Leverstock Green CE (VC) Primary School

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MATHS CALCULATION POLICY

Leverstock Green C of E (VC) Primary School

Policy Review

This policy was agreed by the governing body on 25th January 2025

This policy is due for review in January 2028

Signature ..... Date 25/1/25

Head Teacher

Signature ..... Date 25/1/25

Chair of Governors

LEVERSTOCK GREEN CHURCH OF ENGLAND SCHOOL

We foster an environment where children are supported in their learning and are willing to take risks to challenge their thinking. Children are introduced to mathematics through practical, oral and mental calculations. They are encouraged to articulate their understanding and suggest alternative methods to deepen their understanding. All classes have an ethos where mistakes are welcomed and children are supported to develop their understanding of concepts through correcting these mistakes. In keeping with our Christian ethos, our Christian values of Love, Respect and Forgiveness underpins our planning and deliverance of lessons and all children encouraged to develop academically and socially to the best of their ability.

Information for Parents

What you need to know about calculations

Mathematics will be at the core of your child's schooling from Early Years through to Year Six. Children will be involved in drawing, measuring, handling data and many other practical activities that will support their understanding and enjoyment of the subject. The aim for children is that they use mental calculations where appropriate, but for complex calculations which they cannot do mentally, they will use the efficient written calculation accurately. Children will be expected to learn and use the correct mathematical vocabulary when explaining methods and concepts. The use of mathematical vocabulary is developed using our maths working walls within the classroom. The glossary attached provides examples of some of the vocabulary used throughout the year groups.

This document offers guidance to the methods used within school to assist our pupils with calculations. The methods that we use may or may not be familiar to you; knowing how the methods in this booklet work, will support you when helping your children. The methods we are advocating are in line with the National Curriculum. We hope this will be helpful to you and that you will be able to support your child in learning the necessary rules which will assist in fluent mental recall. Staff in school endeavour to make maths lessons challenging, fun and engaging, using investigations and outdoor learning. It should be noted that not all work will be recorded in workbooks.

All staff within school use this document to ensure consistency in our approach of mathematical teaching, challenging children and moving them onto the next step when they are ready. We aim to provide a broad and balanced curriculum, with children developing a depth of understanding in each domain.

The four operations that are covered by this document are addition, subtraction, multiplication and division. Whichever operation is being taught, the child needs to experience all of the steps below to secure their understanding to their long-term memory:

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Concrete manipulatives Concrete manipulatives are objects that can be touched and moved by pupils to introduce, explore or reinforce a mathematical concept. They provide a vehicle to help pupils make sense of complex, symbolic and abstract ideas through exploration and manipulation. Furthermore, they support the development of internal models and help build stronger memory pathways.

Pictorial (including jottings) The act of translating the concrete experience into a pictorial representation helps focus attention on what has happened and why. This supports deeper understanding and a stronger imprint on memory. Pictorial representations are more malleable than concrete resources and, once understanding is secured, allow exploration of complex problems that may be challenging to reproduce with manipulatives.

Abstract - Written The aim, within this policy, is for compacted forms of notation. These have developed through the history of mathematics. Explicit individual steps in procedure are hidden or they have been shortcut. The informal and expanded methods expose all the intermediate steps, replicating thought processes more closely and support understanding prior to compaction.

Abstract - Spoken Learning to use the correct mathematical vocabulary is vital for the development of mathematical proficiency. The ability to articulate accurately allows pupils to communicate and build meaning. Ideas become more permanent. This can be scaffolded effectively using speaking frames.

Why do children need to do written calculations?

- To represent work that has been done practically
- To support, record and explain mental calculation
- To keep track of steps in a multi-step, complex tasks
- To work out calculations that are too difficult to do mentally

By Upper Key Stage 2, children should be confident in choosing and using a strategy that they know will get them to the correct answer as efficiently as possible.

Children will have specific arithmetic lessons in each operation every term, which include applying the taught skill to mastery questioning, including reasoning and problem solving.

ADDITION

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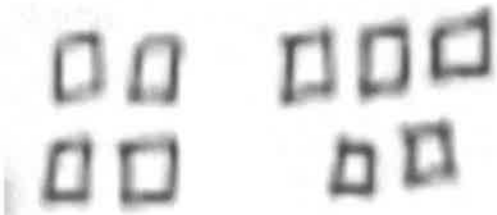
EYFS	**EYFS Framework:** - Develop a deep understanding of number to 10. - Explore the composition of numbers to 10. - Automatically recall number bonds for numbers 0-5 and some to 10

Addition vocabulary: add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more..., how many more to make... ?, how many more is... than...?

Concrete	Pictorial	Abstract - Written symbolic
How many dinosaurs are there?   What about if I give you two more? How many are 		4+5=9

Abstract – Spoken

I know that ….. add ….. is ……
This is because ……. add …….. is ……. altogether
How many more is needed to make …….?

Mental Strategies:

- Develop a mental image of the number system.
- Understand the value of a number
- Counting forwards and backwards
- Recall of number bonds to 10

Notes:

Using a range of practical resources and real-life contexts, pupils develop their understanding of the concept of addition through counting activities.
Children are introduced to the addition symbol (+) and use pictures/diagrams to represent the calculation.
Children represent an addition number sentence in picture form and are able to solve simple addition number sentences using objects or fingers Children will begin to explain their reasoning.

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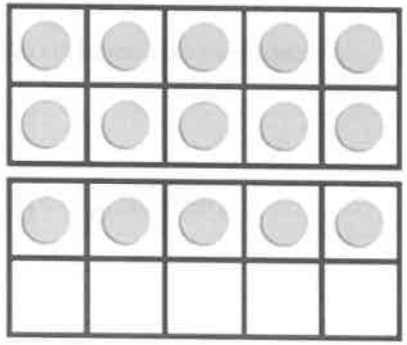
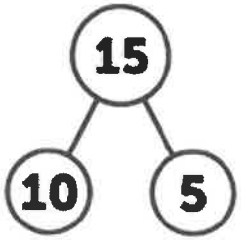
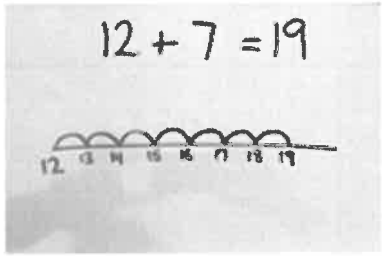
Year 1	**NC Statement:** - add and subtract one-digit and two-digit numbers to 20, including zero - Read and write numbers from 1 to 20 in numerals and words

Addition vocabulary: number bonds, add, more, plus, make, sum, total, altogether, inverse double, near double, equals, is the same as (including equals sign), score, one more, two more… ten more, how many more to make…?, how many more is… than…?, how much more is…?

Concrete	Pictorial	Abstract - Written symbolic
		**10 and 5 more is 15** **10 + 5 = 15**



Abstract – Spoken

I have chosen the number ☐.

That is ☐ ones.

I can see that this is ten ones and ☐ more ones.

I can regroup 10 ones for 1 ten.

☐ is 1 ten and ☐ ones.

Mental Strategies:

- Know addition can be carried out in any order (commutative)
- Add 1- and 2-digit numbers to 20 including 0
- Number bonds to 20
- Doubles of numbers up to and including double 10
- Adding 10 to a single digit number

Notes:

This is the first learning sequence in Year 1 which moves into the second decade. This is the trickiest set of numbers in the number system as the number names give little or no clues to the value of the numbers.
The pupils will be familiar counting on and back to twenty from Reception but in this learning sequence, the way the numbers are built is the focus. How numbers - ten to nineteen - are made up of 'ten and some more' is explored using a variety of models, including place value equipment such as base-10.

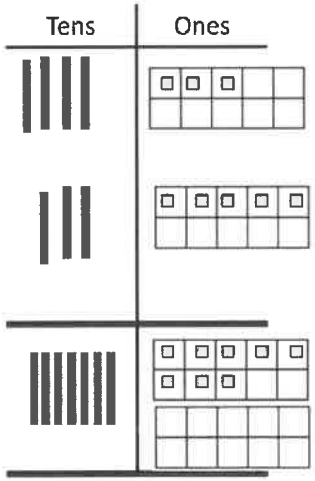
- Identify 1 more than a given number	

Year 2	**NC Statement:** Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones - a two-digit number and tens - two, two-digit numbers

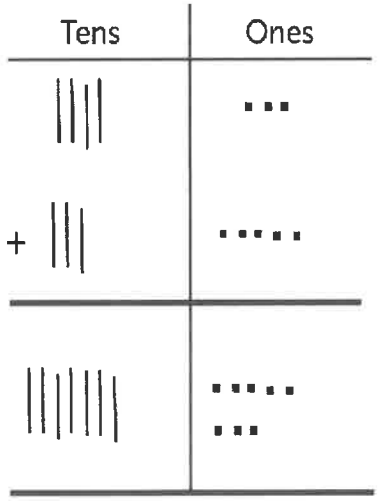
Expanded written method with no regrouping (2-digit numbers)

Addition vocabulary: add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more… ten more… one hundred more, how many more to make…?, how many more is… than…?, how much more is…?, tens boundary

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 40 \quad 3 \\ +\ 30 \quad 5 \\ \hline 70 \quad 8 \end{array}$$

43 + 35 = 78

Abstract - Speaking frame

The sum of.. ones and.. ones is ... ones.
The sum of.. tens and.. tens is.. tens.
So.... + ..is equal to.. tens and.. ones, which is.

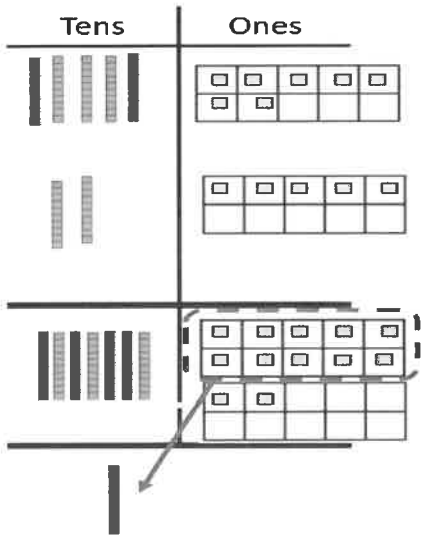
Notes:

Using embedded tens frame supports pupils to organise ones in preparation for regrouping.

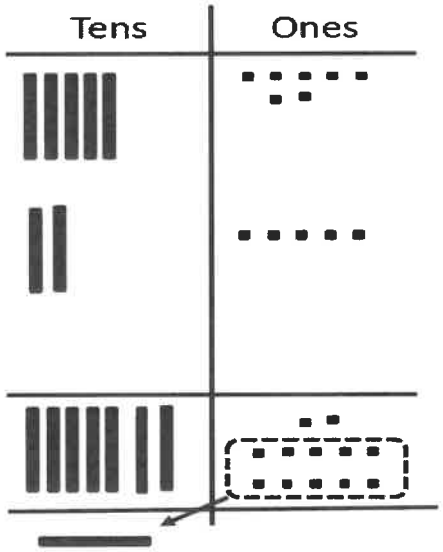
Year 2	**NC Statement:** Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones - a two-digit number and tens - two, two-digit numbers

Expanded written method with regrouping of ones (2-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{rr} & 50 + 7 \\ + & 20 + 5 \\ \hline & 80 + \cancel{12}\ 2 \\ \hline & 10 \end{array}$$

57 + 25 = 92

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Abstract - Speaking frame

The sum of … ones and … ones is … ones.
This is regrouped into … ten and … ones.
The sum of … tens and … tens is …tens.
So, … + … is equal to … tens and … ones, which is …

Mental Strategies:

- Know that addition is the inverse of subtraction
- Add numbers mentally, including: -
  - A 2-digit number and units
  - A multiple of 10 to a 2-digit number
  - Two 2-digit numbers
  - Three 1-digit numbers

- Use knowledge of inverse to check calculations and solve missing number problems
- Use knowledge of number bonds to 10 to calculate number bonds to 100
- Count on in tens from any given number (e.g 19 – 29 – 39 – 49 etc)

Notes:

Pupils should be encouraged to estimate first and check their answer using a mental method.

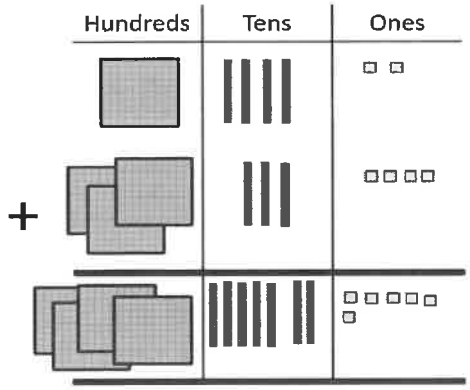
Using embedded tens frame supports pupils to rapidly see the regroup and to keep their jottings organised.

Year 3	**NC Statement:** - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

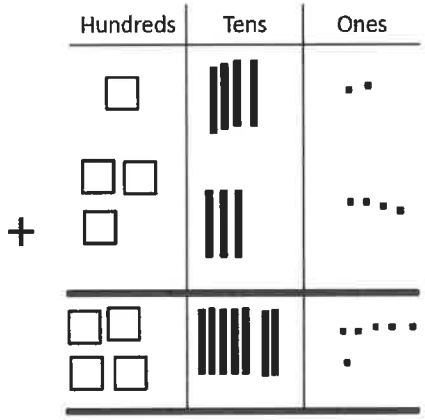
Formal written addition with no regrouping (up to three-digit numbers)

Addition vocabulary: add, increase, total, plus, sum, more, altogether, column addition, estimate, inverse, double, near double, one more, ten more… one hundred more, how many more to make …? how many more is… than …? how much more is…?, tens boundary, hundreds boundary

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 1\ 4\ 2 \\ +\ 3\ 3\ 4 \\ \hline 4\ 7\ 6 \\ \hline \end{array}$$

142 + 334 = 476

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Abstract - Speaking frame

The sum of … ones and … ones is ... ones.
The sum of … tens and … tens is …tens.
The sum of … hundreds and … hundreds is … hundreds.
So, … + … is equal to … hundreds, … tens and … ones,
which is …

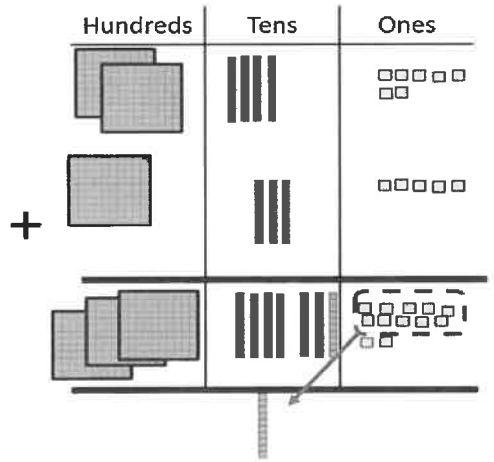
Notes:

Pupils should be encouraged to estimate first and check their answer using a mental met

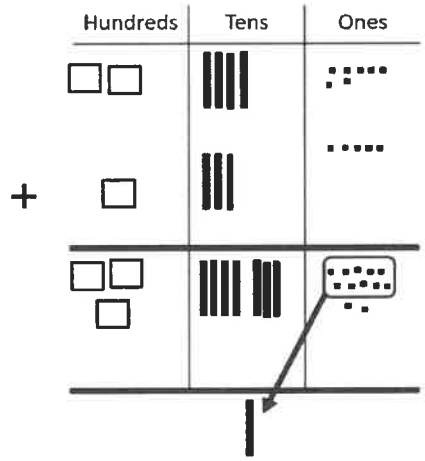
Year 3	**NC Statement:** - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Formal written addition with regrouping of ones (up to three-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 2\ 4\ 7 \\ +\ 1\ 3\ 5 \\ \hline 3\ 8\ 2 \\ \hline 1 \end{array}$$

247 + 135 = 382

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Abstract - Speaking frame

The sum of … ones and … ones is … ones.
The sum of … tens and … tens is …tens.
The sum of … hundreds and … hundreds is … hundreds.
So, … + … is equal to … hundreds, … tens and … ones,
which is … .

Notes:

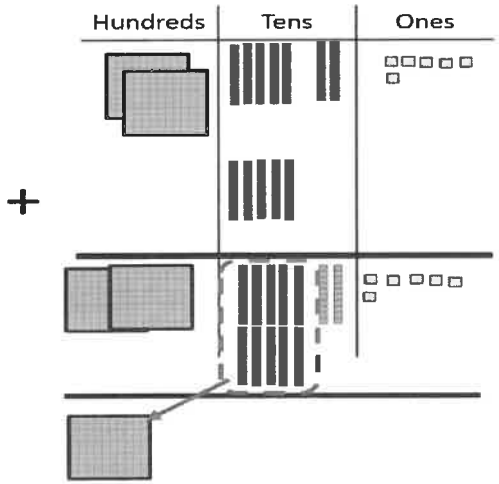
The focus is on regrouping of ones.

Pupils should be encouraged to estimate first and check their answer using a mental method.

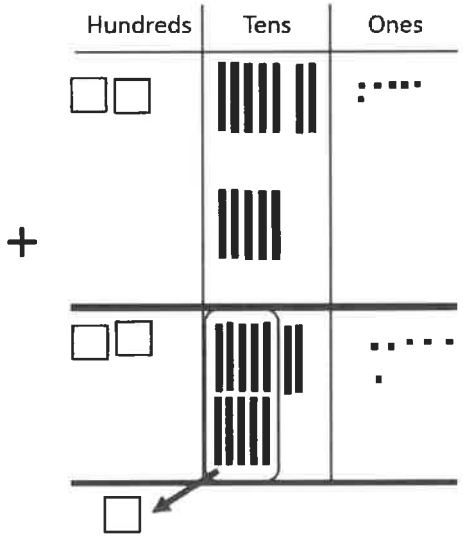
Year 3	**NC Statement:** - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Formal written addition with regrouping tens only (up to three-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 2\ 7\ 6 \\ +\quad 5\ 0 \\ \hline 3\ 2\ 6 \\ \hline 1 \end{array}$$

276 + 50 = 326

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Abstract - Speaking frame

The sum of … ones and … ones is ... ones.
This is regrouped into … tens and … ones.
The sum of … tens and … tens is …tens.
The sum of … hundreds and … hundreds is … hundreds.
So, … + … is equal to … hundreds, … tens and … ones, which is ….

Notes:

The focus is on regrouping of tens.

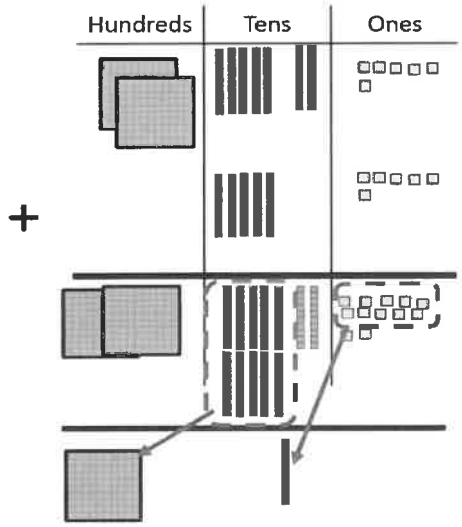
Pupils should be encouraged to estimate first and check their answer using a mental method

.

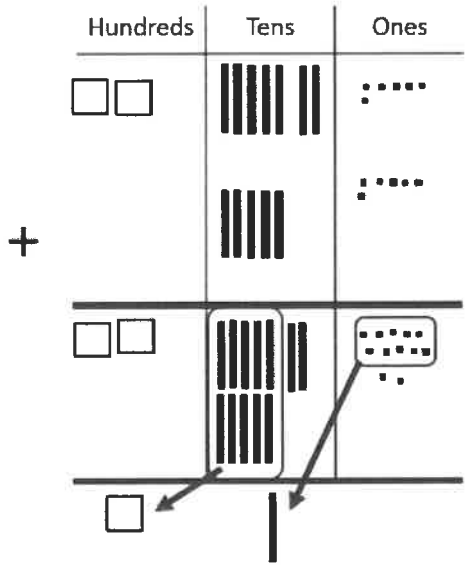
Year 3	**NC Statement:** - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Formal written addition with regrouping tens and ones (up to three-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 2\ 7\ 6 \\ +\quad 5\ 6 \\ \hline 3\ 3\ 2 \\ \hline 1\ 1 \end{array}$$

276 + 56 = 332

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Abstract - Speaking frame

The sum of … ones and … ones is … ones.

This is regrouped into … tens and … ones.
The sum of … tens and … tens is …tens.

This is regrouped into … hundreds and … tens.

The sum of … hundreds and … hundreds is … hundreds.
So, … + … is equal to … hundreds, … tens and … ones, which is …

Notes:

Pupils should be encouraged to estimate first and check their answer using a mental method.

Once pupils have fully understood and rehearsed regrouping within formal addition, this learning continues to be rehearsed and applied throughout Years 4, 5 and 6, including to multi-digit, decimal numbers, money and measures.

Mental Strategies: **Year 3:** -Add numbers mentally, including: - a three-digit number and a single digit number - a 3-digit number and multiples of 10 - a 3-digit number and multiples of 100 - Estimate the answer to a calculation and use inverse operations to check answers - Know number pairs that total 1000 (multiples of 100) - Calculate 10 or 100 more than any given number **Year 4:** -Add numbers mentally, including: ♣ a four digit number and multiples of one thousand - Use knowledge of doubles to derive related facts (e.g 15 + 16 = 31 because 15 + 15 = 30 and 30 + 1 = 31) - Know number pairs that total 1000 (multiples of 10) - Estimate the answer to a calculation and use inverse operations to check answers **Year 5:** -Add numbers mentally with increasingly large numbers (e.g 10,162 + 2,300 = 12,462) - Mentally add tenths (e.g 0.2 + 0.6 = 0.8) and 1-digit whole numbers and tenths (8 + 0.3 = 8.3) - Use number bonds to 100 knowledge to calculate complements to one using hundredths (e.g 0.83 + 0.17 = 1)	- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy **Year 6:** - Add numbers mentally with increasingly large numbers (e.g 10,162 + 2,300 = 12,462) - Add decimal numbers mentally (up to 2 decimal places) - Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

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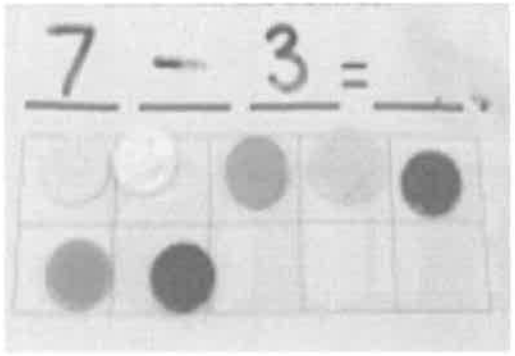
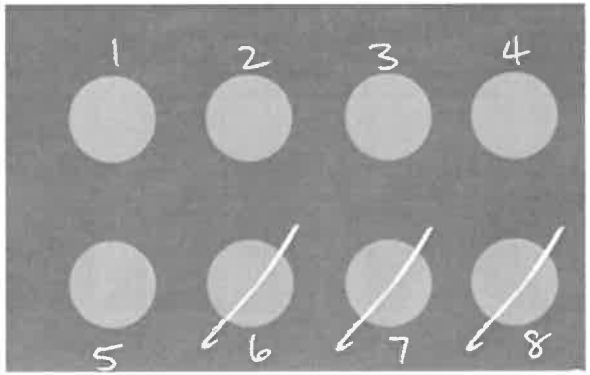
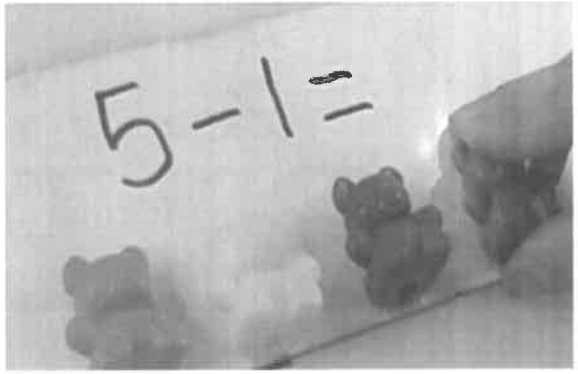
SUBTRACTION

EYFS	**EYFS Framework:** - Develop a deep understanding of number to 10. - Explore the composition of numbers to 10. - Automatically recall number bonds for numbers 0-5 and some to 10

Subtraction vocabulary: take (away), leave, how many are left/left over?, how many have gone?, one less, two less… ten less…,how many fewer is… than…?, difference between, is the same as

Concrete	Pictorial	Abstract - Written symbolic
 		

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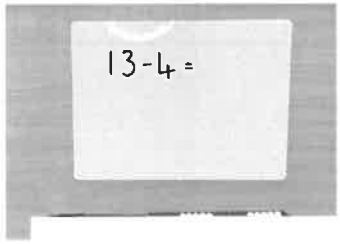
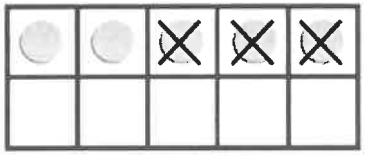
Abstract – Spoken	Notes:
I know that ..... take away ..... is ..... This is because ..... take away ..... leaves ..... left over How many fewer is ..... than .....?	Using a range of practical resources and real-life contexts, pupils develop their understanding of the concept of subtraction as taking away through counting activities. children will use their fingers to help with subtraction, e.g., 5 – 2 = 3. A child will start with the biggest number in their head '5' and hold 5 fingers up They will count back saying '5' (touching their head) '4, 3' (curling one finger down at a time), then count how many fingers are left
Mental Strategies: - Develop a mental image of the number system - Children count backwards using familiar number rhymes (e.g '10 Green Bottles', '5 Fat Sausages') - Count backwards from different starting points	

Year 1	**NC Statement:** - add and subtract one-digit and two-digit numbers to 20, including zero - Read and write numbers from 1 to 20 in numerals and words

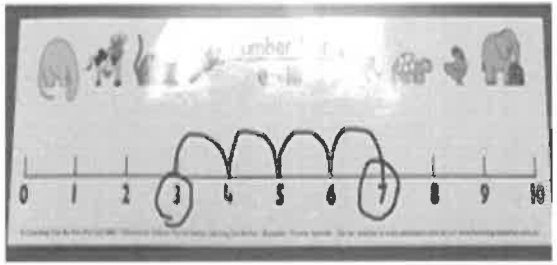
Subtraction vocabulary: subtract, take away, minus, leave, how many fewer is…than..?, how much less is..? half, halve, how many are left/left over?, how many are gone?, one less, two less, ten less…, how many fewer is… than…?, how much less is…? =, equals, sign, is the same as, count on, count back, difference between. how many more is…than..?, how much more is..?

Concrete



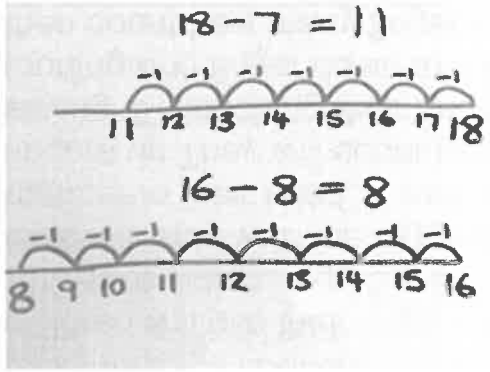


Pictorial



7-4=3

Abstract - Written symbolic



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Abstract – Spoken

how many fewer is...than...? how much less is..?
how many are left/left over? how many are gone?
how many fewer is... than...? how much less is...?
how many more is...than...? how much more is..?

Mental Strategies:

- Subtract 1 and 2 digit numbers to 20 including 0
- - To know that subtraction is not commutative and that the larger number must always come first
- - Use knowledge of number bonds to 10 and 20 to reason (9 + 1 = 10 so 10 – 9 = 1 and 10 – 1 = 9)

Notes:

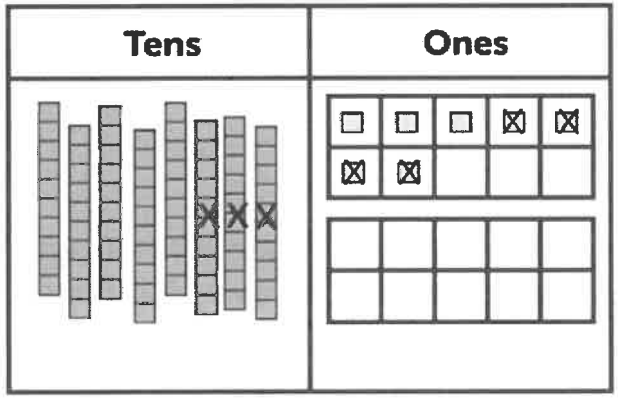
Children will be taught to use a number track to support subtraction by counting backwards.
children will use a prepared number line to solve simple subtraction stories and number sentences by counting backward.
children are taught how to use a blank number line for subtraction (counting backwards) and then encouraged to draw their own number line to help solve problems.

Year 2	**NC Statement:** - add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - - a two-digit number and ones - a two-digit number and tens - two, two-digit numbers.

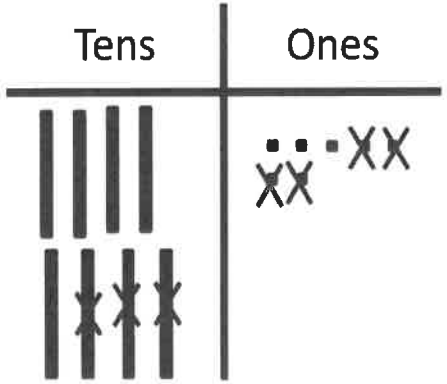
Expanded written subtraction, a 2-digit number from a 2-digit number with no regrouping

Subtraction vocabulary: subtract, minus, leave, how many are left/left over?, how many less is… than…?, how much fewer is…?, difference between, half, halve, equals, sign, is the same as, partition, inverse, count on , count back, one less, ten less… one hundred less.

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 80 + 7 \\ -\ 30 + 4 \\ \hline 50 + 3 \\ \hline \end{array}$$

87 _ 34 = 53

Abstract - Speaking frame

… ones take away … ones leaves … ones.
… tens take away … tens leaves … tens.
So, … - … is equal to… tens and … ones, which is … .

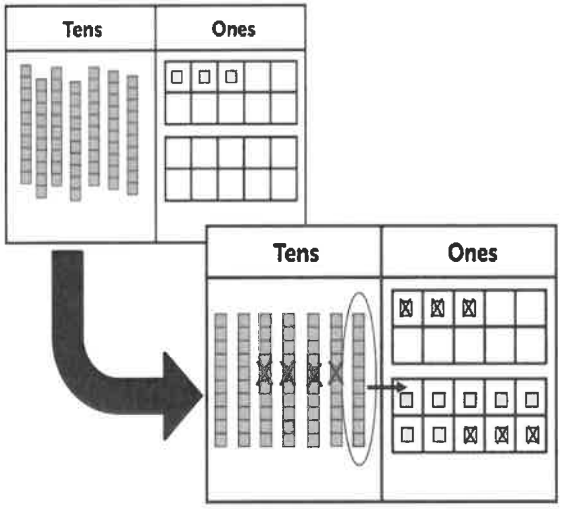
Notes:

Pupils should be encouraged to estimate first and check their answer using a mental method.

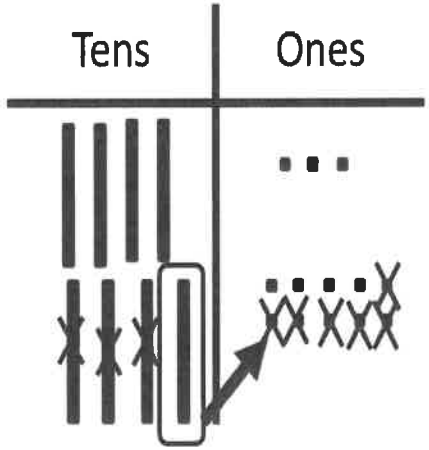
Year 2	**NC Statement:** - add and subtract numbers using concrete objects, pictorial representations, and mentally, including: - a two-digit number and ones - a two-digit number and tens - two, two-digit numbers.

Expanded written subtraction, a 2-digit number from a 2-digit number with regrouping

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{rrcr} & 60 & & 13 \\ & \cancel{70} & + & \cancel{3} \\ - & 40 & + & 6 \\ \hline & 20 & + & 7 \end{array}$$

$73 - 46 = 27$

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Abstract - Speaking frame

I can see that there aren't enough ones for me to take away … ones without regrouping.
Regroup one ten into ten ones.
There are now … tens and … ones.
… ones take away … ones leaves … ones. … tens take away … tens leaves …….tens.
So, … – … is equal to… tens and … ones, which is … .

Mental Strategies:

- To know that subtraction is the inverse of addition
- Use knowledge of inverse to check calculations and solve missing number problems
- Subtract numbers mentally, including:
  - ♣ subtracting units from a 2-digit number
  - ♣ subtracting a multiple of 10 from a 2-digit number
  - ♣ subtracting a 2-digit number from another 2-digit number
- Recall and use subtraction facts to 20 fluently

Notes:

Using embedded tens frame supports pupils to regroup accurately and to keep their jottings organised.

Speaking frame note: "*I can see that there aren't enough ones for me to take away 6 ones without regrouping. Regroup one ten into ten ones. There are now 6 tens and 13 ones.*"

- Use knowledge of number bonds to 100 (multiples of 10) to reason (40 + 60 = 100 so 100 – 60 = 40 and 100 – 40 = 60)	

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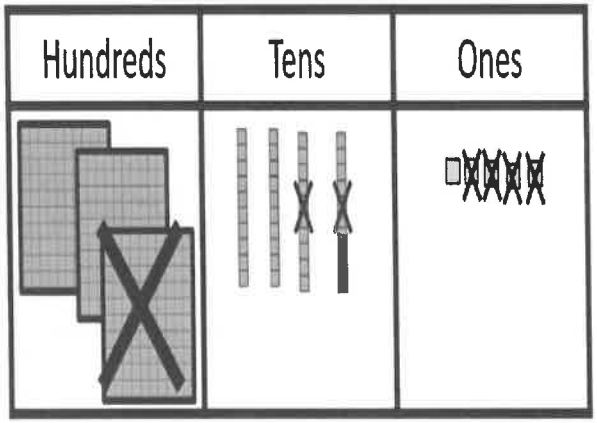
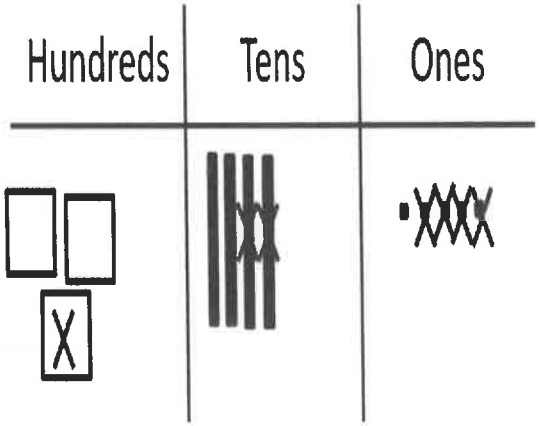
Year 3	**NC Statement:** Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Formal written subtraction with no regrouping (up to 3-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 345 \\ -\,124 \\ \hline 221 \end{array}$$

345 _ 124 = 221

Abstract - Speaking frame

... ones take away ... ones leaves ... ones.
... tens take away ... tens leaves ... tens.
... hundreds take away ... hundreds leaves ... hundreds.
So, ... – ... is equal to ... hundreds, ... tens and ... ones, which is ...

Notes:

Pupils should be encouraged to estimate first and check their answer using a mental method.

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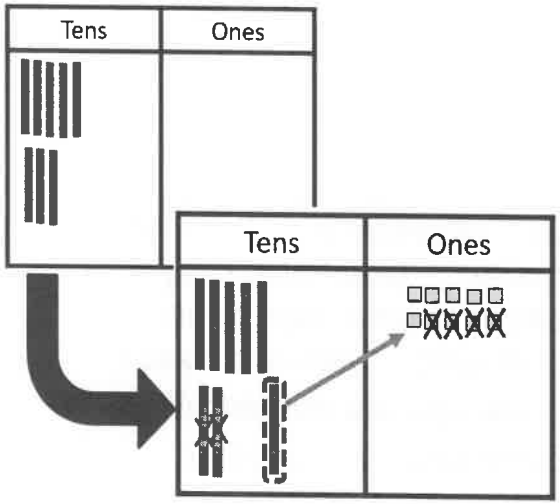
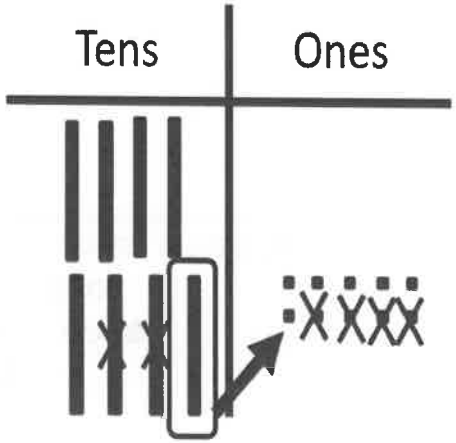
Year 3	**NC Statement:** - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Formal written subtraction – regrouping tens into ones only (up to 3-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} {}^{7}\cancel{8}\,{}^{1}0 \\ -\ 2\ 4 \\ \hline 5\ 6 \\ \hline \end{array}$$

80 _ 24 = 56

Abstract - Speaking frame	Notes:
I can see that there aren't enough ones for me to take away … ones without regrouping. Regroup one ten into ten ones. There are now … tens and … ones. … ones take away … ones leaves … ones. … tens take away … tens leaves … tens. So, … – … is equal to… tens and … ones, which is …	It is important that pupils understand that 80 has been regrouped into 70 and 10. *"I can see that there aren't enough ones for me to take away 4 ones without regrouping. Regroup one ten into ten ones. There are now ten ones and zero ones. 10 ones take away 4 ones leaves six ones. 7 tens take away 2 tens leaves 5 tens. So, 80 – 24 is equal to 5 tens and 6 ones, which is 56."*

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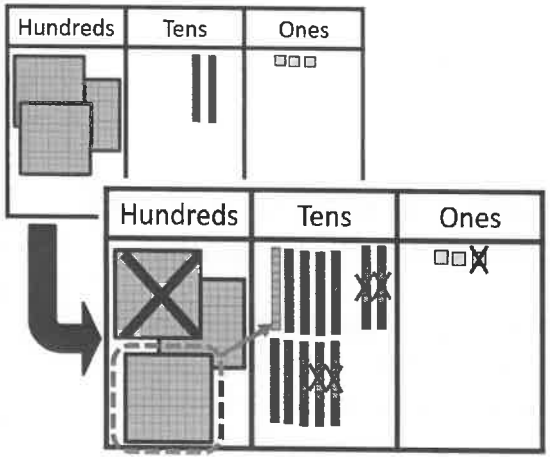
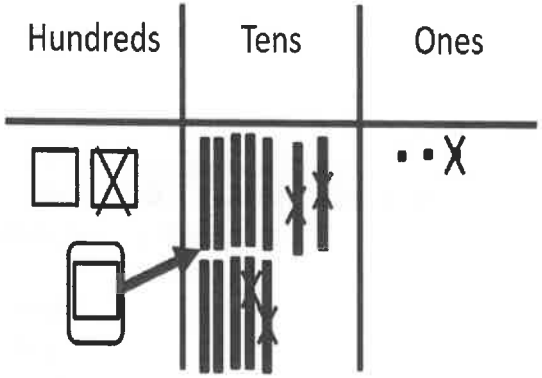
Year 3	**NC Statement:** - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Formal written subtraction – regrouping hundreds into tens only (up to 3-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} {}^{2}\not{3}\,{}^{1}2\;3 \\ -\;1\;4\;1 \\ \hline 1\;8\;2 \end{array}$$

323 – 141 = 182

Abstract - Speaking frame

… ones take away … ones leaves … ones.
I can see that there aren't enough tens for me to take away … tens without regrouping.
Regroup one hundred into ten hundreds.
There are now … hundreds and … tens.
… tens take away … tens leaves … tens.

… hundreds take away … hundreds leaves … hundreds
So, … – … is equal to … hundreds, … tens and … ones, which is ….

Notes:

It is important that pupils start to identify where regrouping is necessary.
Ensure that pupils are confident that the minuend may have been regrouped but it is still of equal value prior to subtraction.

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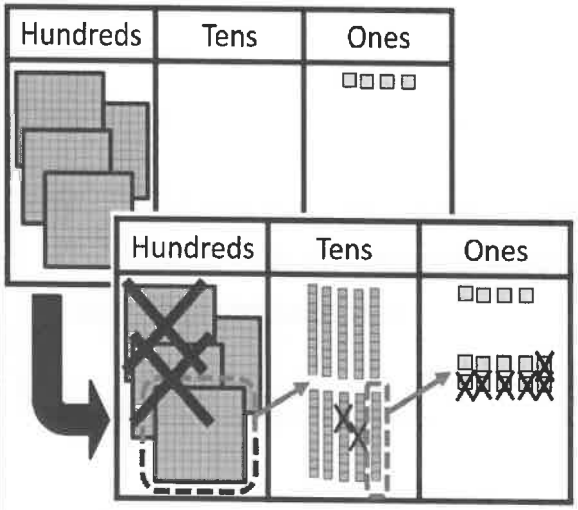
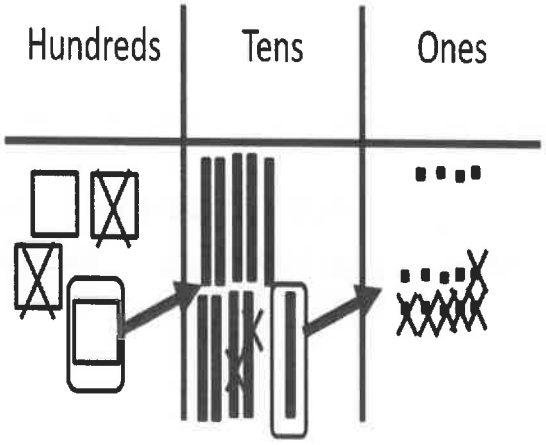
Year 3	**NC Statement:** - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

Formal written subtraction - regrouping hundreds and tens (up to 3-digit numbers)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} {}^{3}\cancel{4}\,{}^{1}\cancel{0}^{9}\,{}^{1}4 \\ -\ 2\ 2\ 6 \\ \hline 1\ 7\ 8 \end{array}$$

404 – 226 = 178

Abstract - Speaking frame

I will need to regroup…

- one hundred into ten tens. I now have … hundreds and … tens.
- one ten into ten ones. I now have … tens and … ones.

Notes:

Speaking frame hint: This is not a complete speaking frame. It is structured to support pupils with the language of regroup only.

Once pupils have fully understood and rehearsed regrouping within formal subtraction, this learning continues to be rehearsed and applied throughout Years 4, 5 and 6, including to multi-digit, decimal numbers, money and measures.

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Mental Strategies:	**Year 5:**
Year 3: Subtract numbers mentally, including: ♣ Subtracting a single digit number from a 3-digit number ♣ Subtracting a multiple of 10 from a 3-digit number ♣ Subtracting a multiple of 10 from a 3-digit number - Estimate the answer to a calculation and use inverse operations to check answer **Year 4:** Subtract numbers mentally, including: - Subtracting multiples of one thousand from a 4-digit number - Use of number pairs that total 1000 (multiples of 10) to calculate subtraction (e.g 1000 – 300 = 700) - Estimate the answer to a calculation and use inverse operations to check answers	Subtract increasingly large numbers mentally (e.g 12, 654 – 1,341 = 11, 213) - Mentally subtract tenths (e.g 0.7 - 0.5 = 0.2) and 1-digit whole numbers and tenths (8 - 0.3 = 7.7) - Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy **Year 6:** Subtract increasingly large numbers mentally (e.g 12, 654 – 1,341 = 11, 213) - Subtract decimal numbers mentally (up to 2 decimal places) - Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

MULTIPLICATION

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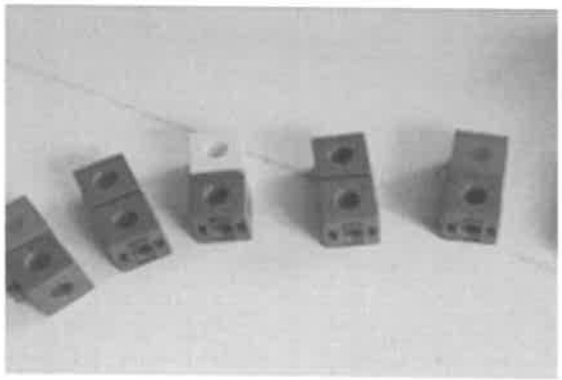
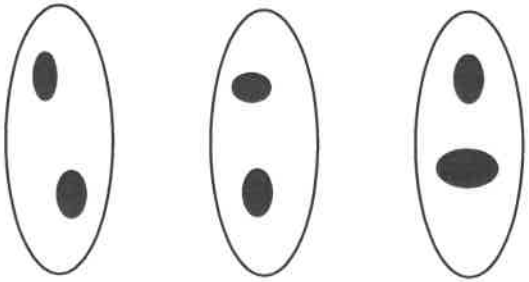
EYFS

Multiplication vocabulary: groups of, lots of, double

Concrete



Pictorial



Mental Strategies

- Develop a mental image of the number system.
- Understand the value of a number
- Counting in 2s, 5s and 10s.
- Number patterns on a number line and on a hundred square – 2's, 5's and 10's.

	Notes: Children will count groups of the same number of objects and add them together. The children learn about grouping in practical contexts and through pictorial representations. Children will solve simple problems involving doubling.	

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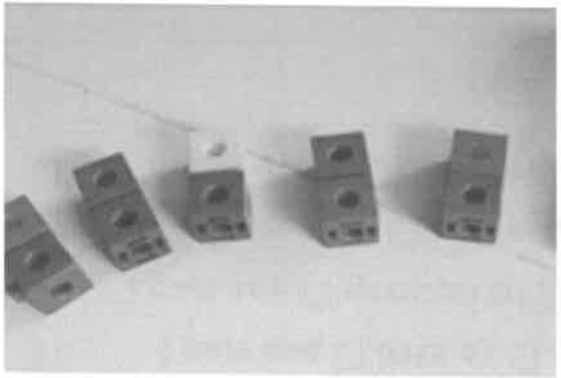
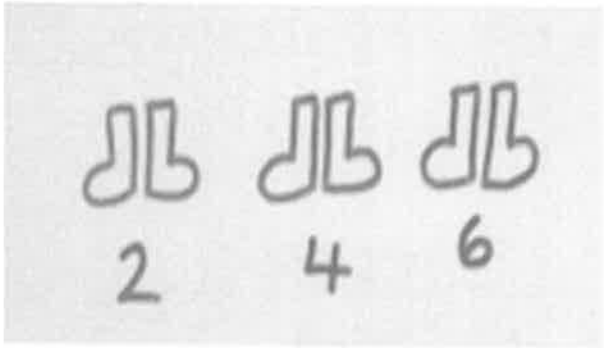
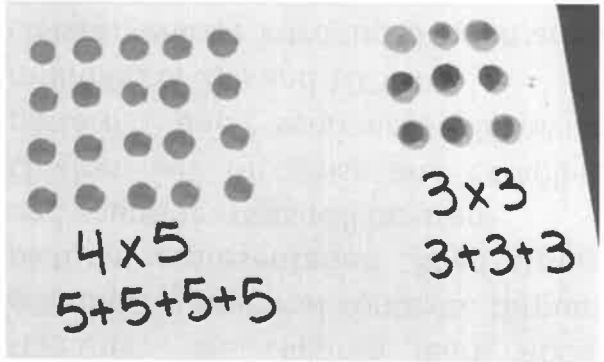
Year 1	**NC Statement:** - solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Subtraction vocabulary: odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times? lots of, groups of, once, twice, five times, ten times, multiple of, times, multiply, multiply by, array, row, column, double.

Concrete	Pictorial	Abstract - Written symbolic
		

Abstract – Spoken	Notes:
I can see ☐ lots of ☐. **I can see ☐ groups of ☐.** **I can see ☐ + ☐ + ☐ + ...** **There are ☐ in total.**	Children will count groups of the same number of objects and add them together. The children learn about grouping in practical contexts, through pictorial representation. Bead strings and counting sticks will be used. children will recognise and complete patterns and sequences involving multiples of 2, 5 and 10. children will be introduced to an array to support multiplication and to support the understanding that multiplication is repeated addition.
Mental Strategies: - Count forwards and backwards in multiples of 2s, 5s and 10s. - Recall doubles of numbers up to and including 10.	

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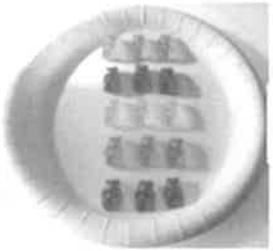
Year 2	**NC Statement:** - recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers - show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot - solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Subtraction vocabulary: odd, even, twos, fives, tens, threes, lots of, groups of, once, twice, three times, five times, ten times, multiple of, times, multiply, multiply by, repeated addition, array, row, column, double.	

Concrete

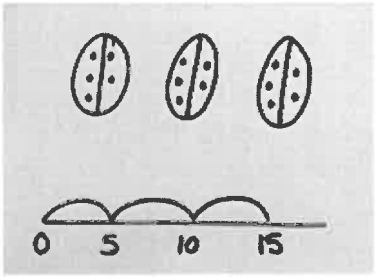


3 x 5 = 15

5 x 3 = 15

Pictorial

I have 3 ladybirds with 5 spots each. How many spots do they have altogether?



Abstract - Written symbolic

2 X 3 = 6

2 + 2 + 2 + 2 = 6

Abstract – Spoken

how many times?
How many groups are there?
There are …. groups of ……

Mental Strategies:

- Count forwards and backwards in multiples of 3.
- Know the 2-, 5- and 10-times tables (in and out of order)
- Recognise odd and even numbers

Notes:

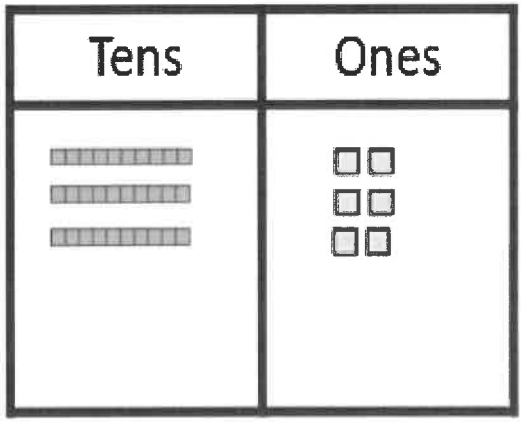
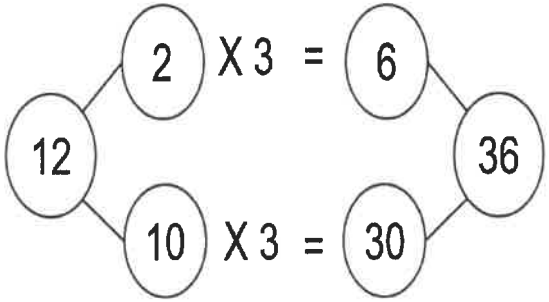
children will understand the operation of multiplication as repeated addition on a blank number line and will use practical resources to support this
children will be able to represent a multiplication calculation using an array and write the multiplication symbol within a number sentence.
Children will also understand that multiplication can be carried out in any order (commutative).

	children will solve one-step multiplication problems (including missing number problems) using concrete objects and pictorial representations.

Year 3	**NC Statement:** - Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

Introducing short multiplication with no regrouping

Multiplication vocabulary: multiply, times, groups of, equal groups of, multiple of, multiplied by, estimate, inverse, grid multiplication, expanded column multiplication, partition, commutative, associative, product.

Concrete	Pictorial - Jottings	Abstract - Written symbolic
		1 2 x 3 3 6 12 x 3 = 36

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Abstract - Speaking frame

... groups of ... ones is ... ones.
... groups of ... tens is ... tens.
... tens added to ... ones is ... .
The product of ... and ... is ... .

Notes:

Pupils have already met the distributive law and rehearsed multiplying by ten.
The focus of this step is support pupils in making the connection between informal distributive approach and the formal layout.

Speaking frame note:
"3 groups of 2 ones is 6 ones. 3 groups of 1 ten is 3 tens. 3 tens added 6 ones is 36. The product of 12 and 3 is 36."

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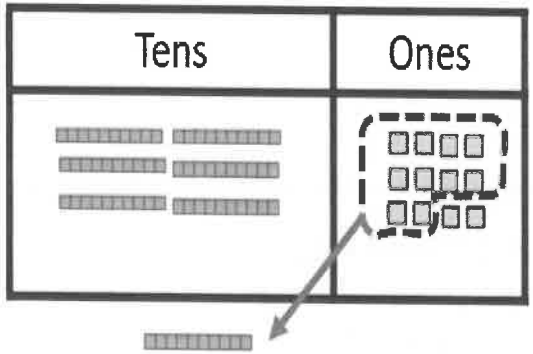
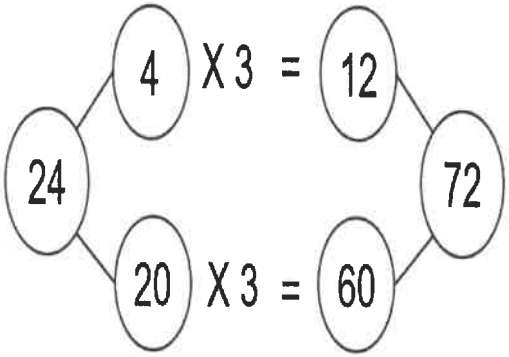
Year 3	**NC Statement:** - Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

Short multiplication with regrouping of ones into tens only

Concrete



Pictorial - Jottings



Abstract - Written symbolic

$$\begin{array}{r} 2\ 4 \\ \times\quad 3 \\ \hline 7\ 2 \\ \hline \end{array}$$

1

24 x 3 = 72

Abstract - Speaking frame

... groups of ... ones is ... ones.
I can regroup the ... ones into ... ten(s) and ... one(s).
... groups of ... tens is ... tens.
... ten(s) added to ... is ... .
The product of ... and ... is ... .

Notes:

Speaking frame note:
"3 groups of 4 ones is 12 ones. I can regroup the 12 ones into 1 ten and 2 ones. 3 groups of 2 tens is 6 tens. 1 ten added to 6 tens is 7 tens. The product of 24 x 3 is 72." Pupils should be encouraged to consider whether italicised language in the speaking frame is required in the calculation.

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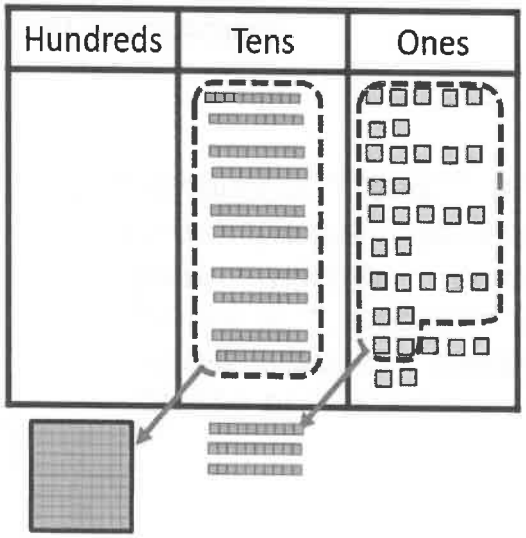
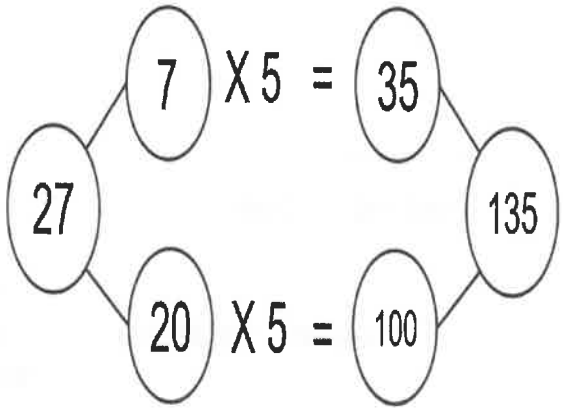
Year 3	**NC Statement:** - Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

Short multiplication with regrouping of tens and ones

Concrete



Pictorial - Jottings



Abstract - Written symbolic

$$\begin{array}{r} 27 \\ \times \quad 5 \\ \hline 135 \\ \hline 3 \end{array}$$

27 x 5 = 135

Abstract - Speaking frame

... groups of ... ones is ... ones.
I can regroup the ... ones into ... ten(s) and ... one(s).
... groups of ... tens is ... tens.
... ten(s) added to ... ten(s) is ..
I can regroup the ... tens into ... hundred(s) and ... ten(s)
The product of ... and ... is ....

Mental Strategies:

- Count forwards and backwards in multiples of 4, 8, 50 & 100
- Know the 3, 4 and 8 times tables (in and out of order)
- Connect the 2, 4 and 8 times tables through doubling
- Use knowledge of place value to calculate multiplication (e.g. 2 x 2 = 4, 2 x 20 = 40, 2 x 200 = 400)

Notes:

At this stage, the pictorial representation is being used as a checking point to ensure pupils answer accurately. This allows focused attention on understanding the abstract recording.

Speaking frame note:
"5 groups of 7 ones is 35 ones. I can regroup the 35 ones into 3 tens and 5 ones. 5 groups of 2 tens is 10 tens. 3 tens added to 10 tens is 13 tens. I can regroup the 13 tens into 1 hundred and 3 tens. The product of 27 x 5 is 135."

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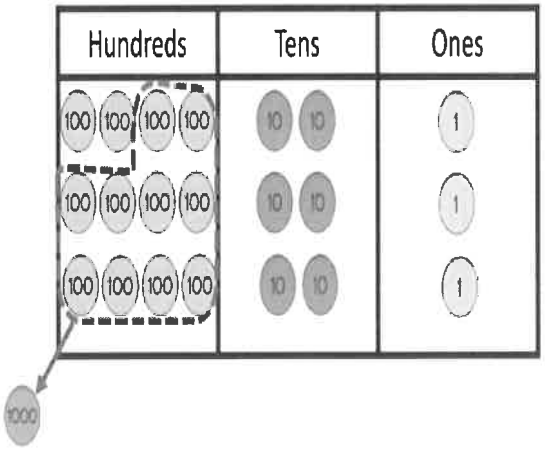
Year 4	**NC Statement:** - Multiply 2-digit and 3-digit numbers by a one-digit number using formal written layout (short multiplication)

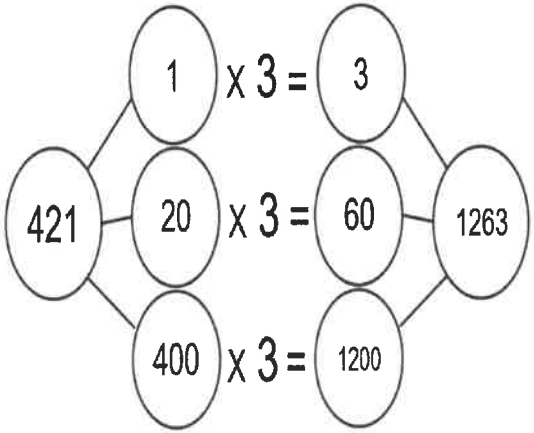
Formal written multiplication with regrouping which generates a new column

Multiplication vocabulary: multiply, multiplied by, product, short multiplication, partition, distributive law, commutative, groups of, multiply, times, multiples, inverse

Concrete



Pictorial - Jottings



Abstract - Written symbolic

$$\begin{array}{r} 4\ 2\ 1 \\ \times\quad\ 3 \\ \hline 1\ 2\ 6\ 3 \\ \hline \end{array}$$

421 x 3 = 1263

Abstract - Speaking frame

Notes:

… groups of … ones is … ones. *(Do I need to regroup?)*
… groups of … tens is … tens. *(Do I need to regroup?)* … groups of … hundreds is … hundreds. *(Do I need to regroup?)*

(… hundreds can be regrouped to … thousands and … hundreds)
The product of … and … is … .

At this stage, the pictorial representation is being used as a checking point to ensure that pupils answer accurately. This allows focused attention on understanding the abstract recording.

Pupils should be encouraged to consider whether the italicised language in the speaking frame is required in the calculation.

Mental Strategies:

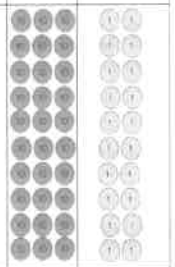
- Know all times tables up to and including 12 x 12 (by the end of Year 4)
- Recognise and use factor pairs (e.g factor pairs for numbers up to and including 10)
- Know that TU x 5 is TU x 10 then divide by 2 (e.g 18 x 5 = (18 x 10) ÷ 2 = 90)
- Know that TU x 9 is TU x 10 then subtract TU (e.g 18 x 9 = (18 x 10) – 18 = 162)

Year 5	**NC Statement:** 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

Expanded vertical multiplication 2-digit by 2-digit

Multiplication vocabulary: composite numbers, prime number, prime factor, cube number, square number, derive, factor pairs, formal written method, times, multiply, multiplied by, multiple of, product, short multiplication, partition, long multiplication, scaling, decimal place, units, tenths and hundreds.

Concrete

x	30	2
10		
4		

x	30	2
10		
4		

Pictorial - Jottings

x	30	2	
10	300	20	= 320
4	120	8	= 128

Abstract - Written symbolic

$$\begin{array}{r} 3\ 2 \\ \times\ 1\ 4 \\ \hline 8 \\ 1\ 2\ 0 \\ 2\ 0 \\ 3\ 0\ 0 \\ \hline 4\ 4\ 8 \end{array}$$

32 x 14 = 448

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Abstract - Speaking frame

First, I need to consider the ones in the multiplier.

… groups of … ones is ones.

… groups of … tens is tens. *(Do I need to regroup?)*

Then, tens in the multiplier.

… groups of … ones is ones. *(Do I need to regroup?)*

… groups of … tens is tens. *(Do I need to regroup?)*

The total of all the partial products is … .

The product of … and … is … .

Notes:

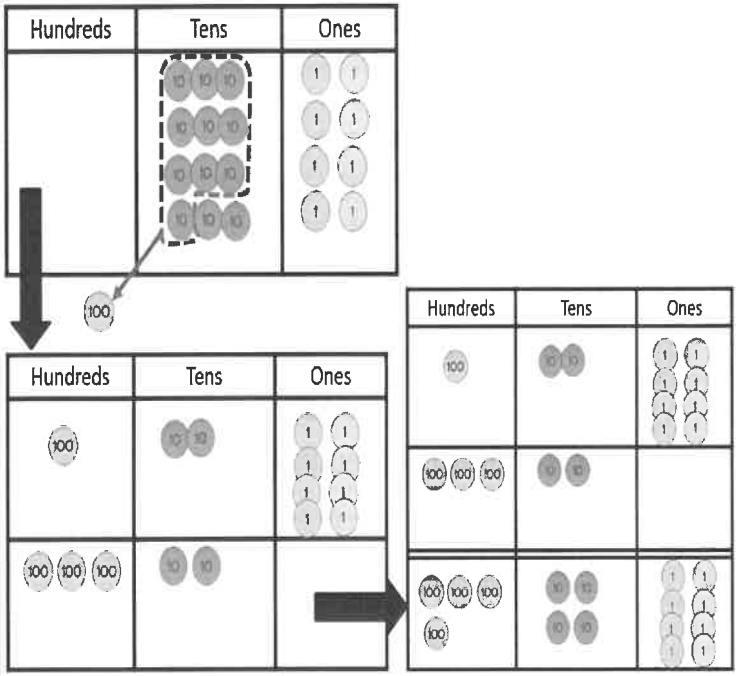
This is a transitional method towards long multiplication. Using the grid supports pupils in their thinking about multiplying by powers of ten and place value. Secure understanding of both of these concepts allows pupils to move to long multiplication more successfully.

Speaking frame hint: linking to what we know and correct place value. For example, 10 groups of 3 tens is 30 tens. This can be regrouped to 3 hundreds.

Year 5	**NC Statement:** 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

Long multiplication 2-digit by 2-digit with simple regrouping

Concrete



Pictorial - Jottings

x	30	2	
10	300	20	= 320
4	120	8	= 128

Abstract - Written symbolic

$$\begin{array}{r} 3\ 2 \\ \times\ 1\ 4 \\ \hline 1\ 2\ 8 \\ 3\ 2\ 0 \\ \hline 4\ 4\ 8 \end{array}$$

32 x 14 = 448

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Abstract - Speaking frame

First, I need to consider the ones in the multiplier.
… groups of … ones is ones. (Do I need to regroup?) …
groups of … tens is tens. (Do I need to regroup?)
Then, considering tens in the multiplier.
… groups of … ones is ones. (Do I need to regroup?)
… groups of … tens is tens. (Do I need to regroup?)
The total of all the partial products is … .
The product of … and … is … .

Notes:

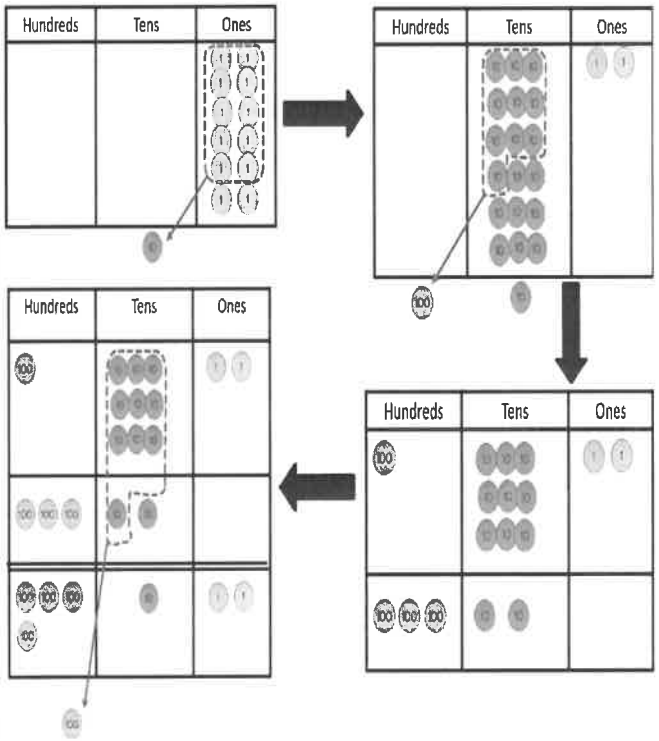
Speaking frame hint: linking to what we know and correct place value.

For example, 10 groups of 3 tens is 30 tens (linking to known fact 10 x 3). This can be regrouped to 3 hundreds.

Year 5	**NC Statement:** 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

Long multiplication 2-digit by 2-digit, focusing on regroup in first partial product

Concrete



Pictorial

x	30	2	
10	300	20	= 320
6	180	12	= 192

Abstract - Written symbolic

$$\begin{array}{r} {\scriptstyle 1} \\ 3\ 2 \\ \times\ 1\ 6 \\ \hline 1\ 9\ 2 \\ 3\ 2\ 0 \\ \hline 5\ 1\ 2 \\ {\scriptstyle 1} \end{array}$$

32 x 16 = 512

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Abstract - Speaking frame

First, I need to consider the ones in the multiplier.
... groups of ... ones is ... ones. *(Do I need to regroup?)*
... groups of ... tens is ... tens. *(Any regroups to add? Do I need to regroup?)*
Then, considering tens in the multiplier.
... groups of ... ones is ... ones. *(Do I need to regroup?)* ...
groups of ... tens is ... tens. *(Do I need to regroup?)*
The total of all the partial products is ... .
The product of ... and ... is ... .

Notes:

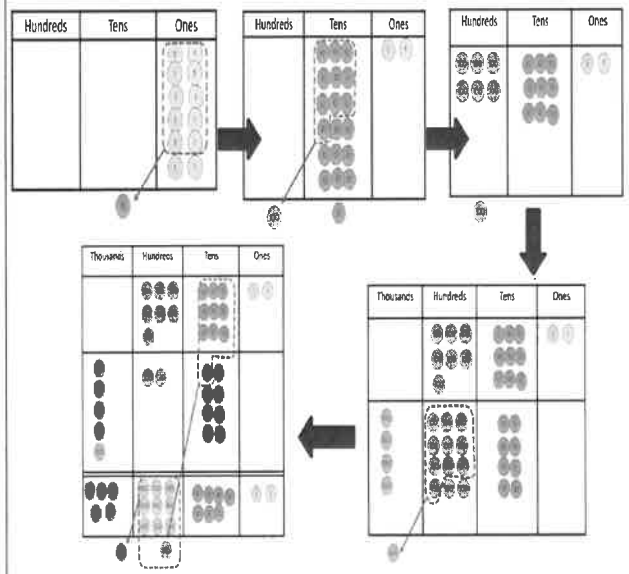
Speaking frame hint: linking to what we know and correct place value.

For example, 6 groups of 3 tens is 18 tens (linking to known fact 6 x 3 = 18). This can be regrouped to 1 hundred and 8 tens.

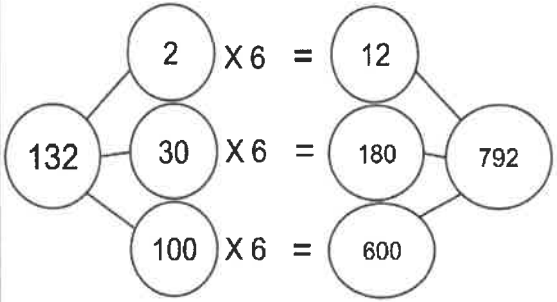
Year 5	**NC Statement:** Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

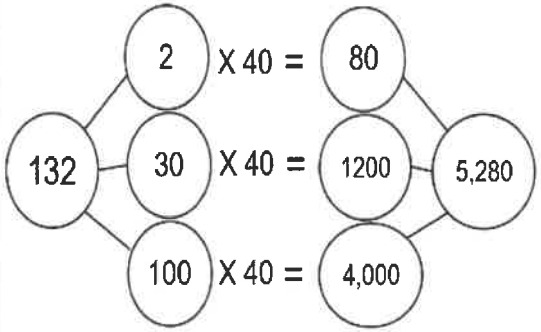
Long multiplication 2-digit by 2-digit regrouping in first and second stage

Concrete



Pictorial - Jottings





Abstract - Written symbolic

$$\begin{array}{r} {\scriptstyle 1\ \ \ } \\ {\scriptstyle 1\ 1\ } \\ 132 \\ \times\ 46 \\ \hline 792 \\ 5280 \\ \hline 6072 \\ \hline {\scriptstyle 1\ 1\ } \end{array}$$

132 x 46 = 6,072

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Abstract - Speaking frame

First, I need to consider the ones in the multiplier.
… groups of … ones is … ones. *(Do I need to regroup?)*
… groups of … tens is … tens. *(Any regroups to add? Do I need to regroup?)*

Then, considering tens in the multiplier.
… groups ff … ones is … ones. *(Do I need to regroup?)*
… groups of … tens is … tens. *(Any regroups to add? Do I need to regroup?)*

The total of all the partial products is … .

The product of … and … is … .

Mental Strategies:

- Recognise and calculate factor pairs for any number
- Use times table knowledge to derive multiples of any number
- Establish whether a number is a prime number (up to 100) or a composite number (not prime) and recall prime numbers up to 19
- To know what a square number is and recall all square numbers (up to and including 144)
- To know what a cube number is and recall the first 5 cube numbers

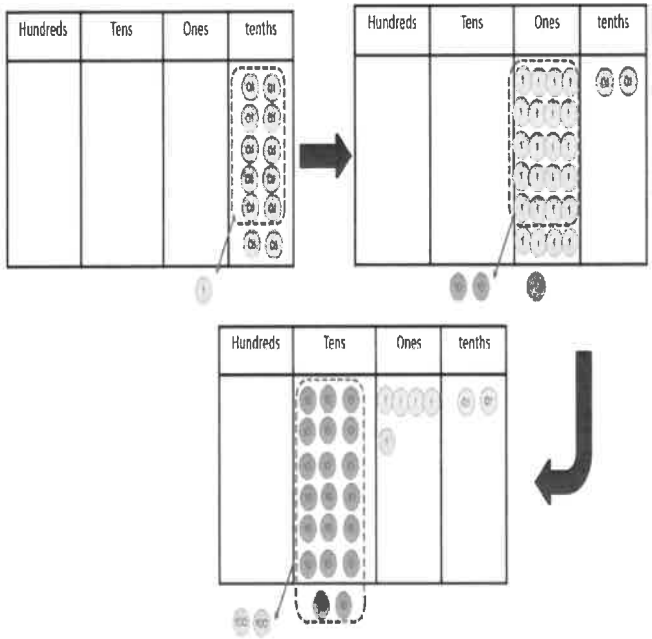
Notes:

Speaking frame hint: linking to what we know and correct place value.

For example, 6 groups of 3 tens is 18 tens (linking to known fact 6 x 3 = 18). This can be regrouped to 1 hundred and 8 tens.

Year 6	**NC Statement:** 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
Formal written multiplication involving numbers with up to 2 decimal places multiplied by a 1-digit number	
Multiplication vocabulary: common factors, multiples, prime, formal written method, multiply, multiplied by, multiple of, product, short and long multiplication, partition, scaling, decimal place, units, tenths and hundredths	

Concrete



Pictorial – Jottings

Jottings: multiples of tricky multipliers

6
12
18
24
30
36
42
48
54
60
66
72

Abstract - Written symbolic

$$\begin{array}{r} {}^{2}\,{}^{1} \\ 34.2 \\ \times \quad 6 \\ \hline 205.2 \\ \hline \end{array}$$

34.2 x 6 = 205.2

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Abstract - Speaking frame

... groups of ... tenths is ... tenths. (Do I need to regroup?)
... groups of ... ones is ... ones. *(Any regroups to add? Do I need to regroup?)* ... groups of ... tens is ... tens. *(Any regroups to add? Do I need to regroup?)* The product of ... and ... is ... .

Mental Strategies:

- Use scaling to solve decimal number problems as whole number problems using the rule: 'the number of decimal digits in the question is the same as the number of decimal digits in the answer'
- Identify common factors, common multiples and prime numbers
- Use common factors to simplify fractions mentally
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

Notes:

Speaking frame hint: linking to what we know and correct place value. For example, 6 groups of 3 tens is 18 tens (linking to known fact 6 x 3 = 18). This can be regrouped to 1 hundred and 8 tens.

DIVISION

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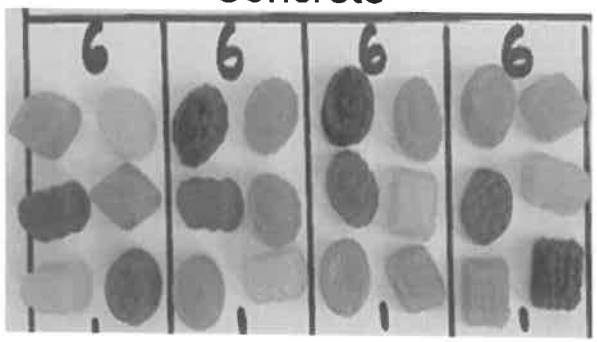
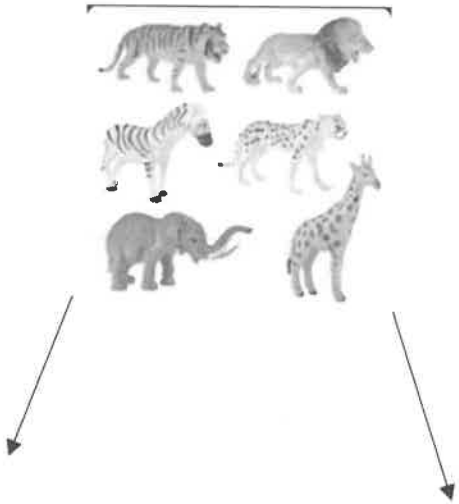
EYFS	

Division vocabulary: halve, half, share, share equally, groups

Concrete



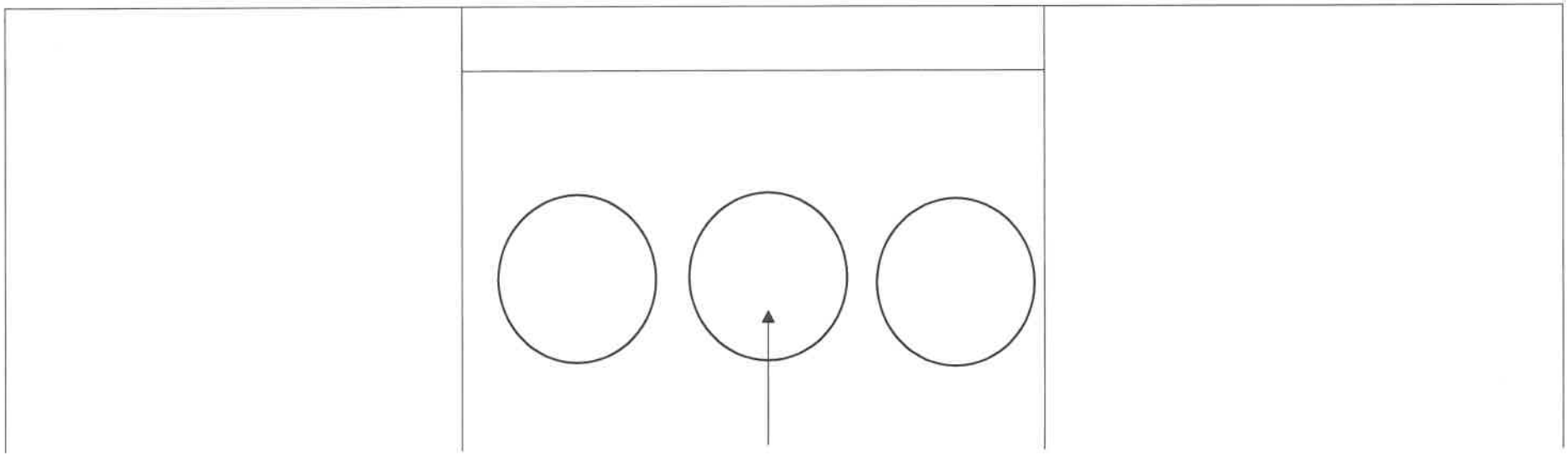
Pictorial



Mental Strategies

- Develop a mental image of the number system

- Understand the value of a number



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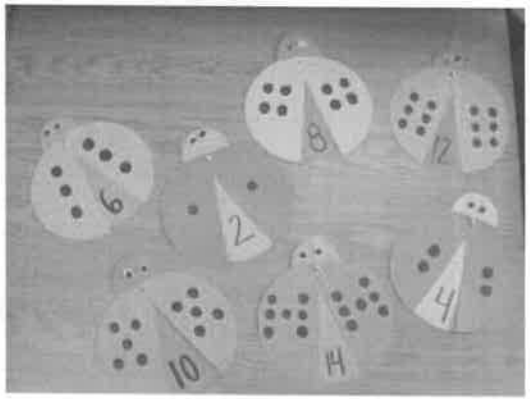
Year 1	**NC Statement:** - solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. -

Division vocabulary: halve, share, share equally, groups, equal groups of, divide, divided by, left, left over

Concrete	Pictorial	Abstract - Written symbolic
8 ÷ 2 = 4 		6 ÷ 2 = 3

Abstract - Speaking frame

☐ groups of ☐ make ☐ .

If you split ☐ into equal groups of ☐,
you get ☐ groups.

Mental Strategies:

- Count forwards and backwards in multiples of 2s, 5s and 10s.

Notes:

Children will understand equal groups and share items out in play scenarios.

Children will be taught to associate 'half' with dividing by two and recognise, find and name a half as one of two equal parts.

Children will recognise and write the division symbol (÷) in mathematical statements, calculating the answer with the teacher using concrete objects.

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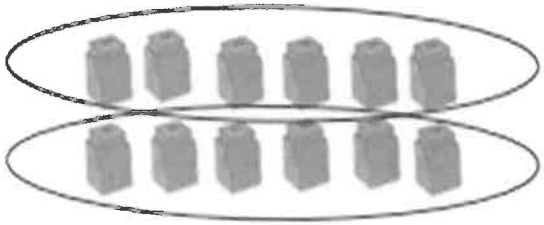
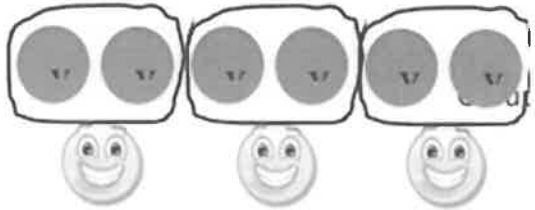
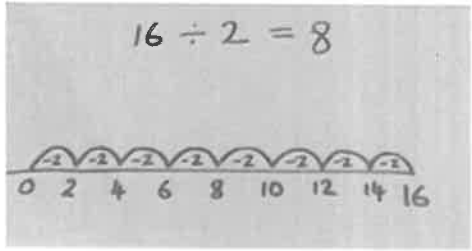
Year 2	**NC Statement:** - recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers - calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs -

Division vocabulary: groups of, equal groups of, halve, share, share equally, divide, divided by, divided into, repeated subtraction, inverse.

Concrete	Pictorial	Abstract - Written symbolic
		

Abstract - Speaking frame

Step 1:

There are ☐ groups of ☐ in ☐.

☐ ÷ ☐ = ☐

Step 2:

If you share ☐ into ☐ groups,
there are ☐ in each group and ☐ left over.

☐ divided by ☐ is ☐ remainder ☐.

☐ ÷ ☐ = ☐ r ☐

Mental Strategies:

- To know that division is the inverse of multiplication
- Recall division facts for the 2, 5 and 10 times tables
- Recall halves for even numbers up to and including 20

Notes:

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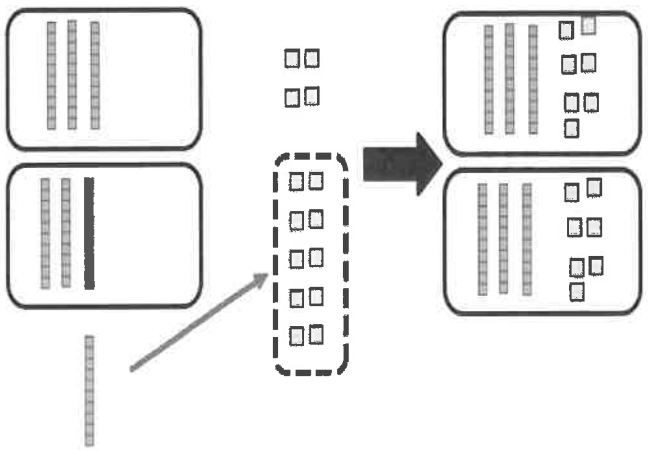
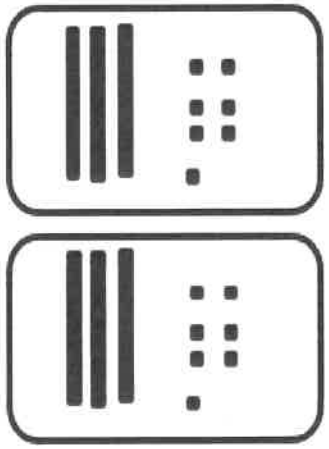
<table>
<tr><td>Year 3</td><td colspan="3"><u>NC Statement:</u>

- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit number,s times one-digit numbers, using mental and progressing to formal written methods</td></tr>
<tr><td colspan="4">Long division of tens and ones with regrouping (sharing structure)</td></tr>
<tr><td colspan="4">Division Vocabulary: divided by, divide, divided into, grouping, divisor, short division, remainder, inverse, quotient, dividend</td></tr>
<tr><td>Concrete</td><td>Pictorial</td><td colspan="2">Abstract - Written symbolic</td></tr>
</table>





$$\begin{array}{r} 3\ 7 \\ 2\overline{)\ 7\ 4} \\ -\ 6\ \downarrow \\ \hline 1\ 4 \\ -\ 1\ 4 \\ \hline 0 \end{array}$$

$74 \div 2 = 37$

Abstract - Speaking frame

First, I am sharing … tens into … equal groups.
There are … tens in each group.
I have … ten(s) remaining.
I need to regroup the remaining … ten(s) into … ones.
I now have … ones in total.
Then, I am sharing … ones into … equal groups.
There are … ones in each group.
I have … one(s) remaining.
The quotient is … with … remainders.

Notes:

This is a crucial stage as it demonstrates the regrouping of the remaining tens for ones and how this is recorded abstractly.

Speaking frame note: *"… I have 1 ten remaining. I need to regroup the remaining 1 ten into 10 ones. I now have 14 ones in total..."*

Mental Strategies: - Know the division facts from the 3, 4 and 8 times tables - Use knowledge of place value to calculate division (e.g. 14 ÷ 2 = 7, 140 ÷ 2 = 70, 1400 ÷ 2 = 700)	

Year 4

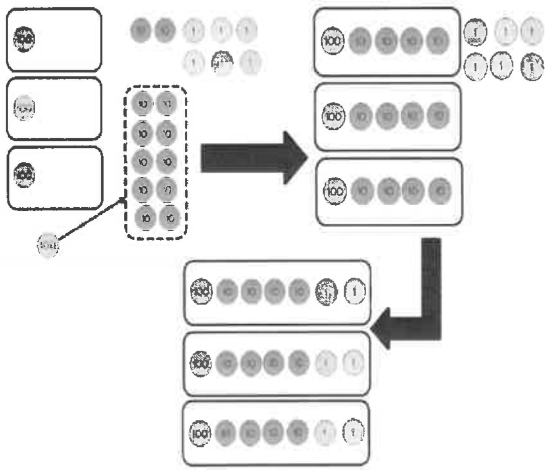
NC Statement:

- Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (non-statutory guidance)

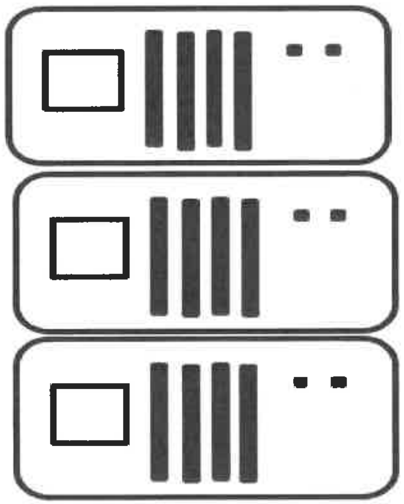
Long division with regrouping hundreds into tens (sharing structure)

Division vocabulary: actor, divisor, divided by, divided into, remainders, divisible by, equivalent, short division, derive, Quotient, inverse, remainder, multiples, exchange

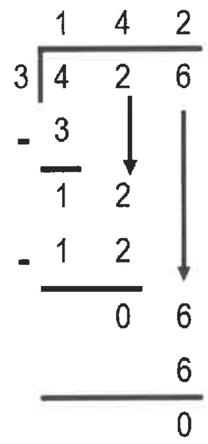
Concrete



Pictorial



Abstract - Written symbolic



$426 \div 3 = 142$

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Abstract - Speaking frame

First, I am sharing … hundreds into … equal groups.
There are … hundreds in each group.
I have … hundred(s) remaining.
I need to regroup the remaining … hundreds into …tens.
I now have … tens in total.
Next, I am sharing … tens into .. equal groups.

Notes:

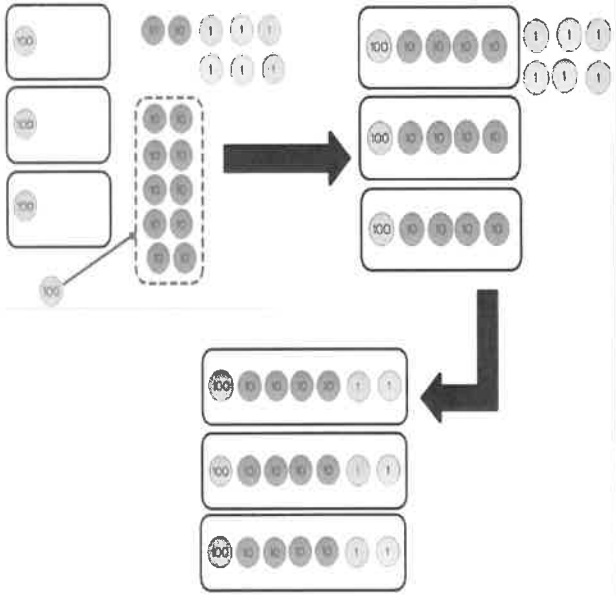
Pupils revisit long division with no regrouping. This is to ensure that they understand the abstract recording of long division.

Speaking frame note: This stage is an extension to the previous speaking frame – focusing on the hundreds regroup.

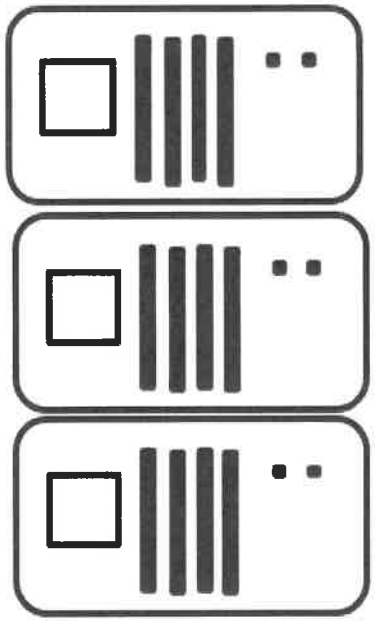
Year 4	**NC Statement:** - Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (non-statutory guidance)

Introducing formal short division (sharing structure)

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 1\ 4\ 2 \\ 3\overline{)\,4\ {}^{1}2\ 6} \end{array}$$

$426 \div 3 = 142$

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Abstract - Speaking frame

First, I am sharing … hundreds into … equal groups.
There are … hundreds in each group.
I have … hundred(s) remaining.
I need to regroup the remaining … hundreds into … tens.
I now have … tens in total.
Next, I am sharing … tens into .. equal groups.

Mental Strategies:

- Know all related division facts for all times tables up to 12 times table (by the end of Year 4)

Notes:

In this stage, pupils learn that the thinking processes for long and short division are the same – it is only the abstract written that is different. It is important that pupils are able to link this to the long division format and can explain the compaction.

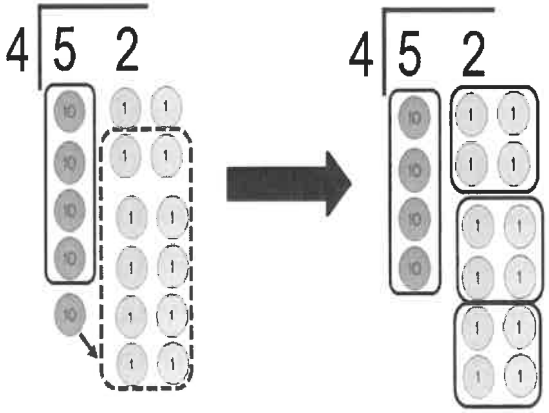
Speaking frame note: This stage is an extension to the previous speaking frame – focusing on the hundreds regroup.

Year 5	**NC Statement:** - Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

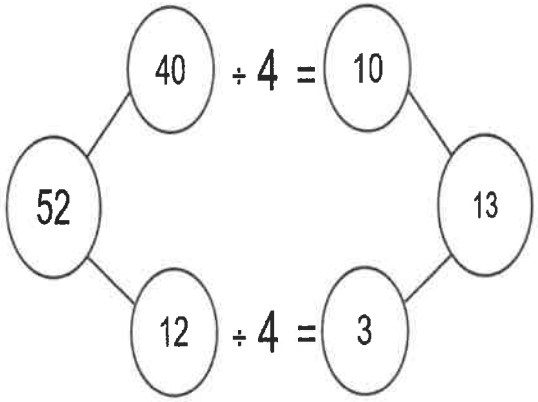
Introducing formal short division regroup from tens to ones (grouping structure)

Division vocabulary: divide, divided by, divided into, divisible by, remainder, quotient, inverse, decomposing, factor, decimal place, units, tenths, scaling, short division.

Concrete



Pictorial - Jottings



Abstract - Written symbolic

$$\begin{array}{r} 1\ 3 \\ 4\overline{)5\ {}^{1}2} \end{array}$$

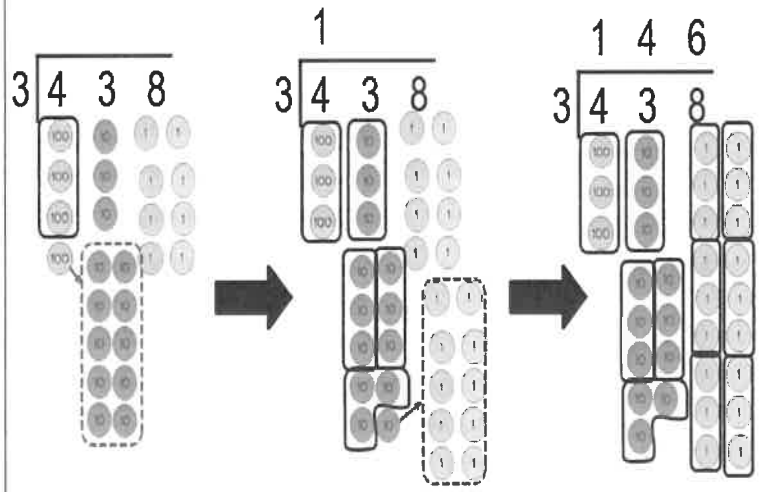
$52 \div 4 = 13$

Abstract - Speaking frame	Notes:
How many groups of … tens are in … tens without regrouping There is/are … ten(s) remaining. I can make … group(s) of … tens. ones. I need to regroup the … tens into … I now have … ones. , without regrouping? How many groups of … ones are in … ones I can make … group(s) of … ones. There is/are … one(s) remaining. There are … groups of … in … with … remainders.	Pupils are encouraged to progress to a grouping model of division. This is in preparation for 2-digit divisors and understanding fractions expressed as part of the quotient. Pupils should explore with simple division calculations to ensure that they understand the shift in structure . **Speaking frame note:** In this example, the speaking frame would be completed like this: *"How many groups of 3 tens are in 4 tens, without regrouping?"* This is to ensure that accurate place value and magnitude is maintained.

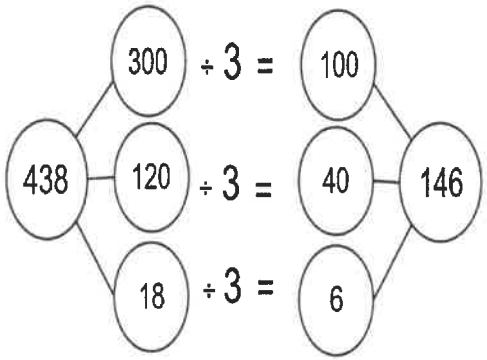
Year 5	**NC Statement:** - Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context -

Short division for numbers up to 4-digits (grouping structure)

Concrete



Pictorial - Jottings



Abstract - Written symbolic

$$\begin{array}{r} 1\ 4\ 6 \\ 3\overline{)\,4\ {}^{1}3\ {}^{1}8} \end{array}$$

$438 \div 3 = 146$

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Abstract - Speaking frame

I want to know how many groups of … are in … .
How many groups of … hundreds are in … hundreds, without regrouping?
I can make … group(s) of …hundreds. There is/are … hundred(s) remaining.
I need to regroup the … hundreds into …tens.

Notes:

Speaking frame note: This is an extension to the previous speaking frame.
In this example, the speaking frame would be completed like this:
"How many groups of 3 hundreds are in 4 hundreds, without regrouping?"
This is to ensure that accurate place value and magnitude is maintained

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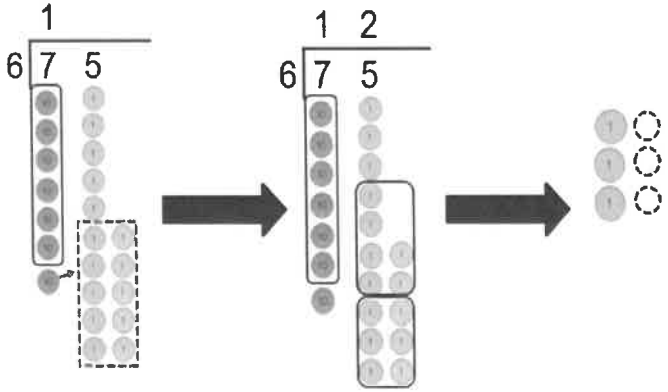
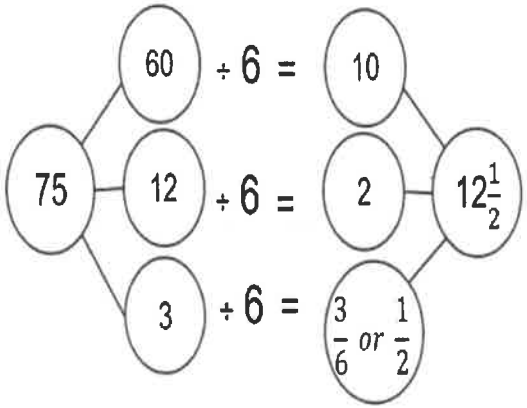
Year 5	**NC Statement:** - Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

Short division (grouping structure) - expressing quotients with fractions

Concrete



Pictorial



Abstract - Written symbolic

$$6\overline{)75} = 12\tfrac{1}{2}$$

$$75 \div 6 = 12\tfrac{1}{2}$$

Abstract - Speaking frame

I have a remainder of … .

This is … (remainder) out of … (divisor) which I need for another group.

This can be written as a fraction — .

This can be simplified to .

Notes:

Speaking frame note: This is an extension to the previous speaking frame (5LS12 Step 2). In this example the speaking frame would be completed like this:

"I have a remainder of 3.
This is 3 out of 6 which I need for another group.

This can be written as a fraction $\frac{3}{6}$.

This can be simplified to $\frac{1}{2}$

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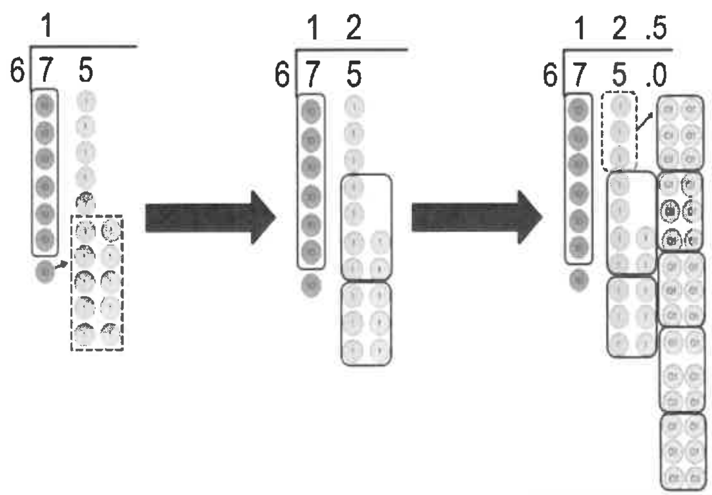
Year 5

NC Statement:

- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

Short division (grouping structure) - expressing quotients with decimals

Concrete



Pictorial – Jottings

Jottings: multiples of the divisor

6
12
18
24
30
36
42
48
54
60

Abstract - Written symbolic

$$6 \overline{)\,7\,{}^{1}5\,.{}^{3}0} = 1\,2\,.5$$

75 ÷ 6 = 12.5

Abstract - Speaking frame

I have a remainder of … .
I need to regroup the … ones into … tenths.
How many groups of … tenths are in … tenths, without regrouping?
I can make … group(s) of … tenths.

There are … groups of … in … .

Notes:

Speaking frame note: This is an extension to the previous speaking frame (5LS12 Step 2). In this example, the speaking frame would be completed like this:

"I have a remainder of 3.
I need to regroup the 3 ones into 30 tenths. How many groups of 6 tenths are in 30 tenths, without regrouping? I can make 5 groups of 6 tenths.
There are 12.5 groups of 6 in 75."

Mental Strategies:

- Multiply and divide numbers mentally drawing upon known facts
- Associate fractions with division

Year 6

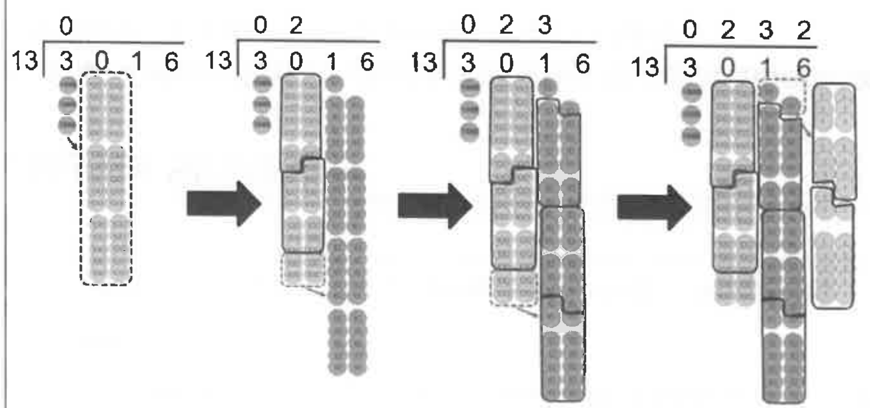
NC Statement:

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division and interpret remainders as whole number remainders , fractions, or by rounding, as appropriate for the context

Long division for numbers up to 4 digits

Division vocabulary: divide, divided by, divided into, divisible by, remainder, factor, quotient, inverse, decimal place, units, tenths, hundredths, scaling, formal written methods

Concrete



Pictorial - Jottings

Jottings: multiples of the divisor

13
26
39
52
65
78
91
104

Abstract - Written symbolic

```
      0  2  3  2
13 |  3  0  1  6
   -  0
      3  0
   -  2  6
         4  1
   -     3  9
            2  6
   -        2  6
               0
```

3016 ÷ 13 = 232

Abstract - Speaking frame

I want to know how many groups of … are in … . , without
How many groups of … thousand are in …thousand regrouping?
I can make … group(s) of …thousand. There is/are … thousand(s) remaining.

I need to regroup the … thousand(s) into …hundreds.

Mental Strategies:

- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Calculate a fraction of an amount

Notes:

The structure of long division was first introduced in year 3, then revisited and extended in both years 4 and 5. It was revised in Step 1 of this sequence.

Jottings are used to scaffold to derived related division facts.

Speaking frame note: This is an extension to the previous speaking frame. In this example, the speaking frame would be completed like this: "How many groups of 13 thousands are in 3 thousand, without regrouping?" I can make zero groups of 13 thousand. There are 3 thousand remaining. I need to regroup the 3 thousands into 30 hundreds."

These additional examples show only jottings, completed speaking frames and abstract recording. This complexity of calculation should only be introduced to pupils once they are confident in the conceptual pathway and can explain the abstract recording with reference to the concrete and pictorial models.

Additional Year 6 examples

Year 6

NC Statement:

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division and interpret remainders as whole number remainders , fractions, or by rounding, as appropriate for the context

Long division for numbers up to 4 digits - expressing quotients with fractions

Abstract speaking frame

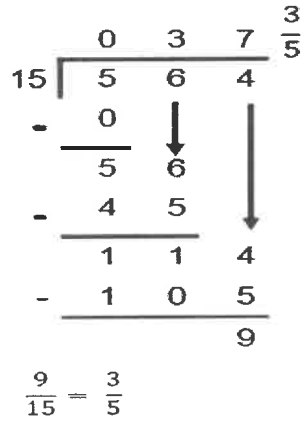
I have a remainder of 9.
This is 9 out of the 15 which I need for another group.
This can be written as a fraction $\frac{9}{15}$.
This can be simplified to $\frac{3}{5}$.
There are $37\frac{3}{5}$ in each of the 15 groups.

Pictorial - Jottings

Jottings: multiples of the divisor

15
30
45
60
75
90
105
120
135
150

Abstract - Written symbolic



$\frac{9}{15} = \frac{3}{5}$

$564 \div 15 = 37\ \frac{3}{5}$

Additional Year 6 examples

Leverstock Green CE (VC) Primary School

Striving for excellence: caring for the individual.

Additional Year 6 examples

Year 6

NC Statement:

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division and interpret remainders as whole number remainders , fractions, or by rounding, as appropriate for the context

Long division for numbers up to 4 digits - expressing quotients with decimals

Abstract speaking frame

I have a remainder of 9.
I need to regroup the 9 ones into 90 tenths.

How many groups of 15 tenths are in 90 tenths, without regrouping?

I can make 6 groups of 15 tenths.

There is nothing remaining.
There are 37.6 groups of 15 in 564.

Pictorial - Jottings

Jottings: multiples of the divisor

15
30
45
60
75
90
105
120
135
150

Abstract - Written symbolic

```
        0  3  7  .6
    ┌──────────────
15  │ 5  6  4  .0
  - 0
  ──
    5  6
  - 4  5
  ──────
    1  1  4
  - 1  0  5
  ─────────
          9  0
  -       9  0
  ─────────────
             0
```

564 ÷ 15 = 37.6

Additional Year 6 examples

Leverstock Green CE (VC) Primary School

Striving for excellence; caring for the individual.

Additional Year 6 examples

Year 6

NC Statement:

Multiply multi-digit numbers of up to 4-digits by a two-digit whole number using the formal written method of long multiplication

Long multiplication; up to 4-digit by 2-digit

Abstract speaking frame

20 groups of 3 tens is 6 hundreds.
I need to add the regrouped 1 hundred.
I now have 7 hundreds.
20 groups of 8 hundred is 16 thousand.
There are no regroups to add.
The total of the two partial products is 22, 572.
The product of 836 and 27 is 22, 572.

Pictorial - Jottings

Jottings: multiples of tricky multipliers

7
14
21
28
35
42
49
56
63
70
77
84

Abstract - Written symbolic

$$\begin{array}{r} {\scriptstyle 1} \\ {\scriptstyle 2\ 4} \\ 836 \\ \times\ 27 \\ \hline 5852 \\ 16720 \\ \hline 22572 \\ {\scriptstyle 1\ 1} \end{array}$$

836 x 27 = 22,572

Additional Year 6 examples