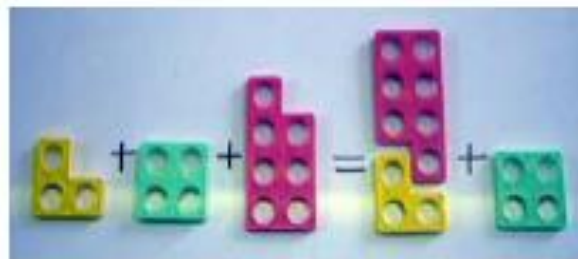**Brighton & Hove CPfE**
City Partnership for Education

Progression in Calculations
June 2016

3 + 4 + 7 = 14
Re-arranging numbers to use bonds to 10 to
help addition

Contents

Introduction

This document has been produced by the City Centre Partnership for Education's numeracy co-ordinators. It has been created in line with the National Curriculum Mathematics programmes of study for key stages 1 and 2 (DfE, September 2013) and, as such is organised in year groups to match the high expectations for all pupils.

This document has also been informed by materials from the National Centre for Excellence in the Teaching of Mathematics (NCETM) and the Maths Hubs, in particular *Calculation Guidance for Primary Schools* (NCETM, October 2015) and *Teaching for Mastery* Years 1 – year 6 (OUP/NCETM, 2015).   Schools in the Partnership are strongly advised to make use of these excellent publications which are freely available from NCETM.   It is also expected that schools will share the calculation methods and expectations in this document with parents / carers through the revised 2016 'Helping your child with maths' booklet and school workshops.

It should be noted that this document focuses specifically on calculation and does not include all aspects of number as specified in the National Curriculum. Although each of the 4 operations is presented separately in this document, these should not be taught in isolation. Rich connections should be made between the 4 operations and other numerical ideas in order to develop pupils' conceptual and procedural **fluency** in calculation skills, numerical **reasoning** and **problem-solving**.

New strategies for calculation need to be supported by familiar models and images to reinforce understanding: moving between the concrete and abstract helps to develop pupils' understanding. When teaching a new strategy it is important to start with numbers that the child can easily manipulate so that they can understand the concept.
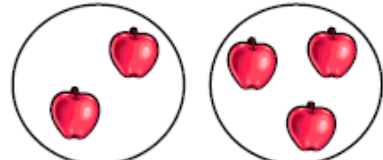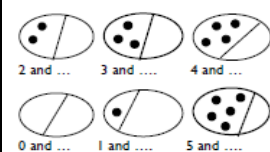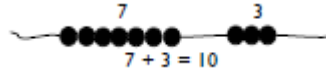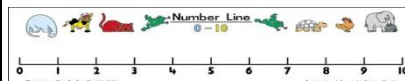
Fluent computational skills depend on accurate and rapid recall of basic number bonds to 20 and times-tables facts. Teaching these basic facts in a way that emphasises patterns and relationships, rather than rote learning, leads to conceptual as well as procedural fluency. Frequent practice of recalling basic number facts will help pupils to commit these to their long term memory.
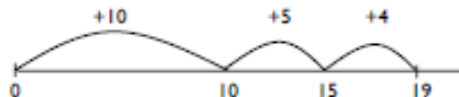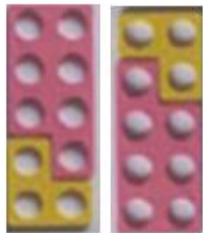
Written methods of calculation are based on mental strategies. Each of the four operations builds on mental skills which provide the foundation for jottings and informal written methods of recording.   These informal written methods are an important stepping stone to help pupils develop fluency with more efficient formal written methods.
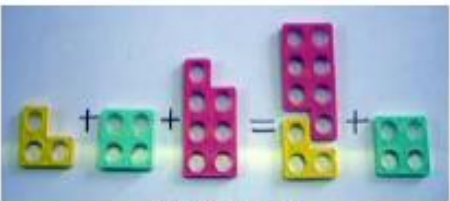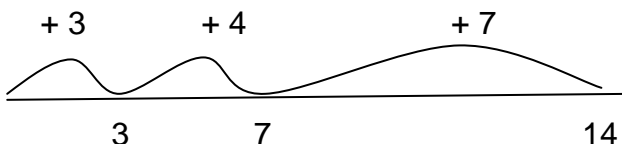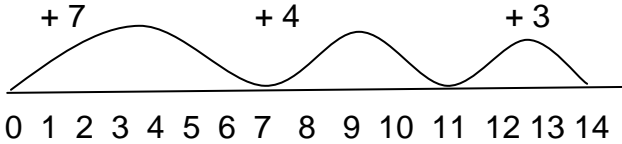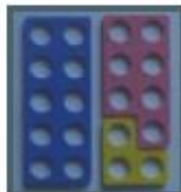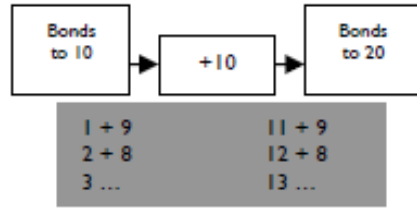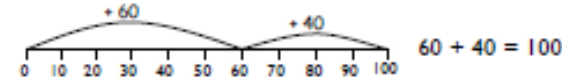
Co-ordinators involved are from : Brighton and Hove CPfE
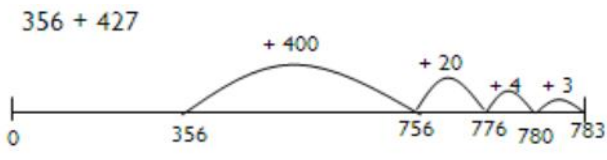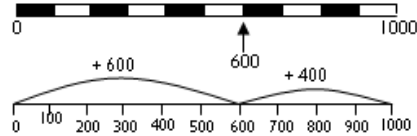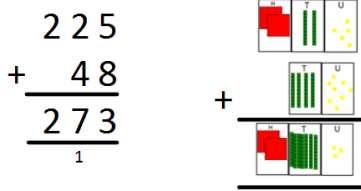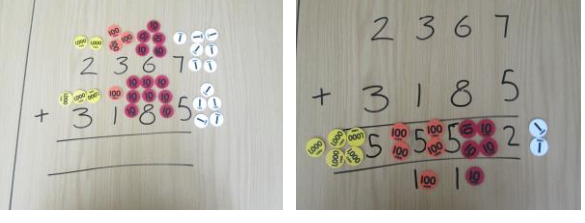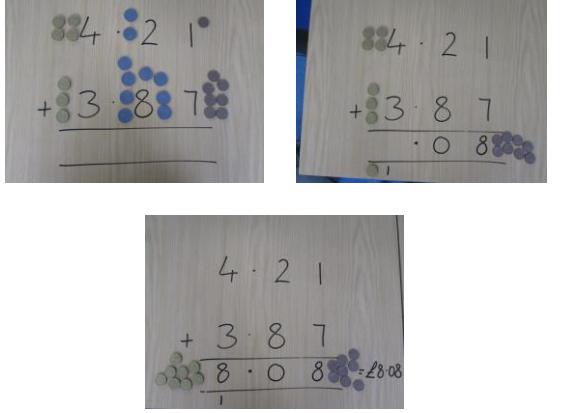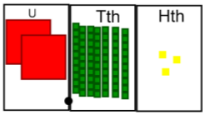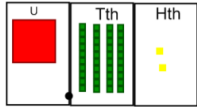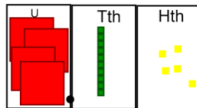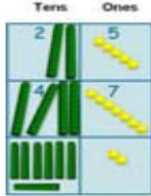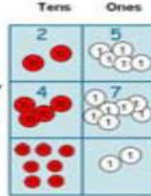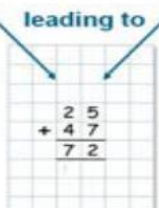
Addition: Foundation Stage

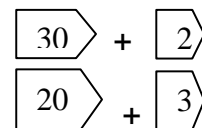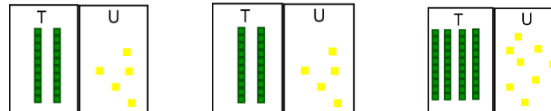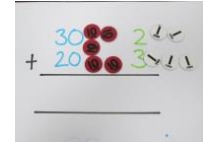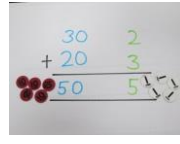| Mental methods	Written methods	Visual images and models	Vocabulary
Find the total number of items in 2 groups by counting all of them. Say the number that is 1 more than a given number. Find 1 more or 1 less from a group of up to 5 objects then 10 objects. They solve problems by doubling. In practical activities and discussion beginning to use the vocabulary involved in adding. Add two single digit numbers and count on to find the answer.	**Informal jottings**. Draw pictures to represent an addition problem. ⭐⭐⭐ + ⭐⭐ Use marks to show meaning Introduce + and = symbols .	Counting on from a number to find the total. I have 5 cubes in my tin. I put in one, two, three cubes more. How many cubes are in the tin now? Use moveable objects when finding totals. Touch and align each object as it is counted Count first group, start count from first group's total when counting second group How many fingers am I hiding? 6 + □ = 10 Make 6 2 and … 3 and …. 4 and … 0 and … 1 and …. 5 and …. 7 3 7 + 3 = 10 4+3=7 Number Line 0 – 10 0 1 2 3 4 5 6 7 8 9 10	Add, more, plus, make, sum, total, altogether, 1 more, 2 more, How many more to make? How many more is … than…? How much more is …? Odd/even **Resources** Moveable counting objects, numicon, coat hangers and pegs, flip flaps, beads, number tracks and lines, number fans.

Addition: Year 1			
Mental Methods	**Written methods**	**Visual images and models**	**Vocabulary**
Count to and across 100 forwards

Be able to quickly use addition facts within 20.

Given a number identify 1 more.

Add 1 and 2 digit numbers to 20 including zero.

Add three 1 digit numbers.

Solve simple word problems involving addition.

Solve one step problems involving addition using concrete objects, pictorial representations and missing number problems.

Count in steps of 2, 5, 10 from any given number, looking at patterns to predict. | **Read, interpret and practise writing mathematical statements involving + and = accurately and fluently**.

 7 + 3 = 10 (recorded with pictures/numicon)
17 + 3 = 20 (recorded with pictures/numicon)

 Children start to record on a number line:

3 + 4 + 7 = 14 (recorded with pictures/numicon)

At the cake sale Year 1 made 10 cakes, Year 2 made 5, Year 3 made 4. How many cakes did we have?

+10   +5   +4

0   10   15   19

(Ensure pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100**)** | Understand that addition can be done in any order. Count on from the biggest number.

13 + 7 = 20
7 + 13 = 20

13   7

3 + 4 + 7 = 14
Re-arranging numbers to use bonds to 10 to help addition

How many fingers am I hiding?

6 + □ = 10

15 + 5 = 20 | Add, more, plus, make, sum, total, altogether, equals, score, double, near double,
1 more, 2 more, 10 more.
How many more to make?
How many more is … than…?
How much more is …?
Odd/even

Resources
Moveable counting objects, numicon, coat hangers and pegs, flip flaps, beads, number tracks and lines, number fans. |

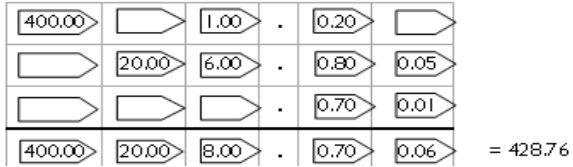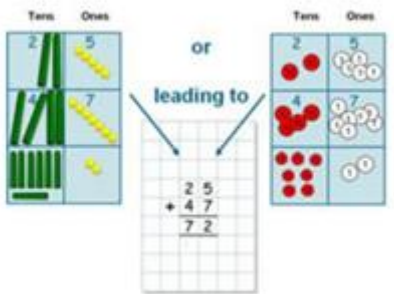| Addition: Year 2			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**
Be able to quickly recall and use addition facts to 20. (Use related facts to perform calculations e.g. 3+7=10, 30+70=100) Derive and use related facts to 100 Add a 2 digit number and ones. Add a 2 digit number and 10s. Add two 2 digit numbers. Add three 1 digit numbers Recognise addition can be done in any order (commutative), extending understanding that 7 +3 = 10, 3 +7 = 10. Recognise and use inverse operation to check (undoing). Solve word problems involving addition of numbers up to 2 digits, using concrete objects and pictorial representations (including numbers, quatities and measures) Count in steps of 2, 3, 5 and 10 from any number. Give 10 more or less than a given number to 100.	**Addition in any order.** Use drawings, numicon and numberlines to show understanding that addition can be done in any order. Children record on number lines including blank number lines: 3 + 4 + 7 = 7 + 4 + 3 + 3 + 4 + 7 3 7 14 + 7 + 4 + 3 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 **Pupils should partition numbers in different ways** (23 = 20 + 3 and 20 = 10 + 13) **Add two 2 digit numbers.** Add 2 digit numbers using partitioning in columns (not bridging 10). Children record : 32 + 23 = 30 + 2 20 + 3 50 + 5 = 55 (Continue to extend understanding of place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100**)**	13 + 7 = 20 7 + 13 = 20 17 + 3 = 20 3 + 17 = 20 Bonds to 10 → +10 → Bonds to 20 1 + 9 11 + 9 2 + 8 12 + 8 3 … 13 … Use knowledge of number bonds to 10 to help with bonds to 20 and multiples of 10 to 100 + 60 + 40 0 10 20 30 40 50 60 70 80 90 100 60 + 40 = 100 Support using Dienes, place value cards. 32 + 23 = 30 + 2 20 + 3 **23 + 25 = 48** T U T U T U	Add, addition, more, plus, make, sum, total, altogether, score, equals, double, near double, 1 more, 2 more, 10 more, 100 more. How many more to make? How many more is … than…? How much more is … than …? Partitioning, Count on, combine, recombine, groups **Resources** Moveable counting objects, numicon, coat hangers and pegs, flip flaps, beads, number tracks and lines, number fans, 100 square, multilink. Dienes, Arrow cards, place value counters

Addition: Year 3			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**

Mental methods

Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more (or less) than any given number.

Add and subtract numbers mentally including:
- a 3 digit number and ones
- a 3 digit number and tens
- a 3 digit number and hundreds

Estimate answers to calculations and use inverse operations to check answers.

Solve problems including missing number problems using number facts, place value and addition/ subtraction.

(Continue to extend understanding of place value and partitioning)

Written methods

HTU + HTU:
Add tens and units separately on a number line (count on).

Children record:

$356 + 427$

Add using vertical or horizontally expanded methods (partitioning), adding least significant digits first.

Children record :

Introduce regrouping (carrying) with column addition.
TU + TU progressing to HTU + HTU.

Children progress onto formal wirtten methods :

Visual images and models

Use base 10/Dienes and place value cards to help children move towards exchanging units for tens.

$600 + 400 = 1000$

Vocabulary

Add, addition, more, plus, make, sum, total, altogether score
How many more to make…?
How many more is…than..?
Tens
Units
Hundreds

Resources:
Base 10/Dienes,
Place value counters,
place value ITP,
Number lines
Arrow cards
Straws/objects grouped in tens

Addition: Year 4			
Mental	**Written**	**Visual images and models**	**Vocab**

Add any two digit number by partitioning or counting on
 	
Ensure pupils practise mental methods with increasingly large numbers.
 	
Estimate and unse inverse operations to check answers to a calculation.
 	
Solve addition and subtraction 2 step problems in context deciding which operations and methods to use and why.
 	
Count backwards through zero to include negative numbers.
 	
(Continue to extend understanding of place value in numbers, counting in units, tens and hundreds up to 1000s)
	Using the formal column method to add 3 and 4 digit whole numbers and £ and p.
	Children record:
	Use regrouping (carrying) below the line for the column method. Digits are lined up carefully in columns.
	
	225 783 2367
	 48 + 342 + 3185
	273 1125 5552
	 1 1 1 1
	
	Using similar methods, add several numbers.
	Then extend to different numbers of digits.
	Children record:
	
	          4
	         57
	         83
	     + 256
	        400
	         2 2
	
	Using methods similar to those above, begin to add two or more three digit sums of money, with or without regrouping (carrying) from the pence to the pounds.
	Know that decimal points should line up under each other (like buttons on a shirt).
	Children record:
	
	£4.21 + £3.87 4.21
	                        3.87
	                        8.08 = £8.08
	                         1
		Adding units first, then 10s, then 100s
		Use base 10/Dienes to help children visualise exchanging units for tens and tens for hundreds:
		
		  2 2 5
		+ 4 8
		  2 7 3
		   1
			Add, addition, more, plus, make, sum, total, altogether, score.
			How many more to make…?
			How many more is…than..?
			Units
			Tens
			Hundreds
			Thousands
			Tens of thousands
			Tenths
			Hundredths
			Difference
			Exchange
			
			Resources:
			Base 10/Dienes, place value ITP, place value counters, Number lines Arrow cards Straws/objects grouped in tens

Addition: Year 5			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**
Count forwards and backwards in steps of powers of 10 from any given number up to 1 000 000. Add and subtract numbers mentally with increasingly large numbers to aid fluency e.g. 12 462 – 2300 = 10 162 Use rounding to check answers to calculations and to determine, in the context of a problem, levels of accuracy. Solve addition (and subtraction) multi-step problems in contexts, deciding which operations and methods to use and why.	**Use efficient written methods to add integers and decimals. Extend methods to numbers with any numbers of digits.** **Add whole numbers with more than 4 digits including using formal written methods (column addition)** Children record: Extend to addition of 4 digit numbers: 3587 +675 4262 Extend to addition of more than 2 numbers: 671 98 +468 1237 **Note: NC2014 does state in fractions Y5 section: read, write, order and compare numbers up to 3 decimal places AND solve problems involving number up to 3 decimal places** Introduce decimals up to 3dp: Children record: 12.7 +14.2 26.9 7.83 4.82 12.65 + 3.674 4.257 7.931 4.67 5.853 19.02 29.543	2.73 +1.42 =4.15 Use base 10/Dienes to help children visualise exchanging hundredths for tenths and tenths for units: (Continue to extend understanding of place value of each digit in up to 6 digit numbers, including decimals, counting in hundreds, thousands, ten thousands up to 1 million. Also counting in tenths and hundredths) Place value counters	Add, addition, more, plus, make, sum, total, altogether score How many more to make…? How many more is…than..? Tens Units Hundreds Thousands Ten thousands Tenths Hundredths Thousandths Exchange **Resources:** Base 10/Dienes, place value ITP, Calculators, (numicon for decimals)

	Fractions Add fractions with the same denominator and denominators that are multiples of the same denominator	**Example:** $\frac{1}{8} + \frac{2}{3} = \frac{19}{24}$ **How To:** Step 1: Find a common denominator $\quad 8 \times 3 = 24$ Step 2: Make equivalent fractions with the new denominator $\quad \frac{1}{8} = \frac{3}{24} \quad \frac{2}{3} = \frac{16}{24}$ Step 3: Add the numerators $\quad \frac{3}{24} + \frac{16}{24} = \frac{19}{24}$ Step 4: Reduce the fraction if needed	

Addition: Year 6			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**
Perform mental calculations, including ones with mixed operations and large numbers.

Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions.

Use negative numbers in context and calculate intevals across zero.

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why | **All of the below is consolidating form Y5 apart from fractions work!**

Use efficient written methods to add integers and decimals. Extend methods to numbers with any numbers of digits.

Add whole numbers with more than 4 digits including using formal written methods (column addition)

Children record:

| Extend to addition of 4 digit numbers | 3587 +675 ------ 4262 | Extend to addition of more than 2 numbers | 671 98 +468 ------ 1237 |

Note: NC2014 does state in fractions Y5 section: read, write, order and compare numbers up to 3 decimal places AND solve problems involving number up to 3 decimal places | Place the digit cards 3-9 to solve this problem

Find the missing digits:

36☐ +☐92 ----- 5☐5

☐☐☐☐ +☐☐☐ ----- 4 5 2 4

400.00		1.00	.	0.20	
	20.00	6.00	.	0.80	0.05
			.	0.70	0.01
400.00	20.00	8.00	.	0.70	0.06	= 428.76

Place value counters: | Add, addition, more, plus, make, sum, total, altogether score How many more to make…? How many more is…than..? Tens Units Hundreds Thousands Ten thousands Tenths Hundredths Thousandths Exchange

Resources: Base 10/Dienes, place value ITP, calculators, numicon for decimals, numicon hoods. |

Introduce decimals up to 3dp:

🖊 Children record:

12.7	7.83		3.674	4.67
+14.2	4.82	+	4.257	5.853
26.9	12.65		7.931	19.02
	1		1 1	29.543
				1 1 1
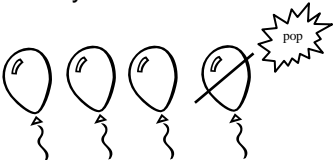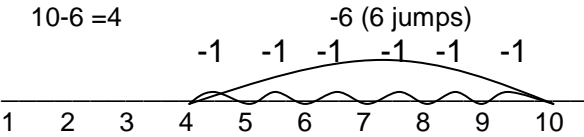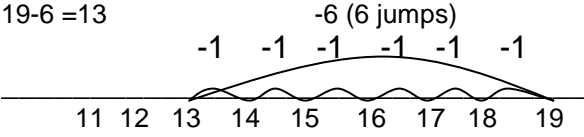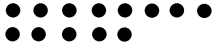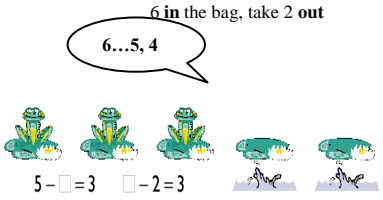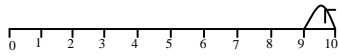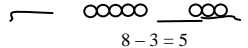
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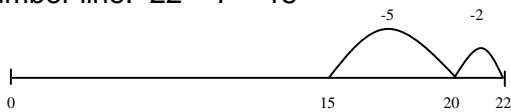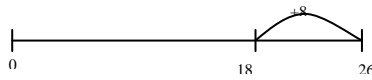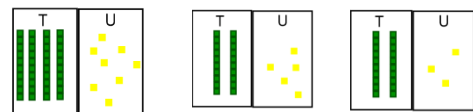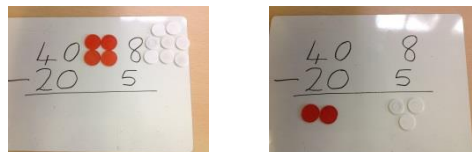
3481.9		2.68
26.85		174.29
0.71		1243.7
3509.46		63.5
1 2		1484.17
		1 1 2 1

Fractions:
Add fractions with different denominators and mixed numbers using the concept of equivalent fractions

Subtraction: Foundation Stage			
Mental Methods	**Written Methods**	**Visual images and models**	**Vocabulary**
Use real life problems and songs to take away and find one less. Find one less from a group of five objects then ten objects. In practical activities begin to use the vocabulary involved in subtracting. Using quantities and objects subtract 2 single digit numbers and count back to find the answer. They solve problems by halving.	**Informal Jottings** Record using marks they can interpret and explain. ⭐ ⭐ ⭐ ✕ ✕ Use marks to show meaning Introduce - and = symbols.	There were 6 people on the bus. Four people get off. How many are left? There were 4 balloons. 1 popped. How many are left? Use tins and counters e.g. if we had 6 biscuits in a tin and we ate one, how many would be left? Use numicon e.g. You have a five plate of numicon. Find a plate with 1 less. Use washing line and spotty cards e.g. Find a card with one spot and peg it on the line. Find a card with one less spot etc. Use carpet squares or painted number lines to practice jumping back 1 to find 1 less.	Subtraction Take away Minus Count back How many? How many more now? Difference Total Halving Fewer Before After **Resources:** 100 squares, number games, number lines, numicon and practical resources to support calculation.

Subtraction	Year 1		
Mental methods	**Written methods**	**Visual models and images**	**Vocabulary**
Memorise and reason with number bonds to 20 both as addition and subtraction e.g. 9+7 = 16; 16 -7 = 9; 7 = 16 – 9 Count back in ones from any two digit number. Subtract 10 from any two digit number. Use number facts to subtract single digit numbers from two digit numbers e.g. use 7 – 2 to work out 27 - 2 Solve one step problems involving subtraction in familiar practical contexts.	**Read, write and interpret mathematical statements involving – and = signs.** Using objects, children are able to subtract a single digit number and count back to find the answers. Children record drawings and can explain what they represent: **Subtract 1 and 2 digit numbers to 20** Begin to record on a number line. 10-6 =4 -6 (6 jumps) -1 -1 -1 -1 -1 -1 1 2 3 4 5 6 7 8 9 10 19-6 =13 -6 (6 jumps) -1 -1 -1 -1 -1 -1 11 12 13 14 15 16 17 18 19 Understanding/experience of finding the difference by comparing 2 lines of objects. Children are introduced to the idea of 'doing' and 'undoing' to demonstrate subtraction as the inverse of addition.	Use fingers to take away and count back Using moveable objects to physically take-away 6 **in** the bag, take 2 **out** 6…5, 4 5 – ☐ = 3 ☐ – 2 = 3 1 **less** than 10 is 9 10 **subtract** 1 equals 9 10 – 1 = 9 0 1 2 3 4 5 6 7 8 9 10 Use bead string 8 – 3 = 5 8 – 3 = 5 Use large scale number lines to reinforce jumping back Which line has the **most** money? How much more? What is the difference between the two amounts?	Subtraction Take away Minus, leave, how many are left, left over, gone, fewer, 1 less, 2 less, 10 less, Count back How many? Difference Total Sharing Halving Fewer **Resources:** 100 squares, number games, number lines Ten frames Bead string Practical resources to support calculation.

Subtraction: Year 2			
Mental Methods	**Written Methods**	**Visual models and images**	**Vocabulary**

Count back in 2s, 3s, 5s and10s from any given number.
 	
Understanding/ experience of finding the difference by counting on and back.
 	
Know subtraction facts for all numbers up to 20 and derive facts for 100 Include halving of whole numbers 17 + 17 = 34 so, 34 – 17 = 17.
 	
Subtract any single digit number from a multiple of 10 (e.g. 60-5)
 	
Subtract a single digit number from a two digit number including crossing the tens boundary (e.g. 57-3, 52-7)
 	
Solve word problems with subtraction of numbers with up to 2 digits.
 	
Subtract mentally:
A 2 digit number and ones A 2 digit number and tens Two 2 digit numbers
 	
Show that subtraction cannot be done in any order.
	Subtract 2 digit numbers from 2 digit numbers.
	
	Children record with informal jottings. Use moveable objects, visual equipment, drawings and number line/100 square to represent subtraction.
	
	Children record counting back on a number line: 22 – 7 = 15
	
	Children record finding the difference by counting on a number line.
	The difference between 18 and 26 is 8. 26 – 18 = 8
	
	Children begin recording subtraction vertically.
	Take away a two digit number from another two digit number (not exchanging).
	   48 – 25
	
	   40 8
	- 20 5
	   20 3
		Subtraction as taking away
		
		22 people on a bus, 7 people get off. How many left on the bus?
		
		Subtraction as counting back
		
		54p in the purse. Take 10p out, another 10p and so on….
		
		oooooooooooooooooooooooooooooooooooooooo ooooooooooooooooooooooooooo
		Finding the difference by comparing 2 groups
		
		The difference between 18 and 26 is 8. 26 – 18 = 8
		
		Support mental subtraction of 2 digit number and ones using straws, objects, numicon.
		
		48 – 25 = 23 - Use base ten
		
		Use place value counters
			Subtraction
			Take away
			Minus
			Count back
			How many?
			Difference
			Total
			Sharing
			Halving
			Fewer
			Half of…
			How many are left?
			How many fewer than…?
			How can we make them the same?
			How many more is…than…?
			How many less than … is ….?
			What is the difference between?
			
			Resources:
			100 squares, number games, number lines and practical resources to support calculation.

Subtraction: Year 3			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**
Count back in steps of 2, 3, 4, 5, 8, 10, 50 and 100 from any given number. Say what is 10 or 100 less than a given number. Derive number facts to 1000 for subtraction. Solve word problems including missing number problems using number facts, place value and addition/ subtraction. Subtract mentally: A 3 digit number and ones A 3 digit number and tens Two 3 digit numbers	**Use expanded written method for HTU-HTU leading to formal written method by the end of the year.** Use a numberline to partition the smaller number. Use a number line to count up from the smaller number (complementary addition). $783 - 356$ $300 + 83 + 40 + 4 = 427$ $783 - 356 = 427$ Introduce regrouping (decomposition using exchanging). $54-27=27$ $754 - 286 =$ $754-286 =$ 	Finding the difference by counting up on a number line. Support with contexts such as difference in height / length etc. $273 \quad - \quad 225 \quad = \quad 48$ 	Subtract Take away Minus Halve Borrowing Units Tens Hundreds Difference between How much less than...? How much more is...? How many more make? **Resources:** 100 squares, number games, number lines, arrow cards, base 10/dienes Place value counters

Subtraction: Year 4			
Mental	**Written**	**Visual images and models**	**Vocabulary**
Subtract numbers mentally including two 2 digit numbers.

Estimate, calculate and check answers.

Practise mental methods with increasingly large numbers

Count back in steps of 2, 3, 4, 5, 6, 7, 8, 9, 10, 25, 50 and 100 and 1000 from any given number

Solve word problems including missing number problems using number facts, place value and addition/ subtraction. | **Refine and use formal written methods to subtract up to 4 digit whole numbers including £ and p.**

Extend column subtraction to 4 digit numbers, including regrouping and multiple regrouping.

Children record:

$$\begin{array}{r} ^{5}\!\!\!\!6\,^{13}\!4\,^{1}6\,7 \\ -\ 2\ 6\ 8\ 4 \\ \hline 3\ 7\ 8\ 3 \end{array}$$

Extend to decimals. For example: £8.95 - £4.38

Know that decimal points should line up under each other (like buttons on a shirt).

Children record:

$$\begin{array}{r} ^{8}\ ^{1} \\ 8.\,9\,5 \\ 4.\,3\,8 \\ \hline 4.\,5\,7 \end{array}$$ | | Subtract
Take away
Minus
Halve
Borrowing
Units
Tens
Hundreds
Difference between
How much less than...?
How much more is...?
How many more make?

Resources:
Arrow cards
Base ten and place value boards
Place value counters
Money |

Subtraction Year 5			
Mental	**Written**	**Visual images and models**	**Vocabulary**

Count backwards in steps of 100, 1000 and 10,000 for any given number up to 1 million.
 	
Continue to practise fast responses to mental maths questions, for example:
12,462 - 2300
 	
Solve word problems including missing number problems using number facts, place value and addition/ subtraction
	Subtract whole numbers with more than 4 digits including using formal written methods (column subtraction)
	
	Note: some children may be using expanded column subtraction
	
	(pencil icon) Children record: Leading to:
	
	600 1 40 1 6 13 1
	754 = 700 + 50 + 4 7 5 4
	- 286 200 + 80 + 6 2 8 6
	        400 60 8 4 6 8
	
	Subtract numbers with different numbers of digits. For example, find the difference between 671 and 58.
	
	Extend column subtraction to 4 digit numbers.
	(pencil icon) Children record:
	
	5 13 1
	6 4 6 7
	- 2 6 8 4
	  3 7 8 3
		3 1
		4.15
		- 1.42
		=2.73
		
		(base ten place value board images)
		
		Use base 10/Dienes to help children visualise exchanging hundredths for tenths and tenths for units in decimal numbers.
			Decrease
			Exchange
			Expanded method
			Inverse
			Counting up
			Estimate
			
			Resources:
			Arrow cards
			Base ten and place value boards
			Money

Extend to decimals. For example: £8.95 - £4.38

✏️Children record:

```
      8 1
   8. 9 5
   4. 3 8
   4. 5 7
```

Know that decimal points should line up under each other.

Note: in the **fractions** section it says: solve problems involving numbers up to 3 decimal places
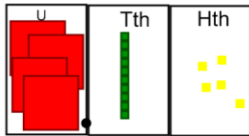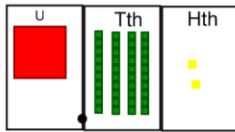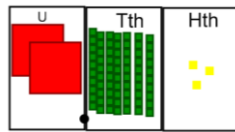
For example :
324.9 - 7.25 and 14.24 - 8.7

✏️Children record:

```
  1   5  1
 1 1. 6 0
   9. 5 8
   2. 0 2
```

Subtract fractions with the same denominator and denominators that are multiples of the same number.

Subtraction: Year 6			
Mental	**Written**	**Visual images and models**	**Vocabulary**
Add and subtract negative numbers. To subtract mixed numbers and fractions. Continue to practise fast responses to mental maths questions, for increasingly large numbers. Solve word problems including missing number problems using number facts, place value and addition/ subtraction.	**Note: there is nothing new for subtraction in Y6 (apart from fractions!) in NC 2014, so consolidate and apply methods from Y5** **Use efficient written methods to subtract integers with 5 and 6 digits and decimals.** 🖊 Children record: 5 13 1 2 6̸ 4̸ 6 7 -1 2 6 8 4 1 3 7 8 3 Using column method, subtract two or more decimal fractions with up to three digits and up to three decimal places. Subtract numbers with different numbers of digits. For example, find the difference between 764 and 5821. Know that decimal points should line up under each other.	3 1 4.15 1.42 2.73 Use base 10/Dienes to help children visualise exchanging hundredths for tenths and tenths for units.	Decrease Exchange Expanded method Inverse Counting up Estimate **Resources:** Arrow cards Base ten and place value boards Money

For example :
324.9 - 7.25 and 14.24 - 8.7

🖊️Children record:

```
    1  5  1
 1̸ 1. 6̸ 0
   9. 5 8
   2. 0 2
```
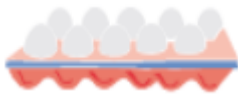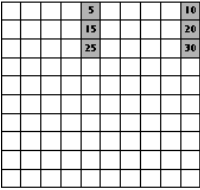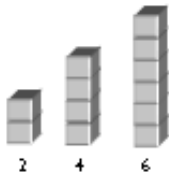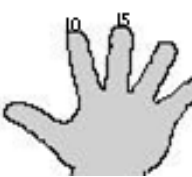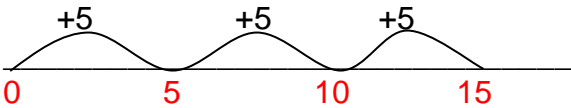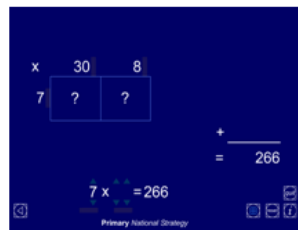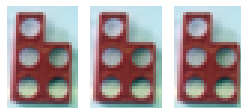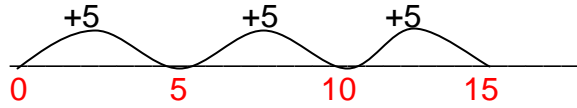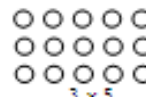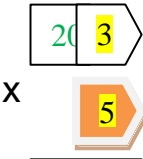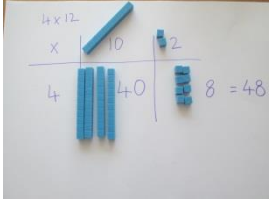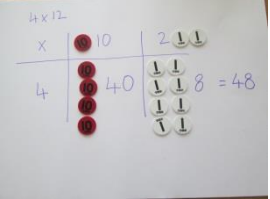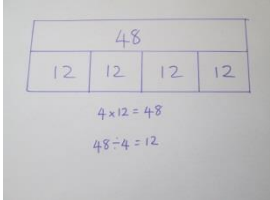
Fractions
Subtract fractions with different denominators
and mixed numbers and mixed numbers
using the concept of equivalent fractions.

Multiplication and Division: Foundation Stage			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**

Doubling
 	
Making pairs
 	
Counting in 2s using numbers up to 20.
 	
Count in 10s up to 100.
 	
Count round the circle of children in twos. Who do you think will say 20?
	Informal jottings
	
	Using marks or pictures to show meaning.
	
		Laying foundations for multiplying by maximising opportunities when counting.
		
		Counting in pairs
		e.g. pairs of children
		       pairs of socks
		       pairs of animals
		       eggs in an egg box
		
		Hop along in twos on a large number track:
		
		Number rhymes such as two, four, six, eight
		Ten fat sausages
		
		 Doubling
		
		Halving
		
		Sharing out objects in groups.
		
			Count, double, pairs, groups.
			
			Resources
			Moveable objects, double decker buses and play people, pairs of socks, shoes, gloves, glasses, egg boxes.

Multiplication: Year 1			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**
Count in 2s, 10s and 5s. Solve one-step problems involving multiplication using concrete objects, pictorial representations and arrays with the support of the teacher	**Begin to explore using x in mathematical statements, calculating the answer with the teacher using concrete objects.** Use 'every day' arrays (egg boxes, page of stamps, milk crates, chocolate bars, chocolate boxes, ice cube trays). Children could record hops on a number line. Use a 100 grid to discuss patterns counting in 2s, 5s and 10s.	$5+5+5+5+5+5=30$ $5 \times 6 = 30$ 5 multiplied by 6 6 groups of 5 6 hops of 5 Money Box "10, 20, 30, 40, 50 ...." Dropping 2 / 5 / 10ps in a box How much money is in the box? How many 2 / 5 / 10ps are in the box? If I added two more 2 / 5 / 10ps what would I have counted to? How many 2 / 5 / 10ps are in the box altogether? Build cube towers by adding two more each time 2 4 6 $5 + 5 + 5 + 5 + 5 + 5 = 30$	Count Double Pairs Groups **Resources** Moveable objects Numicon Hundred grid Number lines Multilink Coins Dienes Counters Washing line Counting stick Bead strings Pegs on hangers Containers Place value arrow cards

Multiplication: Year 2			
Mental	**Written**	**Visual images and models**	**Vocabulary**
Recall multiplication facts for the 2, 5 and 10 multiplication tables (up to x12). Count in steps of 2, 3, 5 and 10 from zero and in 10s from any number. Count in halves and quarters to ten. Calculate mathematical statements for multiplication within the multiplication tables. Recognise and use the inverse relationship to check calculations. Recognise and show that multiplication can be done in any order (commutative). Solve word problems involving multiplication.	**Write and calculate mathematical statements for multiplication within the multiplication tables.** Use x and = signs to read and write mathematical statements. 5 x 2 (pairs of socks) = 10 $5+5+5+5+5+5=30$ $5 \times 6=30$ 5 multiplied by 6 6 groups of 5 6 hops of 5 $10p + 10p + 10p + 10p + 10p = 50p$ $10p \times 5 = 50p$ 5 hops of 10 Draw pictures and arrays. Use knowledge that for whole numbers in exact multiples of • 10 the last digit is 0 • 2 the last digit is 0, 2, 4, 6 or 8 • 5 the last digit is 0 or 5	As an array $3 \times 4 = 12$ $4 \times 3 = 12$ Use fingers to keep tally of the number of multiples counted. Use physical equipment (e.g. beads in pots) Use function machine. Use numicon to represent multiplication as repeated addition - 5 multiplied by 6, or six lots of five, or six times five	Multiply Multiplied by Multiple of Repeated addition Array Double Pairs Lots of Groups of Times **Resources** Moveable objects Numicon Hundred grid Number lines Multilink Coins Dienes Counters Washing line Counting stick Bead strings Pegs on hangers Containers Arrow cards

Multiplication: Year 3			
Mental methods	**Written methods**	**Visual Images and Models**	**Vocabulary**

To learn 4, 6, 8 & 9 times tables.
 	
To consolidate 2, 3, 5, 10, 11 times tables.
 	
Use understanding of place value to multiply whole numbers by 10 or 100.
 	
Understand that with positive whole numbers, multiplying makes a number larger.
 	
Use knowledge that in exact multiples of
• 4 the last two digits are divisible by 4;
• 6 the number is even **and** divisible by 3;
• 8 the last 3 digits are divisible by 8;
• 9 the sum of the digits is divisible by 9
	Use practical and informal methods to multiply.
	
	Horizontal
	
	5 x 3 = 15 on a number line.
	
	+5 +5 +5
	
	0 5 10 15
	
	Grid method
	
	Children record:
	4 x 12 = 48
	
	   10 2
	4
		40	8	= 48
				
				x 30 8
				7 ? ?
				+
				= 266
				7 x = 266
				Primary National Strategy
				Multiplication Grid ITP
				Children should be taught to recognise special case strategies, eg:
				13 x 9
				13 x 11 } multiply by 10 and adjust
				x4 (x2, x2) etc…..
					5 x 3
					5 multiplied by 3
					3 lots of 5
					3 hops of 5
					
					+5 +5 +5
					
					0 5 10 15
					
					Multiplication as an array
					5 x 3
					5 columns of 3
					3 x 5
					3 rows of 5
					
					4 X 1(2) = 4 8
					
					X 10 X 2
					X ********** **
					4 ********** **
					   ********** **
					   ********** **
					
					Place value cards still used to support partitioning, to ensure the process explicit.
					Use scaling to support understanding of proportion.
					
					I'm 3 times as tall as you. I'm 3 metres tall. is
					I'm only 1 metre tall.
						lots of, groups of □, times, multiply, multiplication, multiplied by multiple of, product once, twice, three times… ten times… times as repeated addition array row, column double, halve share, share equally one each, two each, three each… arrow cards
						
						Resources
						Moveable objects
						Numicon
						Hundred grid
						Number lines
						Multilink
						Coins
						Dienes
						Counters
						Washing line
						Counting stick
						Bead strings
						Pegs on hangers
						Containers
						Arrow cards
						Place value sliders
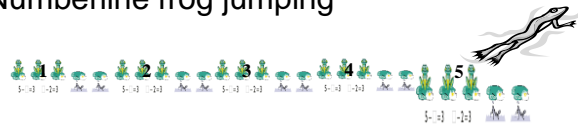
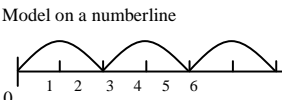| Multiplication: Year 4			
Mental method	**Written method**	**Visual Images and Models**	**Vocabulary**
To learn times tables 7 and 12 and to consolidate times tables up to 12 x 12. Count in multiples of 25, 50, 100 and 1000 from any given number. Respond rapidly to oral or written questions like: *Nine fives.* *3 times 7 times 0.* *4 multiplied by 8… by 0.* *Multiply 9 by 5… by 1.* Use understanding of place value to multiply whole numbers by 10, 100 or 1000 To know that 23 x 8 is approximately 20 x 10 = 200. To recognise and use factor pairs within 144.	**Use written methods to record, support and explain multiplication of 2 and 3 digits x 1 digit** Children record multiplication vertically using partitioning, quickly moving on to short multiplication. $$\begin{array}{r} 23 \\ \times \quad 5 \\ \hline 20 \times 5 \quad 100 \\ 3 \times 5 \quad 15 \\ \hline 115 \end{array} \qquad \begin{array}{r} 23 \\ \times \quad 5 \\ \hline 115 \\ {\scriptstyle 1} \end{array}$$ Short multiplication of TU x U leading to HTU x U. Children record $$\begin{array}{r} 237 \\ \times \quad 5 \\ \hline 1185 \\ {\scriptstyle 1\ 3} \end{array}$$	23 x 5 	lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double, halve, factor **Resources** Numicon Hundred grid Number lines Multilink Coins Dienes/Base 10 Counters Counting stick Bead strings Containers Arrow cards Place value sliders ITPs
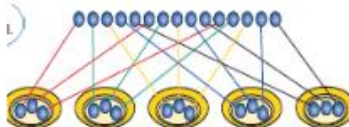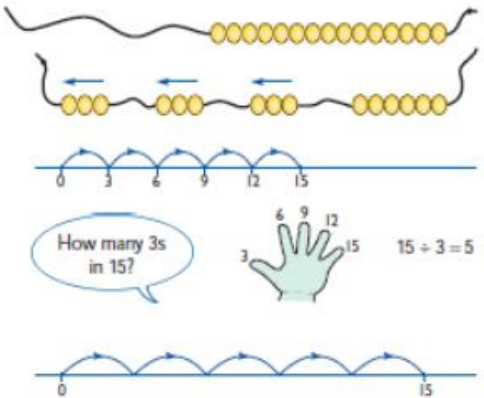
Multiplication: Year 5			
Mental methods	**Written methods**	**Visual images and models**	**Vocabulary**
Use understanding of place value to multiply whole numbers and decimals by 10, 100 or 1000 Respond rapidly to oral or written questions, explaining the strategy used. For example: • Two twelves • Double 32 • 7 times 8… 9 multiplied by 7 • Multiply 31 by 8… by zero… by 1 • Is 81 a multiple of 3? How do you know? • What is the product of 25 and 4? • Find all the different products you can make by using three of these: 6, 7, 8, 9, 11. Know by heart the squares of all numbers from 1×1 to 12×12 and know notation for squares, square root and cubed. Identify prime numbers, know all prime numbers up to 19, prime factors and composite (non-prime) numbers	**Multiply up to 4 digits by 1 or 2 digits.** Revisit the grid method but also introducing column multiplication: Introduce column multiplication by comparing a grid method calculation in order to see how the steps are related. Notice there are less steps involved. **Short multiplication** 24 × 6 becomes 342 × 7 becomes 2741 × 6 becomes Answer: 144 Answer: 2394 Answer: 16 446 **Introduce long multiplication for multiplying by two digits.** Move towards more complex numbers 18 × 3 on the first row (8 x 3 =24, carrying the 2 for 20, then 1 x 3) 18 × 10 on the 2nd row. Show multiplying by 10 by putting zero in units first Children should approximate first	Place value cards still used to support partitioning, to ensure the process is explicit. Also sliders to shift digits left and right. • Work out the 16 times table facts by doubling the 8 times table facts. • Work out: $1 \times 25 = 25$ and so deduce that $2 \times 25 = 50$ $4 \times 25 = 100$ $8 \times 25 = 200$ $16 \times 25 = 400$ … Use combinations of these facts to work out, say, $25 \times 25 = (16 \times 25) + (8 \times 25) + (1 \times 25) = 625$. Three bags of marbles with 4 in each gives a total of 12 marbles. What if there were 40 in each bag? What if there were 30 bags of 4? What other	lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double, halve, share, share equally, factors, prime, square, square root, composite. **Resources** Numicon Hundred grid Number lines Multilink Coins Dienes/Base 10 Counters Counting stick Bead strings Containers Arrow cards Place value sliders ITPs

		multiplication calculations can you work out from 3 x 4 = 12	
Scale up or down by a factor of 2, 5 or 10.	**Long multiplication** 24×16 becomes 2 2 4 × 1 6 2 4 0 1 4 4 3 8 4 Answer: 384 124×26 becomes 1 2 1 2 4 × 2 6 2 4 8 0 7 4 4 3 2 2 4 1 1 Answer: 3224 124×26 becomes 1 2 1 2 4 × 2 6 7 4 4 2 4 8 0 3 2 2 4 1 1 Answer: 3224 Know that brackets determine the order of operations, and that their contents are worked out first. For example: $3 + (6 \times 5) = 33$, whereas $(3 + 6) \times 5 = 45$. **Fractions** Multiply proper fractions and mixed number by whole numbers supported by materials and diagrams (see page 31 for examples)		

Multiplication: Year 6			
Mental	**Written**	**Visual images and models**	**Vocabulary**
Use understanding of place value to multiply whole numbers and decimals by 10, 100 or 1000 giving answers up to 3 decimal places Know by heart the squares of all numbers from 1×1 to 12×12. Derive quickly squares of multiples of 10 to 100, such as 20^2, 80^2. Respond rapidly to oral or written questions, explaining the strategy used. For example: • Two nineteens • Double 75 • 11 times 8… 9 multiplied by 8 • Multiply 25 by 8… by zero… by 1 • Is 210 a multiple of 6? How do you know? • What is the product of 125 and 4? • Find all the different products you can make using two of these: 0.2, 1.4, 0.03, 1.5, 0.5. Identify common factors, common multiples and primes	**Consolidate long and short multiplication** **Multiply 4 digit numbers by a 2 digit whole number.** **Long multiplication** 24×16 becomes — Answer: 384 124×26 becomes — Answer: 3224 124×26 becomes — Answer: 3224 **Short multiplication** 24×6 becomes — Answer: 144 342×7 becomes — Answer: 2394 2741×6 becomes — Answer: 16 446 Multiply a 1 digit number with up to 2 decimal places by whole numbers. $\quad 2\ 3\textbf{.}\ 7\ 5$ $\underline{\text{x}\ \ 3}$ $7^1 1\textbf{.}\,^2 2^1 5$ Understand and use when appropriate the principles of the commutative, associative and distributive laws as they apply	Place value cards still used to support partitioning, to ensure the process is explicit. Work out the 24 times table facts by doubling the 6 times table facts and doubling again. Work out: $1 \times 32 = 32$ and so deduce that $2 \times 32 = 64$ $4 \times 32 = 128$ $8 \times 32 = 256$ $16 \times 32 = 512$ … Use combinations of these facts to work out other multiples of 32. Use knowledge that in exact multiples of: 4 the last two digits are divisible by 4; 6 the number is even **and** divisible by 3; 8 the last 3 digits are divisible by 8; 9 the sum of the digits is divisible by 9.	lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double, halve, factors, prime, square, square root, composite. **Resources** Numicon Hundred grid Number lines Multilink Coins Dienes/Base 10 Counters Counting stick Bead strings Containers Arrow cards Place value sliders ITPs

| **Mental Calculation with decimals**

0.3 x 6 = ?
3 x 6 = 18

0.3 x 6 = 1.8 | to multiplication:

Fractions
Multiply simple pairs of proper fractions writing the answer in it's simple form

   1. Multiply the top numbers (the *numerators*).

   2. Multiply the bottom numbers (the *denominators*).

   3. Simplify the fraction if needed. | $$\frac{1}{2} \times \frac{2}{5} = \frac{1 \times 2}{2 \times 5} = \frac{2}{10}$$

$$\frac{2}{10} = \frac{1}{5}$$ | |

Division: Year 1			
Mental Methods	**Written Methods**	**Visual images and models**	**Vocabulary**
Halve numbers to 20. Know halves of multiples of 10 up to 100. Solve one-step problems using division	**Explore sharing and grouping using practical examples** Draw pictures to record sharing and dividing.	Solve one-step problems involving division using concrete objects, pictorial representations and arrays with the support of the teacher. When counting in 2s, 5s or 10s, using visual and kinaesthetic resources to model the count, ask: **Q:** How many 2s / 5s / 10s have we counted? **Q:** How many more 2s / 5s / 10s do we need to count to reach ….? Match groups of numicon to a given plate. Numberline frog jumping Model how to find find half and quarter of a quantity by sharing into equal groups of 2 and 4	Division Divide Halving Half/Halve Whole Sharing (½, ¼, ¾) Share Grouping Pairs Left over **Resources** 100 squares, number games, number lines along side practical resources to support calculation

Division: Year 2			
Mental Methods	**Written Methods**	**Visual images and models**	**Vocabulary**
Recall and use division facts for the 2, 5 and 10 multiplication tables. Recall the half of all numbers up to 20. Recall the half of all multiples of 10 up to 100. Recognise, find and write fractions 1/3, ¼, 2/4, & ¾ of a quantity. Begin to use knowledge of division as the inverse of multiplication to solve problems ('undoing'). Show that the division of one number by another cannot be done in any order. (unlike multiplication)	Solve problems involving division, using materials, arrays, mental methods and division facts, including problems in contexts**.** **Informal jottings** Use moveable objects, visual equipment and number line/100 square to support understanding of division. **Children understand division as sharing**. I have 8 sweets, if I share them equally between the two of you, how many will you have each? One for you… one for you… A bag of sweets, how many children can have 2 sweets each? Model on a numberline 0 1 2 3 4 5 6 How many groups of 2? **Calculate mathematical statements for division and use the division and equals signs.** Children start to record on a number line. Children record in drawings. $11 \div 2 = 5\, r1$	Use fingers to represent different amounts e.g. 2s, 5s, 10s Share 15 between 5 of you, one for you, one for you… Use number bead strings, number lines, number square, numicon, balance pans. How many 3s in 15? $15 \div 3 = 5$ Model using number lines for grouping. 10 divided in to equal groups of 2 Use grouping ITP	Division Divide Halving Halve Sharing Share Pairs Equal groups Share equally Group Remainder **Resources** 100 squares number games, number lines along side practical resources to support calculation ITP

Division: Year 3			
Mental	**Written**	**Visual Images and Models**	**Vocab**
Estimate, Calculate, Check (ECC)

Use knowledge of division as the inverse of multiplication to solve problems.

    12
 3   4
e.g. use of 'Factor families'

Recall multiplication facts for the 2, 3, 5 and 10 multiplication tables (up to x12).

Estimate, Calculate, Check (ECC) | **Use practical and informal written methods to divide 2 digit numbers e.g. 12 ÷ 3 = 4**

Children consolidate recording using a number line for repeated subtraction.

$12 - 3 - 3 - 3 - 3 =$ $12 ÷ 3 = 4$ ← 12 divided into groups of 3

Understand division is inverse (undoing) of multiplication and vice versa; use this to derive and record related x and ÷ number sentences.

Factor Families/ triangles

12
3 4

Write and calculate statements for division.
Round remainders up or down depending on context.

$11 ÷ 2 = 5 r1$ | 10 divided equally by 2

10 divided in to equal groups of 2

or   First group of 3

Use bead string in parallel with numberline

$15 ÷ 4 = 3 r 3$
Primary National Strategy

Division as sharing

$93 ÷ 3 = 31$

10 for you, 10 for you etc... | lots of, groups of □, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times... ten times...
times as (big, long, wide... and so on), repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each... |

Division: Year 4			
Mental	Written	Visual Images and Models	Vocab
Use understanding of place value to divide whole numbers and decimals by 10, 100 or 1000 Respond quickly to questions like: • *Divide 36 by 4.* • *What is 24 shared between 3?* • *How many fives in 55?* • *Half of 17.* • *One quarter of 3.* Estimate, Calculate, Check (ECC)	**Develop and use written method to record, support and explain division of 2 digit and 3 digit numbers by a 1 digit number including division with remainders e.g. 98 ÷ 5** Use bus stop method $$\begin{array}{r} 113 \\ 3\,\overline{)\,339} \end{array}$$	 $65 \div 7 =$ Primary National Strategy $339 \div 3$ Grouping using partitioning 196 ÷ 6 if I know 3 x 6 … then 30 x 6… 1 9 6 1 8 0 / 1 6 'Chunking up' on a number line 196 ÷ 6 = 32 r 4 Make sensible decisions about rounding up or down after division. For example, 65 ÷ 7 is 9 remainder 2, but whether the answer should be rounded up to 10 or rounded down to 9 depends on the context.	lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each… group in pairs, threes… tens equal groups of, divide, division, divided by, divided into, remainder, factor, quotient, divisible by, inverse.

Division: Year 5			
Mental	Written	Visual images and models	Vocabulary

Divide whole numbers and those involving decimals by 10, 100 and 1000
 	
Estimate, Calculate, Check (ECC)
	Divide numbers up to 4 digits by a 1 digit number using the formal written method of short division, and interpret remainders appropriately for the context
	
	Short division method:
	
	Short division
	98 ÷ 7 becomes 432 ÷ 5 becomes 496 ÷ 11 becomes
	
	   1 4 8 6 r2 4 5 r1
	7 | 9 ^{2} 8 5 | 4 3 ^{3} 2 1 1 | 4 9 ^{5} 6
	
	Answer: 14 Answer: 86 remainder 2 Answer: $45\frac{1}{11}$
	
	Long division ThHTU ÷ TU
	(*Divide, Multiply, Subtract, Bring down*)
	
	NC2014 does state: use written division methods in cases where the answer has up to 2 decimal places
	
	Taken from 2014 N.C. Maths Appendix 1:
	
	Long division
	432 ÷ 15 becomes 432 ÷ 15 becomes 432 ÷ 15 becomes
	
	    2 8 r12 2 8 2 8 · 8
	1 5 | 4 3 2 1 5 | 4 3 2 1 5 | 4 3 2 · 0
	    3 0 0 3 0 0 15×20 3 0 ↓
	    1 3 2 1 3 2 1 3 2
	    1 2 0 1 2 0 15×8 1 2 0 ↓
	      1 2 1 2 1 2 0
	                $\frac{12}{15}$ = $\frac{4}{5}$ 1 2 0
	                               0
	
	Answer: 28 remainder 12 Answer: $28\frac{4}{5}$ Answer: 28·8
		Convert fractions to decimals.
		Explore patterns in converting sequences of fractions to decimals using a calculator e.g. add 1 to numerator and denominator
		
		$\frac{3}{4}$ = 0.75 $\frac{7}{2}$ = 3.5
		$\frac{4}{5}$ = 0.8 $\frac{8}{3}$ = 2.666
		$\frac{5}{6}$ = 0.8333 $\frac{9}{4}$ = 2.25
		
		gets larger gets smaller
		
		Interpreting remainders as fractions:
		e.g. 16 ÷ 5 = 3 1/5
		
		  -5 -5 -5 -1/5
		
		16 11 6 1 0
			lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double, halve, share, share equally.

Short division with decimal remainders

$$1\ 8\ 6.\textcolor{red}{2}$$

$$5\ \overline{\big)\ 9\ {}^{4}3\ {}^{3}1.\ {}^{1}0}$$

Non-statutory: Interpret remainders in different ways including as fractions, decimals or by rounding. (for example, 98 ÷ 4 = 4 98 = 24 r 2 = 24 2 1 = 24.5 ≈ 25).

BUT ensure children have a secure understanding of what they are doing and are able to use their knowledge of related facts to either make a rough estimate first or have an idea about whether their final answer is reasonable or not.

Division: Year 6			
Mental	Written	Visual images and models	Vocabulary
Divide numbers by 10, 100 and 1000 giving answers up to 3 decimal places. Estimate, Calculate, Check (ECC)	**Short division: Divide 4 digit numbers by a 2 digit number using the formal written method of short division interpreting remainders according to context** **Use compact efficient methods to divide integers and decimals by 1 digit integer.** Children record: $87.5 \div 7$ $\quad\quad 1\ 2\ .\ 5$ $7\ )\ 8\ ^17\ .^35$ $87.43 \div 7$ $\quad\quad 1\ 2\ .\ 4\ 9$ $7\ )\ 8^17.^34^63$ **Long division: Divide 4 digit numbers by a 2 digit number using the formal written method of short division interpreting remainders according to context (whole numbers, fractions or by rounding)**	Use division to convert simple fractions into decimals (½, ¼) ½ = ? $10 \div 2 = 5$ $1 \div 2 = 0.5$ Multiply by ½ or ¼ (divide by 2 or 4) – dividing by 2 is the same as halving $½ \text{ of } 18 = 18 \div 2 = \dfrac{\overset{18}{}}{2}$ Taken from 2014 N.C. Maths Appendix 1: **Short division** $98 \div 7$ becomes $\quad\ 1\ \ 4$ $\quad\ \ \ ^2$ $7\ |\ 9\ \ 8$ Answer: 14 $432 \div 5$ becomes $\quad\quad 8\ \ 6\ r2$ $\quad\quad\ \ ^3$ $5\ |\ 4\ \ 3\ \ 2$ Answer: 86 remainder 2 $496 \div 11$ becomes $\quad\quad\ 4\ \ 5\ r1$ $\quad\quad\quad\ ^5$ $1\ 1\ |\ 4\ \ 9\ \ 6$ Answer: $45\frac{1}{11}$ $\quad 1\ \ 8\ \ 6. 2$ $5\ |\ 9\ ^43\ ^31.\ ^10$ *Short division with decimal remainder.*	lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double, halve.

Long division ThHTU ÷ TU (*Divide, Multiply, Subtract, Bring down*)

NC2014 does state: use written division methods in cases where the answer has up to 2 decimal places

(Taken from 2014 N.C. Maths Appendix 1)

Long division

432 ÷ 15 becomes

```
        2  8  r 12
1  5 | 4  3  2
        3  0  0
        1  3  2
        1  2  0
           1  2
```

Answer: 28 remainder 12

432 ÷ 15 becomes

```
        2  8
1  5 | 4  3  2
        3  0  0   15×20
        1  3  2
        1  2  0   15×8
           1  2
```

$\frac{12}{15} = \frac{4}{5}$

Answer: 28 $\frac{4}{5}$

432 ÷ 15 becomes

```
        2  8 · 8
1  5 | 4  3  2 · 0
        3  0  ↓
        1  3  2
        1  2  0
           1  2  0
           1  2  0
              0
```

Answer: 28·8

Fractions

Divide proper fractions by whole numbers.
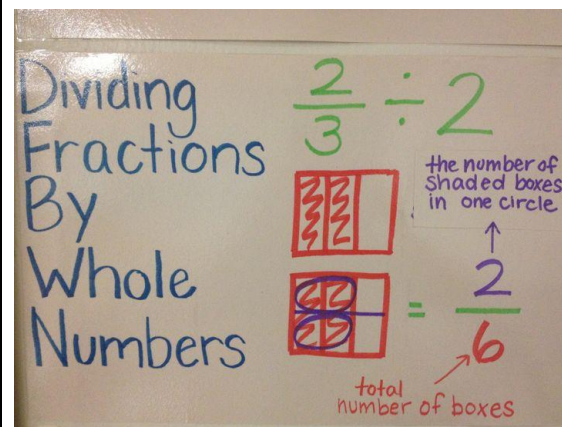
Chn should understand what division of fractions respresents as illustrated above before moving onto written methods. See below:

Example:

$$\frac{1}{2} \div 3 = \frac{1}{2} \div \frac{3}{1}$$

$$\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$

Associate a fraction with division and calculate decimal fraction equivalents eg three quarters = 0.75

Teach pupils to write a 'useful list' first at the side that will help them decide what chunks to use.

Children should **estimate** answers first.

$$
\begin{array}{r}
0.75 \\
4\overline{)3.00} \\
-28 \\
\hline
20 \\
-20 \\
\hline
0
\end{array}
$$