used to help with problem solving.

**Written methods**  
As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured.  
Continue calculating with decimals, including those with different numbers of decimal places.

**Problem Solving**  
Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross curricular links) to deepen their understanding.