



Calculation Policy

Addition – Years 1-3

+ = signs and missing numbers

Children need to understand the concept of equality before using the '=' sign. Calculations should be written by the teacher either side of the equality sign so that the sign is not just interpreted as 'the answer'.

$2 = 1 + 1$ (= is equal to, has the same value as..)

$2 + 3 = 4 + 1$

Missing numbers need to be placed in all possible places.

$3 + 4 =$ $= 3 + 4$

$3 +$ $= 7$ $7 =$ $+ 4$

Counting and Combining sets of Objects

Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation)

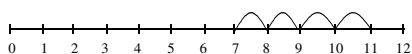


Understanding of counting on with a numbertrack.



Understanding of counting on with a numberline (supported by models and images).

$7 + 4$



Towards a Written Method

Children are **not expected** to use a written method in Year 1. They will be taught to count and bundle straws independently in to tens and ones to gain a full understanding of the value of tens and ones.

They will then progress on to Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation) They will be taught to use straws in such a way to support one step addition problems. They may record formally as above $5 + 7 = 12$ $12 = 5 + 7$

Children will progress to using Dienes apparatus

Missing number problems e.g $14 + 5 = 10 +$ $32 +$ $+ = 100$
 $35 = 1 +$ $+ 5$

Mental Methods

It is valuable to use a range of representations (also see Y1).

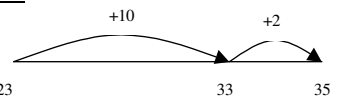
Continue to use numberlines to develop understanding of:

Counting on in tens and ones

$23 + 12 = 23 + 10 + 2$

$= 33 + 2$

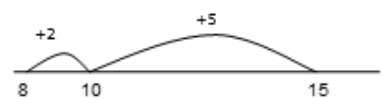
$= 35$



Partitioning and bridging through 10.

The steps in addition often bridge through a multiple of 10 e.g. Children should be able to partition the 7 to relate adding the 2 and then the 5.

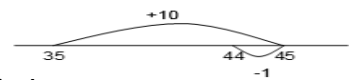
$8 + 7 = 15$



Adding 9 or 11 by adding 10 and adjusting by 1

e.g. Add 9 by adding 10 and adjusting by 1

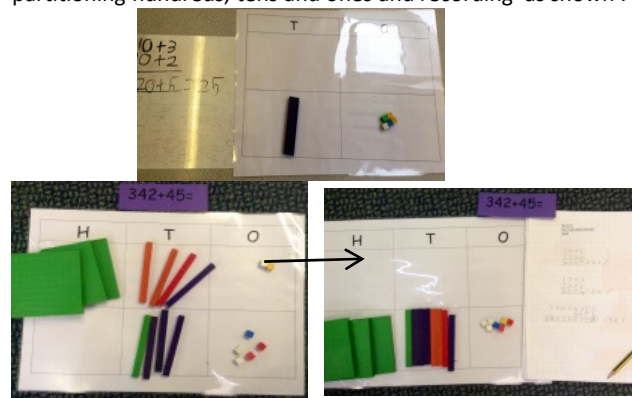
$35 + 9 = 44$



Towards a Written Method

Partitioning and recombine

Children are taught to partition in to tens and one, using Dienes apparatus. Children will place the apparatus on to a place value chart and begin by adding **from the ones** column. Progress to partitioning hundreds, tens and ones and recording as shown :



Children are taught to **exchange** ones for a ten, when bridging ten.

Missing number problems using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

Mental Methods

Partition into tens and ones

Partition both numbers mentally and recombine.

Count on by partitioning the second number only e.g.

$247 + 125 = 247 + 100 + 20 + 5$

$= 347 + 20 + 5$

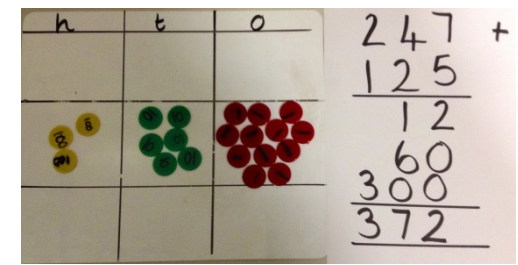
$= 367 + 5$

$= 372$

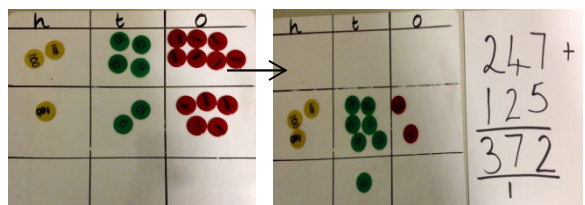
Children need to be secure adding multiples of 100 and 10 to any three-digit number including those that are not multiples of 10.

Towards a Written Method

Introduce expanded column addition modelled with place value counters (Dienes should still be used for those who need a less abstract representation) Children will be taught to add the ones column first.



Leading to children understanding the exchange between tens and ones.



Some children may begin to use a formal columnar 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. Children are taught to write a 1 for the exchanged ten underneath the equals box.

Year 1 objectives

Statutory requirements

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.



Year 1 guidance

Notes and guidance (non-statutory)

Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, $9 + 7 = 16$; $16 - 7 = 9$; $7 = 16 - 9$). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.

Pupils combine and increase numbers, counting forwards and backwards.

They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.



Year 2 objectives

Statutory requirements

Pupils should be taught to:

- solve problems with addition and subtraction:
 - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
 - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
 - a two-digit number and ones
 - a two-digit number and tens
 - two two-digit numbers
 - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.



Return

Year 2 guidance

Notes and guidance (non-statutory)

Pupils extend their understanding of the language of addition and subtraction to include sum and difference.

Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using $3 + 7 = 10$; $10 - 7 = 3$ and $7 = 10 - 3$ to calculate $30 + 70 = 100$; $100 - 70 = 30$ and $70 = 100 - 30$. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$). This establishes commutativity and associativity of addition.

Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.



Year 3 objectives

Statutory requirements

Pupils should be taught to:

- add and subtract numbers mentally, including:
 - a three-digit number and ones
 - a three-digit number and tens
 - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.



Year 3 guidance

Notes and guidance (non-statutory)

Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.

Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (see [Mathematics Appendix 1](#)).

