



**Villa Real School**  
*together we achieve*

# Written Calculation Policy

## 2021

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Date: February 2021

Signed and Adopted by the Governing Body:

Chair of Governors

Date: 22.02.21

Date to be reviewed: September 2022

## Calculation Policy

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## **RATIONALE**

This Calculation Policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression. The content is set out in stages under the following headings: addition, subtraction, multiplication and division. Statements taken directly from the programmes of study are listed in bold at the beginning of each section.

Pupils will, firstly, use mental methods, but for calculations that they cannot do in their heads, they will need to use an efficient written method accurately and with confidence.

When a new concept is introduced there will be a Concrete, Pictorial and then Abstract approach to teaching.

## **AIMS**

- To ensure consistency and progression in the school's approach to calculation
- To ensure that pupils develop an efficient, reliable, formal written method of calculation for all operations
- To ensure that pupils can use these methods accurately with confidence and understanding

## **HOW TO USE THIS POLICY**

- The policy should be used as the basis of planning
- If, at any time, pupils are making significant errors, the previous stage in calculation should be re-visited
- Suitable resources, models, images and methods of communication within a Total Communication environment to support pupils understanding of calculation and place value, as appropriate, should be used

The policy should be used in conjunction with the Maths Glossary from the NCETM and our Maths Scheme of Work -

<https://www.ncetm.org.uk/public/files/17308038/>

- .

# Calculation Guidance - Addition Stage 1

## 'When you add a number, it gets bigger'

- Pupils 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. Initially using numbers to 5, then to 10.
- They will find one more than a given number.
- They will combine 2 parts to make a whole.
- Begin to use numerals as labels for numbers.

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

Do not move onto the next stage until this one has been mastered.

### Concrete – real things to touch and move

Counting aloud

Count and rearrange

### Pictorial

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

### Abstract

1 2 3 4 5 6 7 8 9 10

DIGITS -Number only linked to concrete – labelling numbers using the digits

### Vocabulary

Add, more, and, make, total, altogether, score, double, one more, makes, is,

### Links to Other Strands

Counting forwards  
 Combining and increase numbers  
 Develop the concept of addition  
 Real Life links with verbal number stories

### Numicon/Number Links

Pupils should be able to recognise the Numicon plates to 10.  
 Name or label the plates using digits  
 Put in order from 1 to 10 making the step sequence  
 Find a missing numicon shape in the step sequence  
 Label the step sequence with digit cards 1 – 10  
 Use Numicon when solving addition calculations – placing the shapes together and finding the one that matches to place on top –  
 Fitting plates together – step+step, step+non step, non step+non step together

## Calculation Guidance – Addition Stage 2

### ‘When you add a number, it gets bigger’

Pupils will continue to engage in a wide variety of songs, rhymes, games and activities.

Given a number, identify one more

- Read, write and interpret mathematical statements involving addition (+) and the equals (=) sign
- Add one- digit and two-digit numbers within 20, including zero
- Solve missing number problems e.g.  $10 + = 16$

Pupils will continue to practise counting on from any number e.g. ‘Put five in your head and count on four.’

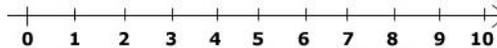
Initially use a number track to count on for addition, counting on from the largest number:

$5 + 4 = 9$  ‘Put your finger on number five. Count on four.’

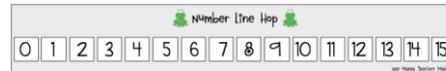


Then progress to a marked number line:

$3 + 3 = 6$  ‘Put your finger on number three and count on three.’



$8 + 7 = 15$  ‘Put your finger on number eight and count on seven.’

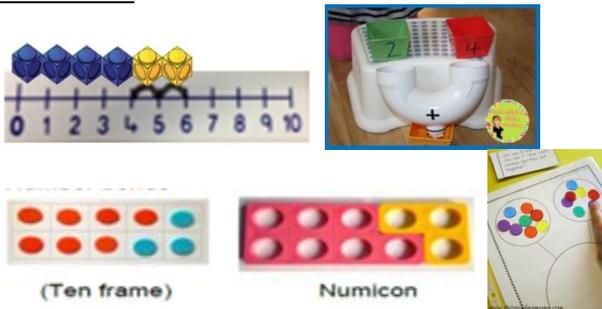


Continue to practise counting on from the largest number for addition with totals within 20.

Use various manipulatives to calculate to 10 initially and then progress up to totals to 20.

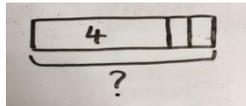
Do not move onto the next stage until this one has been mastered.

#### Concrete



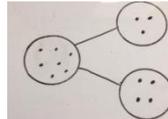
#### Pictorial

4 add 2 is

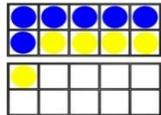


7 is equal to 3 and 4

7 is the same as 3 and 4



Draw the tens frame or other manipulative



6 add 5 is?

#### Abstract



What is 2 more than 4?

What is the sum of 2 and 4?

What is the total of 4 and 2?

$4 + 2$

Children to understand equality

		$6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$
--	--	----------------------------------------------------------------

Vocabulary  
 Add, more, and, plus, make, total, altogether, score, double, one more

Links to Other Strands  
 Combine and increase numbers, counting forwards  
 Develop the concept of addition and use operations fluently  
 Discuss and solve problems in familiar practical contexts  
 Compare, discuss and solve practical (measure) problems e.g. longer than, heavier than, bigger than

Numicon/Number Links  
 Make numberline to 20 and label with numerals  
 Make, recognise, use teen numbers from the two plates (2 digit) tens and ones  
 Use numicon to add numbers to total no more than 20  
 Use numicon to find number bonds/pairs to 10 and then link to number bonds/pairs to 20

# Calculation Guidance – Addition Stage 3

## 'When you add a number, it gets bigger'

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
- Three one-digit numbers

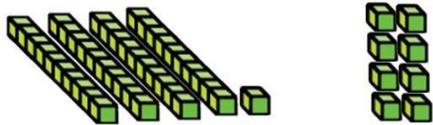
Counting on

- Counting on in ones using an empty number line, within 100
- Counting on in tens using an empty number line, within 100
- Use in conjunction with a 100 square to show jumps of tens

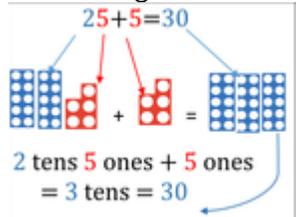
Do not move onto the next stage until this one has been mastered.

Initially begin with addition to 50  
Then to 75  
Then to 100.

Concrete  
TO+O using base 10

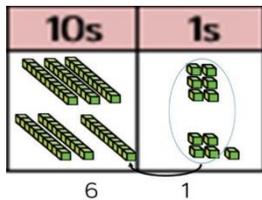


TO+O using numicon

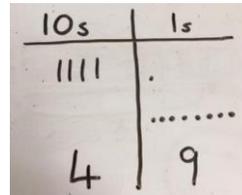


TO + TO using base 10. Continue to develop understanding of partitioning and place value.

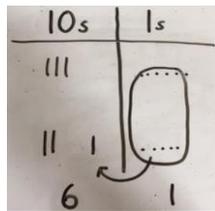
$36 + 25$



Pictorial



Represent base ten with lines for tens and dots or crosses for ones.



$36 + 25 =$

Use pictures or a number line. Regroup or partition the smaller number to make 10.



$3 + 9 =$

Abstract

$48 + 36 = 84$  'Put the biggest number first (48), and then partition the smaller number ( $36 = 30 + 6$ ) and count on:  $48 + 30 + 6$ .'

- Use in conjunction with a 100 square to show jumps of tens and ones and something concrete too
- If pupils are confident, use more efficient jumps:

$48 \quad 78 \quad 80 \quad 84$

- Use in conjunction with a 100 square to show jumps of tens and ones/units and something concrete too

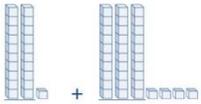
Also use the partitioning method to add two two-digit numbers:  $43 + 25 = 68$       40

$3 \quad 20 \quad 5$

$40 + 20 = 60$

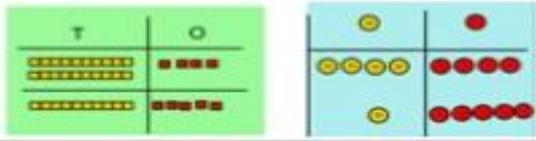
$3 + 5 = 8$

$60 + 8 = 68$



$$24 + 15 =$$

Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters/dienes.



Partition and recombine  $46 + 27 = 60 + 13 = 73$



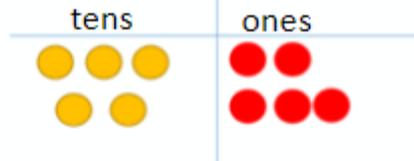
$$4 + 7 + 6 = 17$$

Put 4 and 6 together to make 10. Add on 7.

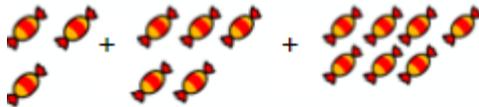


Number bonds/pairs/combinations to 100

After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.



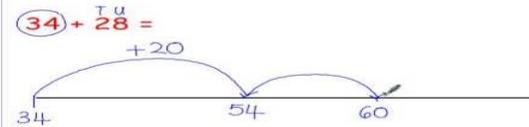
Add together three groups of objects. Draw a picture to recombine the groups to make 10.



$$46 + 27 = 73 \quad \text{Count in tens then bridge.}$$



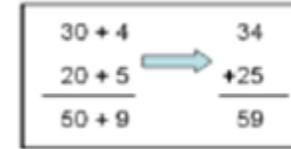
Using a blank number line  
(adding on all the tens, bridging through ten)



Bar modelling There were 43 sweets in 1 jar and 78 sweets in another, how many were there altogether?

'Partition the numbers into tens and ones. Add the tens together and then add the ones together.

Recombine to give the answer'.



Then move on to calculations that **bridge** the tens:

$$48 + 36 = 40 + 8 + 30 + 6$$

$$40 + 30 = 70$$

$$8 + 6 = 14$$

$$70 + 14 = 84$$

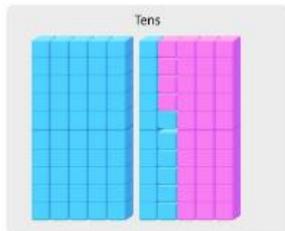
$$48 + 36 = 84$$

This is an alternative way of recording the partitioning method.

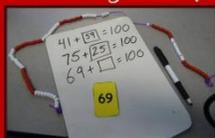
This will lead into formal written methods in Stage 4.

Further develop addition with numbers that bridge 100, using a **200 grid** to support.

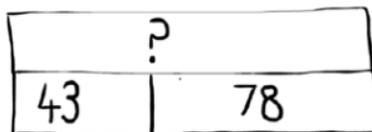
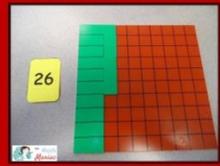
$$66 + 4 = 100$$



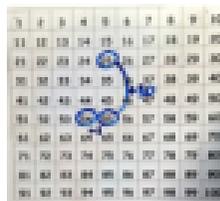
### Promoting Fluency



### Combinations of 100



25 + 29 by + 30 then -1  
(Round and adjust)



### Vocabulary

Add, more, and, plus, make, total, altogether, score, double, one more, tens, ones, place value, worth, column, tens digit, ones digit, digit, 2 digit number  
(When ready - Three digit number, hundreds digit, hundreds)

### Links to Other Strands

Solve problems using various concrete and pictorial representations  
Apply increasing knowledge of written methods  
Partition numbers in different ways  
Discuss and solve problems that emphasis the value of each digit in 2 digit numbers  
Counting up in fractions to 10

### Numicon/Number Links

Making 2 digit numbers with plates then moving onto base 10 as its easier to manipulate as you use bigger numbers.

Always start with numicon when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Remember numicon can still be used for problem solving, doubling,



# Calculation Policy – Addition Stage 4

## ‘When you add a number, it gets bigger’

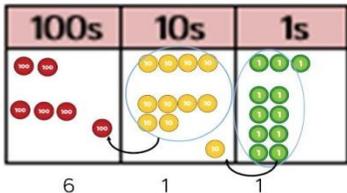
- Add numbers mentally including a three digit number and ones, three digit number and tens and three digit number and hundreds
- Add numbers with up to three digits, using formal written method of columnar addition

Do not move onto the next stage until this one has been mastered.

### Concrete

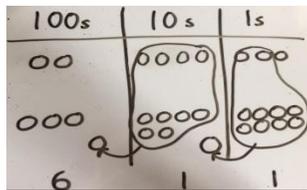


Use of place value counters to add HTO + TO, HTO + HTO etc. When there are 10 ones in the 1s column- we exchange for 1 ten, when there are 10 tens in the 10s column- we exchange for 1 hundred.



### Pictorial

Children to represent the counters in a place value chart, circling when they make an exchange.



Children to draw the base 10 in a grid to show the concrete equivalent

Bar Modelling to support understanding of language

315	$315 - 185 = ?$
185	$185 + ? = 315$

?	$185 + 315 = ?$
185	$? - 185 = 315$

- Further develop the use of the **empty number line** with calculations that **bridge 100**:

$78 + 46 = 124$	$78 + 40 + 6$
78	118      124

### Abstract

Introduce the **expanded written method** with the calculation presented both horizontally and vertically (in columns). Initially use calculations where it has not been necessary to bridge across the tens or hundreds:

$$63 + 32 = 95$$

60 and 3  
+30 and 2  
90 and 5 = 95

This will lead into the method:

63	
+32	itten
95	

Use the language of place value to ensure understanding: ‘Three add two equals five. Write five in the ones column. 60 add 30 equals 90. Write 9 (90) in the tens column.

Then introduce calculations where it is necessary to bridge:

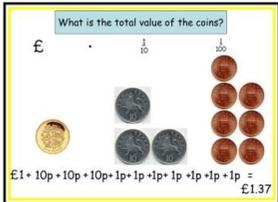
68	
+24	
12 (ones)	
80 (tens)	
92	

Add the least significant digits (ones) together first and then the tens in preparation for the formal written method. Writing the units and tens is not necessary as long as the pupils understand the method.

If pupils are ready, introduce the formal written method, where it is necessary to ‘carry’ ten from the ones to the tens column:

68	
+24	
92	
1	





If pupils are confident, further develop with the addition of a three- digit number and a two digit number.

If, at any time, pupils are making significant errors, return to previous stage in calculation.

### Vocabulary

Add, more, and, plus, make, total, altogether, score, double, one more, tens, ones, place value, worth, column, tens digit, ones digit, digit, 2 digit number  
(When ready - Three digit number, hundreds digit, hundreds)

### Links to Other Strands

Use coins as ones, tens and hundreds, 1p, 10p, £1  
 Estimating and using the inverse to check  
 Solve addition problems in context deciding which operations to use and why  
 Recognising place value up to 3 digit numbers  
 Estimate, calculate, compare different measures, including money in £ and p (including fractions and decimals)  
 Addition of fractions with the same demoninator to become fluent  
 Counting using simple fractions and decimals forwards

### Numicon Links

Children may need support for place value, and understanding worth of numbers so use for this  
 Most children should be using place value counters or base ten to support their visual understanding as a concrete activity but also whilst using asbtract or pictoral methods too.

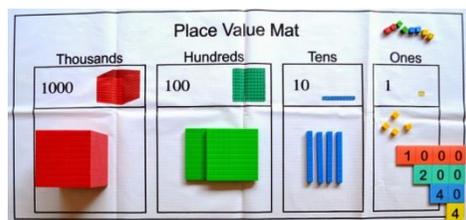
## Calculation Guidance – Addition Stage 5

### ‘When you add a number, it gets bigger’

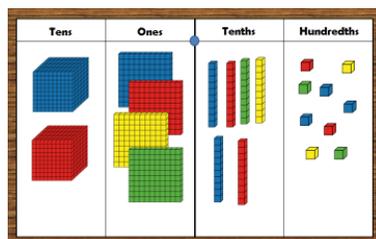
- Add numbers with up to 4 digits using the formal written method of columnar addition where appropriate
- Continue to teach the use of **empty number lines** with three and four digit numbers, as appropriate.
- Further develop the formal written method of addition, with three-digit numbers. Revisit the **expanded method** first, if necessary. If pupils are confident, introduce the addition of a four-digit number and a three digit number. Continue to develop with addition of two four-digit numbers and with decimals (in the context of money or measures).

#### Concrete

As in previous stage plus...



Decimals/Money Place value



#### Pictorial

As in previous stage plus...

Drawing of base 10 or place value counters to support understanding of abstract and showing concrete.

Use of number line to count on using partitioning method – thousands, hundreds, tens, and ones

#### Abstract

$$176 + 147 = 323$$

$$\begin{array}{r} 176 \\ +147 \\ \hline 323 \end{array}$$

This will lead into the **formal written method**:

Use the language of place value to ensure understanding: ‘Seven add six equals 13. Write 3 in the ones column and ‘carry’ one across into the tens column (10). 40 add 70 and then the ten that we carried equals 120. Write 2 in the tens column (20) and ‘carry’ 1 (100) across into the hundreds column. 100 add 100 and the 100 that has been carried equals 300. Write 3 in the hundreds column (300).

The digits that have been ‘carried’ should be recorded under the line in the correct column (the next column).

#### Vocabulary

Add, more, and, plus, make, total, altogether, score, double, one more, tens, ones, place value, worth, column, tens digit, ones digit, digit, 2 digit number

Three digit number, hundreds digit, hundreds, four digit number, thousands, calculation

### Links to Other Strands

Estimate and use inverse operations to check answers  
Solve 2 step addition problems – use pictorial bar method/jottings to support this  
Recognise place value in a 4 digit number  
Measures – money, length, perimeter,  
Addition of fractions, decimals

Do not move onto the next stage until this one has been mastered.

### Numicon/Number Links

Making 2 digit numbers with plates then moving onto base 10 or place value counters or cards as its easier to manipulate as you use

bigger numbers.



900 90 9  
 $999 = 900 + 90 + 9$

Always start with familiar manipulative for a visual when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Remember numicon can still be used for problem solving, doubling, Ensure children understand the value of these numbers and use the right terminology for ones and tens to help with column methods.

# Calculation Guidance – Subtraction Stage 1

“When you subtract, the number gets smaller.”

- Pupils will engage in a variety of counting songs and rhymes and practical activities. Involving counting backwards or taking away
- In practical activities and through discussion they will begin to use the vocabulary associated with subtraction.
- They will find one less than a given number.
- They will begin to relate subtraction to ‘taking away’ using objects to count ‘how many are left’ after some have been taken away.

Pupils will begin to count back from a given number.

## Concrete

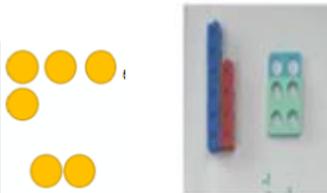
Actual apples or other objects to physically take away and remove or hide from a whole



Numicon number line to use and count backwards



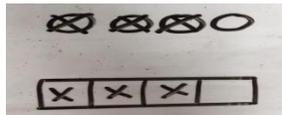
one less than 7 is six



six take away 2 makes 4

## Pictorial

I have 6 apples, 2 get eaten, how many are left.



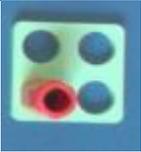
There are 4 books. I have read 3 of them. How many are left to read?

## Abstract



0 1 2 3 4 5 6 7 8 9 10  
Labelling numicon plates on a numberline and counting back wards from 10

Do not move onto the next stage until this one has been mastered.



4 take away 1 is 3

Vocabulary

Take away, how many are left?, less, one less, makes, is, equals

Links to Other Strands

Take away from and decrease numbers, counting backwards.  
Discuss and solve subtraction problems in familiar practical contexts.  
Compare, describe and solve practical (measure) problems e.g. shorter than, lighter than, less than

Numicon/Number Links

Pupils should be able to recognise the Numicon plates to 10.  
Name or label the plates using digits  
Put in order in step sequence starting with 10 at the end.  
Find a missing numicon shape in the step sequence  
Label the step sequence with digit cards 1 – 10  
Use Numicon when solving subtraction calculations – placing the whole underneath the number to take away and (hiding it) to see what shape fits on the part that is left? Or placing the number of numicon pegs in the takeaway number to see what is left.

# Calculation Guidance – Subtraction Stage 2

## “When you subtract, the number gets smaller.”

- Given a number, identify one less
- Read, write and interpret mathematical statements involving subtraction (-) and the equals (=) sign
- Subtract one-digit and two-digit numbers within 20, including zero
- Solve missing number problems ( $20 - ? = 15$ )
- Count on to find the difference

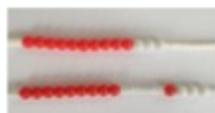
Do not move onto the next stage until this one has been mastered.

Pupils will continue to practise counting back from a given number to 20

### Concrete

Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.

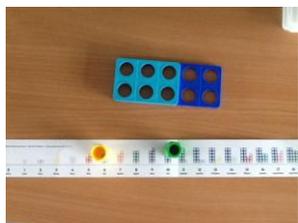
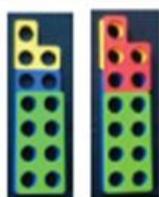
$$13 - 4 =$$



Use counters and move them away from the group as you take them away counting backwards as you go.



Difference between 13 and 8  
 $13 - 8 =$   
 $8 + \_ = 13$



### Pictorial

Initially use number track or numicon line to count back from 10 gradually increasing to 20



$9 - 5 = 4$  'Put your finger on number nine. Count back 5.'



Then from numbers to 20



### Abstract

$$18 - 3 = 15$$

$$8 - 2 = 6$$

Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

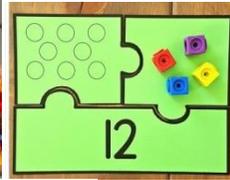
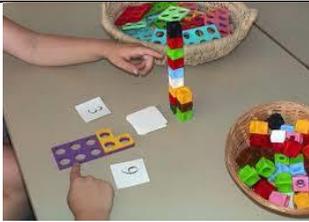
Move to using numbers within the part whole model.



$$16 - 8 =$$

How many do we take off to reach the next 10?

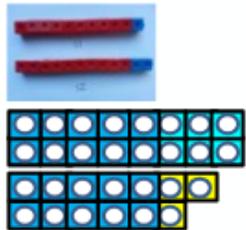
How many do we have left to take off?



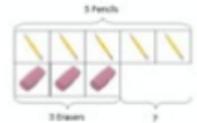
$14 - 5 =$   
 Make 14 on the ten frame. Take away the four first to make 10 and then take away one more so you have taken away 5. You are left with the answer of 9.



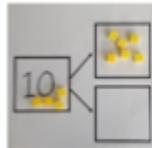
Compare amounts and objects to find the difference. Use cubes to build towers, numicon or make bars to find the difference.



Use basic bar models with items to find the difference.

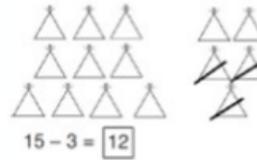


Link to addition- use the part whole model to help explain the inverse between addition and subtraction.



If 10 is the whole and 6 is one of the parts. What is the other part?  
 $10 - 6 =$

Cross out drawn objects to show what has been taken away.

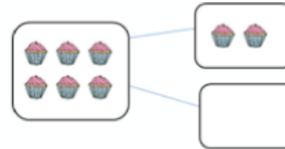


3	?
7	

$7 - 3 = ?$

Bar Model

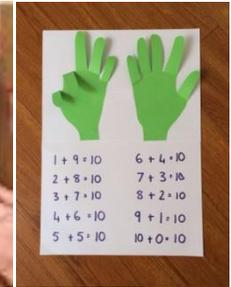
Use a pictorial representation of objects to show the part part whole model.



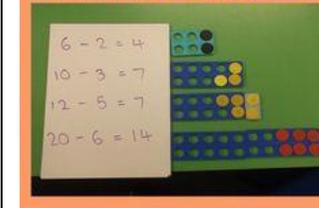
Subtraction number story: High school students

4 planes. 1 jet away. 3 are left.  
 4 take away 1 is 3.  
 $4 - 1 = \square$

5 planes. 2 fly away. 3 are left.  
 5 take away 2 is 3.  
 $5 - 2 = \square$



Subtraction using counters



Whack-a-Ball Subtraction Game



6 less than 10 is 4



Vocabulary

Find the difference, take away, how many are left?, less, one less, makes, equals, is, smaller

Links to Other Strands

- Combine and decrease numbers, counting backwards.
- Develop the concept of subtraction and use the operations flexibly.
- Discuss and solve problems in familiar practical contexts.
- Compare, describe and solve practical (measure) problems e.g. shorter than, lighter than.

Numicon/Number Links

Pupils should be able to recognise the Numicon plates to 20.  
Name or label the plates using digits (numerals)  
Put in order in step sequence starting with 10 at the end – going backwards right to left  
Find a missing numicon shape in the step sequence  
Label the step sequence with digit cards 1 – 20  
Use Numicon when solving subtraction calculations – placing the whole underneath the number to take away and (hiding it) to see what shape fits on the part that is left? Or placing the number of numicon pegs in the takeaway number to see what is left.

## Calculation Guidance – Subtraction Stage 3 “When you subtract, the number gets smaller”

- Subtract numbers using concrete objects, pictorial representations, and mentally, including:
- Take away a one digit number from a two digit number
- Take away tens numbers from a two digit number
- Take away a two-digit number from a larger 2 digit number

### Counting on to find a small difference

Count up from the smallest number to the largest to find the difference.

$$32 - 28 = 4 \quad \quad \quad \underline{28} \quad 29 \quad 30 \quad 31 \quad 32$$

‘The difference between 28 and 32 is 4.’

If pupils are confident, further develop this method:

$$76 - 58 = 18 \quad \quad \quad \underline{58} \quad 60 \quad 70 \quad 76$$

‘The difference between 58 and 76 is 18.’

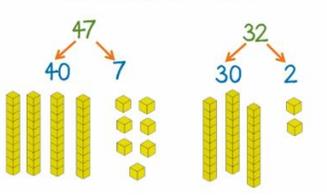
Further develop subtraction with numbers that bridge 100, using a 200 grid to support.

Initially begin with using numbers to 50, then 75 and then 100 as they build confidence in numbers and their value.

Do not move onto the next stage until this one has been mastered.

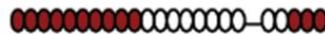
### Concrete

Subtract: 47 - 32.



### Pictorial

Number track / Number line – jumps of 1 then efficient jumps using number bonds  
23 - 5 = 18



Counting back using an empty number line within 100, in ones:

$$34 - 6 = 28 \quad \quad \quad 28, 29, 30, 31, 32, 33, 34$$

And in tens:

### Abstract

Subtraction, using partitioning, on an empty number line:  $76 - 45 = 31$  (76 - 4 tens and 5 ones)

Counting back in tens and ones:

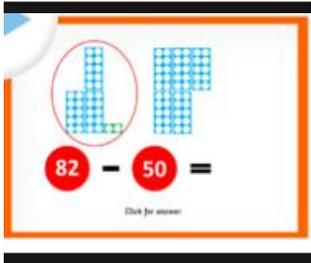
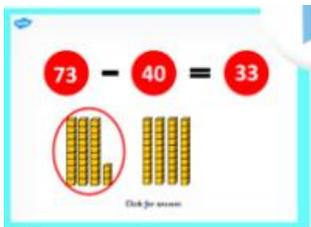
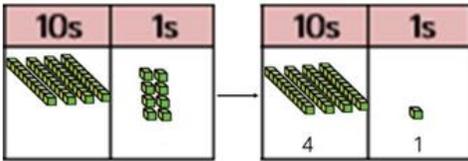
$$76, 66, 56, 46, 36, 35, 34, 33, 32, 31$$

If pupils are confident, use more efficient jumps: (76 - 4 tens (40) and 5 ones (5))

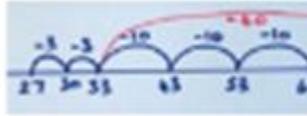
$$76 \quad 36 \quad 31$$

Column method using base 10.

48-7



$58 - 30 = 28$     28, 38, 48, 58



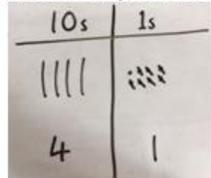
Subtraction number line always start from biggest number on right and go backwards.

Use in conjunction with a 100 square to show jumps of tens and then tens and ones when appropriate.

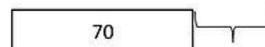
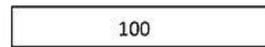
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

$54 - 32 = 22$

Children to represent the base 10 pictorially.



48-7 =



$100 - 70 = ?$

Use in conjunction with a 100 square to show jumps of tens and ones/units.

Count up from the smallest number to the largest to find the difference.

$32 - 28 = 4$     28    29    30    31    32

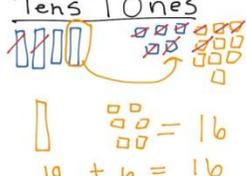
'The difference between 28 and 32 is 4.'

If pupils are confident, further develop this method:

$76 - 58 = 18$     58    60    70    76

'The difference between 58 and 76 is 18.'

Further develop subtraction with numbers that bridge 100, using a 200 grid to support.

$\begin{array}{r} 45 \\ -29 \\ \hline 16 \end{array}$	<p style="margin: 0;">Tens   Ones</p>  <p style="margin: 0;"><math>10 + 6 = 16</math> Regrouping to carry</p>
-------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Vocabulary

Find the difference, take away, how many are left?, less, one less, makes, equals, is, smaller, subtract, subtraction, what is the difference between, How many less is ? than ?,

Links to Other Strands

Counting down in tens, fives, twos, threes,  
 Calculating change when using money  
 Solve problems using various concrete and pictorial representations  
 Apply increasing knowledge of written methods  
 Partition numbers in different ways  
 Discuss and solve problems that emphasis the value of each digit in 2 digit numbers  
 Counting down in fractions from 10

Number/Numicon Links

making 2 digit numbers with plates then moving onto base 10 as its easier to



manipulate as you use bigger numbers.

Always start with numicon when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Remember numicon can still be used for problem solving, doubling, Ensure children understand the value of these numbers and use the right terminology for ones and tens.

## Calculation Guidance – Subtraction Stage 4

### “When you subtract, the number gets smaller”

- Subtract numbers with up to three digits, using formal written method of columnar subtraction

Further develop the use of the empty number line with calculations that bridge 100:

$$126 - 45 = 81 \qquad 81 \qquad 86 \qquad 96 \qquad 106 \qquad 116 \qquad 126$$

Use practical equipment to support counting back in tens and bridging 100 such as 200 grid, Numicon, Cuisenaire rods etc. Then use more efficient jumps: 81 86 96 106 116 126

Extend with larger numbers by counting back:

$$216 - 27 = 189 \qquad 189 \qquad 190 \qquad 196 \qquad 216$$

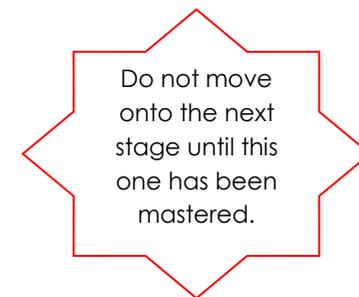
And by counting on to find the difference (small difference):

$$231 - 198 = 33 \qquad 198 \qquad 200 \qquad 230 \qquad 231$$

'The difference between 198 and 231 is 33.'

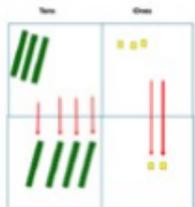
- Expanded written method using numbers to total less than 100 **without** decomposition/exchange
- Formal written method using numbers to total less than 100 **without** decomposition/exchange
- Then
- Expanded written method using numbers to total less than 100 **with** decomposition/exchange
- Formal written method using numbers to total less than 100 **with** decomposition/exchange

If pupils are confident, extend the use of the **formal written method** with numbers over 100 (3 digit), returning to the expanded method first, if necessary.



#### Concrete

Use Base 10 to make the bigger number then take the smaller number away.



#### Pictorial

#### Abstract

Introduce the **expanded written method** with the calculation presented both horizontally and vertically (in columns) and **supported with practical activities**. Use two-digit numbers when introducing this method, initially:

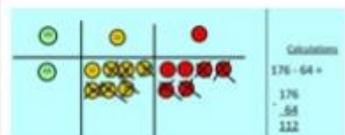
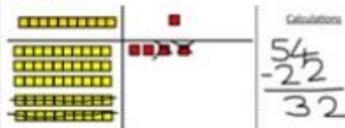
$$78 - 23 = 55 \qquad \begin{array}{r} 70 \text{ and } 8 \\ -20 \text{ and } 3 \\ \hline 50 \text{ and } 5 = 55 \end{array}$$

'Partition numbers into tens and ones. Subtract the ones, and then subtract the tens. Recombine

Show how you partition numbers to subtract. Again make the larger number first.



Draw the Base 10 or place value counters alongside the written calculation to help to show working.



391	
186	?

Raj spent £391, Timmy spent £186. How much more did Raj spend?

Calculate the difference between 391 and 186.

? = 391 - 186 - change position of =

give answer.' Use practical activities to support the teaching of this method.

This will lead into the **formal written method**:

$$\begin{array}{r} 78 \\ -23 \\ \hline 55 \end{array}$$

Use the language of place value to ensure understanding. 'Eight subtract three, seventy subtract twenty.'

You could then change word 'and' for '+'.  
 $70 + 8 - 20 - 3 = 55$

$$\begin{array}{r} 47 - 24 = 23 \\ -20 + 7 \\ \hline 20 + 3 \end{array}$$

This will lead to a clear written column subtraction.

Introduce the **expanded written method** where exchange/decomposition is required

$$\begin{array}{r} 73 - 27 = 46 \\ 70 + 3 \text{ becomes } 60 \text{ and } 13 \\ -20 + 7 \quad \quad \quad \underline{20 \text{ and } 7} \\ \quad \quad \quad \quad \quad \quad \underline{40 + 6 = 46} \end{array}$$

73 is partitioned into 60 and 13 in order to calculate 73 - 27.

This can be demonstrated practically and does not have to be recorded.

When pupils are confident with the expanded method introduce the **formal written method, involving decomposition/exchange**:

$$73 - 27 = 46$$

$$\begin{array}{r} 63 \\ 73 \\ \underline{27} \\ 46 \end{array}$$

$$\begin{array}{r} 39\Box \\ - \Box\Box6 \\ \hline \Box05 \end{array}$$

Vocabulary

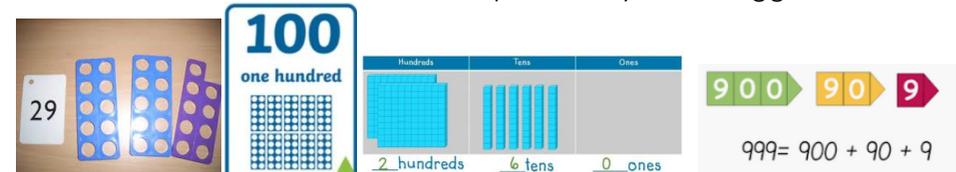
Find the difference, take away, how many are left?, less, one less, makes (equals for KS2) smaller, subtract, subtraction, what is the difference between, How many less is ? than ?, columns, carry/move across, exchange,

Links to Other Strands

- Counting down in multiples
- Calculating change when using money less than £1
- Solve problems using various concrete and pictorial representations
- Apply increasing knowledge of written methods
- Partition numbers in different ways
- Discuss and solve problems that emphasis the value of each digit in 2 digit numbers
- Counting down in fractions from 10

Number/Numicon Links

Making 2 digit numbers with plates then moving onto base 10 or place value counters or cards as its easier to manipulate as you use bigger numbers.



Always start with familiar manipulative for a visual when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Remember numicon can still be used for problem solving, doubling, Ensure children understand the value of these numbers and use the right terminology for ones and tens to help with column methods.

## Calculation Guidance – Subtraction Stage 5

### “When you subtract, the number gets smaller”

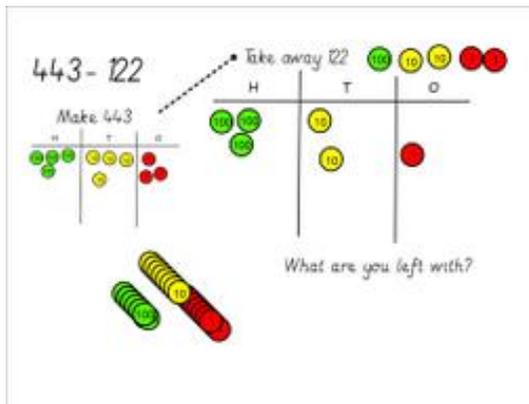
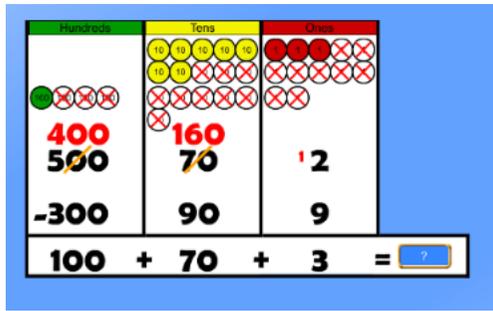
- Subtract numbers with up to 4 digits using the formal written method of columnar subtraction where appropriate

Continue to teach the use of empty number lines with three and four digit numbers, as appropriate.

Continue to develop the formal written method of subtraction by revisiting the expanded method first, if necessary.

Continue to use base-ten / Numicon materials to support understanding.

#### Concrete



#### Pictorial

Drawing a base ten or place value counters into column grid to support.

Drawing a blank numberline to count back on – or count up to find the difference

#### Abstract

See stage 4 for support in getting to this point.

$$\begin{array}{r} 515 \\ 765 \\ - 39 \\ \hline 726 \end{array}$$

Borrow and Regroup Method  
Or Decomposition

Subtraction with Regrouping in  
Ones, Tens, Hundreds, and Thousands

$$\begin{array}{r} 5,146 - 2,598 = \\ \text{Th H T O} \\ 5,146 \\ - 2,598 \\ \hline 2,548 \end{array}$$

$$\begin{array}{r} 39 \square \\ - \square \square 6 \\ \hline \square 0 5 \end{array}$$

Do not move  
onto the next  
stage until this  
one has been  
mastered.

### Vocabulary

Find the difference, take away, how many are left?, less, one less, makes (equals for KS2) smaller, subtract, subtraction, what is the difference between, How many less is ? than ?,

### Links to Other Strands

Counting down in multiples

Calculating change when using money using pounds and pence

Solve problems using various concrete and pictorial representations

Apply increasing knowledge of written methods

Partition numbers in different ways

Discuss and solve problems that emphasis the value of each digit in 3 or 4 digit numbers

Measures - problem solving everyday situations

Counting down in fractions from 10

### Numicon/Number Links

Making 3 and 4 digit numbers with base 10 or place value counters

900 90 9

$999 = 900 + 90 + 9$  Or place value cards

Always start with a familiar manipulative (Base ten) when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Remember numicon can still be used for problem solving, doubling,

Ensure children understand the value of these numbers and use the right terminology for ones, tens, hundreds, thousands to help with column methods.

## Calculation Guidance – Multiplication Stage 1 “When you multiply, the number gets bigger”

- Pupils will engage in a wide variety of songs and rhymes, games and activities. In practical activities and through discussion they will begin to solve problems involving doubling.

### Concrete



‘Three apples for you and three apples for me. How many apples altogether?’

Real life doubles

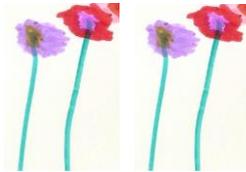


5 fingers and 5 fingers. There is the same on each hand. How many fingers altogether?

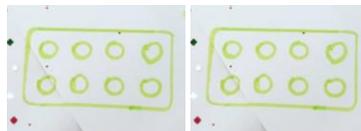


A six and a six – they are the same – How many dots altogether?

### Pictorial



Draw doubles



Draw two things that are the same.

### Abstract

Do not move onto the next stage until this one has been mastered.

### Vocabulary

The same, double, how many altogether?

### Links to Other Strands

Addition – numbers getting bigger  
Shape and space – 2D and 3D shape matching  
Counting up  
Patterns  
Problem Solving using familiar contexts

### Numicon/Number Links

Finding numicon plates that are the same and using their number names  
Pupils should be able to recognise the Numicon plates to 10.  
Name or label the plates using digits  
Put in order from 1 to 10 making the step sequence  
Find a missing numicon shape in the step sequence  
Label the step sequence with digit cards 1 – 10  
Fitting plates together – step+step, step+non step, non step+non step together

# Calculation Guidance – Multiplication Stage 2

## “When you multiply, the number gets bigger”

- Link to repeated addition (2+2+2) (5+5) (10+10+10+10)
- Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Count in multiples of twos, fives and tens (to the 10th multiple)
- Continue to look at doubles

Pupils will count repeated groups of the same size in practical contexts. They will use the vocabulary associated with multiplication in practical contexts. They will solve practical problems that involve combining groups of 2, 5 or 10. E.g. socks, fingers and cubes



Use arrays to support early multiplication  $2 \times 5 = 10$  (2 lots of/groups of 5)

'Two groups of five faces'. How many faces altogether? 2, 4, 6, 8, 10'. Two groups of five faces. How many faces altogether? 5, 10'

'2 groups of 5'

'How many altogether?'

'5+5=10'

Double five is ten

**Only use 2's 5's and 10's numbers at this level. Therefore only groups of these – you can have 4 groups of 5 but not 5 groups of 4!!**

### Concrete

'Five pairs of socks. How many socks altogether? 2, 4, 6, 8, 10' (Actual socks)

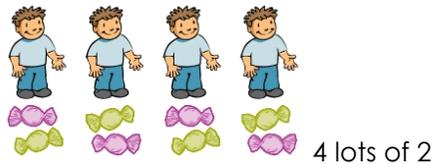


'Three pots of ten crayons. How many crayons

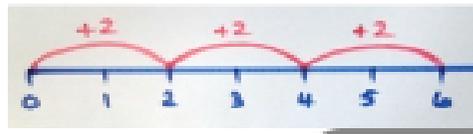


altogether? 10, 20, 30'

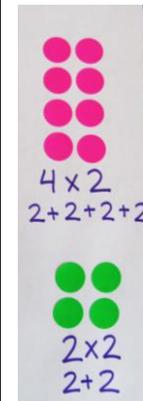
### Pictorial



4 lots of 2

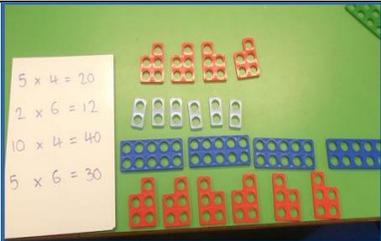


### Abstract

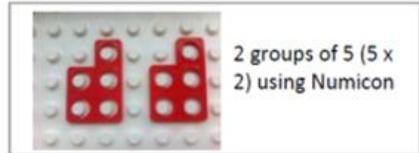
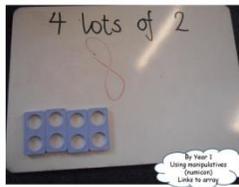
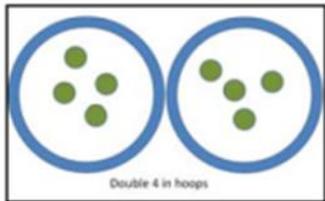
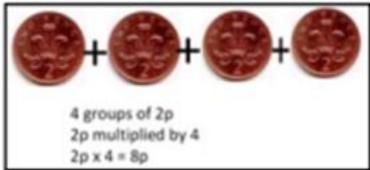


Write addition sentences to describe objects and pictures.





4 lots of 5, 6 groups of 2, 4 times 10, 6 x 5  
 Children don't necessarily have to find the answer they could just match the visual with the calculation – then find the answer being the next step.



Real life contexts and use of practical equipment to count in repeated groups of the same size:



How many wheels are there altogether?



How much money do I have?

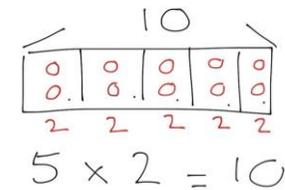
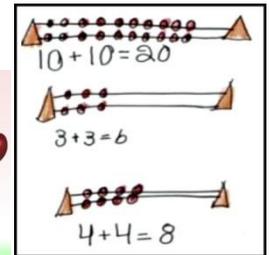
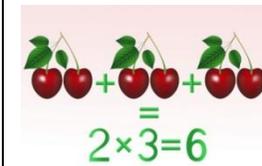


How many groups of 2 are there?

$$2+2+2+2+2=10$$



Then link to  $4 \times 5 =$   
 Writing or reading calculations for either pictorial or concrete examples.

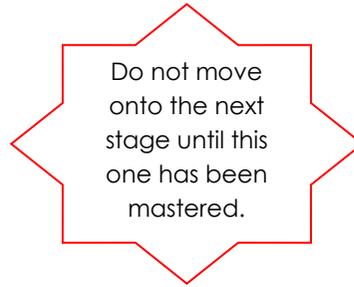


Vocabulary

Lots of, groups of, times, x, =, multiplied by, arrays, the same, double, how many altogether,

Links to Other Strands

Doubling and doubles  
Counting up on number lines  
Division – inverse  
Patterns in the number sequence  
Discuss and solve familiar practical problems



Numicon Links

Numbers to 20 and beyond  
Using plates to support finding totals and counting up  
Make numberline to 20 and label with numerals  
Make, recognise, use teen numbers from the two plates (2 digit) tens and ones  
Use numicon to add numbers to total no more than 20  
Use numcion to find number bonds/pairs to 10 and then link to number bonds/pairs to 20  
Matching plates to 2p, 5p, 10ps

## Calculation Guidance – Multiplication Stage 3

### “When you multiply the number gets bigger”

- Recall and use multiplication facts for the 2, 5 and 10 multiplication tables
- Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication ( $\times$ ) and equals (=) signs
- solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts
- show that multiplication of two numbers can be done in any order (commutative)

Pupils will use a range of vocabulary to describe multiplication and use practical resources, pictures, diagrams and the  $\times$  sign to record.

#### Combining Groups (repeated addition):

'3 groups of 10 crayons'  
 'How many crayons altogether?'  
 '10 + 10 + 10 = 30'  
 '3 groups of 10'  
 '3 times 10'  
 '3 x 10 = 30' '10 x 3 = 30'

Do not move onto the next stage until this one has been mastered.

This stage is similar to stage 2. It deepens the understanding about multiplication and the commutative law associated with it. – Stick to just using 2x, 5x and 10x facts for now.

#### Use arrays to support multiplication

Concrete  
 (See array and other concrete options in Stage 2)

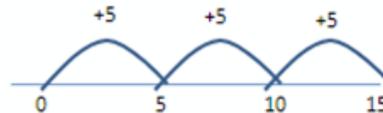
Real life arrays



EVERYDAY ARRAYS

Pictorial  
 See ideas from Stage 2 as well.

Use an empty number line.



Abstract  
 $6 \times 5 = 30$   
 '5 + 5 + 5 + 5 + 5 + 5 = 30'  
 '6 rows of 5'  
 '6 groups of 5'  
 '5 groups of 6'  
 '5 lots of 6'  
 '5 times 6'  
 '5 x 6 = 30'  
 '6 x 5 =



Make arrays in here

Make the link to repeated addition.

**Commutative Property:**  
The order of multiplication between two numbers does not matter.

$2 \times 4 = 8$        $4 \times 2 = 8$

$2 \times 4 = 4 \times 2$

Doing the 3 times table the first number we need is?

0 3 30

Vocabulary

Lots of, groups of, times, x, =, multiplied by, arrays, multiplication, 'other way round' equals, is, totals, how many altogether? Grid, row, line,

Links to Other Strands

Counting in twos, fives, tens along number stick from 0x to 12x  
 Number patterns in the number system  
 Discuss and solve problems in familiar practical contexts, including using quantities and measures.  
 Odd and even numbers linked to two times table and doubling always = an even number  
 Division – commutative law/inverse  
 Measurement – 5 minute intervals telling the time  
 Tally charts/block diagrams/pictogram when the image/block is the value of 2,5,10  
 Use coins as manipulatives – 5p, 10p, 2p, £2

Numicon/Number Links

Understanding of 2 digit numbers, use correct terminology for tens and ones.  
 Building larger numbers as totals to x calculation and understand the value of them.  
 Use addition techniques with the plate to support this

If children lack number knowledge, just use calculations which are limited to a total they understand – then increase this as number knowledge increases.

## Calculation Guidance – Multiplication Stage 4

### “When you multiply, the number gets bigger”

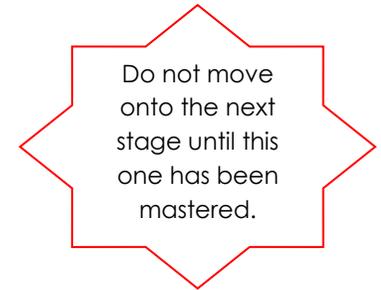
- Recall and use multiplication facts for the **3, 4 and 8** multiplication tables (continue to practise the 2, 5 and 10 multiplication tables)
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to a formal written method

Continue to use number lines and arrays to support multiplication, as appropriate (see stage 2 and 3 guidance).

$$4 \times 3 = 12 \quad 0 \quad 3 \quad 6 \quad 9 \quad 12$$

Teach

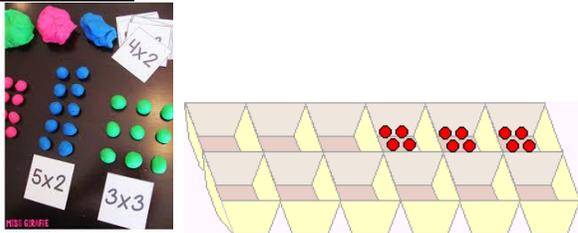
- **Partitioning method for multiplication of a teen number by a one-digit number:**
- **Grid Method (teen number multiplied by a one-digit number):**
- This will lead into **expanded short multiplication:**
- **Refine the recording in preparation for formal short multiplication:**
- **Formal short multiplication**



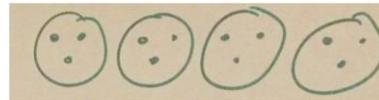
Continue to develop the formal written method of multiplication throughout year three using teen- numbers multiplied by a one-digit number.

If pupils are confident progress to multiplying other two-digit numbers by a one-digit number (see stage 5 guidance).

#### Concrete



#### Pictorial



#### Abstract

Write sequences with multiples of numbers.

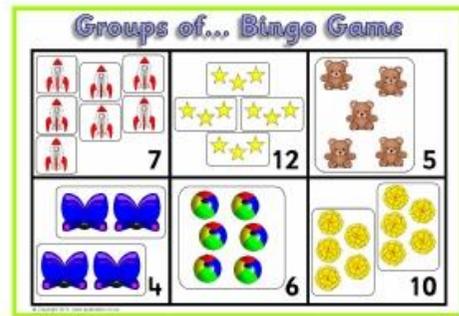
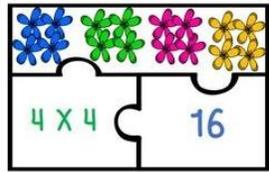
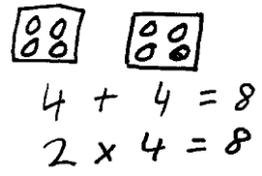
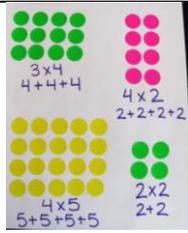
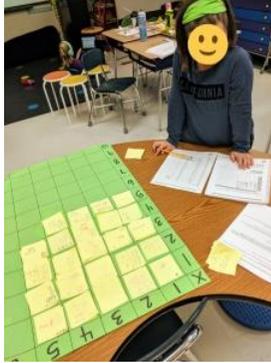
2, 4, 6, 8, 10

5, 10, 15, 20, 25, 30

**Partitioning method for multiplication of a teen number by a one-digit number:**

$13 \times 5 = 65$  (Partition 13 into  $10 + 3$ )

$10 \times 5 = 50$



$$\begin{array}{r} 3 \times 5 = 15 \\ 50 + 15 = 65 \end{array}$$

Demonstrate the partitioning method using a number line.

**Grid Method (teen number multiplied by a one-digit number):**

$$13 \times 8 = 104$$

X	10	3
8	80	24

'Partition 13 into 10 + 3 then multiply each number by 8. Add the partial products (80 and 24) together.'

This will lead into **expanded short multiplication:**

$$\begin{array}{r} 13 \times 8 = 104 \qquad 10 \ 3 \\ X \ 8 \\ \underline{24} \ (3 \times 8) \\ + 80 \ (10 \times 8) \\ \underline{104} \end{array}$$

Include an addition symbol when adding partial + 80 (10 x 8) products.

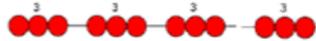
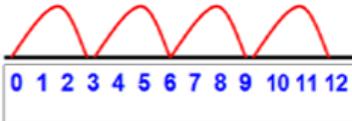
Refine the recording in preparation for **formal short multiplication:**

$$\begin{array}{r} 10 \ 3 \\ 24 \ (3 \times 8) \\ + 80 \ (10 \times 8) \\ \underline{104} \end{array}$$

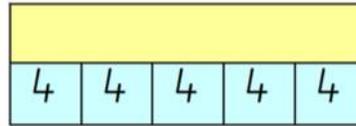
Count in multiples supported by concrete objects in equal groups.



Create arrays using counters/cubes to show multiplication sentences.



Use the bar model to calculate how many wheels there are altogether.



\_\_\_ x \_\_\_ = \_\_\_

There are 8 sweets in a packet, how many sweets are there in 4 packets?



Which of these is the correct bar model to represent this word problem? Explain your reasoning.



Draw the bar model and write the number sentence to work out the answer to this problem.

Freddy gets £12 pocket money every month. He saves his pocket money for 5 months. How much money has he saved?



Use the language of place value to ensure understanding. Include an addition symbol when adding partial +80 (10 x 8) products. Model the same calculation using a number line, if necessary, to ensure understanding.

**Formal short multiplication:**

$$\begin{array}{r} 13 \\ \times 8 \\ \hline 104 \end{array}$$

Ensure that the digit 'carried over' is written under the line in the correct column. Use the language of place value to ensure understanding.

### Vocabulary

Lots of, groups of, times, x, =, multiplied by, arrays, multiplication, 'other way round' equals, is, totals, how many altogether? Grid, row, line,

### Links to Other Strands

Counting in threes, fours, eights along number stick from 0x to 12x  
Number patterns in the number system  
Discuss and solve problems in familiar practical contexts, including using quantities and measures.  
Odd and even numbers linked to two times table and doubling always = an even number  
Division – commutative law/inverse  
Measurement – 5 minute intervals telling the time  
Tally charts/block diagrams/pictogram when the image/block is the value of 2,5,10  
Use coins as manipulatives – 5p, 10p, 2p, £2

### Numicon/Number Links

Understanding of 2 digit numbers, use correct terminology for tens and ones.  
Step counting  
Building larger numbers as totals to x calculation and understand the value of them.  
Use addition techniques with the plates to support this



If children lack number knowledge, just use calculations which are limited to a total they understand – then increase this as number knowledge increases.

# Calculation Guidance – Multiplication Stage 5

## “When you multiply, the number gets bigger”

- Recall multiplication facts for multiplication tables up to  $12 \times 12$
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Use the language of place value to ensure understanding. Ensure that the digits ‘carried over’ are written under the line in the correct column.

### Concrete

**Modeling 2-digit by 1-digit with Base Ten Blocks**

$32 \times 3 =$

Get 3 groups of 32.

Combine the tens and ones.

Solve.

$64 \times 3 = 192$

### Pictorial

**Multiplication Strategies**

Example:  $6 \times 182$

**Area Model**

**Distributive Property**

$$6 \times 182 = 6 \times (100 + 80 + 2)$$

$$= (6 \times 100) + (6 \times 80) + (6 \times 2)$$

$$= 600 + 480 + 12$$

$$= 1,092$$

**Partial Products**

$$\begin{array}{r} 182 \\ \times 6 \\ \hline 1092 \end{array}$$

$600 \leftarrow 6 \times 1 \text{ hundred}$   
 $480 \leftarrow 6 \times 8 \text{ tens}$   
 $12 \leftarrow 6 \times 2 \text{ ones}$

**Standard Algorithm**

$$\begin{array}{r} 182 \\ \times 6 \\ \hline 1092 \end{array}$$

Start in the ONES place

$6 \times 2 = 12$  MENTAL  
 $6 \times 8 = 48 + 1 = 49$  MATH  
 $6 \times 1 = 6 + 4 = 10$

Repeat for the following stories:  
 Brandon has a bookshelf with 4 shelves. He put 14 books on each shelf. How many books did he put on the bookshelf?  
 Information: 4 shelves, 14 books on each shelf  
 Answer statement: He put \_\_\_\_\_ books on the bookshelf.  
 What type of problem is this? Multiplication (combining equal groups; parts are equal; looking for the whole)

- A.  |..... |..... |..... |.....
- B.  ||||.....
- C.  ||||.....
- D.  $14 \times 4 = 56$

### Abstract

Continue to use empty number lines, as appropriate (see stage 4 guidance).

Further develop the grid method for two-digit numbers multiplied by a one-digit number.

$$36 \times 4 = 144$$

X	30	6
4	120	24

$$120 + 24 = 144 \text{ (add the partial products)}$$

**Expanded short multiplication** (two-digit number by a one-digit number):

$$36 \times 4 = 144$$

$$\begin{array}{r} 30 \ 6 \\ \times \quad 4 \\ \hline 24 \ (4 \times 6 = 24) \\ + 120 \ (4 \times 30 = 120) \\ \hline 144 \end{array}$$

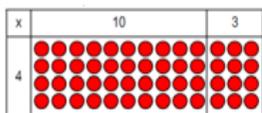
Include an addition symbol when adding partial products.

Refine the recording in preparation for the formal short multiplication.

$$36 \times 4 = 144$$

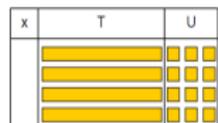
$$\begin{array}{r} 36 \\ \times 4 \\ \hline 24 \ (4 \times 6) \\ + 120 \ (4 \times 30) \\ \hline 144 \end{array}$$

Show the link with arrays to first introduce the grid method.



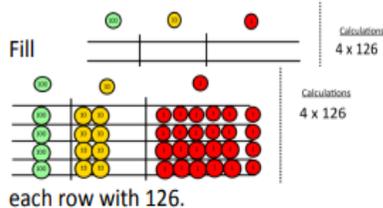
4 rows of 10  
4 rows of 3

Move on to using Base 10 to move towards a more compact method.

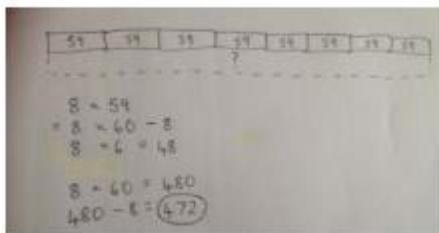
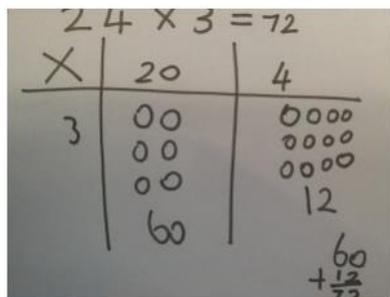


4 rows of 13

Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.



each row with 126.



Do not move onto the next stage until this one has been mastered.

This leads to **short multiplication (formal method)** of a two-digit number multiplied by a one-digit number. If necessary return to the grid method first:

$$127 \times 6 = 762$$

X	100	20	7
6	600	120	42

$$600 + 120 + 42 = 762$$

This leads to **expanded short multiplication**:

$$127 \times 6 = 762$$

$$\begin{array}{r} 2 \ 2 \ 7 \\ \times \quad 6 \\ \hline 4 \ 2 \quad (6 \times 7) \\ + 1 \ 2 \ 0 \quad (6 \times 20) \\ + 6 \ 0 \ 0 \quad (6 \times 100) \\ \hline 7 \ 6 \ 2 \end{array}$$

This will lead into **short multiplication (formal method)**:

$$\begin{array}{r} 1 \ 2 \ 7 \\ \times \quad 6 \\ \hline 7 \ 6 \ 2 \end{array}$$

## Vocabulary

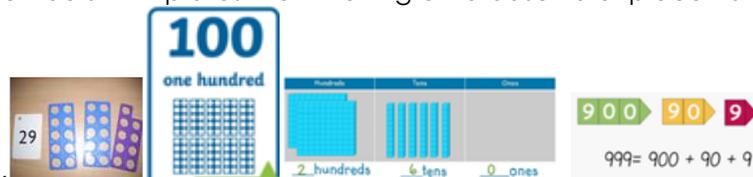
Lots of, groups of, times, x, =, multiplied by, arrays, multiplication, 'other way round' equals, is, totals, how many altogether? Grid, row, line,

## Links to Other Strands

Problem solving in familiar contexts  
Multiples of 2,3,4,5,6,7,8,9,10,11,12  
Scales in Pictogram/bar charts etc.

## Numicon Links

Making 2 digit numbers with plates then moving onto base 10 or place value counters or cards as its easier to manipulate as you use



bigger numbers.

Always start with familiar manipulative for a visual when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Equivalent fractions	Remember numicon can still be used for problem solving, doubling, Ensure children understand the value of these numbers and use the right terminology for ones and tens to help with column methods.
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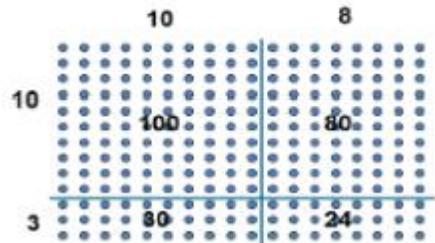
# Calculation Guidance – Multiplication Stage 6

## “When you multiply, the number always gets bigger”

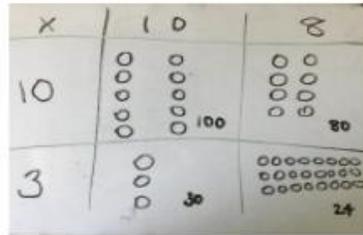
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers. Build on the work covered in stage 5 with the formal method of short multiplication (two-digit number multiplied by a one-digit number). When pupils are confident introduce multiplication by a two-digit number. If necessary, return to the grid method and/or expanded method first.

### Concrete

Show the link with arrays to first introduce the expanded method.



### Pictorial



X	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16

### Abstract

**Expanded long multiplication** (two-digit numbers multiplied by a teen-number)

$$23 \times 13 = 299$$

$$\begin{array}{r} 23 \\ \times 13 \\ \hline 69 \quad (3 \times 3) \\ 230 \quad (3 \times 20) \\ \hline 299 \end{array}$$

**Compact long multiplication (formal method):**

$$23 \times 13 = 299$$

$$\begin{array}{r} 23 \\ \times 13 \\ \hline 69 \\ 230 \\ \hline 299 \end{array}$$

Use the language of place value to ensure understanding. Add the partial products

Extend to larger two-digit numbers (returning to the grid method and then expanded method if necessary)

Do not move onto the next stage until this one has been mastered.

### Vocabulary

Lots of, groups of, times, x, =, multiplied by, arrays, multiplication, 'other way round' equals, is, totals, how many altogether? Grid, row, line,

### Links to Other Strands

Problem solving in familiar contexts  
 Multiples of 2,3,4,5,6,7,8,9,10,11,12  
 Scales in Pictogram/bar charts etc.  
 Equivalent fractions

### Numicon/Number Links

Making 2,3,4 digit numbers with base 10 or place value counters or cards as its easier to manipulate as you use bigger numbers.



	Always start with familiar manipulative for a visual when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts
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# Calculation Guidance – Division Stage 1

## 'When you divide, the number gets smaller'

- Pupils will engage in a wide variety of songs and rhymes, games and activities.
- In practical activities and through discussion they will begin to solve problems involving halving and sharing.



Share the apples between two people.

'Half of the apples for you and half of the apples for me.'



### Concrete



### Pictorial

Draw the concrete manipulatives used in activity

Share this food between you and me – draw both our lunches.



### Abstract

### Vocabulary

Share, half, group, part, same on both sides, same number of both sides, fair

### Links to Other Strands

Simple fractions – part of a whole number/shape  
 Odd and even numbers - patterns  
 Even and equality  
 Counting number in each group  
 Counting up  
 Patterns  
 Problem Solving using familiar contexts

### Numicon/Number Links

Find plates that are the same, equal  
 Look at/sort plates which are even – without a step and not even – with a step  
 Recognising numicon plates to 10  
 Name and label plates with digit cards  
 Ordering and counting back from 10 – 0  
 Labelling step sequence 10 - 0



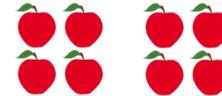
## Calculation Guidance – Division Stage 2

### “When you divide, the number gets smaller”

- Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- Count in multiples of twos, fives and tens (to the 10th multiple)

Pupils will start with practical sharing using a variety of resources. They will share objects into equal groups in a variety of situations. They will begin to use the vocabulary associated with division in practical contexts.

‘Share these eight apples equally between two pupils. How many apples will each child have?’



‘Share 20 crayons between 2 pots.’ ‘How many crayons are in each pot?’

Pupils will move from sharing to grouping in a practical way.

‘Put 20 crayons into groups of 10. How many pots do we need?’

**Use arrays to support early division.**

‘How many faces altogether? How many groups of two?’



‘Five groups of two.’

‘How many groups of 5?’

‘10 shared equally between 2 people.’

‘Half of ten is five.’

Continue to solve problems in practical contexts throughout stage 2, and develop the language of early division, with appropriate resources.

Do not move onto the next stage until this one has been mastered.

To begin with share numbers no bigger than 20 into their factors. – for example

15 shared into 5

12 shared into 2

9 shared into 3

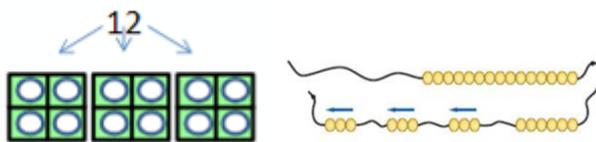
**Concrete**  
**Sharing**



**Grouping**  
How many groups of 2 are there in 14?



Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.



**Pictorial**

*Division*

$14 \div 2 = 7$   
14 "shared between" 2

$14 \div 2 = 7$   
14 "into groups of" 2

$8 \div 2 = 4$

$\frac{1}{2}$  of 14

Hand-drawn diagrams showing 14 dots in a vertical line, 8 dots in two rows of four, and 14 dots in two rows of seven.

Use a number line to show jumps in groups. The number of jumps equals the number of groups.

A number line from 0 to 12 with jumps of 3: 0-3, 3-6, 6-9, 9-12.

Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.

A bar model for  $20 \div 5 = ?$  and  $5 \times ? = 20$ .

Draw an array and use lines to split the array into groups to make multiplication and division sentences.

A 3x5 array of 15 grey dots.

**Abstract**

*Division*

$14 \div 2 = 7$   
14 "shared between" 2

$14 \div 2 = 7$   
14 "into groups of" 2

Share 9 buns between three people.  
 $9 \div 3 = 3$

$15 \div 3 =$

Hand-drawn diagrams showing 14 dots in a vertical line, 9 dots in three groups of three, and a ten-frame with 15 dots.

Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.

A bar model for  $20 \div 5 = ?$  and  $5 \times ? = 20$ .

Link division to multiplication by creating an array and thinking about the number sentences that can be created.

A 3x5 array of 15 yellow cubes.

Eg  $15 \div 3 = 5$     $5 \times 3 = 15$   
 $15 \div 5 = 3$     $3 \times 5 = 15$

Vocabulary

Share, sharing, share them out, groups, half, divide, groups of, equally, equal, the same, divide, fair, all the groups the same, share equally

Links to Other Strands

Halves

Fractions

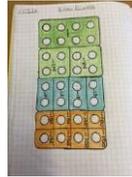
Odd and even numbers - patterns

Multiplication – inverse, number families, times tables,

Counting in multiples – 2,5,10's

Recognition of patterns in the number system

Problem solving in familiar situations



Numicon/Number Links

Counting to 20 forwards and backwards

Step sequence building 0 - 20

Recognising teen numbers, building, naming, labelling, using 2 plates and using tens and ones vocab.

Fitting plates inside shapes of other plates – can 2 number 4 plates, fit inside a 7? Can 3 number 2 plates fit inside a 6?

## Calculation Guidance Division Stage 3

### “When you divide, a number it gets smaller”

- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables up to 12x
- Calculate mathematical statements for division within the multiplication tables they know and write them using the division ( $\div$ ) and equals (=) signs
- Solve problems involving division, using materials, arrays, repeated subtraction, mental methods, and multiplication and division facts, including problems in contexts

Pupils will use a range of vocabulary to describe division and use practical resources, pictures, diagrams and the  $\div$  sign to record, using multiples that they know.

#### Sharing and grouping

#### Using arrays to support division

On Word  $\div$  sign

NumLock on,  
Press down Alt

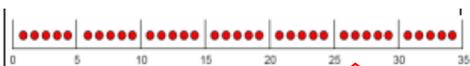
#### Concrete

Use the ideas from Stage 2 but use for the whole of 2,5,10 x tables up to their 12x

- Representations to support multiplicative reasoning:



Using Dienes: "If  $40 \div 10 = 4$  and  $30 \div 10 = 3$ , what do you think  $70 \div 10$  would be? Why?"



How many 10s in 40?

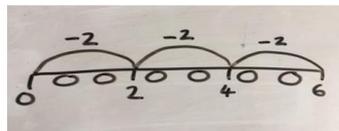


Do not move onto the next stage until this one has been mastered.

#### Pictorial

Use the ideas from Stage 2 but use for the whole of 2,5,10 x tables up to their 12x

Children to represent repeated subtraction pictorially.



0000000000  
0000000000  
0000000000  
0000000000

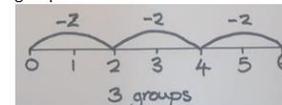
$40 \div 4 =$  How many tens in forty, How many groups of 10 make 40? etc

#### Abstract

Use the ideas from stage 2 but use for whole of 2,5,10 x tables up to their 12x

$40 \div 10 =$

Abstract number line to represent the equal groups that have been subtracted.



#### Sharing and Grouping

'50 crayons shared equally between 5 pots.' (Sharing) 'We have 50 crayons and put ten in each pot. How many pots do we need?' (Grouping).

'50 divided by 10 = 5'

'50 divided by 5 = 10'

$50 \div 10 = 5$

$50 \div 5 = 10$

		<p><b>Using arrays to support division</b></p> <p><math>15 \div 5 = 3</math>  <math>15 \div 3 = 5</math></p> <p>How many groups of 3?  How many groups of 5?  15 shared between 3 people is...?  15 shared between 5 people is...?</p> <p>15 divided by 5 = 3  15 divided by 3 = 5</p> <p>When pupils are ready, use an empty number line to count forwards:</p> <p><math>30 \div 5 = 6</math>  'How many jumps of 5 make 30?'</p> <p>0      5      10      15      20      25      30</p>
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Vocabulary  
Share, sharing, share them out, groups, half, divide, groups of, equally, equal, the same, divide,  $\div$

<p><u>Links to Other Strands</u></p> <p>Halves  Fractions – writing building, and recognising  Odd and even numbers  Multiplication – inverse, number families, times tables,  Counting in multiples 2,5,10 from 12x to 0  Writing and telling the time to 5mins</p>	<p><u>Numicon/Number Links</u></p> <p>Using plates to count up in 2's 5's, 10's  Skip counting  Understanding, naming, building 2digit numbers  Use subtraction techniques with numicon/ base 10 to support repeated subtraction and grouping  Use correct terminology for tens and ones.  If children lack number knowledge, just use calculation</p>
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## Calculation Guidance – Division Stage 4

### “When you divide, a number it gets smaller”

- Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables (continue to practise the 2, 5 and 10 multiplication tables)
- Write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers divided by one digit numbers, using mental maths and progressing to a formal written method

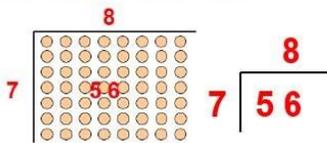
Continue to use practical resources, pictures, diagrams, number lines, arrays and the  $\div$  sign to record, using multiples that they know, as appropriate (see stage 3 guidance).

On Word  $\div$  sign  
NumLock on,  
Press down Alt

#### Concrete

Use ideas from previous stages using 3,4,8x tables to 12x

How many 7's make 56?



7. Division - tens and ones. Place Value Counters

Use the Place Value Counters to make 36. Now share the Place Value Counters equally to divide 36 by 3.

Tell the story:  
I have divided 36 into 3 lines of 1 ten and 2 ones. So,  $36 \div 3 = 12$

#### Pictorial

Use ideas from previous stages using 3,4,8x tables to 12x



#### Abstract

Using an empty number line to count forwards:  $24 \div 3 = 8$   
'How many threes are in 24?'

0    3    6    9    12    15    18    21    24

'How many groups of three in 24?'

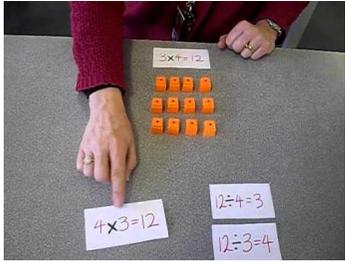
Introduce the formal layout using multiplication/division facts that the pupils know:

$$24 \div 3 = 8$$

This can also be written: (Bus Stop Method)

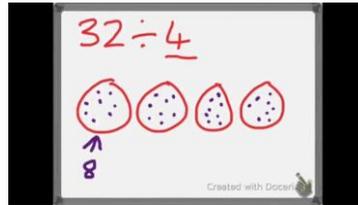
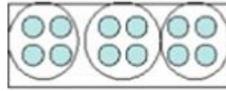
$$\begin{array}{r} 8 \\ 3 \overline{) 24} \end{array}$$

'Twenty four divided by three equals eight.'    'How many threes are there in twenty four?'

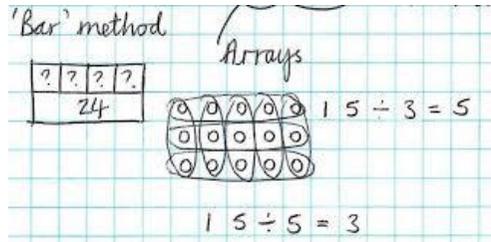
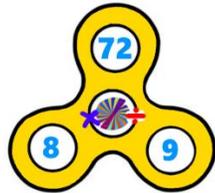


X ÷ Fact families

Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.



**Multiplication-Division Facts**



Find the inverse of multiplication and division sentences by creating four linking number sentences.

$$36 \div 3 = 12$$

$$30 \quad 6$$

$$30 \div 3 = 10 \quad 6 \div 3 = 2$$

$$7 \times 4 = 28$$

$$4 \times 7 = 28$$

$$28 \div 7 = 4$$

$$28 \div 4 = 7$$

"4 x 3 is 12, so 12 ÷ 3 = 4."

Vocabulary

Share, sharing, share them out, groups, halves, half, divide, groups of, groups, equally, equal, the same, divide, ÷,

Links to Other Strands

Fractions  
Solving problems with familiar contexts  
Measuring and scaling up and down  
Commutative Law and Inverse

Numicon/Number Links

Recognise, make, label 2 digit numbers  
Use correct terminology for tens and ones  
Skip counting  
Making 2 digit numbers with plates then moving onto base  
manipulate as you use bigger numbers.



10 as its easier to

Always start with numicon when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Remember numicon can still be used for problem solving, doubling,  
Ensure children understand the value of these numbers and use the right terminology for ones and tens.

## Calculation Guidance – Division Stage 5

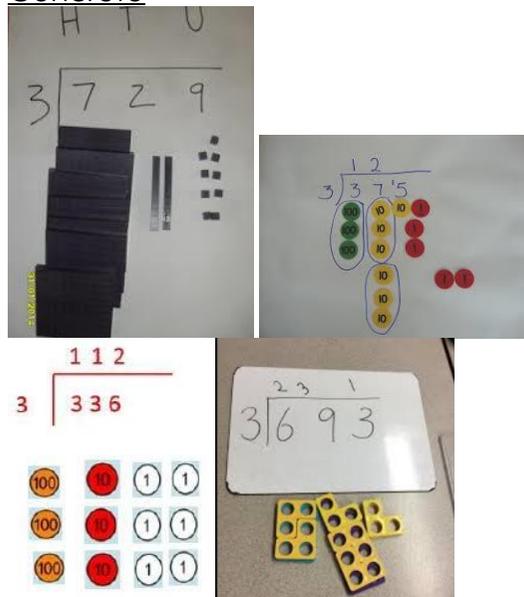
### “When you divide, the number gets smaller”

Do not move onto the next stage until this one has been mastered.

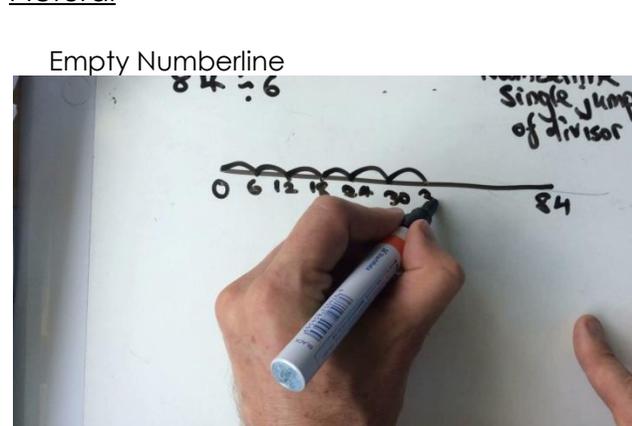
- Recall multiplication and division facts for multiplication tables up to  $12 \times 12$
- Use place value, known and derived facts to divide mentally
- Divide two-digit and three-digit numbers by a one-digit number using formal written layout (not explicitly stated in the programmes of study but implied in the non-statutory guidance)

NB Remainders are not specifically referred to until Year 5 in the National Curriculum. However, this may be an appropriate point to introduce them using familiar multiplication facts.

#### Concrete



#### Pictorial



#### Abstract

See use of abstract written method alongside concrete methods in concrete column.

Continue to write and calculate mathematical statements for division using the multiplication tables that the pupils know e.g.  
 $32 \div 8 = 4$

Continue using the formal written layout for division using multiplication tables that pupils know: (Bus stop method)

$$\begin{array}{r} 4 \\ 8 \overline{) 32} \end{array}$$

‘How many eights are there in 32?’  
 Continue using the formal written layout, introducing remainders:

$$25 \div 3 = 8 \text{ r}1$$

$20 \div 3 = 6r2$



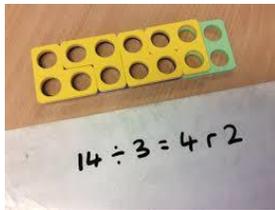
$20 \div 5 = 4$



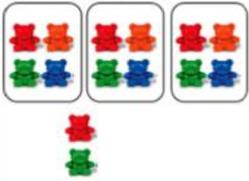
$20 \div 8 = 2r4$



$20 \div 7 = 2r6$



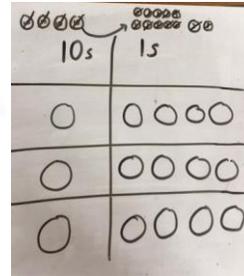
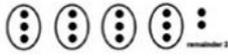
$14 \div 3 =$   
Divide objects between groups and see how much is left over



Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.

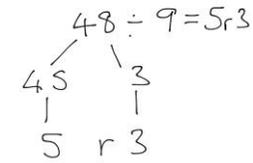


Draw dots and group them to divide an amount and clearly show a remainder.



42 divided by 3 (using partitioning)

$$\begin{array}{r} 8 \text{ r} 1 \\ 2 \overline{) 25} \end{array}$$



I know that  
 $6 \div 3 = 2$ , so  
 $600 \div 3 = 200$ .

$$\begin{array}{r} 32 \\ 6 \overline{) 192} \end{array}$$

$$192 \div 6 = 32$$

2d ÷ 1d with remainders using lollipop sticks. Cuisenaire rods, above a ruler can also be used.  
 $13 \div 4$

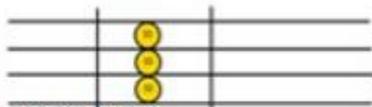
Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.



There are 3 whole squares, with 1 left over.

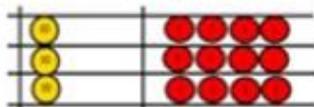
$42 \div 3 =$

Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.



have 1 ten left over.

We exchange this ten for ten ones and then share the ones equally among the groups.



We look how much in 1 group so the answer is 14.

Vocabulary

Share, sharing, share them out, groups, halves, half, divide, groups of, groups, equally, equal, the same, divide, ÷,

Links to Other Strands

Fractions  
 Solving problems with familiar contexts  
 Measuring and scaling up and down  
 Commutative Law and Inverse

Numicon Links

Pattern Seeking in the number system

making 2 digit numbers with plates then moving onto base 10 as its easier to



manipulate as you use bigger numbers.

Always start with numicon when modelling a new concept, and then move onto either base ten or place value counters to support visually with more abstract concepts

Remember numicon can still be used for problem solving, doubling, Ensure children understand the value of these numbers and use the right terminology for ones and tens.

# Pre-Key Stage 1 Standards – Maths

Standard 1	The pupil can:			
	<ul style="list-style-type: none"> <li>demonstrate an understanding of the concept of transaction (e.g. by exchanging a coin for an item, or one item for another, during a role-play activity)</li> </ul>			
	<ul style="list-style-type: none"> <li>distinguish between 'one' and 'lots', when shown an example of a single object and a group of objects</li> </ul>			
	<ul style="list-style-type: none"> <li>demonstrate an understanding of the concept of 1:1 correspondence (e.g. giving one cup to each pupil).</li> </ul>			

Standard 2	The pupil can:			
	<ul style="list-style-type: none"> <li>identify the big or small object from a selection of two</li> </ul>			
	<ul style="list-style-type: none"> <li>sort objects according to a stated characteristic (e.g. group all the small balls together, sort the shapes into triangles and circles)</li> </ul>			
	<ul style="list-style-type: none"> <li>say the number names to 5 in the correct order (e.g. in a song or by joining in with the teacher)</li> </ul>			
	<ul style="list-style-type: none"> <li>demonstrate an understanding of the concept of numbers up to 5 by putting together the right number of objects when asked</li> </ul>			
<ul style="list-style-type: none"> <li>copy and continue simple patterns using real-life materials (e.g. apple, orange, apple, orange, etc.).</li> </ul>				

Standard 3	The pupil can:			
	<ul style="list-style-type: none"> <li>identify how many objects there are in a group of up to 10 objects, recognising smaller groups on sight and counting the objects in larger groups up to 10</li> </ul>			
	<ul style="list-style-type: none"> <li>demonstrate an understanding that the last number counted represents the total number of the count</li> </ul>			
	<ul style="list-style-type: none"> <li>use real-life materials (e.g. apples or crayons) to add and subtract 1 from a group of objects and indicate how many are now present</li> </ul>			
<ul style="list-style-type: none"> <li>copy and continue more advanced patterns using real-life materials (e.g. apple, apple, orange, apple, apple, orange, etc.).</li> </ul>				

Standard 4	The pupil can:			
	• read and write numbers in numerals from 0 to 9			
	• demonstrate an understanding of the mathematical symbols of add, subtract and equal to			
	• solve number problems involving the addition and subtraction of single-digit numbers up to 10			
	• demonstrate an understanding of the composition of numbers to 5 and a developing ability to recall number bonds to and within 5 (e.g. $2 + 2 = 4$ and $3 + 1 = 4$ )			
	• demonstrate an understanding of the commutative law (e.g. $3 + 2 = 5$ , therefore $2 + 3 = 5$ )			
	• demonstrate an understanding of inverse relationships involving addition and subtraction (e.g. if $3 + 2 = 5$ , then $5 - 2 = 3$ )			
	• demonstrate an understanding that the total number of objects changes when objects are added or taken away			
	• demonstrate an understanding that the number of objects remains the same when they are rearranged, providing nothing has been added or taken away			
	• count to 20, demonstrating that the next number in the count is one more and the previous number is one less			
	• recognise some common 2-D shapes.			

## BSquared Sections

Number (Calculation)

Geometry and Measure

Probability and Statistics

# Pre-Key Stage 2 Standards – Maths

Standard 1	<b>The pupil can:</b>			
	<ul style="list-style-type: none"> <li>demonstrate an understanding of the concept of transaction (e.g. by exchanging a coin for an item, or one item for another, during a role-play activity)</li> </ul>			
	<ul style="list-style-type: none"> <li>distinguish between 'one' and 'lots', when shown an example of a single object and a group of objects</li> </ul>			
	<ul style="list-style-type: none"> <li>demonstrate an understanding of the concept of 1:1 correspondence (e.g. giving one cup to each pupil).</li> </ul>			

Standard 2	<b>The pupil can:</b>			
	<ul style="list-style-type: none"> <li>identify the big or small object from a selection of two</li> </ul>			
	<ul style="list-style-type: none"> <li>sort objects according to a stated characteristic (e.g. group all the small balls together, sort the shapes into triangles and circles)</li> </ul>			
	<ul style="list-style-type: none"> <li>say the number names to 5 in the correct order (e.g. in a song or by joining in with the teacher)</li> </ul>			
	<ul style="list-style-type: none"> <li>demonstrate an understanding of the concept of numbers up to 5 by putting together the right number of objects when asked</li> </ul>			
	<ul style="list-style-type: none"> <li>copy and continue simple patterns using real-life materials (e.g. apple, orange, apple, orange, etc.).</li> </ul>			

Standard 3	<b>The pupil can:</b>			
	<ul style="list-style-type: none"> <li>identify how many objects there are in a group of up to 10 objects, recognising smaller groups on sight and counting the objects in larger groups up to 10</li> </ul>			
	<ul style="list-style-type: none"> <li>demonstrate an understanding that the last number counted represents the total number of the count</li> </ul>			
	<ul style="list-style-type: none"> <li>use real-life materials (e.g. apples or crayons) to add and subtract 1 from a group of objects and indicate how many are now present</li> </ul>			
	<ul style="list-style-type: none"> <li>copy and continue more advanced patterns using real-life materials (e.g. apple, apple, orange, apple, apple, orange, etc.).</li> </ul>			

Standard 4	<b>The pupil can:</b>			
	• read and write numbers in numerals from 0 to 9			
	• demonstrate an understanding of the mathematical symbols of add, subtract and equal to			
	• solve number problems involving the addition and subtraction of single-digit numbers up to 10			
	• demonstrate an understanding of the composition of numbers to 5 and a developing ability to recall number bonds to and within 5 (e.g. $2 + 2 = 4$ and $3 + 1 = 4$ )			
	• demonstrate an understanding of the commutative law (e.g. $3 + 2 = 5$ , therefore $2 + 3 = 5$ )			
	• demonstrate an understanding of inverse relationships involving addition and subtraction (e.g. if $3 + 2 = 5$ , then $5 - 2 = 3$ )			
	• demonstrate an understanding that the total number of objects changes when objects are added or taken away			
	• demonstrate an understanding that the number of objects remains the same when they are rearranged, providing nothing has been added or taken away			
	• count to 20, demonstrating that the next number in the count is one more and the previous number is one less			
	• recognise some common 2-D shapes.			

Standard 5 (working towards the KS1 expected standard)	<b>The pupil can:</b>			
	• read and write numbers in numerals up to 100			
	• partition a two-digit number into tens and ones to demonstrate an understanding of place value, though they may use structured resources to support them			
	• add and subtract two-digit numbers and ones, and two-digit numbers and tens, where no regrouping is required, explaining their method verbally, in pictures or using apparatus (e.g. $23 + 5$ ; $46 + 20$ ; $16 - 5$ ; $88 - 30$ )			
	• recall at least four of the six number bonds for 10 and reason about associated facts (e.g. $6 + 4 = 10$ , therefore $4 + 6 = 10$ and $10 - 6 = 4$ )			

	<ul style="list-style-type: none"> <li>count in twos, fives and tens from 0 and use this to solve problems</li> </ul>			
	<ul style="list-style-type: none"> <li>know the value of different coins</li> </ul>			
	<ul style="list-style-type: none"> <li>name some common 2-D and 3-D shapes from a group of shapes or from pictures of the shapes and describe some of their properties (e.g. triangles, rectangles, squares, circles, cuboids, cubes, pyramids and spheres).</li> </ul>			

Standard 6 (working at the KS1 expected standard)	<b>The pupil can:</b>			
	<ul style="list-style-type: none"> <li>read scales in divisions of ones, twos, fives and tens</li> </ul>			
	<ul style="list-style-type: none"> <li>partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus</li> </ul>			
	<ul style="list-style-type: none"> <li>add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. <math>48 + 35</math>; <math>72 - 17</math>)</li> </ul>			
	<ul style="list-style-type: none"> <li>recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If <math>7 + 3 = 10</math>, then <math>17 + 3 = 20</math>; if <math>7 - 3 = 4</math>, then <math>17 - 3 = 14</math>; leading to if <math>14 + 3 = 17</math>, then <math>3 + 14 = 17</math>, <math>17 - 14 = 3</math> and <math>17 - 3 = 14</math>)</li> </ul>			
	<ul style="list-style-type: none"> <li>recall multiplication and division facts for 2, 5 and 10 and use them to solve simple problems, demonstrating an understanding of commutativity as necessary</li> </ul>			
	<ul style="list-style-type: none"> <li>identify <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{2}</math>, <math>\frac{2}{4}</math>, <math>\frac{3}{4}</math>, of a number or shape, and know that all parts must be equal parts of the whole</li> </ul>			
	<ul style="list-style-type: none"> <li>use different coins to make the same amount</li> </ul>			
	<ul style="list-style-type: none"> <li>read the time on a clock to the nearest 15 minutes</li> </ul>			
	<ul style="list-style-type: none"> <li>name and describe properties of 2-D and 3-D shapes.</li> </ul>			

#### B Squared Areas

- Number (Calculation)
- Geometry and Measure
- Probability and Statistics

# AQA Mathematics - Entry Level 1

## Component 1: Properties of Number

1.1 Count reliably up to 20 items

1.2 Read, write, order and compare numbers up to 20, including zero

Say which two numbers is smaller or larger

Say which of three or more numbers is the smallest or the largest

Put three or more numbers in order, starting with the smallest

1.3 Complete a number line up to 20

## Component 2: The Four Operations

1.1 Add two whole numbers with a total up to 20

Zero can be one of the numbers

Key Words - add, sum, total, altogether

Use the = sign to represent equality

1.2 Subtract one number up to 20 from another

Zero can be the number subtracted

Key words - take, take away, subtract, difference, how much more, how much less

1.3 Understand and use the + and – signs to solve simple number problems

Work out  $5 + 11$

$6 = 10 - ?$

Understand that subtraction is the inverse of addition

## Component 3: Ratio

1.1 Understand equality

Use and understand the = sign

$2 + 5 = 5 + ?$

1.2 Identify or show one half of a quantity up to 20

Shade half of a shape

Given a picture of children – What fraction of the children are boys?

1.3 Work out half of an even number up to 20

## Component 4: Money

1.1 Recognise coins and notes up to £20

1p, 2p, 5p, 10p, 20p, 50p, £1, £2, £5, £10, £20

How much is each coin worth?

1.2 Exchange money up to 20p for an equivalent amount in other denominations

Show 2 different ways of making 9p

1.3 Add up to 20 coins

Up to 20p in 1p, 2p, 5p, 10p, 20p coins up to £20 in £1 and £2 coins

Jack has these coins – How much does he have?

## Component 5: The Calendar and Time

1.1 Know the days of the week and their order

Key words – today, yesterday, tomorrow, now, before, after, next

What is the day before Tuesday

1.2 Read the time to the hour or half hour on an analogue clock and draw the hands on a clock to show these times

1.3 Order familiar events

Put in order – eat dinner, go to school, wake up, leave school, have breakfast

## AQA Mathematics – Entry Level 1 Cont...

### Component 6: Measures

#### 1.1 Compare lengths, heights, weights and capacities

Key words: long, longer, short, shorter, tall, taller, heavy, heavier, light, lighter, more, less, most, least

#### 1.2 Give the length of a line drawn on a centimetre grid

Up to 20cm

#### 1.3 Describe capacity in fractions

Key words are empty, half full, full

Tick the jug that is more than half full

### Component 7: Geometry

#### 1.1 Recognise and name squares, rectangles, triangles, circles, and cubes

Drawings may not be accurate, but intention must be clear

#### 1.2 Compare and order a group of shapes or pictures or similar shapes of different size and recognise congruent shapes

Key words- smaller, smallest, bigger, biggest, large, larger, largest, thinner, thinnest, narrower, narrowest, wider, widest, longer, longest, shorter, shortest

Tick the two shapes that are the same.

#### 1.3 Use and understand positional language

Key words: left, right, between, inside, outside, in the middle, below, under, above, on top of

### Component 8: Statistics

#### 1.1 Sort and classify objects using a single criterion

Shaded/unshaded, round/not round

#### 1.2 Interpret and draw conclusions from a list or group of objects

How many blue cars were there?

Which colour was the most popular?

#### 1.3 Construct and interpret simple line graphs

Including block graphs

# AQA Mathematics - Entry Level 2

## Component 1: Number

### 2.1 Read, write, order and compare numbers up to 100

Numbers could be in context

Key words – smaller, larger, less, more, fewer, smallest, largest, least, most, fewest

### 2.2 Recognise place value in two-digit numbers

### 2.3 Count from 0 in steps of 3, 2 and 5

Fill in blanks in the list of multiples of 2 up to 24 (36 for 3 and 60 for 5)

The list could be counting up or down

### 2.4 Round numbers less than 100 to the nearest 10

### 2.5 Understand and identify odd and even numbers

Write down an even number between 7 and 13

## Component 2: The Four Operations

### 2.1 Add whole numbers with a total to 100

### 2.2 Subtract one number up to 100 from another

### 2.3 Multiply using single digits whole numbers

Key words – multiply, multiplication, times, lots of

Understand that multiplication is the same as repeated addition

### 2.4 Use and interpret +, -, x and = in real situations for solving problems

Dan had some sweets; He ate 13 and had 8 left.

How many did he eat in the first place?

### 2.5 Recall and use multiplication facts for 2, 5, 20 multiplication tables 2.

## Component 3: Ratio

### 2.1 Identify or show one third or one quarter of a quantity up to 24

Shade one third or one quarter of a shape

Given a picture of children – What fraction of the children are boys?

### 2.2 Work out one third or one quarter of a number to 24

Without remainders

### 2.3 Count in fractions of one half or one third or one quarter

Give the next number in the pattern

### 2.4 Work out amounts two, three or four times the size and given amount

Key words – double, twice, three times, four times as

### 2.5 Recognise the equivalence of $\frac{1}{2}$ and $\frac{3}{4}$

## Component 4: Money

### 2.1 Appreciate the purchasing power of money

If I had a £2 coin, would I have enough to buy a can of pop?

If I had a £2 coin, would I have enough to buy a computer?

### 2.2 Convert pence to pounds and vice versa

How many pence is £4.30

Write 715 pence in pounds

### 2.3 Make amounts of money up to £2 with given coins

How can you make £1.65 using only 50p, 20p and 5p coins

### 2.4 Make amounts of money in multiples of £5 from £5, £10 and £20 notes

How can you make £55 using only £20 and £5 notes?

### 2.5 Calculate with amounts of money in pence up to £1 and whole pounds to £100 and give change.

Hayley bought 3 chocolate bars for 30p each. How much change should she get from a £1?

## AQA Mathematics – Entry Level 2 Cont...

### Component 5: The Calendar and Time

#### 2.1 Know the seasons and the months and their order

What season is it after summer?

#### 2.2 Know that 1 week = 7 days, 1 day = 24 hours, 1 hour = 60 mins, 1 minute = 60 seconds

#### 2.3 Read the time displayed on an analogue or 12 hour digital clock in hours, half hours and quarter hours, draw the hands on a clock or the digital display to represent these times

Students should be able to convert 'quarter past eight' to 8.15 and draw hands on a clock to show this time.

#### 2.4 Read the time to the nearest five minutes on an analogue clock, draw the hands on a clock to show the time, and read any time on a digital clock

#### 2.5 Find the difference between two times given in hours, half hours and quarter hours

How many minutes are there from 2.45 to 3.15?

### Component 6: Measures

#### 2.1 Choosing appropriate standard units of length, capacity, and weight

Mm, cm, m, km, g, kg, ml, cl, l

Which unit would be best to measure the length of a football pitch?

#### 2.2 Compare and order lengths, capacities, and weights in the same units

#### 2.3 Select a possible length, capacity, or weight for a given item

#### 2.4 Measure or draw a length using a ruler

In whole mm, or whole or half cm

#### 2.5 Estimate the weight, length or capacity of given items

Given two items, tick the heavier item

Estimate the weight of a bag of crisps

### Component 7: Geometry

#### 2.1 Recognise and name shapes including pentagons, hexagons and octagons and identify a right-angled triangle from a set of triangles

A right angle will be identified by a small square

#### 2.2 Recognise and name cuboids, pyramids and spheres

#### 2.3 Describe the properties of 2D shapes, including straight and curved edges

Number of edges and vertices

#### 2.4 Describe the properties of solid shapes

Number of edges, vertices and faces

#### 2.5 Understand angle as a measure of turn

Quarter, half, three quarter, and whole turn, clockwise and anticlockwise

### Component 8: Statistics

#### 2.1 Sort and classify objects using more than one criterion

#### 2.2 Collect information by survey

Ask 10 classmates what their favourite food is

In the external assessment the student will select the correct question to ask in a survey from a given list

#### 2.3 Record results in lists, tally charts and tables

#### 2.4 Construct and interpret pictograms where one picture is worth one item

#### 2.5 Interpret simple tables, diagrams, lists and graphs

Given a daily temperature graph for July, find the highest temperature that month

# AQA Mathematics - Entry Level 3

<p><b>Component 1: Number</b></p> <p><u>3.1 Read and write numbers up to 1,000</u> <u>3.2 Order and compare numbers up to 1,000</u> <u>3.3 Recognise place value in three digit numbers</u> <i>In 482, which is the units digit?</i> <u>3.4 Round numbers less than 1,000 to the nearest 10</u> <u>3.5 Round numbers less than 1,000 to the nearest 100</u> <u>3.6 Find 10 or 100 more or less than a given number</u> <u>3.7 Recognise and use multiples of 2, 3, 4, 5, 8, 10, 50 and 100</u> <i>Key word: multiple</i></p>
<p><b>Component 2: The Four Operations</b></p> <p><u>3.1 Add and subtract using three-digit numbers</u> <u>3.2 Multiply a two digit whole number by a single digit whole number</u> <u>3.3 Divide a two digit whole number by a single digit whole number</u> <i>Key words are divide, division, divided by, share equally, equal groups of</i> <i>Understand that division is the same as repeated subtraction</i> <i>Understand that division is the inverse of multiplication</i> <i>Interpret the remainder in a practical situation</i> <u>3.4 Use and interpret +, -, x, ÷ and = in real-life situations for solving problems</u> <i>Could be multi-step Kim bought three packs of 12 eggs. She used 4 eggs on Monday and 5 eggs on Tuesday. How many eggs did she have left?</i> <u>3.5 Use inverse operations to find missing numbers</u> <i>Work out the missing number <math>35 + ? = 124</math></i> <u>3.6 Estimate the answer to a calculation</u> <u>3.7 Recall and use multiplication facts for the 3, 4 and 8 multiplication tables</u></p>
<p><b>Component 3: Ratio</b></p> <p><u>3.1 Identify or show unit fractions up to one tenth of a quantity up to 100</u> <i>Shade a given unit fraction of a specified grid. Given a picture of children, What fraction of the children are boys?</i> <u>3.2 Work out unit fractions to one tenth of a number up to 100 Without remainder</u> <u>3.3 Identify or show any number of thirds, quarters, fifths or tenths of a quantity</u> <i>Shade a fraction of a shape. Given a picture of children, What fraction of the children are boys?</i> <u>3.4 Work out any number of thirds, quarters, fifths or tenths of an amount Without remainder</u> <u>3.5 Recognise and identify equivalent fractions</u> <i><math>\frac{1}{2} = \frac{2}{10}</math></i> <u>3.6 Add and subtract fractions with the same denominator within one whole</u> <u>3.7 Work out amounts 5, 8 or 10 times the size of a given amount</u></p>
<p><b>Component 4: Money</b></p> <p><u>3.1 Appreciate the purchasing power of amounts of money (notes)</u> <i>If I had a £10 note, would I have enough to buy a bottle of shampoo? If I had a £10 note, would I have enough to buy a motorbike?</i> <u>3.2 Exchange notes for an equivalent value in coins</u> <i>Show how can you make £5 using only silver coins</i> <u>3.3 Use decimal notation for money Understand that £3.20 should not be written as £3.2 or £3.20p</u> <u>3.4 Interpret a calculator display Understand that 3.2 (in pounds) on a calculator means £3.20</u> <u>3.5 Solve real life problems involving what to buy and how to pay</u> <i>Lucy is saving £4.50 each week to buy a mobile phone for £90. How many weeks will she have to save?</i> <u>3.6 Add amounts of money and give change</u> <i>Adam buys three computer games for £29.99 each and two for £14.99 each. How much does he spend altogether?</i> <u>3.7 Carry out investigations involving money</u></p>

## AQA Mathematics – Entry Level 3 Cont...

### Component 5: The Calendar and Time

#### 3.1 Solve problems involving time

*Mohammed got on the bus at 10 o'clock. His journey lasted 45 minutes. What time did he get off the bus?*

#### 3.2 Know that there are 365 days in a year, 366 days in a leap year, 12 months in a year and 52 full weeks in a year

#### 3.3 Use a calendar and write the date correctly (day/month/year)

*Given a calendar, What is the date of the first Friday in January? How many days are there in October?*

#### 3.4 Tell and write the time from an analogue clock, including using Roman numerals from I to XII

#### 3.5 Understand and use the 12 hour and 24 hour clock systems and convert from one system to the other

Key words are noon, morning, afternoon, evening and midnight

*Write 2pm in the 24 hour clock system*

#### 3.6 Convert between hours, minutes and Seconds

*Change 250 minutes into hours and minutes*

#### 3.7 Add up to three lengths of time given in minutes and hours Shown part of a TV guide,

*How long do 'Emmerdale, Coronation Street and Britain's Got Talent last altogether?*

### Component 6: Measures

#### 3.1 Add lengths, capacities and weights and compare the total to another total or a requirement

#### 3.2 Convert standard units of length, capacity and weight

*How many kg is 2500 g?*

*Change 410 cm into m and mm*

#### 3.3 Compare and order lengths, capacities and weights in different standard units

*Which is longest, 4.2 m, 395 cm or*

*4050 mm?*

#### 3.4 Measure the perimeter of a simple shape

#### 3.5 Choose an appropriate measuring instrument

#### 3.6 Read values from an appropriate scale

Read off a number line

#### 3.7 Read and compare temperature including temperature with negative

### Component 7: Geometry

#### 3.1 Recognise and name prisms, cylinders and cones

#### 3.2 Draw lines of symmetry on shapes or pictures Including real life items such as road signs

#### 3.3 Recognise and draw nets of cubes and cuboids

#### 3.4 Identify whether an angle is less or more than a right angle

#### 3.5 Identify horizontal, vertical and parallel lines

#### 3.6 Denote the position of a point on a grid by its coordinates or identify a point or item given its coordinates

#### 3.7 Use North (N), East (E), South (S) and West (W) to give directions or position from a map

### Component 8: Statistics

#### 3.1 Construct and interpret bar charts with the vertical axis scaled in ones or twos

#### 3.2 Construct and interpret pictograms where one picture represents more than one item

#### 3.3 Extract numerical information from lists, tables, diagrams and charts Including timetables, holiday brochures, sports results etc.

#### 3.4 Complete a frequency table given the original list of results

#### 3.5 Complete a tally chart and the resulting frequency table

#### 3.6 Compare two or more diagrams Given bar charts for attendances at two youth clubs for a week, Which youth club had more people on Monday?

#### 3.7 Solve one-step and two-step problems based on statistical information

*Given daily temperature graphs for July and August, find how much higher the highest temperature was in July than in August.*