

Teaching Addition from Foundation to Year 6



Children are taught to understand addition as combining two or more sets and counting on.

Combining sets of objects

At a party, I eat 2 cakes and my friend eats 3. How many cakes did we eat altogether?



Count out three strawberries. Count out 2 strawberries. How many strawberries altogether?



Early addition is about combining 2 sets of objects physically.

Once confident pupils will be encouraged to draw simple pictures to help them combine sets without objects.

Combining sets

$$8 + 4 = \square$$

8 people are on the bus. 4 more get on at the next stop. How many people are on the bus now?



or



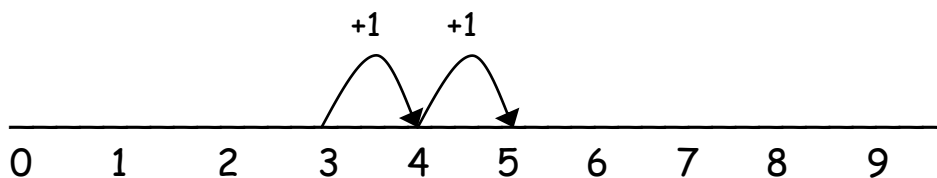
Children are now to simplify their method of recording using dots or marks to represent objects (quicker than drawing a picture)

Children may also be introduced to using tally marks |||| means 5

Using a number line to solve additions to 10 (counting on)

$$3 + 2 = 5$$

Start at 3 and count on 2

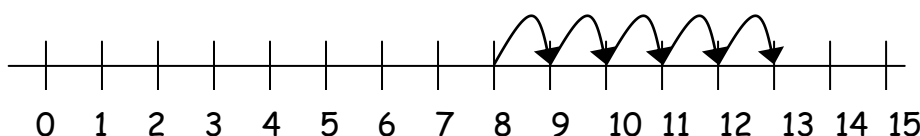


Children are encouraged to use a large number line, counting on in ones, often using a finger to mark each jump. Initially this method would be used along side previous methods until children are confident using a number line

Number lines are used to help pupils count beyond 10.

$$8 + 5 = 13$$

+1 +1 +1 +1 +1



Introducing a hundred square

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

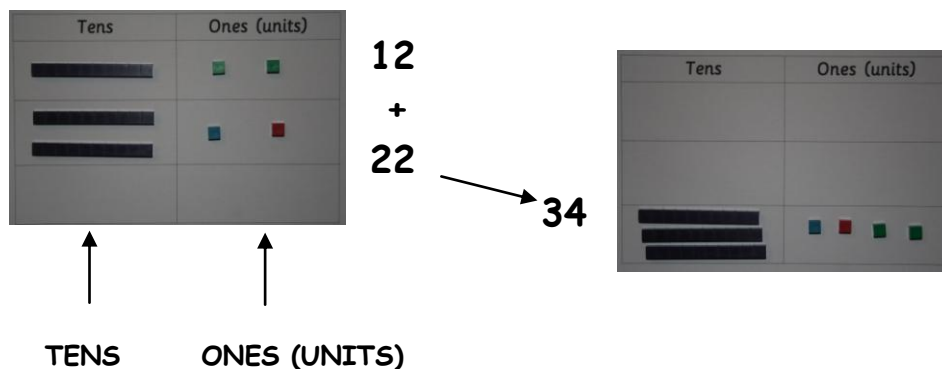
Children begin to use 100 squares as a tool to aid counting on in small steps (eg. in 1s or 2s)

This example show using a 100 square to count on 2 from 5.

Introducing partitioning (numbers over 10)

Children will learn that numbers 10 or over (and under 100) are made up of TENS (left hand digit) and ONES(UNITS) (right hand digit).

Partitioning a number involves splitting it up into TENS/ONES (UNITS). Numbers can be added by combining the TENS and combining the ONES (UNITS)



Initially this will be practically done using Ten sticks and ones

This method is also used to introduce the idea of adding (and subtracting) HUNDREDS

Using a hundred square

$15 + 10 = \square$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Adding 10 involves moving down a row.

$21 + 16 = \square$

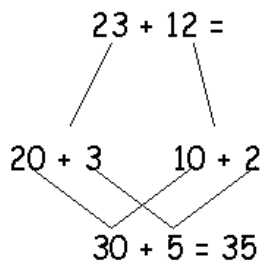
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Adding 16 involves moving down a row and across 6 places.

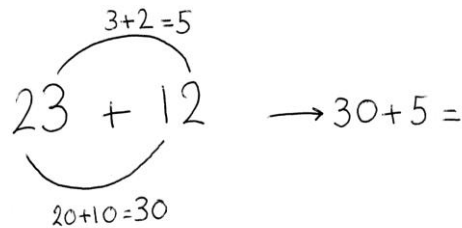
Children start to recognise patterns within a hundred square. They understand that by adding 10 they move down a row.

Using partitioning without equipment

Each number is split into TENS and UNITS/ONES. These are then grouped and added.



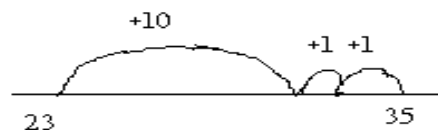
Number bracelets



Once children are confident manipulating TENS and ONES (UNITS), they are encouraged to partition numbers in the way(s) shown.

Using number lines to add larger numbers

$23 + 12 = \square$



$34 + 23 = \square$

Children will begin to use the 'empty number line' themselves starting with the largest number and counting on.

Here a child understands that to add 23 you can add 20 and then add 3.

Introduction of more formal methods, building on from partitioning

427 + 356

$$\begin{array}{r}
 400 + 300 = 700 \\
 20 + 50 = 70 \\
 7 + 6 = 13 \\
 \hline
 = 783
 \end{array}$$

Working from the hundreds column first as these are the most significant digits.

Children will be taught written methods for those calculations they cannot do 'in their heads'. These methods encourage pupils to think about the value of digits, but the addition of the numbers is still done mentally.

Alternatively the numbers can be partitioned like this:

$$\begin{array}{r}
 400 + 20 + 7 \\
 300 + 50 + 6 \\
 \hline
 700 + 70 + 13 = 783
 \end{array}$$

Developing a more concise method

Initially problems do not involve the need to swap ONES/UNITS for TENS, or TENS for HUNDREDS (no carrying)

$$\begin{array}{r}
 358 \\
 + 31 \\
 \hline
 9 \text{ (adding ONES/UNITS)} \\
 80 \text{ (adding TENS)} \\
 300 \text{ (adding HUNDREDS)} \\
 \hline
 300 + 80 + 9 = 389
 \end{array}$$

$$\begin{array}{r}
 358 \\
 + 38 \\
 \hline
 16 \\
 80 \\
 300 \\
 \hline
 300 + 80 + 16 = 396
 \end{array}$$

Once pupils are confident solving problems up to 1000 using the above method, they are encouraged to use a more concise method, column addition. Children are shown to start on the least significant number (the ONES/UNITS) and add the columns from right to left.

The above method is then condensed further

Add the ones; **seven** add **five** is **twelve**; put **one ten** under the *tens* column and the **2** in the *ones* column

$$\begin{array}{r}
 587 + 375 \\
 \hline
 587 \\
 375 \\
 \hline
 2 \\
 1
 \end{array}$$

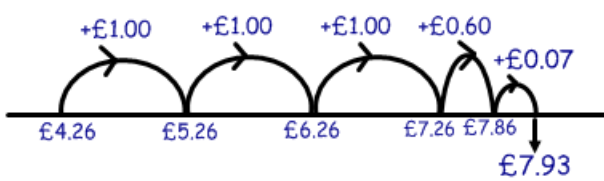
Add the tens. **Eighty** add **seventy** is **one hundred and fifty** add **ten** underneath, is **one hundred and sixty**; put **sixty** on the *tens* column and **one hundred** under the *hundreds* column

$$\begin{array}{r}
 587 \\
 375 \\
 \hline
 62 \\
 11
 \end{array}$$

Add the hundreds; **five hundred** add **three hundred** is **eight hundred**, add **one hundred** underneath is **nine hundred**; put the **nine hundreds** in the *hundreds* column

$$\begin{array}{r}
 587 \\
 375 \\
 \hline
 962 \\
 11
 \end{array}$$

This column addition follows the more traditional method most adults are familiar with. While pupils explore this method they will use the previous method alongside this one.

<p>Addition of decimals</p> <p>£4.26 + £3.67 =</p> $ \begin{array}{r} \text{£}4.26 \\ \text{£}3.67 \\ \hline \text{£}0.13 \text{ (6p + 7p)} \quad 0.06 + 0.07 \\ \text{£}0.80 \text{ (20p + 60p)} \quad 0.20 + 0.60 \\ \hline \text{£}7.00 \text{ (£4 + £3)} \quad 4.00 + 3.00 \\ \text{£}7.93 \end{array} $  <p>Starting at £4.26, £3.67 is added on, using a number line.</p>	<p>Once decimals are introduced (eg. Money), the children will revisit partitioning and using number lines.</p> <p>The digit immediately after the decimal place are TENTHS, the next digit is then the HUNDRETHS.</p>
<p>Concise method for adding decimals</p> <p>123.9 + 7.25</p> $ \begin{array}{r} 123.9 \\ + 7.25 \\ \hline 131.15 \\ 11 \end{array} $ $ \begin{array}{r} 6.72 \\ + 8.56 \\ \hline 15.28 \\ 1 \end{array} $	<p>Once secure with previous methods the column method will be introduced to add decimal to decimal and decimal to whole numbers.</p>