

Addition

Early Years

Finding the whole when adding

Pupils should be able to:

- know more than one number
- Using quantities and objects, they add two single-digit numbers and count on to find the answer

Adding One More than a Number

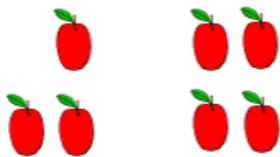
Use of everyday objects, cubes and counters to find one more than any given number to 20



Build a Numicon number track and do a walk of one more



Use of pictorial representations to count one more than a number



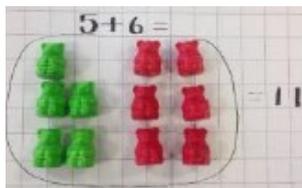
Use of a number track and a counter or whiteboard pen to count on a jump of one more than



Use of mental maths to count on from the biggest number one more

Adding Two Single-Digit Numbers

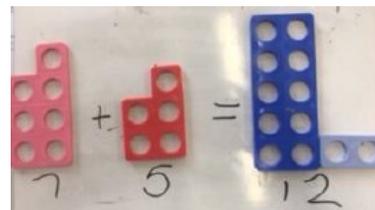
Use of everyday objects, cubes and counters to add



Children will start by counting all beginning with one. When they are secure, move them on to counting on from one number

5...6,7,8,9,10

Use of Numicon to add single digits

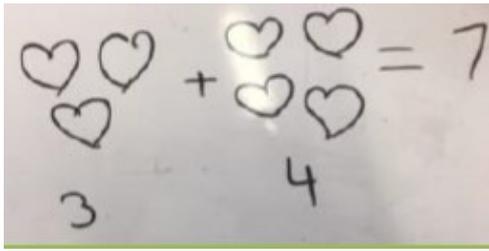


Children start by counting all circles, later on recognising the shape and counting on

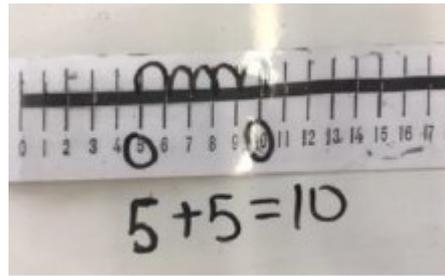
Vocabulary

add, total, plus, together

Children draw pictures and use representations of pictures to count all or count on from the biggest number



Use of a numbered line to count on from the biggest number



Vocabulary

add, total, plus, together

Addition

Finding the whole when adding

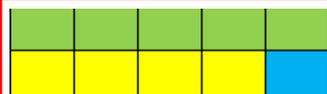
Year 1

Pupils should be able to:

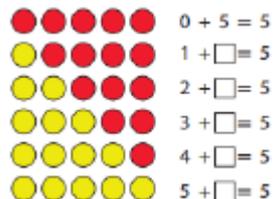
- read, write and interpret mathematical statements involving addition
- represent and use all number bonds within 20
- add one-digit and two-digit numbers to 20, including 0
- solve one-step problems that involve addition using concrete objects and pictorial representations and missing number problems

Number Bonds

Use of cubes to represent bar model and part-part whole model



Use of pictorial representations



$0 + 5 = 5$

$1 + \square = 5$

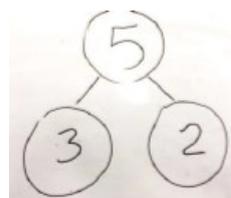
$2 + \square = 5$

$3 + \square = 5$

$4 + \square = 5$

$5 + \square = 5$

Abstract part-part whole model alongside calculation



Use of Numicon to represent number bonds



Use of ten frame to represent number bonds to 10

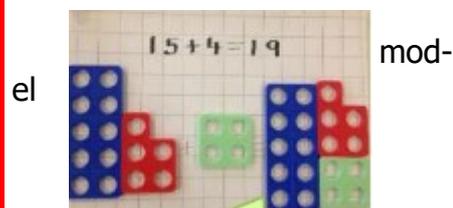


Add One-Digit and Two-Digit

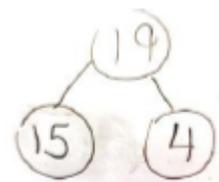
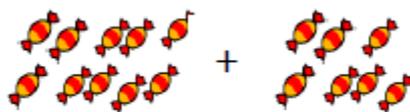
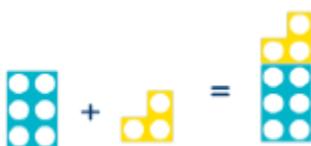
Always beginning with the bigger number and counting on

Recall 1d + 1d briefly

Use of everyday objects, counters, Base 10, Numicon and cubes using part-part whole



Pictorial representations



Children move on to counting on mentally

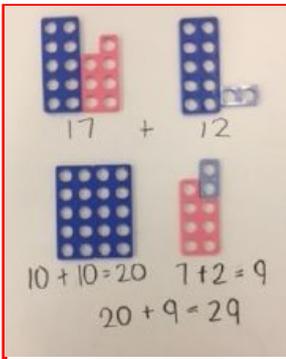
$15 + 4 = 19$

15...16, 17, 18, 19



Vocabulary

add, addition, total, equal, group, calculation, plus, together



If children are secure when adding 2 digits within 20, they may start partitioning by adding the tens and then the ones with Numicon / Base 10

Children can then move to recording abstractly

$$17 + 12 =$$

$$10 + 10 = 20$$

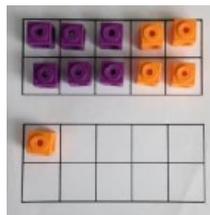
$$7 + 2 = 9$$

$$20 + 9 = 29$$

When children are secure, they can move on to

Renaming to Make 10

Use of a ten frame and Base 10 by partitioning the smaller number to make 10 and then counting on the left over amount



Fill the 10 frame horizontally

Step 1: Make 10

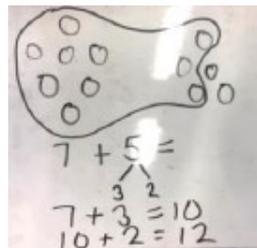
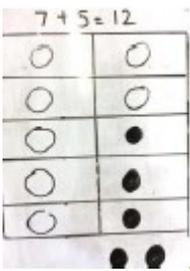
Step 2: Add the left over amount

$$7 + 5 =$$

$$7 + 3 = 10$$

$$10 + 2 = 12$$

Use pictorial strategies to support ten frame well as well as to show 10



gies port
as cir-

Use abstract methods of partitioning the smaller number to make 10 when strategies are secure prior

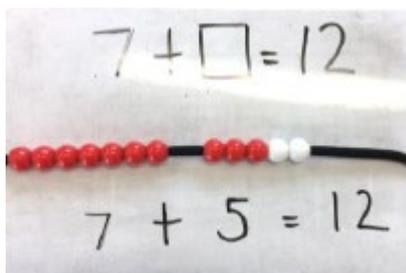
$$9 + 7 =$$

$$9 + 1 = 10$$

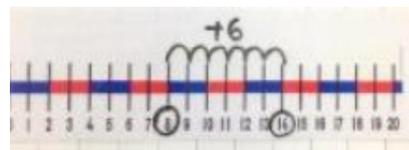
$$10 + 6 = 16$$

Missing Number Problems

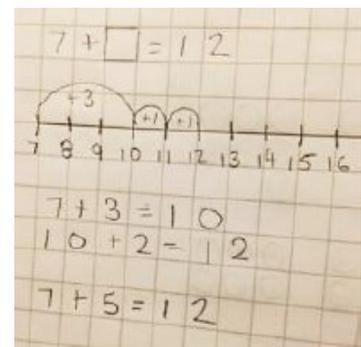
Children begin by using any concrete objects (cubes, Numicon, bead strings) to support "counting on" to find the missing number



Children can then use the a number line to support counting on to find missing numbers



Children should use knowledge of number bonds to partition when counting on to find the missing number



Take care to build up fluency of number bonds rather than relying too much on number lines

Vocabulary

add, addition, total, equal, group, calculation, plus, together

Addition

Year 2

Finding the whole when adding

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 numbers and tens
 - 2 two-digit numbers
 - adding 3 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

Adding a Two-Digit Number and Ones

Use of practical apparatus to support adding such as Numicon, bead strings, Base 10 etc.

$$16 + 7 = 23$$



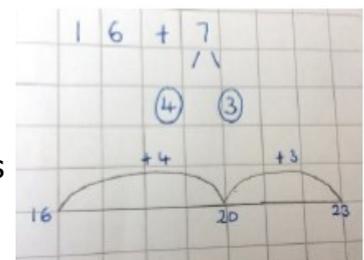
Use of part-part whole concept so children can partition to use knowledge of number bonds to support adding

$$16 + 7 =$$

$$16 + 4 = 20$$

$$20 + 3 = 23$$

Use of sticks and dots pictorial method



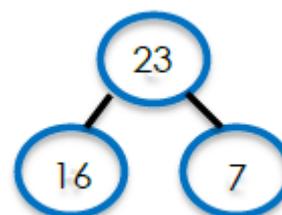
Mentally counting on from the biggest number using partitioning and part-part whole to support fluency



$$16 + 7 =$$

$$16 + 4 = 20$$

$$20 + 3 = 23$$



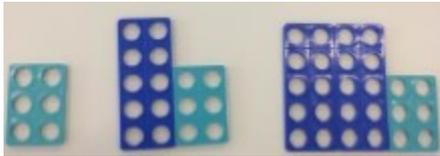
Vocabulary

add, addition, total, equal, group, calculation, altogether

Adding Tens to a Number

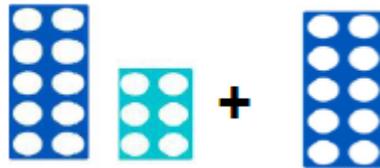
Use of practical apparatus (Numicon, Base 10, bead strings, hundred square etc) to support adding

$$6 + 10 = 16$$



$$16 + 10 = 26$$

Use of pictorials in books and jottings to support adding tens



$$16 + 10 = 26$$

Mentally adding ten to a number. Children use knowledge of patterns to add ten to a given number.

$$16 + 10 = 26$$

Children can explain the pattern they notice

I noticed that the ones digit stays the same when I add a ten

No renaming!

Adding Two Two-Digit Numbers

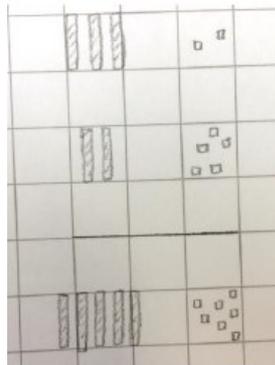
Use Base 10 to add
Add together the ones first and then the tens

$$32 + 25 = 57$$



Use of children's drawings / images of Base 10 to support understanding

$$32 + 25 = 57$$



Use of the partitioning method to add

$$32 + 25 = 57$$

- partition the 2 digit numbers
- arrange in a column
- add the ones
- add the tens
- recombine



With renaming!

Use Base 10 to add

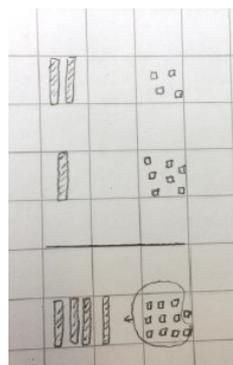
Add together the ones first and then the tens

$$24 + 17 = 41$$



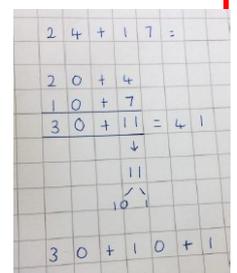
Use of children's drawings / images of Base 10 to support understanding

$$24 + 17 = 41$$



Use of the partitioning method to add

- partition the 2 digit numbers
- arrange in a column
- add the ones
- add the tens
- recombine



Vocabulary

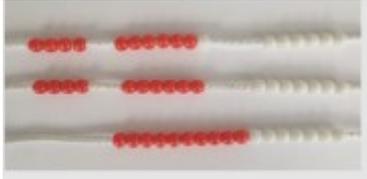
add, addition, total, equal, group, calculation, altogether

Adding 3 Single-Digit Numbers

Use of concrete apparatus (bead strings, ten frames, Reken... etc) to show visually

$$4 + 7 + 6 = 17$$

Put 4 and 6 together to make ten. Add on 7.

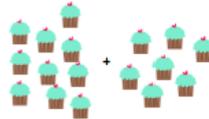


Add together three groups of objects. Draw a picture to recombine the groups to make 10

$$4 + 7 + 6 = 17$$

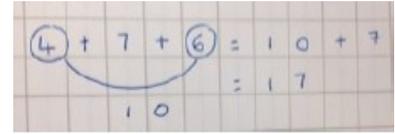


be-



comes

Combine the two numbers that make 10 and then add on the remainder



Encourage children to notice the number bonds to ten

Vocabulary

add, addition, total, equal, group, calculation, altogether

Addition

Finding the whole when adding

Year 3

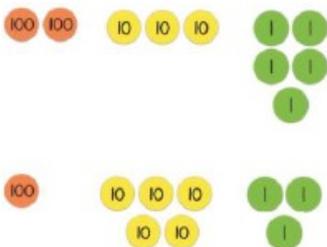
Pupils should be taught to:

- add numbers mentally, including:
 - a three-digit number and ones
 - a three-digit number and tens
 - a three-digit number and hundreds
- Add numbers with up to 3 digits using formal written methods of columnar addition

Adding Three-Digit Numbers

Use of concrete place value counters and Base 10 to support adding

$$235 + 153$$



Insist that children line up counters as if in columns

Show bar model first (link to part-part whole model)

Support pictorially through drawings and pictures in books

$$235 + 153 = 388$$



Insist that children line up drawings of counters as if in columns

Using the partitioning method to add at first before moving on to column method

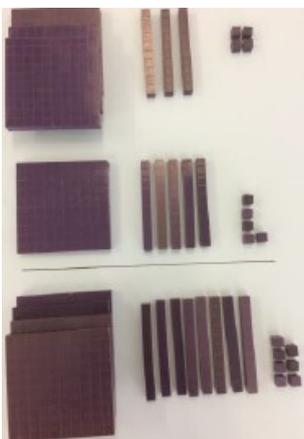
$$235 + 153 = 388$$



No renaming!

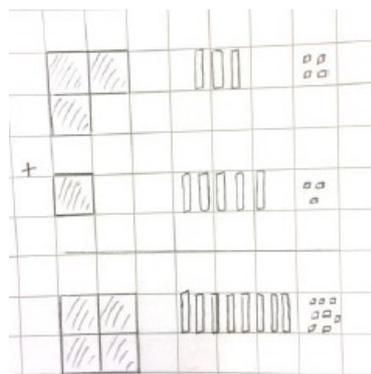
Compact Columnar Addition

Column method with Base 10 or place value counters

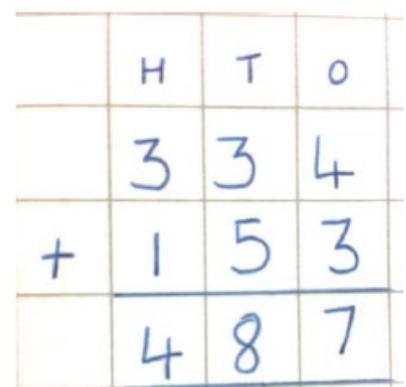


Show bar model first

Children draw pictures or use the support of pictures of concrete objects in the column method



Formal column method involving no renaming

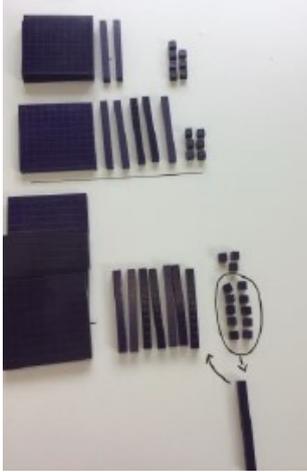


Vocabulary

addend, total, sum, partition, increase, altogether

Column method with Base 10
or place value counters

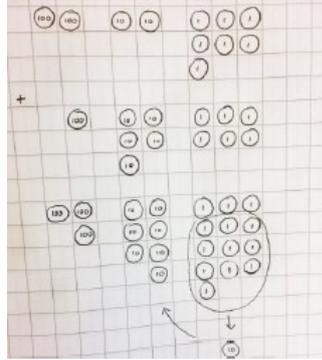
$$227 + 156 = 383$$



Show bar model first

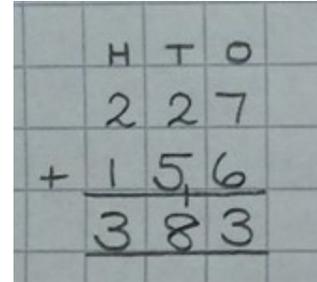
Children draw pictures or use
the support of pictures of con-
crete objects in the column
method

$$227 + 156 = 383$$



Formal column method involv-
ing renaming

$$227 + 156 = 383$$



Addition

Finding the whole when adding

Year 4

Pupils should be taught to:

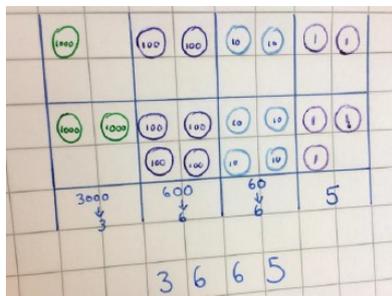
- add numbers with up to 4 digits using the formal written methods of columnar addition

Compact Columnar Addition

Represent addition calculation as a bar model representation first

Children move on to draw a pictorial representation of the columns and place value counters

$$1222 + 2443 = 3665$$

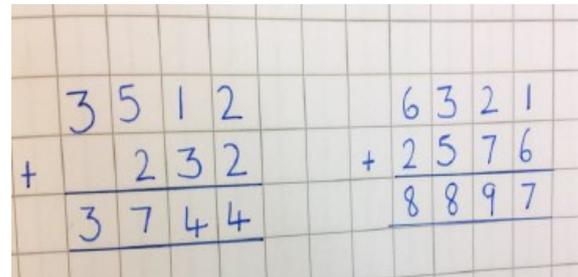


Formal column method involving no renaming

$$3512 + 232 = 3744$$

$$6321 + 2576 = 8897$$

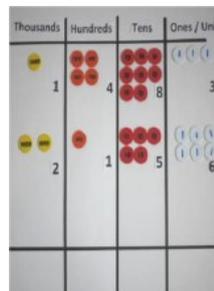
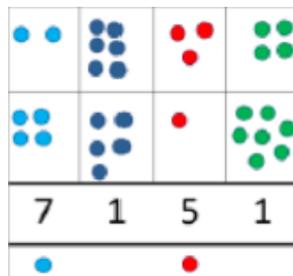
No renaming



Renaming

Children can use and draw a pictorial representation of the columns and place value counters

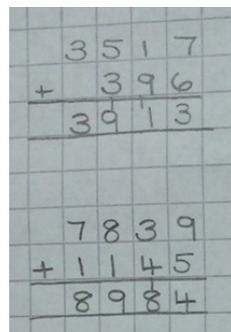
$$2634 + 4517 = 7151$$



Formal column method involving renaming

$$3517 + 396 = 3913$$

$$7839 + 1145 = 8984$$



Insist on using the language of place value to ensure understanding, e.g. one ten and nine tens equals ten tens; eight hundreds and one hundred equals nine hundreds

Vocabulary

addend, total, sum, partition, increase, altogether

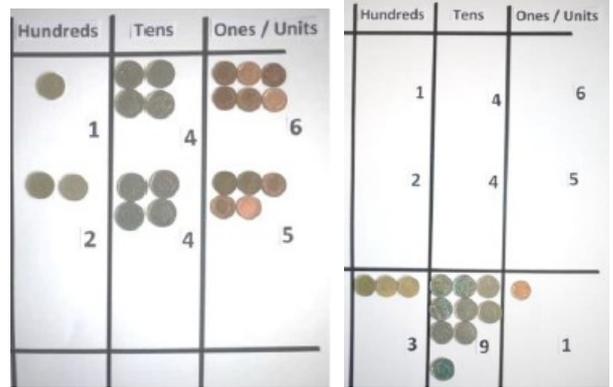
Addition with Decimals

Children use coins to add two decimal amounts together

Example shows renaming

$$£1.46 + £2.45 = £3.91$$

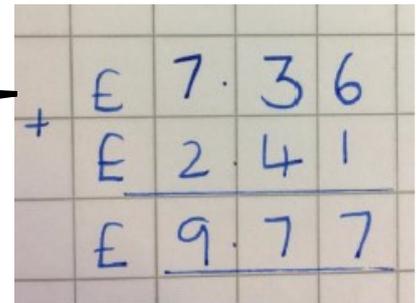
Again, insist upon the use of the language of place value



Formal column method with decimals in different contexts including money

$$£7.36 + £2.41 = £9.77$$

No renaming



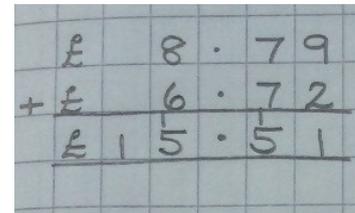
Write down the decimal point first, taking care it is lined up like all the other place value columns

It is important the children realise they are adding tenths and hundredths and that they are adding part of a number not a whole

Formal column method with decimals in different contexts including money

$$£8.79 + £6.72 = £15.51$$

Renaming



Write down the decimal point first, taking care it is lined up like all the other place value columns

Vocabulary

addend, total, sum, partition, increase, altogether

Addition

Year 5

Pupils should be taught to:

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

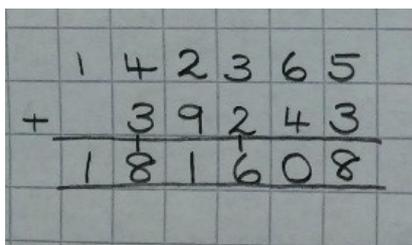
Compact Columnar Addition

Show bar model first

Use place value grid to start with if helpful to children's understanding

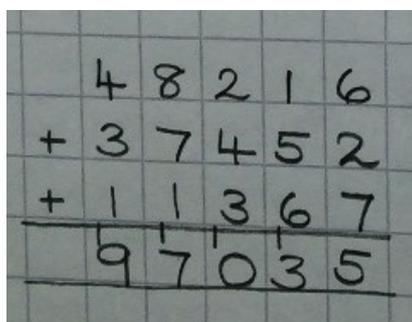
Children should use the column method when adding tens of thousands and hundreds of thousands. As with previous years, children begin by adding the ones, then the tens etc

$$142365 + 39243 = 181608$$



Children need to start using the column method to add more than two values

$$48216 + 37452 + 11367 = 97035$$

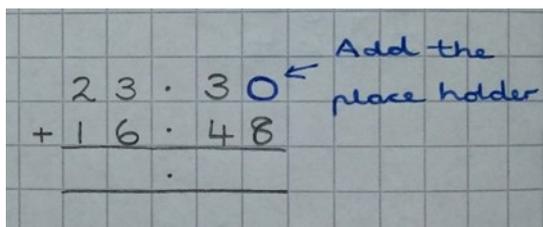


Columnar Addition with Decimals

Zero (0) should be used as a place holder to ensure that the numbers are to the same decimal place. Zero is added to show there is no value to add

$$23.3 + 16.48 = 39.78$$

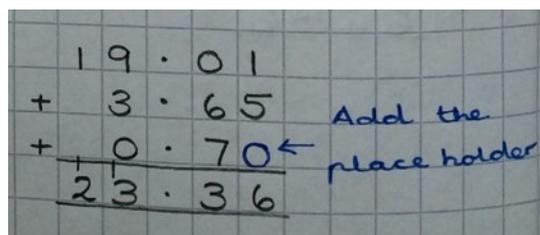
Write down the decimal point first, taking care it is lined up like all the other place value columns



It is important that children recognise they are adding tenths and hundredths and they understand they are adding part of a number not a whole number

$$19.01 + 3.65 + 0.7 = 23.36$$

Write down the decimal point first, taking care it is lined up like all the other place value columns



Vocabulary

addend, total, sum, partition, increase, altogether

Columnar Addition with Decimals

Show bar model first

Formal column method is used to solve problems in the context of measure, e.g. weight and money

The decimal point needs to be written first and lined up like all the other place value columns

$$26.6 \text{ kg} + 14.8 \text{ kg} = 41.4 \text{ kg}$$

2	6	.	6	kg	
+	1	4	.	8	kg
<hr/>					
4	1	.	4	kg	

Children use the column method to add more than two values in the context of measures

$$£19.01 + £3.65 + £0.70 = £23.36$$

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

Renaming below

Vocabulary

addend, total, sum, partition, increase, altogether

Addition

Year 6

In Year 6, children continue to practise the column addition method for addition of bigger numbers and decimal numbers up to three decimal places

Columnar Addition with Decimals

Up to 3 places

The decimal point needs to be written first and lined up like all the other place value columns

$$15.092 + 24.564 = 39.656$$

	1	5	.	0	9	2	
+	2	4	.	5	6	4	
<hr/>							
	3	9	.	6	5	6	

Adding more than one decimal number

Zero (0) should be used as a place holder to ensure that the numbers are to the same decimal place

The decimal point needs to be written first and lined up like all the other place value columns

$$41.472 + 32.8 = 74.272$$

	4	1	.	4	7	2	
+	3	2	.	8	0	0	
<hr/>							
	7	4	.	2	7	2	

The decimal point needs to be written first and lined up like all the other place value columns

$$3.06 + 12.421 + 9.9 = 25.381$$

				3	.	0	6	0	
+	1	2	.	4	2	1			
+		9	.	9	0	0			
<hr/>									
	2	5	.	3	8	1			

Children use the column method to add several numbers with different numbers of decimal places

Zero (0) should be used as a place holder to ensure that the numbers are to the same decimal place

The decimal point needs to be written first and lined up like all the other place value columns

Tenths, hundredths and thousandths should be correctly aligned

$$23.361 + 9.08 + 59.77 + 1.3 = 93.511$$

				2	3	.	3	6	1	
+				9	.	0	8	0		
+		5	9	.	7	7	0			
+			1	.	3	0	0			
<hr/>										
	2	9	3	.	5	1	1			

Children use the column method to add several numbers with different numbers of decimal places

Zero (0) should be used as a place holder to ensure that the numbers are to the same decimal place

The decimal point needs to be written first and lined up like all the other place value columns

Tenths, hundredths and thousandths should be correctly aligned

Vocabulary

addend, total, sum, partition, increase, altogether

Columnar Addition to One Million

Use place value grid if helpful at the start

$$302432 + 110709 = 413141$$

A handwritten columnar addition problem on a grid. The numbers are aligned by place value. The first number is 302432 and the second is 110709. A horizontal line is drawn under the second number. The sum, 413141, is written below the line. Small vertical lines are drawn under the digits 0, 7, and 0 in the second number to indicate carrying.

$$396042 + 525738 = 921780$$

A handwritten columnar addition problem on a grid. The numbers are aligned by place value. The first number is 396042 and the second is 525738. A horizontal line is drawn under the second number. The sum, 921780, is written below the line. Small vertical lines are drawn under the digits 9, 2, and 7 in the second number to indicate carrying.

Vocabulary

addend, total, sum, partition, increase, altogether