This policy was produced between a working party of Maths Subject Leaders within the Thrive group of schools in June 2019.
It is a working document and will be revised and amended as necessary.
Some images have been copied from NCETM materials.

The objective for Early Years is to ensure that all children develop firm mathematical foundations in a way that is engaging, and appropriate for their age. Calculation guidance for the EYFS to be developed with Thrive Maths leads and Early Years practitioners.

Mathematics: Number

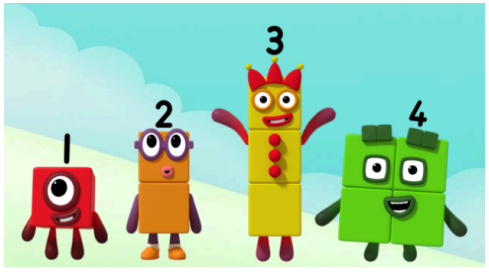
Key Vocabulary: ‘one’, ‘two’, ‘three’, ‘lots’, ‘fewer’, ‘hundreds’, ‘how many?’ and ‘count’ in a variety of situations.

Foundation Stage 1
Before calculations can be introduced, children need to have a secure knowledge of number. In FS1, children are introduced to the concept of counting, number order and number recognition through practical activities and games. This is taught through child initiated games such as hide and seek and I spy. Children also learn how to count 1-1 (pointing to each object as they count) and that anything can be counted, for example, claps, steps and jumps. This is reinforced by opportunities provided in the outdoor area for the children to count e.g. counting building blocks, twigs etc. This is heavily supported by Master the Curriculum

Mathematics: Number

Key Vocabulary: ‘more’, ‘less’, ‘equals’, ‘lots’, ‘add’, ‘subtract’, ‘how many?’ and ‘count’ in a variety of situations.

Foundation Stage 2
Before calculations can be introduced, children in FS2 need to build on concepts taught in FS1 by working through the number objectives in the 40 – 60 month band of Development Matters. **Using explicit mathematical language**, it is important that practitioners model precise and correct mathematical language. There are suggestions of key sentences in the Number Blocks NCETM materials to use and have repeated by the children; they provide a language structure to connect each mathematical idea to different contexts. The Number Blocks sequence of lessons are available for guidance, along with practitioner notes, helping children to bring the numbers and ideas to life in the world around them. It is vital to ensure that children have a secure understanding of the ‘oneness of one’ etc, for numbers within 10 before moving on to simple calculations; one more/one less and addition and subtraction of single digit numbers, not crossing 10.



EYFS Maths objectives and Early learning Goals

Maths objectives derived from Development matters:

Number:
Count objects, actions and sounds.
• Link the number symbol (numeral) with its cardinal number value
• Count beyond ten.
• Compare numbers
• Understand the 'one more than/one less than' relationship between consecutive numbers
• Understand the 'one more than/one less than' relationship between consecutive numbers
• Explore the composition of numbers to 10 • Automatically recall number bonds for numbers 0–5 and some to 10
• Verbally count beyond 20, recognising the pattern of the counting system
• Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
• Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally
• Have a deep understanding of number to 10, including the composition of each number • Subitise (recognise quantities without counting) up to 5
• Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Shape:
•Select, rotate and manipulate shapes to develop spatial reasoning skills
• Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can
• Continue, copy and create repeating patterns

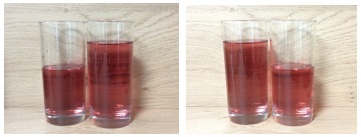
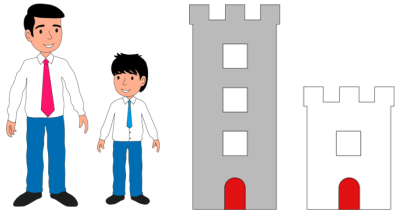
Number ELG
Children at the expected level of development will:
• Have a deep understanding of number to 10, including the composition of each number
• Subitise (recognise quantities without counting) up to 5/
• Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

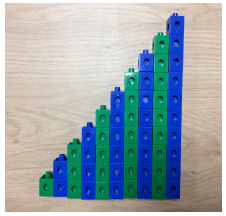
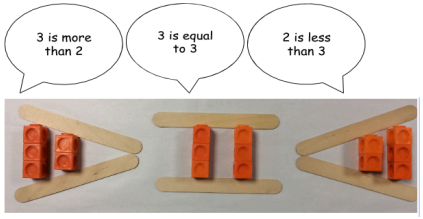
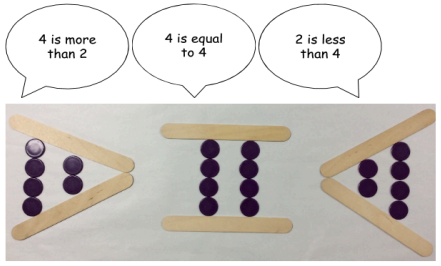
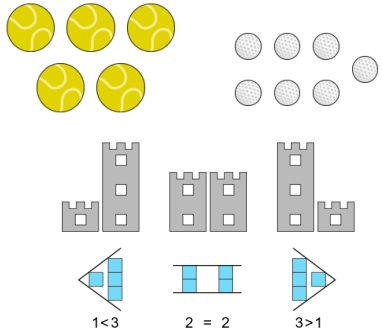
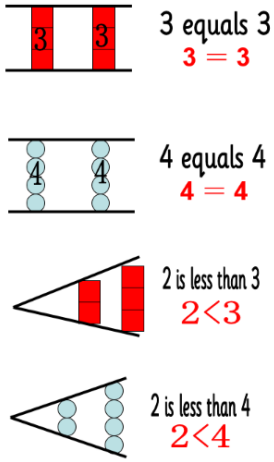
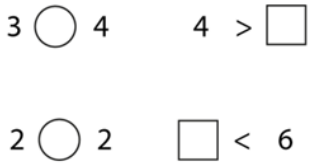
Numerical Patterns ELG
Children at the expected level of development will:
• Verbally count beyond 20, recognising the pattern of the counting system
• Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
• Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally

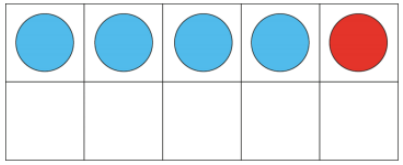
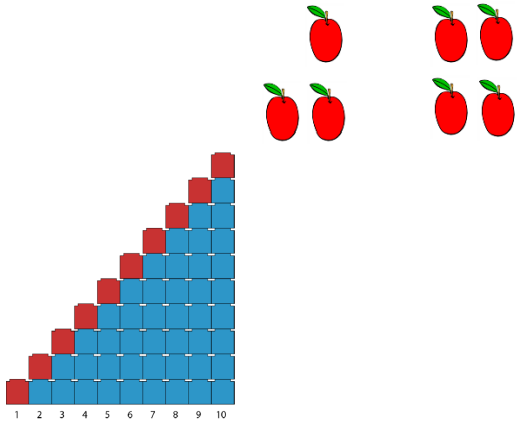
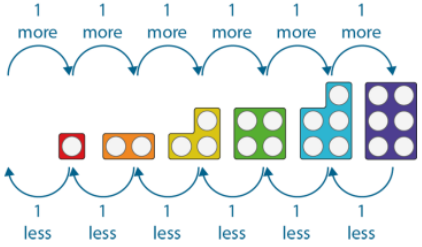
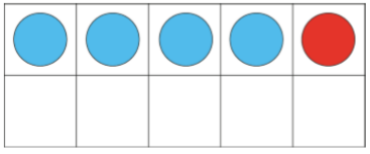
Addition

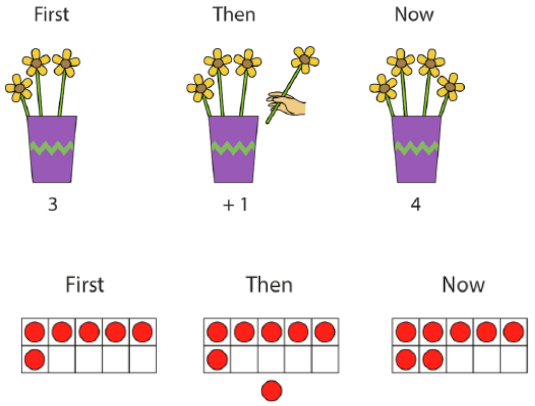
Key Vocabulary: sum, total, parts and wholes, plus, add, altogether, more, ‘is equal to’, ‘is the same as’, addend

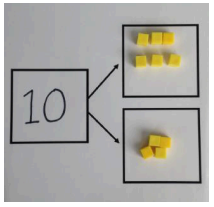
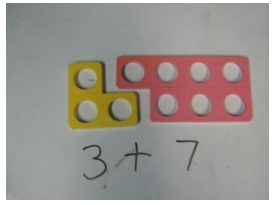
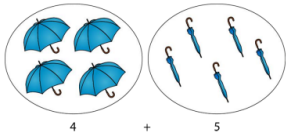
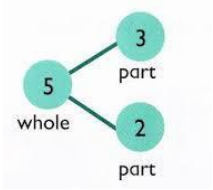
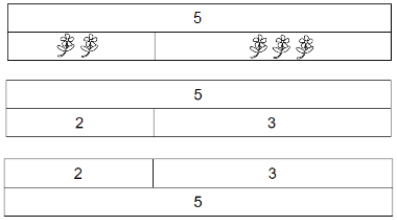
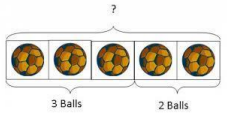
Year 1

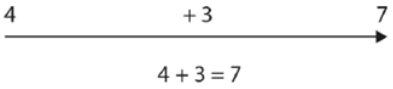
Objective and Strategies	Concrete	Pictorial	Abstract
Comparing objects, groups of objects **(Length, weight, mass, heavier, lighter, same, equal)**	People's height, distance, mass. Comparing multiple objects. Use of concrete materials e.g. compare bears, jewels, cubes etc. to create groups of different sizes to compare   Use of pan balances using Numicon to show equivalence, more than and less than. 	Present the children with a range of pictorial representations.  	

Using < > and = **Fewer, more, less than, more than, equal to, fewer than**	Children to use concrete apparatus to explore, i.e. multilink, lollypop sticks.    	Present the children with a range of pictorial represenations.   	Now remove the pictorial contexts and present the children with just expressions to be completed. 

Finding one more, finding one less	Children to use Numicon, multilink, counters and tens frames etc. to explore.  Multilink staircase in 2 different colours to highlight each number is one more than the previous number.  	Children to use a range of pictorial representations to explore further. These could be given to the children or drawn by the children to support their thinking.  Counters and tens frames:  • *'Four is one less than five.'* • *'Five is one more than four.'* Base-ten number boards:  • *'Two is one less than three.'* • *'Three is one more than two.'*	Now remove the pictorial contexts and present the children with different expressions to complete, i.e. one more/one less sentences. 1 more than 3 is ☐ 1 less than 2 is ☐ 1 more than ☐ is 1 1 less than ☐ is 1

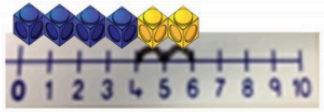
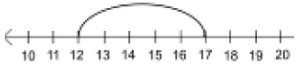
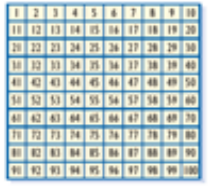
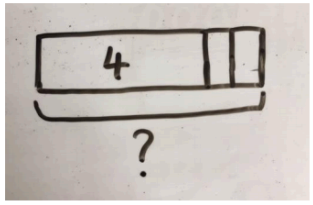
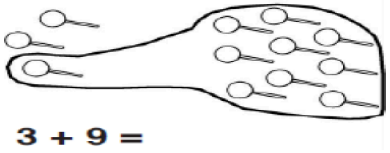
Adding 1 gives 1 more (This is out of sequence with the PD Materials [1.7] so this may need to come later in the teaching sequence. After augmentation [1.6].) Linked to above step. Children to formalise this as an addition of one.	Children to use real life objects, tens frames etc. to explore.  	Use pictorial representations. Children to use these to tell the story of adding 1. 	Present adding 1 in a variety of ways, i.e. missing numbers. 3 + 1 = 4 so: 1 + 3 = ☐ *'Fill in the missing numbers.'* 9 + 1 = ☐ 1 + 9 = ☐ 8 + 1 = ☐ 1 + 8 = ☐ 7 + 1 = ☐ 1 + 7 = ☐ 6 + 1 = ☐ 1 + 6 = ☐ 5 + 1 = ☐ 1 + 5 = ☐ 4 + 1 = ☐ 1 + 4 = ☐ 3 + 1 = ☐ 1 + 3 = ☐ 2 + 1 = ☐ 1 + 2 = ☐ 1 + 1 = ☐ 1 + 1 = ☐ 0 + 1 = ☐ 1 + 0 = ☐

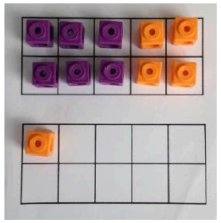
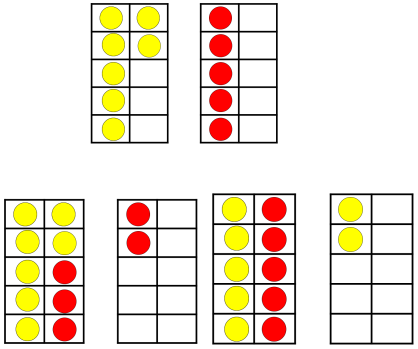
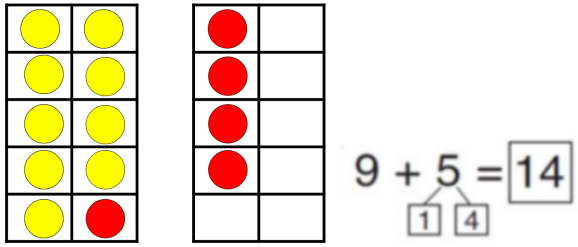
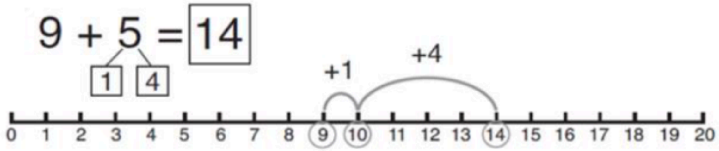
Aggregation - Combining two parts to make a whole: part-whole model See NCETM PD Materials 1.5	Children to use cubes and numicon to explore. Present in groups, bars and part whole models.      Use other resources too e.g. eggs, shells, teddy bears, cars.	Use a range of pictorial representations. Ensure some are clearly grouped and then move on to images which are not clearly grouped.   Continue to use part whole models to represent.    	4 + 3 = 7 Addend + Addend = Sum 10 = 6 + 4 

Augmentation—increasing an amount (Children develop an understanding of the concept of addition. The calculation is alongside but the focus is on the story and the structures rather than the solutions should remain the focus throughout.) See NCETM PD Materials 1.6	Use FIRST, THEN, NOW and range of practical situations for showing augmentation. E.g. First there were 4 children on the carpet, then 3 more came. Now there are 7 children on the carpet. (Children could act out this story)   4 + 3 = 7

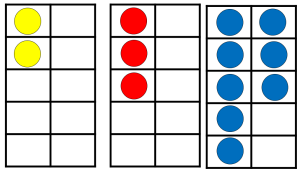
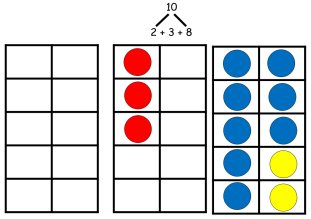
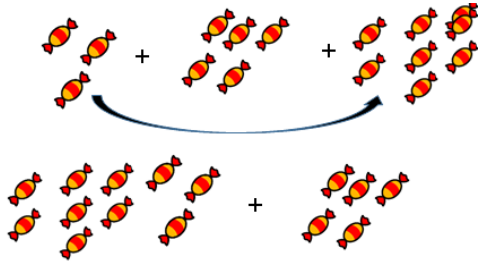
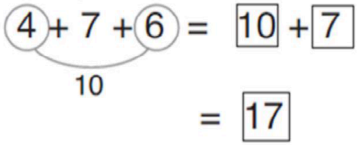
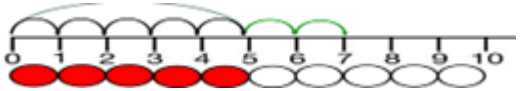
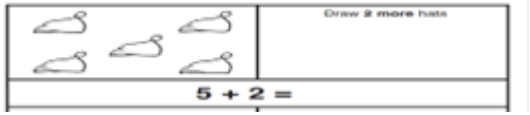
4 +3

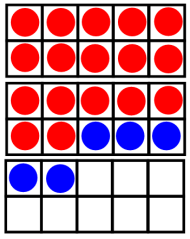
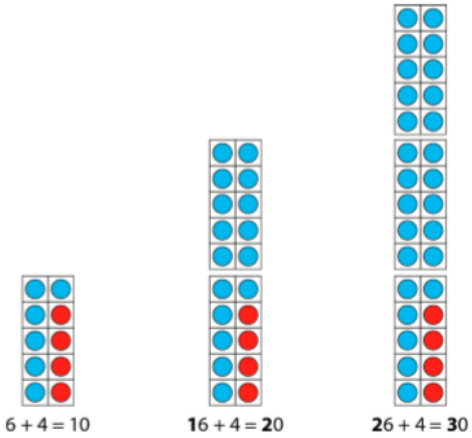
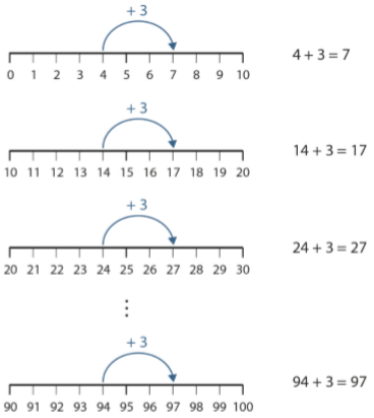
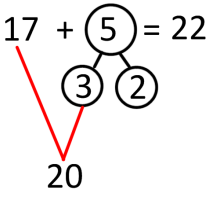
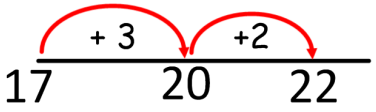
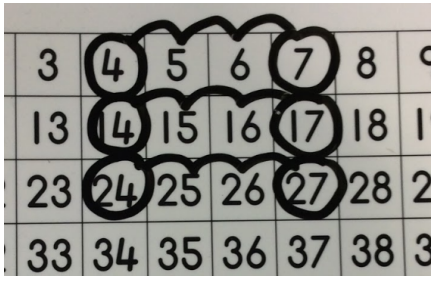
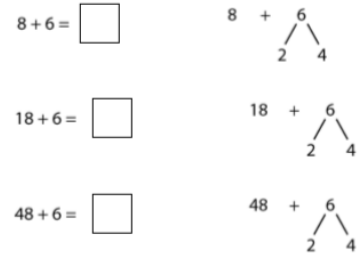
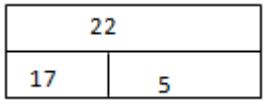
4 + 3 = 7

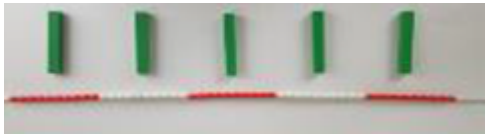
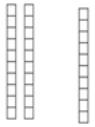
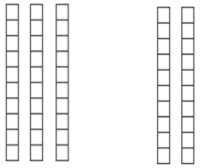
Starting at the larger number and counting on (augmentation)	Start with the larger number on the bead string and then count on the smaller number 1 by 1 to find the answer.  Use cubes and Numicon too. 	Starting at the larger number on a number line or hundred square and count on in ones or one jump to find the answer. 12+ 5 =   Bar models could be used to encourage the children to count on, rather than count all. 	5 + 12 = 17 *'Place the largest number in your head and count on the smaller number to find your answer.'* What is 5 more than 12? What is the sum of 12 and 5? What is the total of 5 and 12?
Regrouping to make 10. ***Ensure that ten frames have been used previously to explore and represent number bonds to 10** *This is an essential skill for column addition later.*	 9 + 3 = 12 6 + 5 = 11	 Use pictures or a number line. Regroup or partition the smaller number to make 10.	7 + 4 = 11 *'If I am at seven, how many more do I need to make 10? How many more do I add on now?'* Children to develop an understanding of equality e.g. 6 + □ = 11 6 + 5 = 5 + □ 6 + 5 = □ + 4

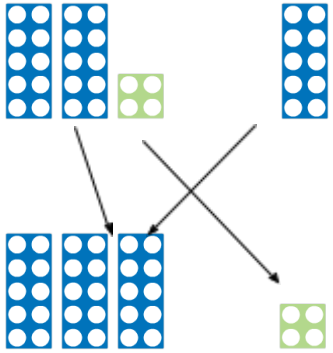
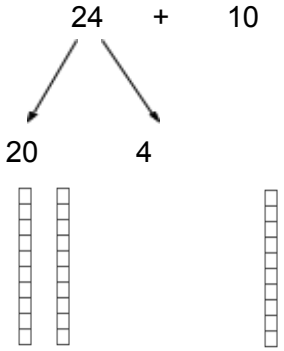
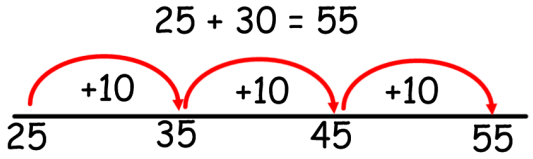
	Start with the larger number and use the smaller number to make 10.  7 + 5 = 12 	 Children to draw counters/cubes on a tens frame. This can then be demonstrated on a number line.  	

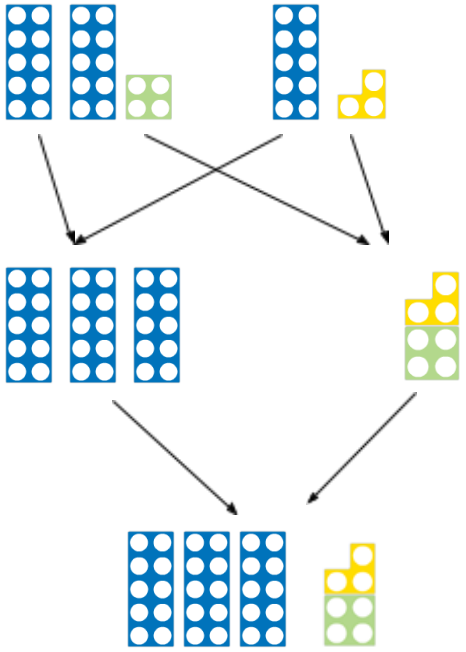
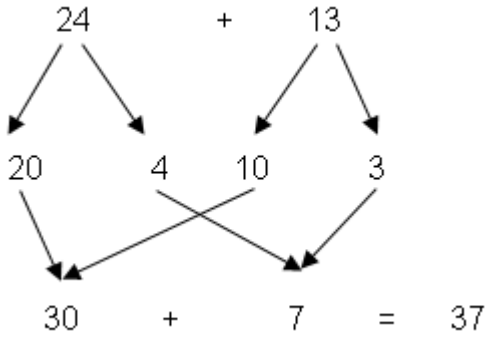
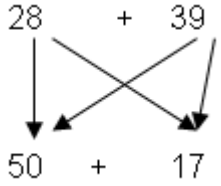
Year 2

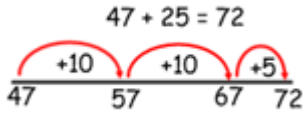
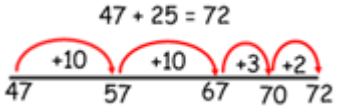
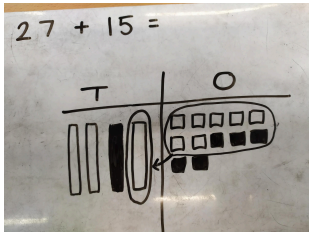
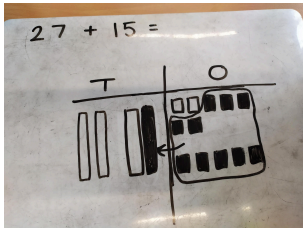
Adding three single digits **N.B. Making 10 should be the main strategy.**	2 + 3 + 8= 13 Put 8 and 2 together to make 10. Add on 3.  	Add together three groups of objects. Draw a picture to recombine the groups to make 10.  Children could also draw counters on tens frame to represent the problem.	 Combine the two numbers that make 10 and then add on the remainder.
Represent & use number bonds and related subtraction facts within 20	 2 more than 5	 	Emphasis should be on the language *'1 more than 5 is equal to 6.'* *'2 more than 5 is 7.'* *'8 is 3 more than 5.'*

Adding a 2 digit and single digit number	Children to use previous strategies, i.e. regrouping to make 10 and known facts. Children to explore with tens frames, counters and numicon tiles (see above).  Children explore the pattern. 17 + 5 = 22 27 + 5 = 32 Filling tens frames:  	Emphasise using known facts from previous learning to make links and spot patterns. Use part part whole and number line to model.     	 17 + 5 = 22  Explore related facts 17 + 5 = 22 22 = 17 + 5 5 + 17 = 22 22 = 5 + 17 22—17 = 5 17 = 22 - 5 22—5 = 17 5 = 22 - 17 4 + 3 = 7 14 +3 = 17 24 + 3 = 27

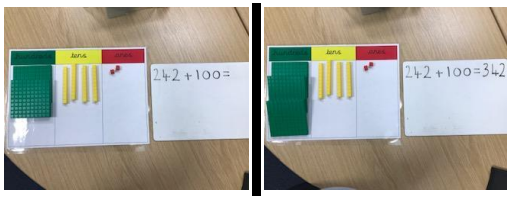
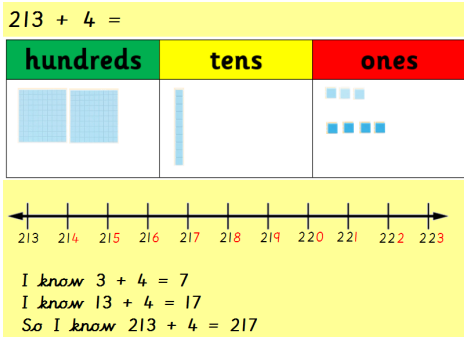
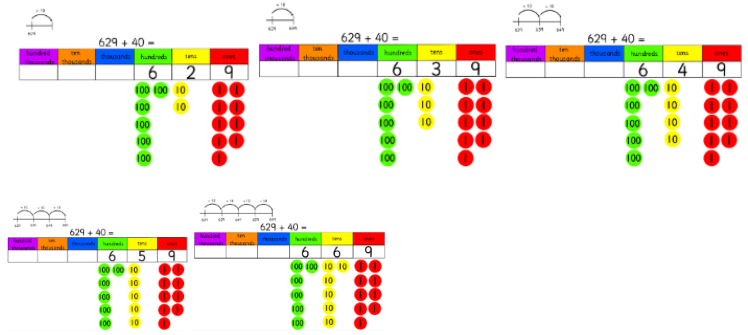
Adding multiples of 10	Numicon, base ten and bead strings used to explore.  *Remember to link this to known facts from previous learning, i.e. 2 + 1 = 3 If I know 2 + 1 = 3, I know 2 tens and 1 ten make 3 tens 2 things and 1 thing is always 3 things. 3 + 2 = 5 3 tens and 2 tens are 5 tens 30 + 20 = 50 	Represent pictorially with images of base ten. Children to be encouraged to draw own representations of the problem. 20 + 10  __ tens and ___ tens makes __ tens 	20 + 10 = 30 20 + 30 = 50 70 = 50 + 20 40 + □ = 60 □ + 30 = 50

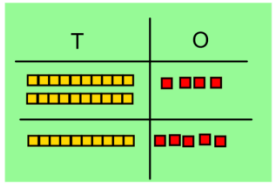
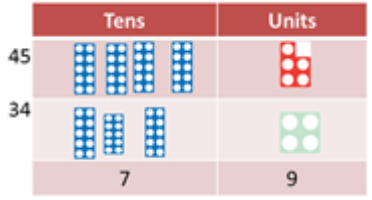
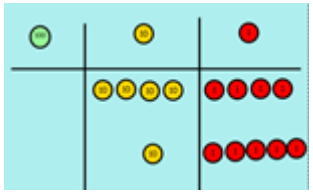
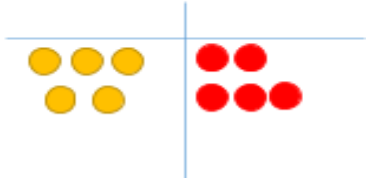
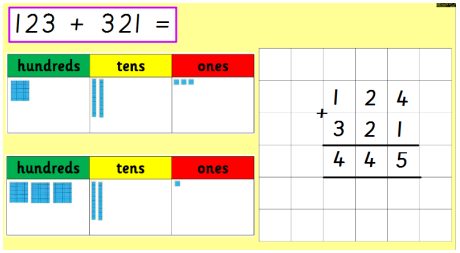
Adding a 2 digit and multiple of 10	Numicon and base ten used to explore. 24 + 10 =  25 + 10 =  Explore that the ones digit does not change.	24 + 10 =  20 + 10 = 30 30 + 4 = 34  	24 + 10 = 20 + 10 + 4 = 34 27 + 10 = 37 27 + 20 = 47 27 + □ = 57 □ + 30 = 67

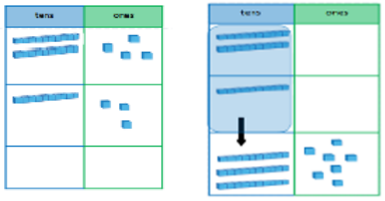
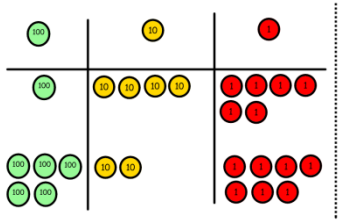
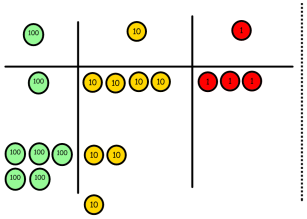
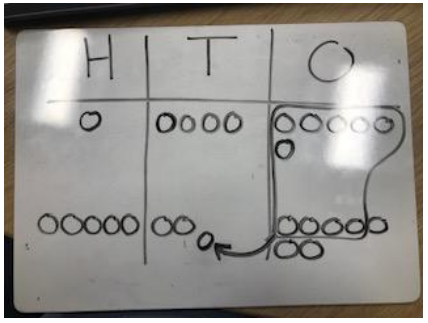
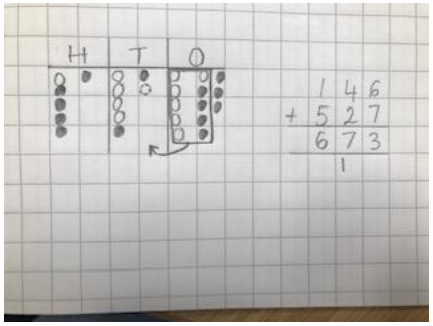
Partitioning and recombining to add two two-digit numbers. (Begin with examples where the ones do not cross the boundary)	24 + 13 = 37 	24 + 13 =  28 + 39 =  This could then be broken down to add multiples of 10 first and then the ones. *50 + 10 + 7 = 67* 50 + 17 = 67 Use jotting alongside apparatus e.g. Numicon, base 10	24 = 20 + 4 13 = 10 + 3 30 + 7 = 37 Ongoing dialogue which is not necessary to record. 

	25 + 47 =  Also show combining the tens and ones and exchanging 10 ones for 1 ten and regrouping the ten.	Explore only partitioning one of the addends. Use part part whole to bridge 10 if necessary.   Also show combining the tens and ones and exchanging 10 ones for 1 ten and regrouping the ten.  	

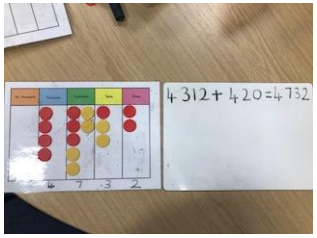
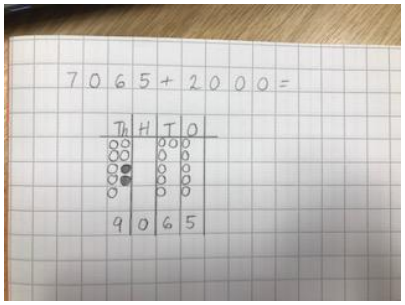
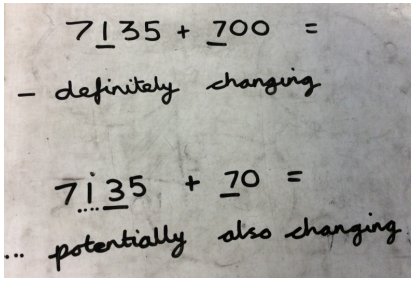
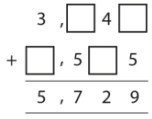
Year 3

Mental addition of 3 digit numbers and multiples of 1, 10 and 100	Use Base 10 and place value charts to represent the additions. 242 + 100 = 	Use place value charts, base ten, counters and number lines to represent problems pictorially.  629 + 40 = 	213 + 4 = 217 40 + 213 = 253 215 + ___ = 265 ___ + 300 = 515

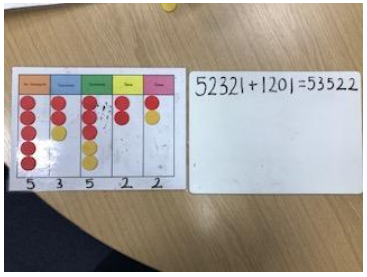
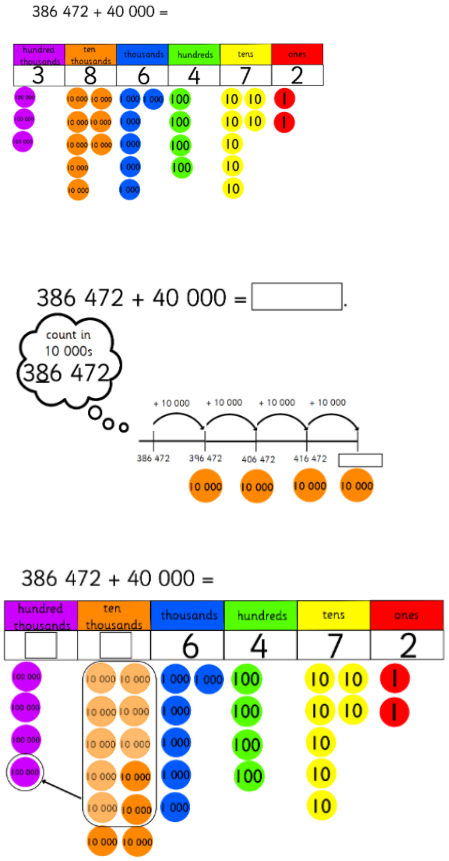
		Children to be encouraged to use own jottings to work out the answer.	
Column method - no regrouping ***Non-statutory Y2 - Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.***	24 + 15= Add together the ones first then add the tens. Use the Base ten blocks first before moving onto place value counters.    44 15	After practically using the base 10 blocks and place value counters, children can draw the counters or Base ten e.g. lines of tens and dots or crosses for ones. T O  21 + 34 = 55 Ensure that different representations and layouts are used alongside column method, i.e. part part whole models.  	Calculations: 21 + 34 = 2 1 + 3 4 = 21 + 34 Calculate the sum of twenty-one and thirty-four. 2 2 3 + 1 1 4 3 3 7 In year 3, there are 21 children and in year 4, there are 34 children. How many children are there in total?

			
Column method - regrouping	Make both numbers on a place value grid.  146 + 527 *Add up the ones and exchange 10 ones for one 10.*  146 + 527 Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added. This can also be done with Base ten to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.	Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding. 146 + 527 =  	536 + 85 621 1 1 263 + 257 520 1 1

Year 4

Mental addition – build upon year 3 mental addition but with increasingly larger numbers	Use Base 10 and place value charts to represent the additions. 4312 + 420 = 	Children to use own jottings to support, i.e. place value charts with counters. 7065 + 2000 = 	4312 + 420 = 7065 + 2000 = ____ + 3000 = 5286 
Column Addition	Children to use Base ten, place value charts and counters (see Year 3)	Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding (see Year 3).	

Year 5

Add and subtract numbers mentally with increasingly large numbers	Use Base 10 and place value charts to represent the additions. 52321 + 1201 = 	After practically using Base ten blocks and place value counters, represent pictorially and encourage the children to draw their own representations. 	

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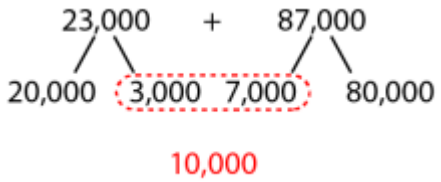
<td> 
</td>
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</tr>
<tr>
<td>Column Addition</td>
<td>Children to use Base ten, place value charts and counters (see Year 3)</td>
<td>Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding (see Year 3).

<table>
<tr><th colspan="3">Thousands</th><th colspan="3">Ones</th></tr>
<tr><th>100s</th><th>10s</th><th>1s</th><th>100s</th><th>10s</th><th>1s</th></tr>
<tr><td>3</td><td>6</td><td>5</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>+ 2</td><td>1</td><td>4</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>5</td><td>7</td><td>9</td><td>0</td><td>0</td><td>0</td></tr>
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<table>
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<tr><td>168,000</td><td>?</td></tr>
</table>
</td>
<td>Without place-value headings
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+ 2 1 4, 0 0 0
5 7 9, 0 0 0</td>
</tr>
</table>

Year 6

<table>
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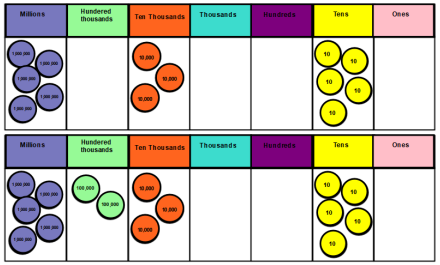
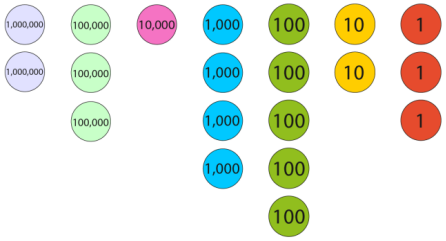
<td>Add and subtract numbers mentally with increasingly large numbers</td>
<td>
5 030 050 + 200 000 =


'What is 2,314,523 + 30,000?'


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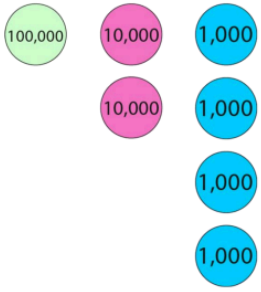
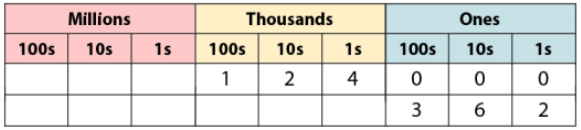
<td>
'What is 124,000 + 362?'




</td>
<td>
3 550 020 = 3 000 000 + ___ + 20

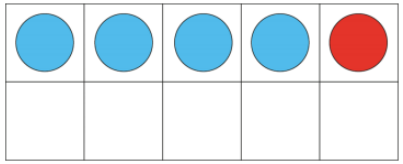
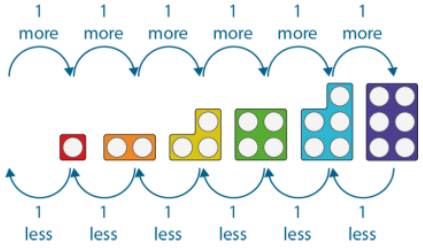
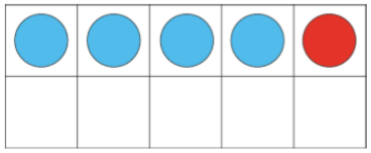
3,514,203 + 4,000,000 = ☐
3,514,203 + 400,000 = ☐
3,514,203 + 40,000 = ☐
3,514,203 + 4,000 = ☐

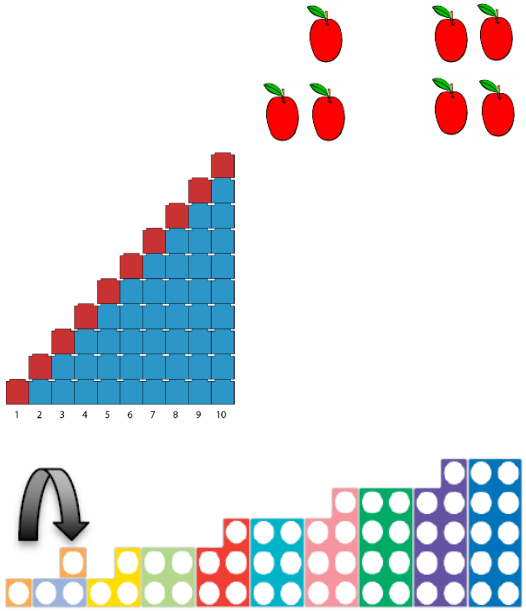
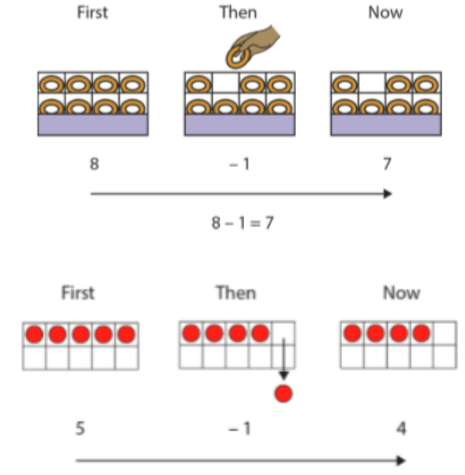
630,421 + 130,000 = ☐
630,421 + 136,000 = ☐
630,421 + 136,200 = ☐
630,421 + 136,205 = ☐
</td>
</tr>
<tr>
<td>Column Addition</td>
<td>Children to use Base ten, place value charts and counters (see Year 3)</td>
<td>Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding (see Year 3).</td>
<td></td>
</tr>
</table>

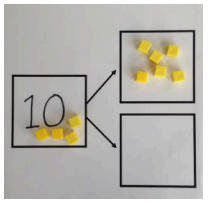
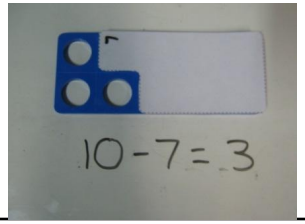
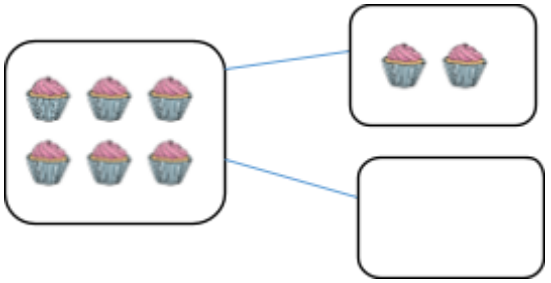
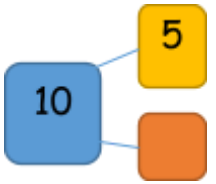
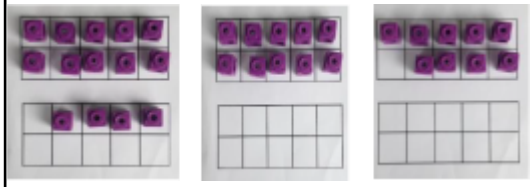
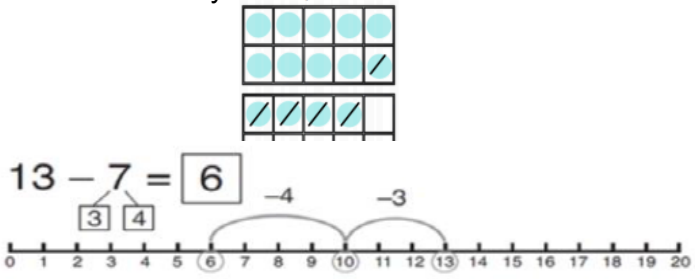
Subtraction

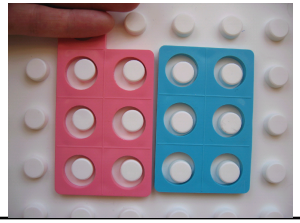
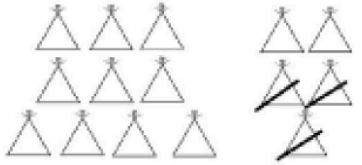
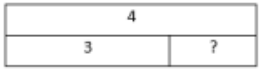
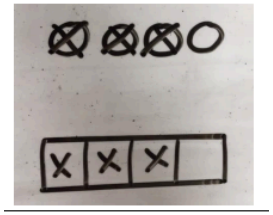
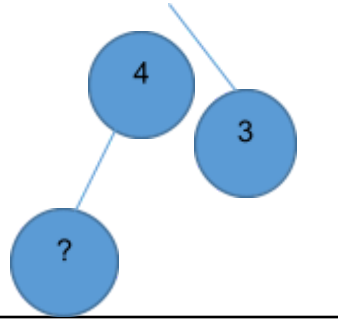
Key Vocabulary: take away, less than, the difference, subtract, minus, fewer, decrease, subtrahend, minuend, wholes and parts

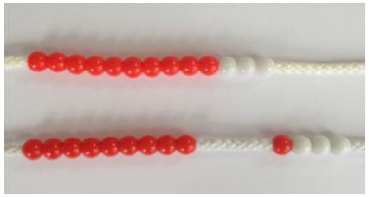
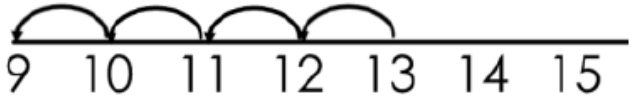
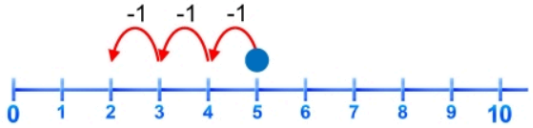
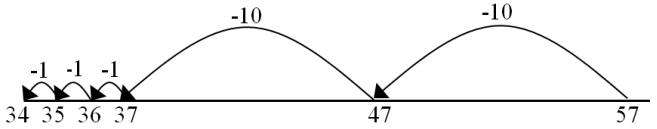
Year 1

Objective and Strategies	Concrete	Pictorial	Abstract
Finding one more, finding one less *NB: this is the same as in addition section above it is just here as a reminder.*	Children to use Numicon, multilink, counters and tens frames etc. to explore.  Multilink staircase in 2 different colours to highlight each number is one more than the previous number.	Children to use a range of pictorial representations to explore further. These could be given to the children or drawn by the children to support their thinking.  Counters and tens frames:  • *'Four is one less than five.'* • *'Five is one more than four.'* Base-ten number boards:  • *'Two is one less than three.'* • *'Three is one more than two.'*	Now remove the pictorial contexts and present the children with different expressions to complete, i.e. one more/one less sentences. 1 more than 3 is ☐ 1 less than 2 is ☐ 1 more than ☐ is 1 1 less than ☐ is 1

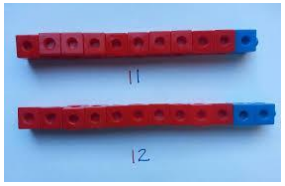
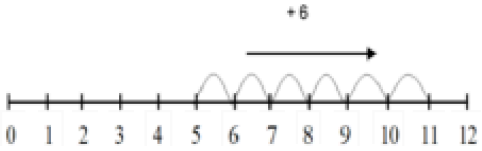
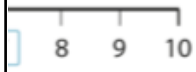
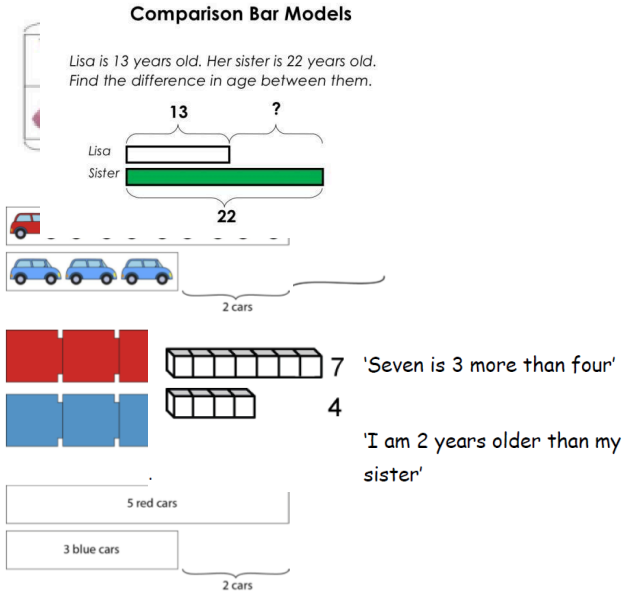
			
Subtracting 1 gives 1 less Linked to above step. Children to formalise this as a subtraction of one. (This is out of sequence with the PD Materials [1.7] so this may need to come later in the teaching sequence. After reduction [1.6].)	Children to use real life objects, tens frames etc. to explore.  	Use pictorial representations. Children to use these to tell the story of subtracting 1. 	Present subtracting 1 in a variety of ways, i.e. missing numbers. *'Fill in the missing numbers.'* 10 – 1 = ☐ 5 – 1 = ☐ 9 – 1 = ☐ 4 – 1 = ☐ 8 – 1 = ☐ 3 – 1 = ☐ 7 – 1 = ☐ 2 – 1 = ☐ 6 – 1 = ☐ 1 – 1 = ☐ 9-?=8

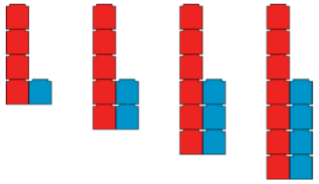
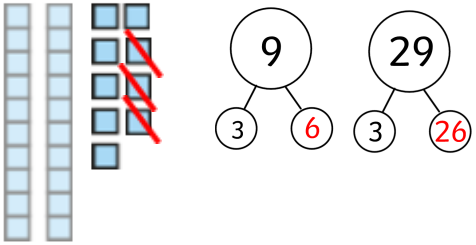
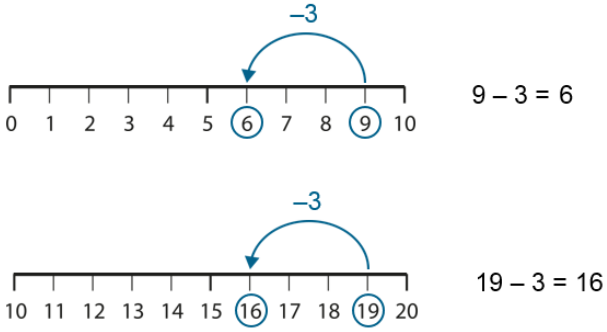
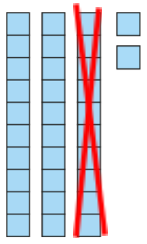
Part-Part Whole Model Represent and use addition and related subtraction facts within 20 See NCETM PD Materials 1.5	 Link to addition - use the part whole model to help explain the inverse between addition and subtraction. *If 10 is the whole and 7 is one of the parts. What is the other part?* 10 - 7 =  	Use a pictorial representation of objects to show the part-part whole model. 	 Move to using numbers within the part whole model.
Making 10	14 – 5 = 9  *Make 14 on the tens frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.*	Children to represent the ten frame pictorially and discuss what they did to make 10.  Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	Children to show how they can make 10 by partitioning the subtrahend. 14 – 5 = 9  14 – 4 = 10 10 – 1 = 9 *How many do we take off to reach the next 10?* *How many do we have left to take off?*

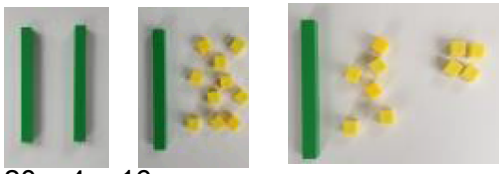
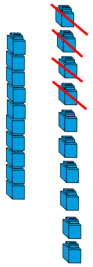
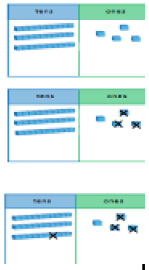
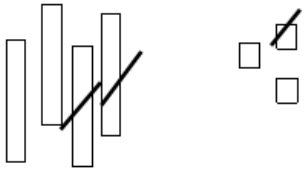
Taking away ones Physically taking away and removing objects from a whole	Use physical objects e.g. ten frames, Numicon, cubes and other items such as beanbags could be used.  6 – 2 = 4   Subtraction as 'chopping off'	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.  15 – 3 = 12   	18 – 3 = Minuend – subtrahend = Difference = 18 - 3

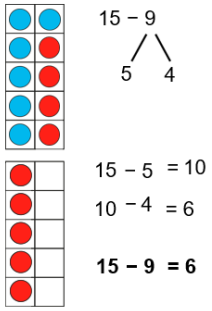
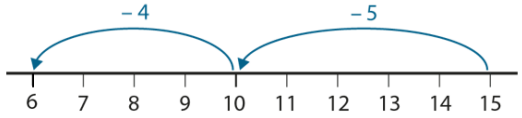
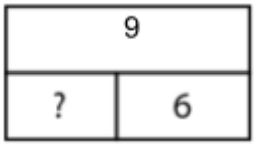
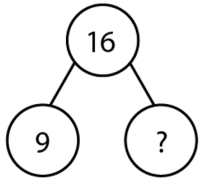
Subtraction as reduction Counting back See NCETM PD Materials 1.6	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.  13 – 4 Use counters and move them away from the group as you take them away counting backwards as you go. 	Children to represent the calculation on a number line or number track and show their jumps. A hundred square can also be used.  Start at the bigger number and count back the smaller number showing the jumps on the number line.  This can progress all the way to counting back using two 2 digit numbers. 	Put 13 in your head, count back 4. What number are you at? Use your fingers to help. Encourage the use of an empty number line.

Year 2

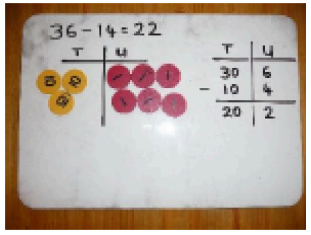
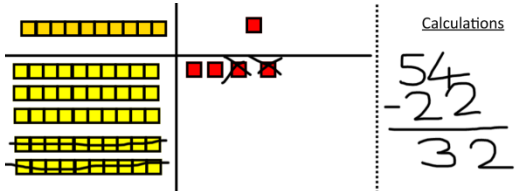
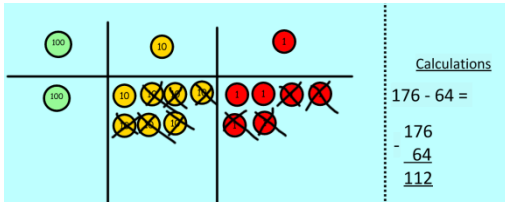
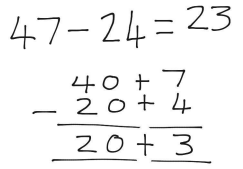
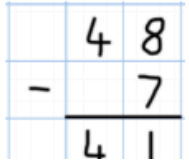
Subtraction as difference See NCETM PD Materials 1.12	Compare amounts and objects to find the difference.  Use cubes to build towers or make bars to find the difference. Use basic bar models with items to find the difference.  5 is 3 more than 2	Count on to find the difference.   Draw bars to find the difference between 2 numbers. Cuisenaire rods are useful for this.  	Find the difference between 8 and 5. 8 – 5, the difference is ■ The difference between 7 and 4 is 3 Word Problems: Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches they have. Hannah has12 sweets and her sister has 5. How many more does Hannah have than her sister?

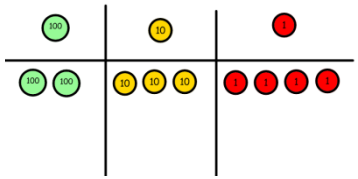
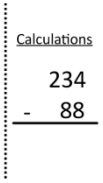
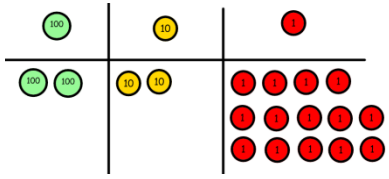
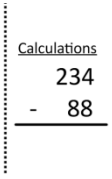
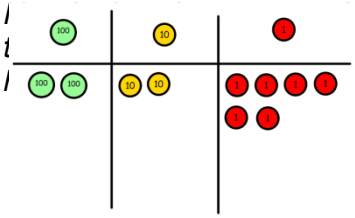
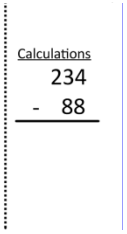
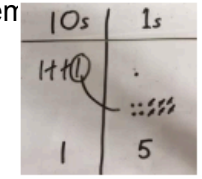
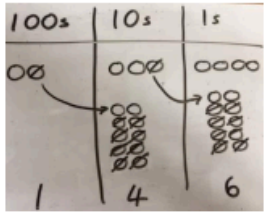
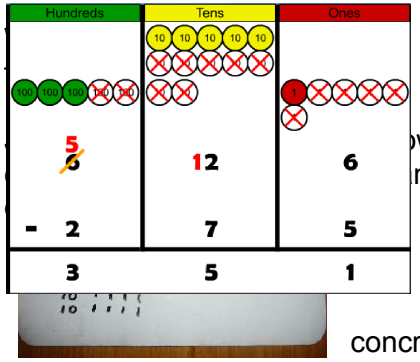
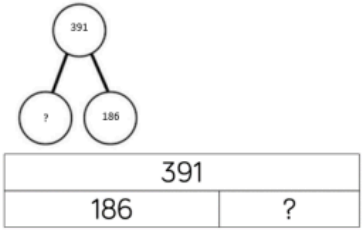
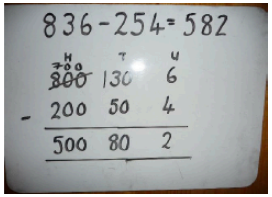
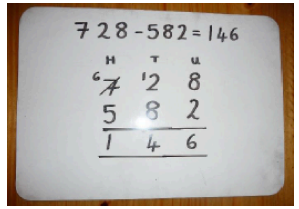
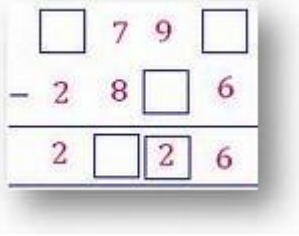
Same difference		Pictorially with counters, number lines and bar models	4 – 1 = 3 5 – 2 = 3 6 – 3 = 3 7 – 4 = 3 Children to explore why They have the same difference. 9 – 6 = 8 – 5 = 7 – 4 =
2d-1d	 Explore that 9 - 3 = 6 so 29 - 3 = 26 etc.		9 - 3 = 6 19 - 6 = 13 29 - 6 = 23 etc.
2d-multiple of ten	32 - 10 = 22 Children use dienes, PV counters or Numicon. They remove the correct number of tens 	Children draw rods and cubes and cross off multiples of ten. 44 - 20 = 	64 - 10 = ☐ 64 - 20 = ☐ 64 - 30 = ☐ 64 - ☐ = 24 ☐ - 50 = 14

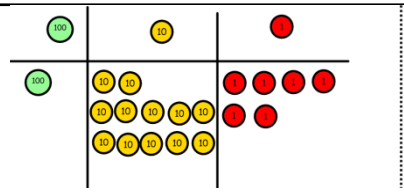
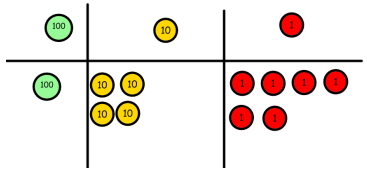
Regroup a ten into ten ones	Use a PV chart to show how to change a ten into ten ones, use the language 'exchange and regroup'. Exchange 1 ten for 10 ones, Now regroup the 10 ones and place in the ones column.  20 – 4 = 16	20 – 4 = 16 	20 - 4 = 16 □ – 4 = 26 40 – □ = 36
Partition to subtract without regrouping	34 — 13 = 21 Use Dienes to show how to partition the number when subtracting without regrouping. 	43 — 21 = 22 Children draw representations of Dienes and cross off. 	43 — 21 = 22

Make ten strategy (subtract through ten to make a ten and subtract from ten) See NCETM PD Materials 1.11 TP 6	15 – 9 = Make 15 on the ten frame. Take 5 away to make ten, then take 4 more away so that you have taken 9.  Also show take from the ten strategy. 15-9 = 10-9=1 + 5 = 6	15 - 9 =  Jump back 5 first, then another 4. Use ten as the stopping point.	16 - 9 = How many do we take off first to get to 10? How many left to take off?  

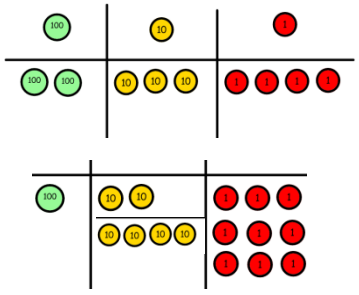
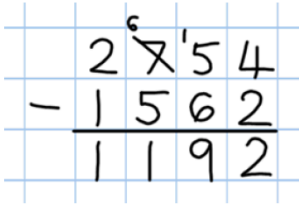
Year 3

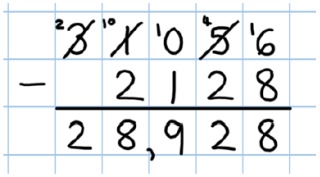
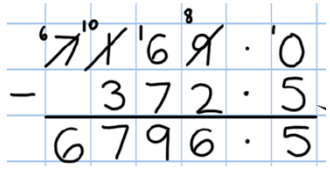
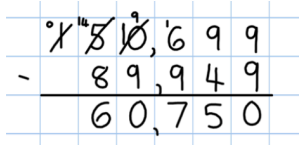
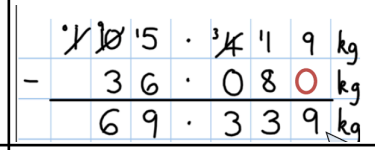
Column method - without regrouping	Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first. 	  and dots or crosses for ones.	Draw the Base 10 or place value counters alongside the written calculation to help to show working. The Base 10 can also be represented pictorially using lines for tens	 This will lead to a clear written column subtraction. 

Column method - with regrouping	Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges. Make the larger number with the place value counters.   Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.   Now I can subtract my ones.   	Represent the Base 10 pictorially, ren ıow the exchange.  Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.   exchange/regrouping. own here shows that the nd knows when to Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.  	 Children can start their formal written method by partitioning the number into clear place value columns.  Children must understand what has happened when they have crossed out digits. Missing Digit Calculations:  Word Problems:

	 Calculations 234 - 88 Now I can take away eight tens and complete my subtraction  Calculations ~~234~~ - 88 146		Raj spent £391, Timmy spend £186. How much more did Raj spend?

Year 4-6

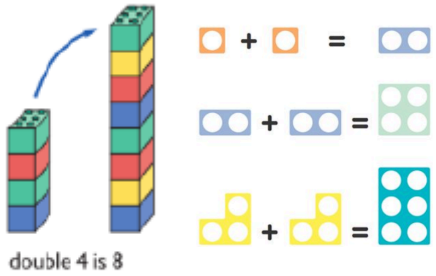
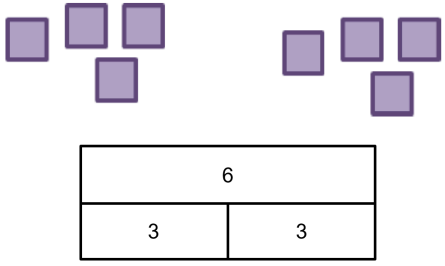
Subtracting hundreds, tens and ones Year 4 subtract with up to 4 digits. *Introduce decimal subtraction through context of money*	234 - 179  Model process of exchange using Numicon, base ten and then move to PV counters.	Children to draw PV counters and show their exchange—see Y3	 Use the phrase ‘exchange and regroup’ for exchange
Y4 mental			

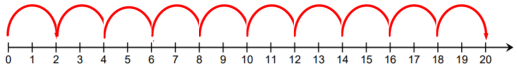
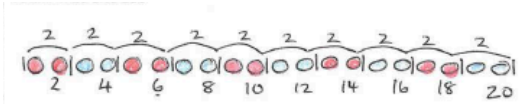
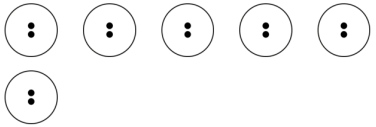
Year 5- Subtract with at least 4 digits, including money and measures. *Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal point.*	As above	Children to draw PV counters (including decimal PV counters) and show their exchange—see Y3	 Use zeros for placeholders. 
Y5 mental			
Year 6—Subtract with increasingly large and more complex numbers and decimal values.	As above	As above	 
Y6 mental			

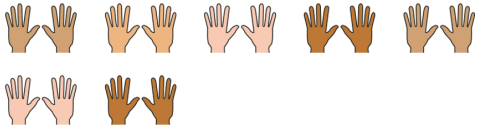
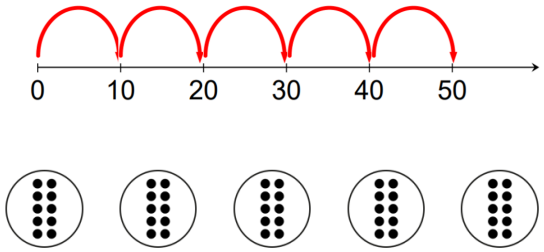
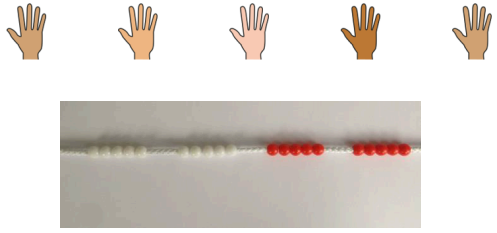
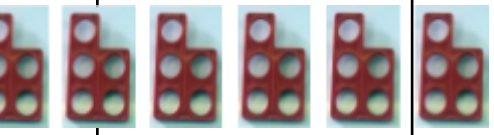
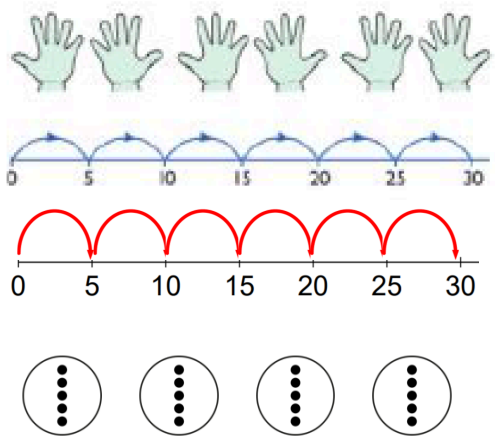
Multiplication

Key Vocabulary: double, times, multiple, groups of, lots of, equal groups, the product of, factor, product, multiplied by, times by

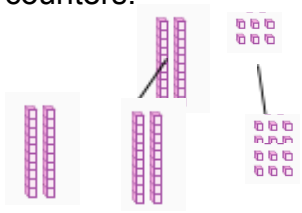
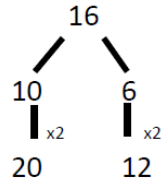
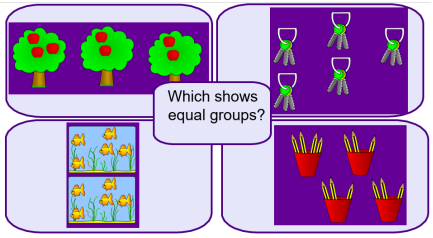
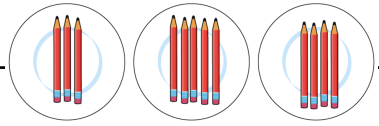
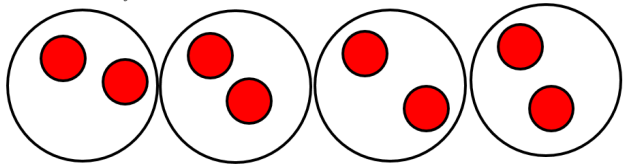
Year 1

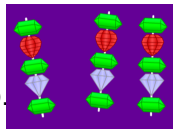
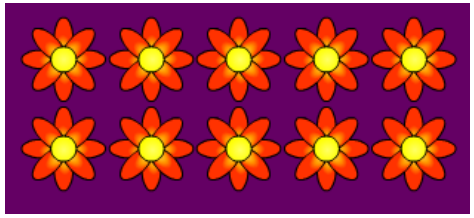
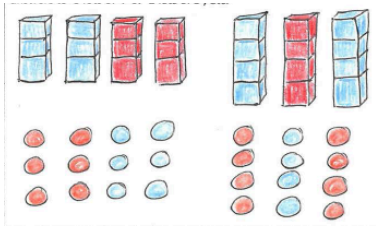
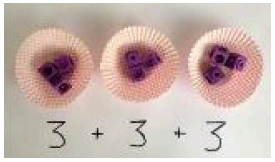
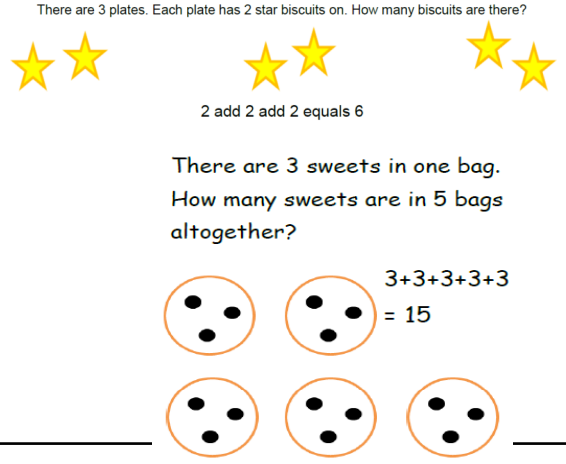
Objective and Strategies	Concrete	Pictorial	Abstract
Doubling Double numbers to ten in Y1	Use practical activities to show how to double a number.  	Draw pic tures to show how to double a number. Double 4 is 8  	Double 4 is 8. 4 and another 4 is 8

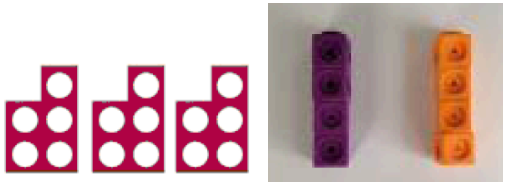
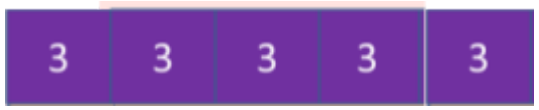
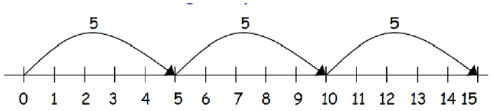
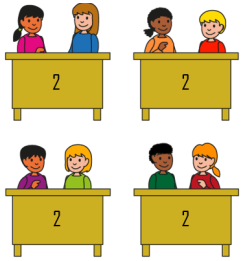
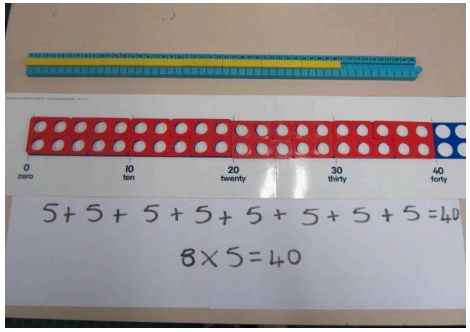
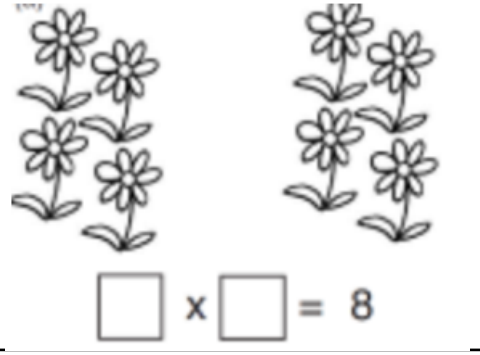
Counting in multiples of 2	Count in multiples using real-life objects and contexts supported by concrete objects in equal groups. 	Use a number line, hundred square or pictures to continue support in counting in multiples.   Children make representations to show counting in multiples of 2.Count in multiples of a number aloud.  	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10

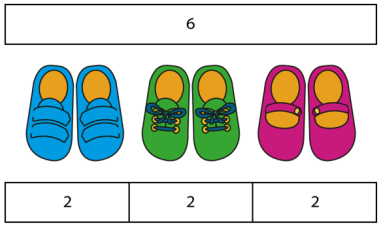
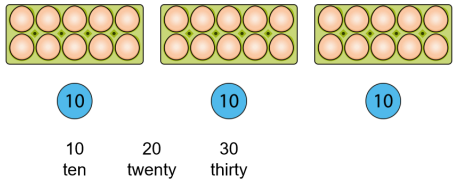
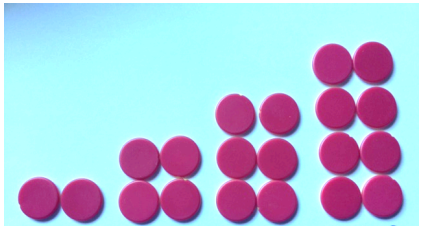
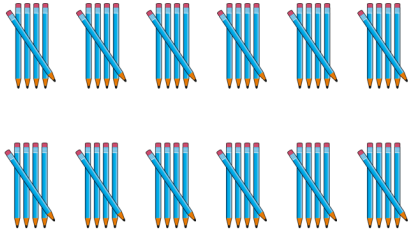
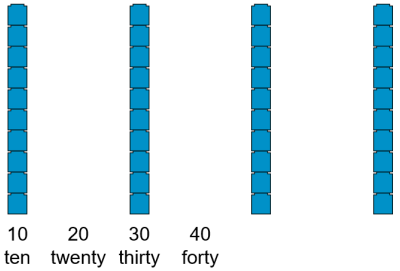
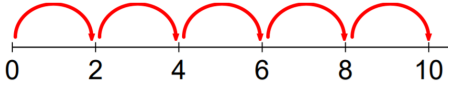
Counting in multiples of 10			10, 20, 30, 40, 50
Counting in multiples of 5	 		5, 10, 15, 20, 25 , 30

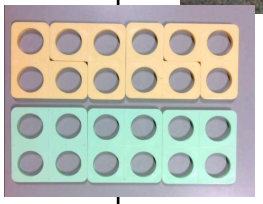
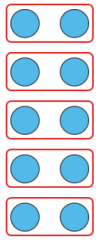
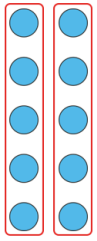
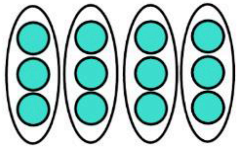
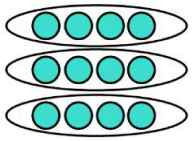
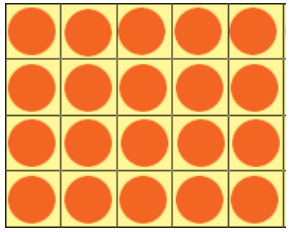
Year 2

Double a 2-digit number	Model doubling using Dienes and PV counters. 	Draw pictures and representations to show how to double numbers	Partition a number and then double each part before recombining it back together. 
Equal/non-equal groups	Use real life objects and contexts to examine equal and non-equal groups.  These are non-equal groups. 	Children make/match/draw representations of real life problems to show equal groups and find the total.  There are 4 equal groups. There are 2 in each group. There are 8 altogether. 	If there are five groups with three in each group. Are they equal groups? There are 2 bags with 4 sweets in and 1 bag with 6 sweets in. Are these equal groups?

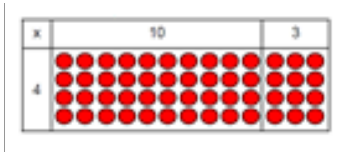
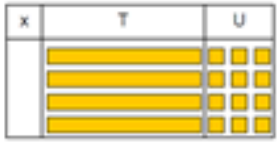
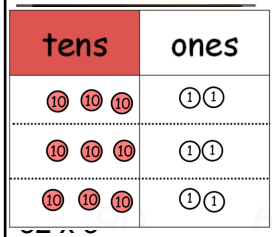
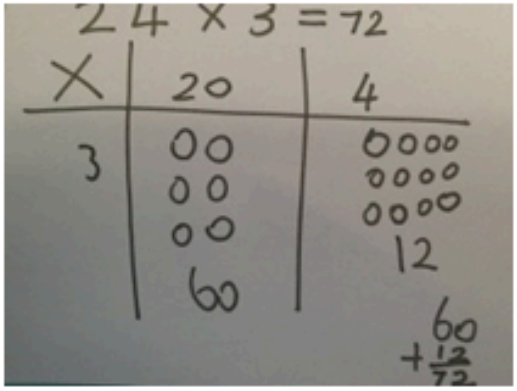
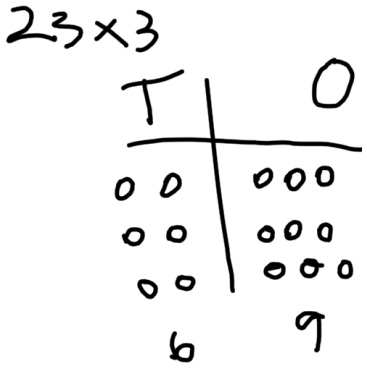
	These are equal groups. There are 3 equal groups. There are 5 in each group.  There are five equal groups. Each group has 3 cakes. 		
Understand and use arrays	Use objects laid out in arrays to find the answers to 2 lots of 5, 3 lots of 2 etc. 	Make and draw representations of arrays to show understanding 	
Repeated addition	Use objects and real life contexts.  2 + 2 + 2 + 2 + 2 = 10 There are 5 groups of 2. There are 10 socks altogether.  There are 3 groups of 3.	Make and draw representations to show repeated addition.  There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? 2 add 2 add 2 equals 6 There are 3 sweets in one bag. How many sweets are in 5 bags altogether? 3+3+3+3+3 = 15	Write addition sentences to describe objects and pictures. 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40

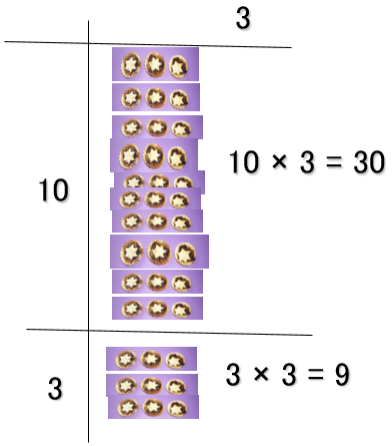
	There are 9 altogether. 	Children can record this as a bar model:   5 + 5 + 5 = 15	
Repeated addition to multiplication Relate repeated addition to multiplication using the x sign	Write multiplication sentences to match repeated addition.  2 + 2 + 2 + 2 4 × 2  	Children make and draw representations and record both an addition sentence and a multiplication sentence.  1 + 1 + 1 + 1 + 1 + 1 = 6 6 x 1 = 6  	Write multiplication sentences to match repeated addition, without the support of representations. 2 + 2 + 2 + 2 + 2 = 10 5 x 2 = 10

Understand the 2, 5 and 10 times table	Use objects and real life contexts for multiples of 2, 5 and 10  3 × 2 = 6  3 × 10 = 30  **2X1 =2 2X2=4 2x3=6 2X4=8** 	Make and draw representations for 2, 5 and 10 times tables   4 × 10 = 40 Number lines, bead strings, counting sticks and bar models should be used to show representation of counting in multiples.  5 x 2 = 10  4 x 5 = 20	Understand the terms factor and product 3 × 2 = 6 factor × factor = product 6 = 3 × 2 product = factor × factor Count in multiples of a number aloud. 5, 10, 15, 20 … The 2nd multiple of 5 is 10. 2 lots of 5 equals 10 2 times 5 equals 10 2 x 5 = 10

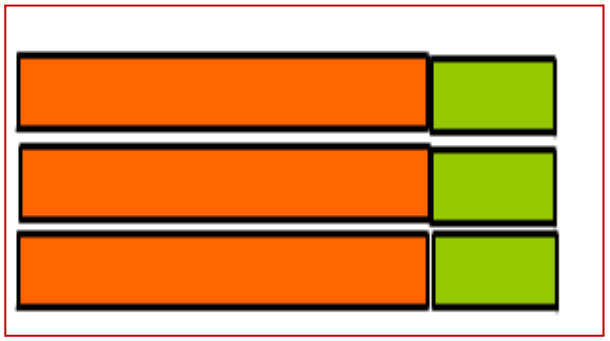
Using arrays, show multiplication is commutative	Create arrays using counters/cubes to show multiplication sentences.   	Use representations of arrays to show different calculations and explore commutativity. Draw arrays in different rotations to find **commutative** multiplication sentences.   5 × 2 = 10 5 groups of 2 5 × 2 = 10 2 groups of 5 2, times   Link arrays to area of rectangles.   4 × 2 = 8 2 × 4 = 8  2 × 4 = 8 4 × 2 = 8	Use an array to write multiplication sentences and reinforce repeated addition. 12 = 3 × 4 12 = 4 × 3 Factor x Factor = Product  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 3 + 3 + 3 + 6 = 15 5 x 3 = 15 3 x 5 = 15

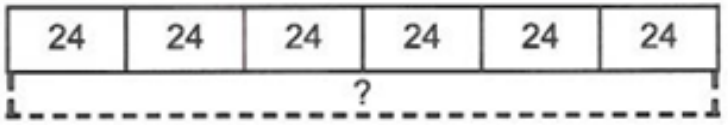
Year 3

Multiplying 2-digit by 1 digit using partitioning (no regrouping)	Show the links with arrays to illustrate the PV partitioning  4 rows of 10 4 rows of 3 Move onto base ten to move towards a more compact method.  4 rows of 13 Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.  Chn can see array in the ones and the tens. There is a visual link to repeated addition.	Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.  	23 x 3 = 69 $\begin{array}{r} 23 \\ \times \quad 3 \\ \hline 69 \end{array}$



26 x 4 =





13 × 3 = 39

10 × 3 = 30

3 × 3 = 9

30 + 9 = 39

×	3
10	10x3
3	3x3

x	20	4
6	120	24

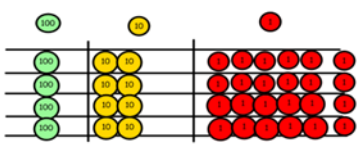
24 x
6
24
120
144

Year 4-6

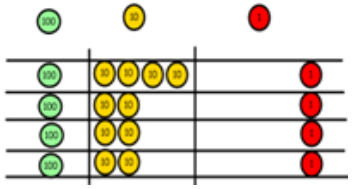
Grid method recap from year 3 for 2 digits x 1 digit

Move to multiplying 3 digit numbers by 1 digit. (year 4 expectation)

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



Add up each column, starting with the ones making any exchanges needed



$$\begin{array}{r} {}^{2}126 \\ \times\ 4 \\ \hline 4 \end{array}$$

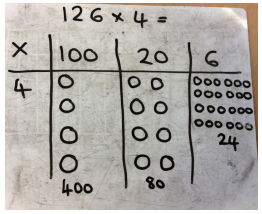
$$\begin{array}{r} {}^{1}{}^{2}126 \\ \times\ 4 \\ \hline 04 \end{array}$$

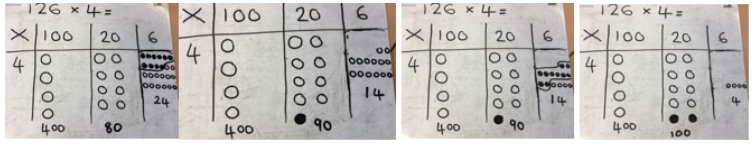
Ask Qs – where is that regrouped ‘1’ (one hundred) in the representation?

$$\begin{array}{r} {}^{1}{}^{2}126 \\ \times\ 4 \\ \hline 504 \end{array}$$

Children can represent their work with place value counters in a way that they understand.

They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below.





$$\begin{array}{r} {}^{2}126 \\ \times\ 4 \\ \hline 4 \end{array}$$

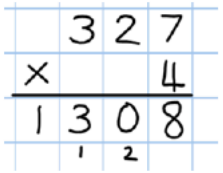
$$\begin{array}{r} {}^{1}{}^{2}126 \\ \times\ 4 \\ \hline 504 \end{array}$$

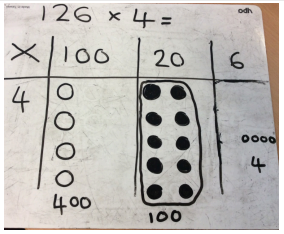
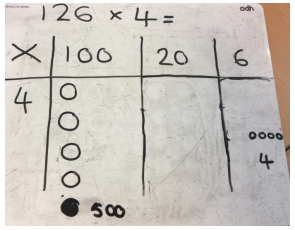
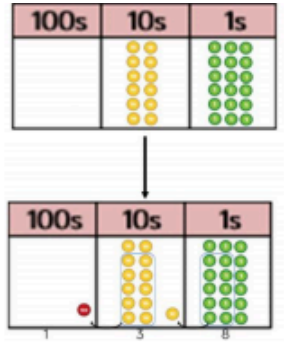
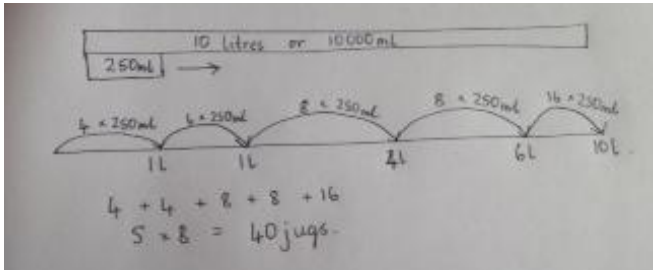
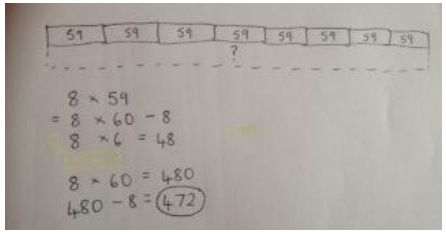
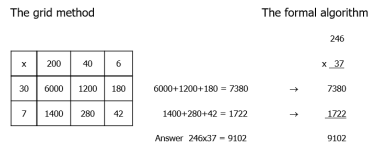
×	300	20	7
4	1200	80	28

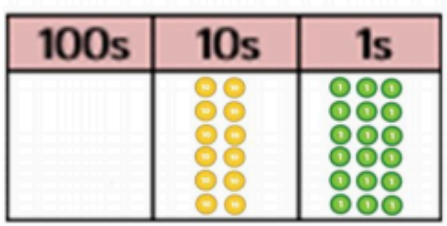
$$\begin{array}{r} 327 \\ \times\ 4 \\ \hline 28 \\ 80 \\ 1200 \\ \hline 1308 \end{array}$$

See ‘grid to formal algorithm’ below but for 2 or 3 digit x 1 digit.

Move to compact method of short multiplication.



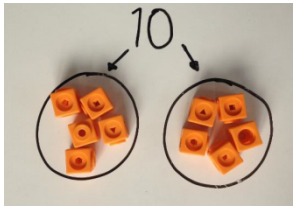
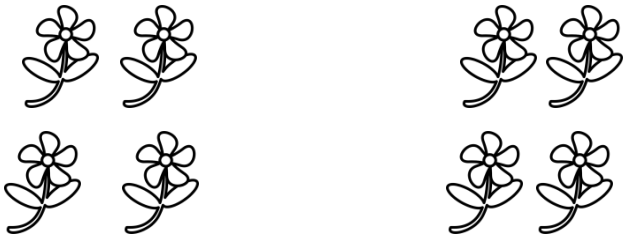
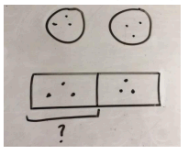
		 	
Column Multiplication	Children can continue to be supported by place value counters at this stage of multiplication. Keep numbers simple to review concept of regrouping and why start with the ones. 6 x 23 =  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens. *'With counters, prove that 6 x 23 = 138'*	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. *Note other mental strategies applied.*   *What is the calculation?* *What is the product?*	 Start with expanded version of long multiplication, reminding the children about lining up their numbers clearly in columns. If  it helps, children can write out what they are solving next to their answer. 32 x 24

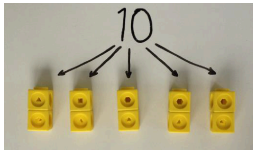
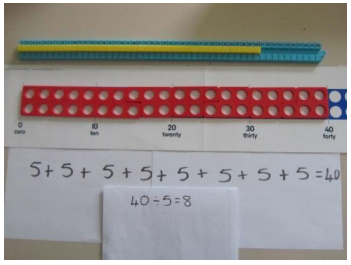
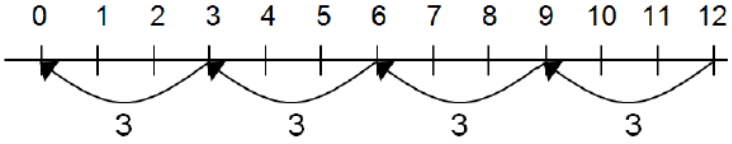
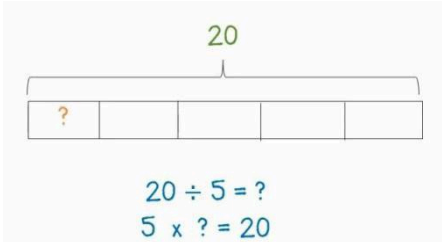
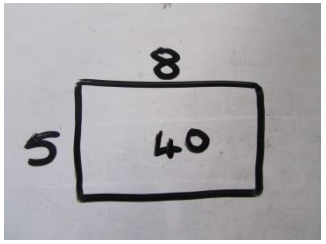
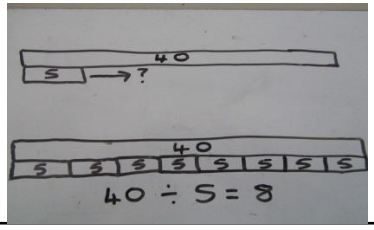
			This moves to the more compact method. To get 13420 children have solved 1342 x 10. To get 10736 children have solved 1342 x 8.

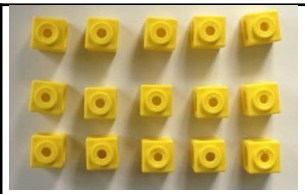
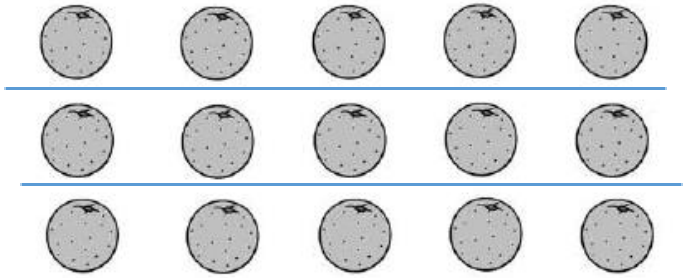
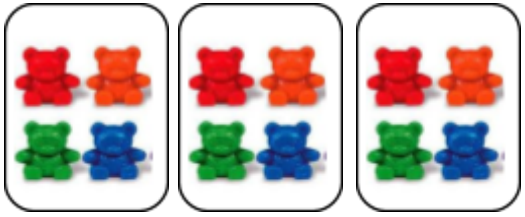
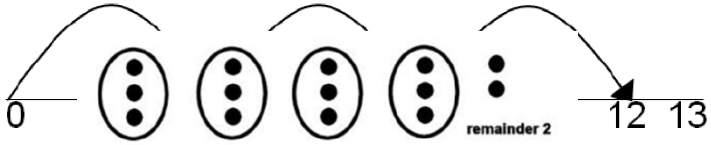
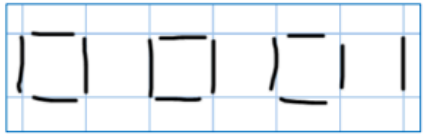
Division

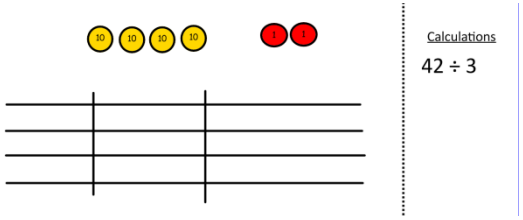
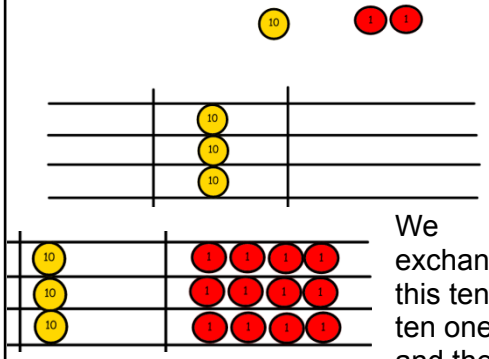
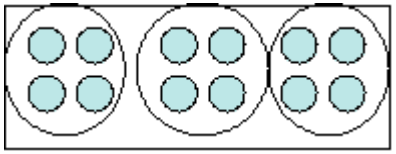
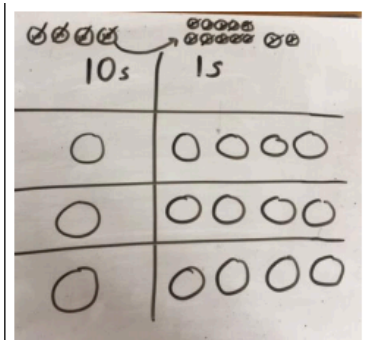
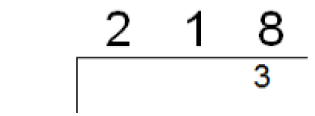
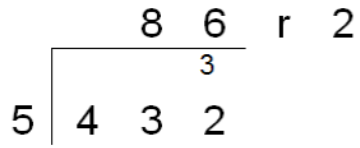
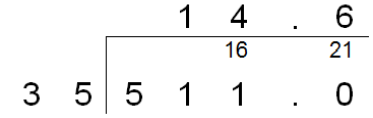
Key Vocabulary: share, group, divide, divided by, half, dividend, divisor, quotient

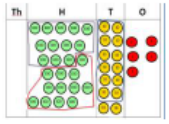
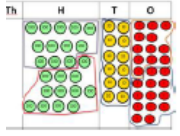
Year 1

Objective and Strategies	Concrete	Pictorial	Abstract
Division as sharing.	Sharing using a range of objects.  *I have 10 cubes, can you share them equally in 2 groups?* 	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4 Begin to use mathematical pictures. 	Share 9 buns between three people. 9 ÷ 3 = 3 3 | 3 | 3 Children should be encouraged to use their times tables facts.

Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.     *How many 5's in 40?*	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.   Children should be taught to represent this as a bar model:  	28 ÷ 7 = 4 *Divide 28 into 7 groups. How many are in each group?*

Division within arrays	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. E.g. 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	 Draw an array and use lines to split the array into groups to make multiplication and division sentences.	Find the inverse of multiplication and division sentences by creating four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7
Division with a remainder	14 ÷ 3 = Divide objects between groups and see how much is left over.   Use small sticks/lollipop sticks for 2 digit ÷ 1 digit with remainders. Use lollipop sticks to form wholes. E.g. 13 ÷ 4 squares are made because we are dividing by 4.	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder. Draw dots and group them to divide an amount and  clearly show a remainder. Represent lollipop sticks pictorially. 	Complete written divisions and show the remainder using r.  13 ÷ 4 = 3 r1 Children should be encouraged to use their times tables facts; they could also represent repeated addition on a number line.

	 There are 3 whole squares, with 1 left over.	There are 3 whole squares, with 1 left over.	
Short division	Use place value counters to divide using the short division method alongside an array/grid.  42 ÷ 3= Start with the largest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.  We exchange this ten for ten ones and then	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.  Encourage them to move towards counting in multiples to divide more efficiently. The use of place value grids with counters drawn in an array should also be used.  Part whole models can also be used as a variation to the short method. E.g. *Using the part whole model below, how can you divide 615 by 5 without using short division?* 	Begin with divisions that divide equally with no remainder.   Move onto divisions with a remainder. Finally move into decimal places to divide the total accurately. 

	share the ones equally among the groups. We look how much is in 1 group so the answer is 14.		
Long Division	 $\begin{array}{r} 0212 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$ 2544 ÷ 12 How many groups of 12 thousands do we have? None  Exchange 2 thousand for 20 hundreds.  $\begin{array}{r} 02 \\ 12\overline{)2544} \\ 24 \\ \hline 1 \end{array}$ How many groups of 12 are in 25 hundreds? 2 groups. Circle them. We have grouped 24 hundreds so can take them off and we are left with one.  $\begin{array}{r} 021 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 2 \end{array}$ Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2.  Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2	Children to represent the counters, pictorially and record the subtractions beneath.	$\begin{array}{r} 0 \\ 12\overline{)2544} \end{array}$ Step one- exchange 2 thousand for 20 hundreds so we now have 25 hundreds. $\begin{array}{r} 02 \\ 12\overline{)2544} \\ 24 \\ \hline 1 \end{array}$ Step two- How many groups of 12 can I make with 25 hundreds? The 24 shows the hundreds we have grouped. The one is how many hundreds we have left. $\begin{array}{r} 021 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 2 \end{array}$ Exchange the one hundred for 10 tens. How many groups of 12 can I make with 14 tens? The 14 shows how many tens I have, the 12 is how many I grouped and the 2 is how many tens I have left. $\begin{array}{r} 0212 \\ 12\overline{)2544} \\ 24 \\ \hline 14 \\ 12 \\ \hline 24 \\ 24 \\ \hline 0 \end{array}$ Exchange the 2 tens for 20 ones. The 24 is how many ones I have grouped and the 0 is what I have left.