



Mental Calculations (ongoing)

Mental recall of number bonds: $6 + 4 = 10$ $\square + 3 = 10$ $25 + 75 = 100$ $19 + \square = 20$

Use near doubles $6 + 7 = \text{double } 6 + 1 = 13$

Addition using partitioning and recombining $34 + 45 = (30 + 40) + (4 + 5) = 79$

Counting on or back in repeated steps of 1, 10, 100, 1000 $86 + 57 = 143$ (by counting on in tens and then in ones)
 $460 - 300 = 160$ (by counting back in hundreds)

Add the nearest multiple of 10, 100 and 1000 and adjust $24 + 19 = 24 + 20 - 1 = 43$ $458 + 71 = 458 + 70 + 1 = 529$

Use the relationship between addition and subtraction $36 + 19 = 55$ $19 + 36 = 55$ $55 - 19 = 36$ $55 - 36 = 19$

Many calculation strategies will continue to be used. They are not replaced by written methods.

Calculation Policy for Addition

Before the introduction of formal written methods for addition, children should be able to:

1. Recall all addition pairs to $9 + 9$ and complements in 10;
2. Add mentally a series of one-digit numbers, such as $5 + 8 + 4$;
3. Add multiples of 10 (such as $60 + 70$) or of 100 (such as $600 + 700$) using the related addition fact, $6 + 7$, and their knowledge of place value;
4. Partition two-digit and three-digit numbers into multiples of 100, 10 and 1 in different ways.

Early Years Foundation Stage (EYFS)

Children will engage in a wide variety of songs and rhymes, games and activities.

They will begin to relate addition to combining two groups of objects, first by counting all and then by counting on from the largest number.

They will find **one more** than a given number.

In practical activities and through discussion they will begin to use the **vocabulary** involved in addition.



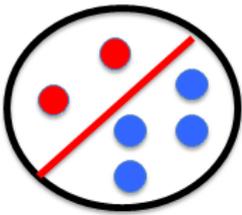
'You have five apples and I have three apples. How many apples are there altogether?'



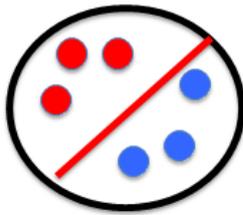
If I have 4 counters and you have 3 counters. How many counters do we have altogether?

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.

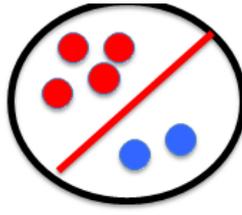
Number bonds of each individual number should be practiced and linked with addition sentences E.g. 2 add 4 equals 6. Hearing this language is encouraged early. This can be represented through drawings and use of concrete objects such as: Numicon, cubes and real life objects.



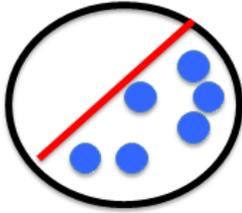
2 and 4 makes 6



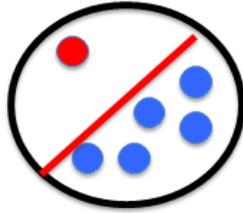
3 and 3 makes 6



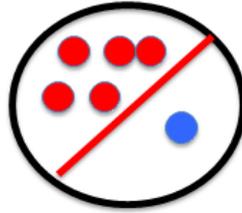
4 and 2 makes 6



0 and 6 makes 6



1 and 5 makes 6



5 and 1 makes 6

Year 1

Statutory requirements

Pupils should be taught to:

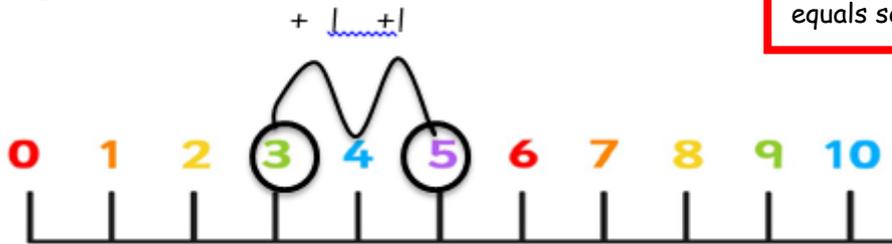
- read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- represent and use number bonds within 20
- add one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as $7 = \square + 5$.

Children use number tracks, number lines and practical resources, to support calculation.



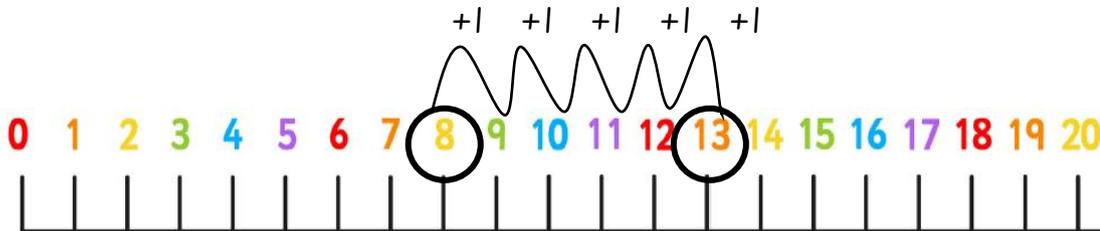
They count on from the largest number.

$$3 + 2 = 5$$



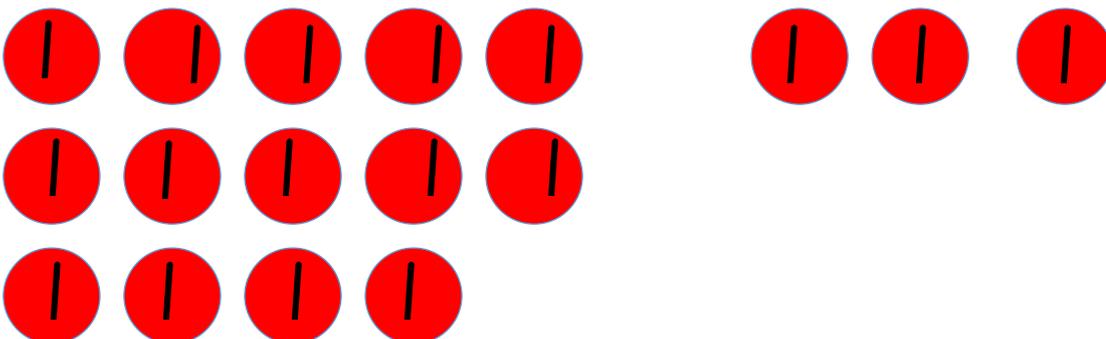
All addition sentences should be read aloud to reinforce understanding E.g. fourteen add three equals seventeen.

$$8 + 5 = 13$$



Children to count the hops made and not the numbers. Also, concrete objects should be used to prove answers and to help children visualise the quantities. Understanding of place value can be reinforced through representations of tens and units.

$$14 + 3 = 17$$



A build up of units to be modelled first then progression onto understanding of tens and units.



Problem Solving

Children should apply their understanding of these methods to add to a range of word problems, missing number problems and incomplete questions.

Reasoning

Children should be encouraged to talk through their processes with explanations of why to really strengthen understanding. This should be applied to a range of scenarios.

Year 2

Statutory requirements

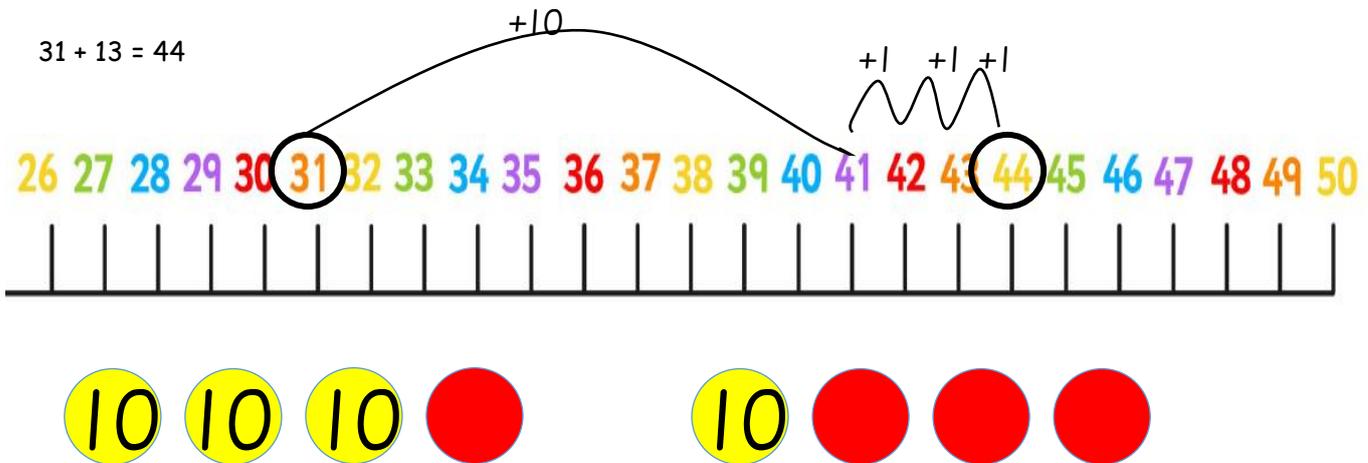
Pupils should be taught to:

add 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

Children will begin to use number line starting with the larger number and counting on. Children are encouraged to make larger jumps of 10.

First counting on in tens and ones.



	Tens	Units
	3	1
+	1	3
	4	4

Children should use concrete objects to help visualise the process and help reason their answers.

Teacher should model column addition alongside children working out with number lines and concrete objects. This will support the transfer between methods and strengthen understanding and familiarity.

All addition sentences should be read aloud to reinforce understanding E.g. thirty-one add thirteen equals forty-four.

In Y2 the children are also introduced to the **column addition** method, which will also support their understanding of place value.

Children should be given question without carrying to instil confidence with the method. Teacher can provide tens and units titles to help scaffold. Importance of one number per square should be reinforced.

$27 + 15 = 42$

	Tens	Units
	2	7
+	1	5
	4	2

Once children are ready, they should progress onto examples with carrying.
Again, concrete objects should be used to aid understanding.

Mental Methods

When adding two digit numbers the children can use partitioning which can help with mental calculations too.

$26 + 43 =$

$20 + 40 = 60$

$6 + 3 = 9$

$60 + 9 = 69$

This method should not be written out by the children and should remain as a mental strategy.

Problem Solving

Children should apply their understanding of these methods to add to a range of word problems, missing number problems and incomplete questions.

Reasoning

Children should be encouraged to talk through their processes with explanations of why to really strengthen understanding. This should be applied to a range of scenarios.

Year 3

Statutory requirements

Pupils should be taught to:

- add numbers with up to three digits, using formal written methods of columnar addition

Build up starting with 2 digits + 2 digits

Reinforcing the compact layout

Stages of progression

1. no carrying (demonstration stage only), e.g. $54 + 35$, $326 + 271$
2. carrying from units to tens, e.g. $47 + 26$, $368 + 423$
3. carrying from tens to hundreds, e.g. $368 + 481$
4. carrying from units to tens and tens to hundreds, e.g. $47 + 76$, $368 + 478$
5. a mixture of 'carries'

$$368 + 478$$

	H	T	U
	4	7	8
+	3	6	8
	8	4	6

All addition sentences should be read aloud to reinforce understanding E.g. four hundred and seventy eight add three hundred and sixty eight equals eight hundred and forty six.

The scaffolding of the H,T,U are to be used to reinforce place value and can be removed when the children are ready.

When the compact layout is introduced, the language of place value should continue to be used but when children are confident, they will use 'digit-speak', e.g. for the addition of two three-digit numbers above, they are likely to say:

- 8 add 8 is sixteen; 6 in the answer and carry 1
- 6 add 7 is 13 plus the carry 1 is 14; 4 in the answer and carry 1
- 3 add 4 is 7 plus the carry 1 is 8
- Answer is 846

This is a form of shorthand that speeds up the process of addition. If children consistently carry out a range of calculations correctly, it is likely that they understand the process. However, teachers should occasionally check their understanding by asking children to explain what exactly they mean at each stage of the calculation, e.g. what does that 'carry 1' really mean?

Concrete Objects

Use of concrete objects throughout each stage can help children visualise the process and understand the difference with place value. Place value counters can support this.

$$347 + 145 =$$

	H	T	U
	100 100 100	10 10 10 10	1 1 1 1 1 1
+	100	10 10 10 10	1 1 1 1 1

Once it becomes 10 it will need swapping to the next place counter.

Problem Solving

Children should apply their understanding of these methods to add to a range of word problems, missing number problems and incomplete questions.

Reasoning

Children should be encouraged to talk through their processes with explanations of why to really strengthen understanding. This should be applied to a range of scenarios.

Year 4

Statutory requirements

Pupils should be taught to:

- add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate

The major progression is from 3 digits to 4 digits. Using the place value column titles can be used to support understanding.

	Th	H	T	U
	3	1	6	4
+	1	3	5	7
	4	5	2	1

All addition sentences should be read aloud to reinforce understanding E.g. three thousand, one hundred and sixty four add one thousand, three hundred and fifty seven equals four thousand, five hundred and twenty one.

Children in Y4 will meet some fairly simple additions of £.p. some children may be able to use the compact column method, but those who have not learnt how to use this method should change pounds to pence and add using a compact method.

Ensure that children are aware that the decimal points should line up especially when using mixed amounts.

Eg $£3.59 + 78p = £4.37$

	U	.	t	p
	3	.	5	9
+	0	.	7	8
	4	.	3	7

Problem Solving

Children should apply their understanding of these methods to add to a range of word problems, missing number problems and incomplete questions.

Reasoning

Children should be encouraged to talk through their processes with explanations of why to really strengthen understanding. This should be applied to a range of scenarios.

Year 5

Statutory requirements

Pupils should be taught to:

- add whole numbers with more than 4 digits, including using formal written methods (columnar addition)

Continue column addition method taught in earlier year groups.

These should be extended through addition of money and measures.

Problem Solving

Children should apply their understanding of these methods to add to a range of word problems, missing number problems and incomplete questions.

Reasoning

Children should be encouraged to talk through their processes with explanations of why to really strengthen understanding. This should be applied to a range of scenarios.

Year 6

There are no formal statutory requirements for addition in Y6. They are expected to continue with the formal written methods and apply this to problem solving.

Problem Solving

Children should apply their understanding of these methods to add to a range of word problems, missing number problems and incomplete questions.

Reasoning

Children should be encouraged to talk through their processes with explanations of why to really strengthen understanding. This should be applied to a range of scenarios.