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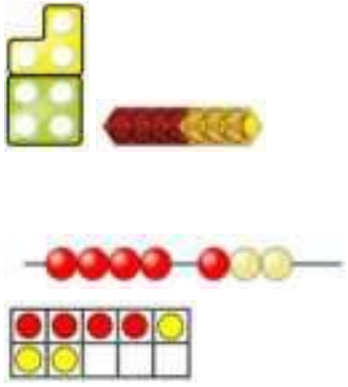
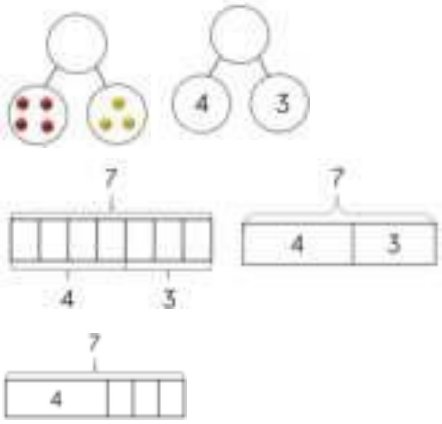
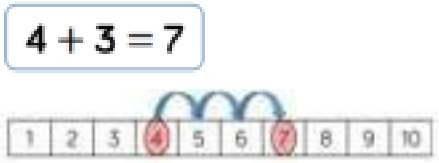
Calculation skills for Year 1 and 2 have been included so the earlier calculation learning journey is clear.

Addition

Key Vocabulary: same as equal number sentence

add increase total sum addition more altogether count on plus count all

Year Group	Skill	Representations and Models	Concrete The 'doing' stage	Pictorial The 'seeing' stage	Abstract The 'symbolic' stage
1	Add two 1-digit numbers to 10 (aggregation & augmentation)	Part- whole model Bar model Number shapes	 **(support augmentation)**		

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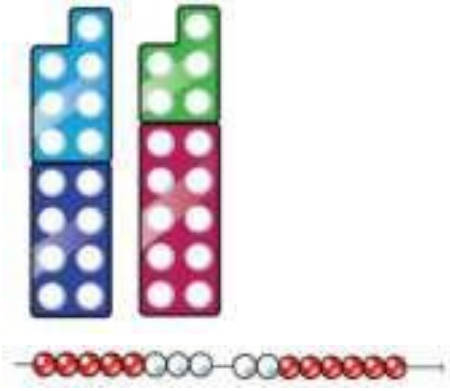
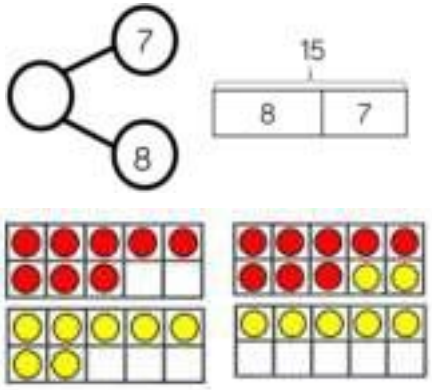
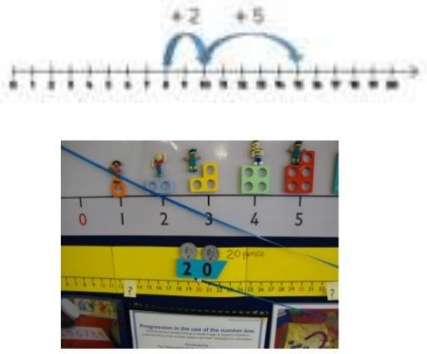
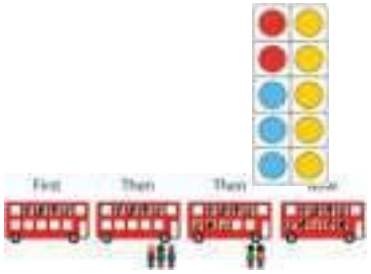
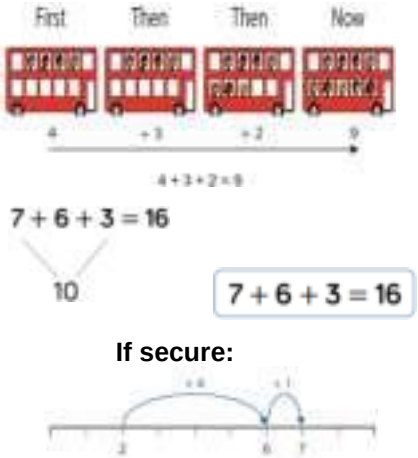
1	Add 1 and 2-digit numbers to 20	Part- whole model Bar model Number shapes Ten frames (within 20)			
Year Group	**Skill**	**Representations and Models**	**Concrete** The 'doing' stage	**Pictorial** The 'seeing' stage	**Abstract** The 'symbolic' stage
1 and 2	Add three 1-digit numbers (addends)	Part- whole model B ar model			

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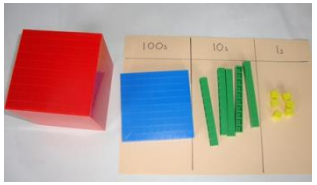
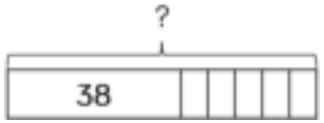
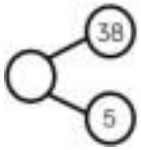
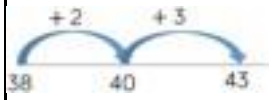
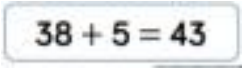
2	Add 1 and 2-digit numbers to 100	Part- whole model Bar model Number lines (labelled) Straws	 	  Counting on from the larger number 	 **GDS** 

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OAKLEY CE JUNIOR SCHOOL - PROGRESSION OF CALCULATION SKILLS

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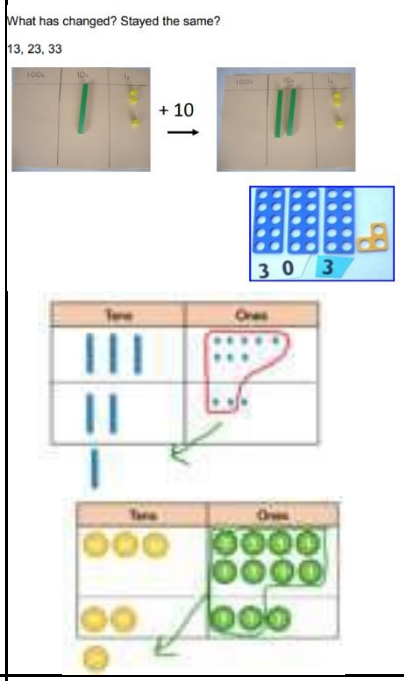
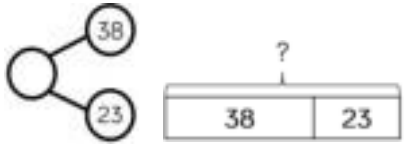
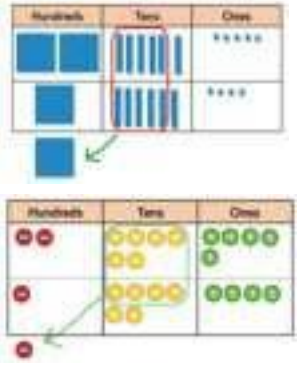
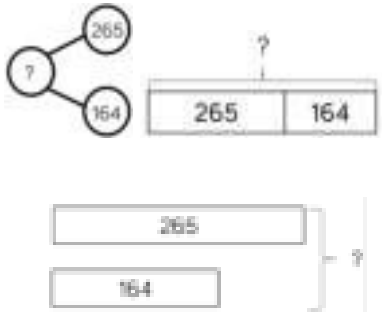
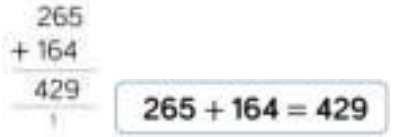
Year Group	Skill	Representations and Models	**Concrete** The 'doing' stage	**Pictorial** The 'seeing' stage	**Abstract** The 'symbolic' stage
2	Add two 2-digit numbers	Part- whole model Bar model Number lines (blank) Straws			 GDS
3	Add with up to 3-digits	Part- whole model Bar model			

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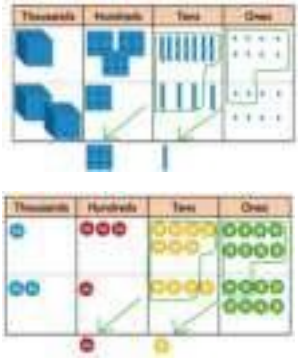
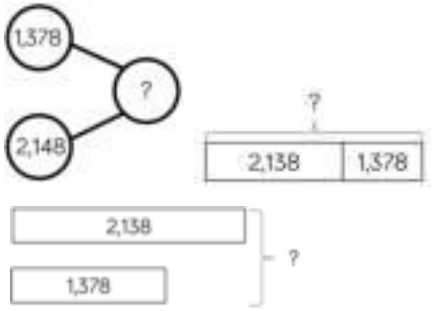
Year Group	**Skill**	**Representations and Models**	**Concrete** The 'doing' stage	**Pictorial** The 'seeing' stage	**Abstract** The 'symbolic' stage
4	Add with up to 4-digits	Part- whole model Bar model			1,378 + 2,148 = 3,526 1 3 7 8 + 2 1 4 8 3 5 2 6 1 1

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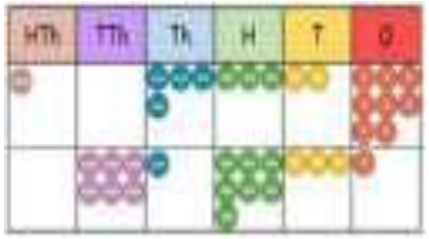
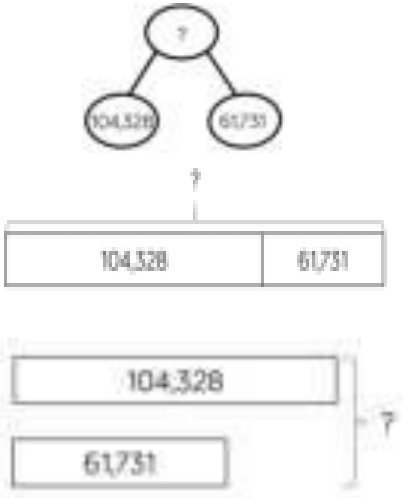
5	Add with more than 4 digits	Part- whole model Bar model			104,328 + 61,731 = 166,059 1 0 4 3 2 8 + 6 1 7 3 1 1 6 6 0 5 9 1
Year Group	**Skill**	**Representations and Models**	**Concrete** The 'doing' stage	**Pictorial** The 'seeing' stage	**Abstract** The 'symbolic' stage

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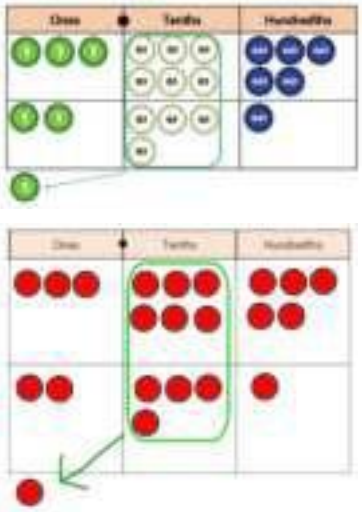
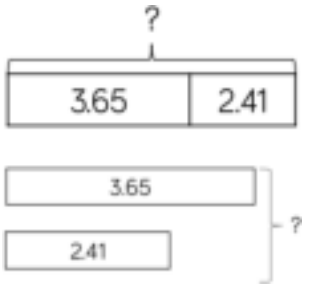
5	Add with up to 3 decimal places	Part- whole model Bar model			**3.65 + 2.41 = 6.06** 3.65 + 2.41 6.06 1

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Subtraction

Key Vocabulary:

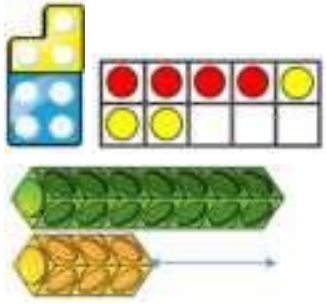
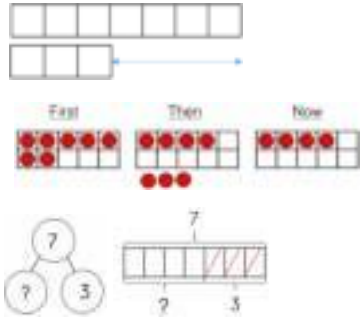
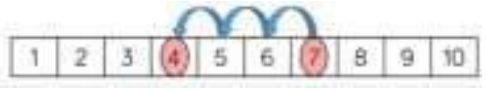
subtract	decrease by	reduce	exchange	inverse
less than	distance between	count back/on	take from	difference
take away	deduct	minus	fewer than	

Children need to understand that subtraction is not commutative or associative.

Partitioning: Splitting a number into its component parts

Difference: The numerical difference between two numbers is found by comparing the quantity in each group

Reduction: Subtraction as takeaway

Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
1	Subtract two 1-digit numbers to 10	Part-whole model Bar model Number shapes Ten frames (within 10) Bead string (10)			$7 - 3 = 4$ 

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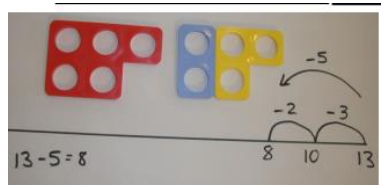
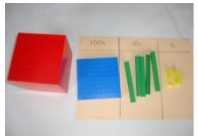
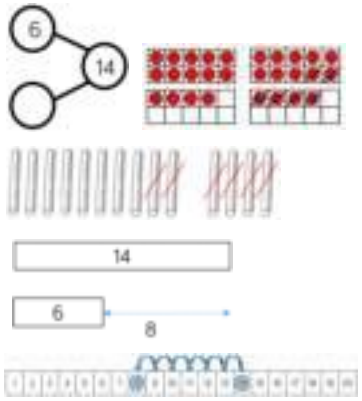
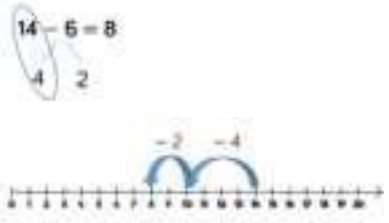
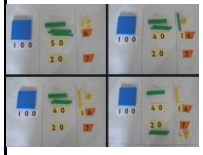
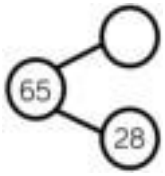
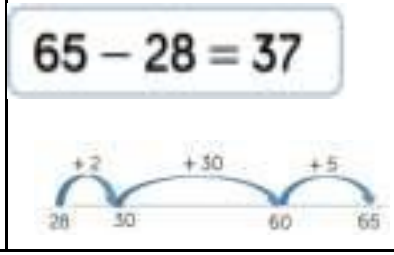
		Number tracks		 Pictures 	

Year Group	Skill	Representations and Models	Concrete The 'doing' stage	Pictorial The 'seeing' stage	Abstract The 'symbolic' stage
1	Subtract 1 and 2-digit numbers to 20	Part-whole model Bar model Number shapes Ten frames (within 20) Bead string (20) Number tracks Number lines (labelled) Straws	 		
2	Subtract 1 and 2-digit numbers to 100	Part-whole model Bar model Number lines (labelled & blank) Straws			

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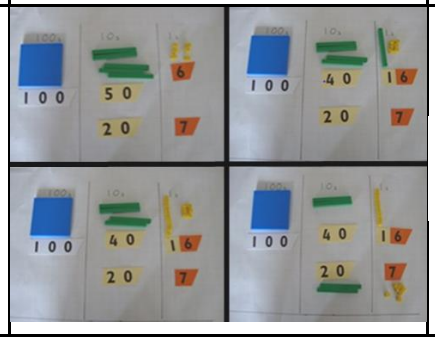
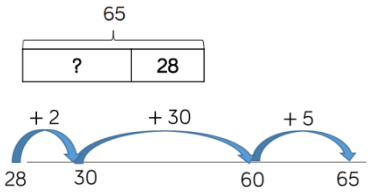
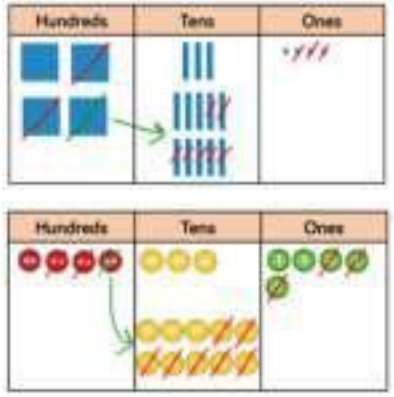
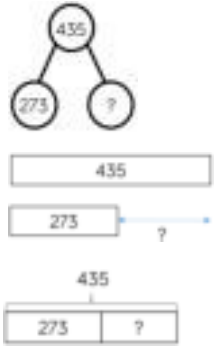
		Hundred square			
2	Subtract two 2-digit numbers	Part-whole model Bar model Number lines (blank) Straws Base 10 Place Value Counters			65 − 28 = 37 **Ensure that the children write out their calculation alongside any concrete resources so they can see the pictoral links.** **Exs – 10's and 1's** **GDs – multiples of 5's and 10's**
3	Subtract with up to 3-digits	Part-whole model Bar model Base 10 Place value counters Column addition			435 − 273 = 262 3 1 4 3 5 − 2 7 3 2 6 2 **Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.**
4	Subtract with up to 4-digits	Part-whole model Bar model			4,357 − 2,735 = 1,622

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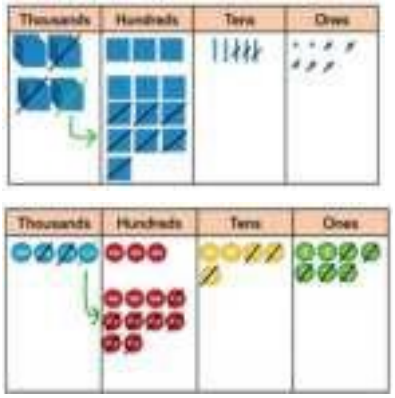
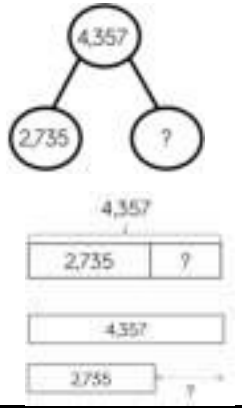
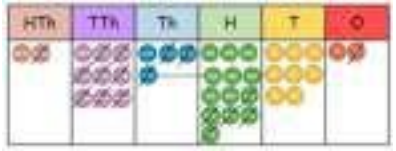
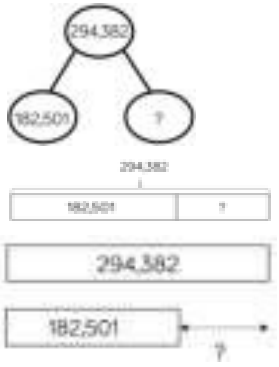
		Base 10 Place value counters Column addition			3 1 4357 − 2735 1622 **Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.**
Year Group	**Skill**	**Representations and Models**	**Concrete** The 'doing' stage	**Pictorial** The 'seeing' stage	**Abstract** The 'symbolic' stage
5	Subtract with more than 4-digits	Part-whole model Bar model Base 10 Place value counters Column addition			294,382 − 182,501 = 111,881  **Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.**
5	Subtract with up to 3 decimal places	Part-whole model Bar model Base 10			5.43 − 2.7 = 2.73

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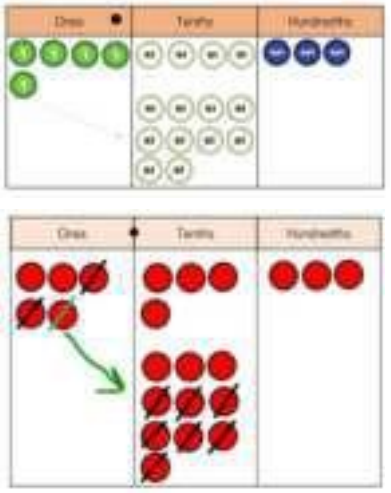
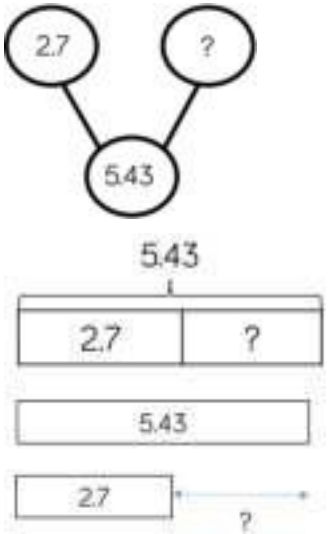
		Place value counters Column addition			$\overset{4}{\cancel{5}}\overset{1}{.}43$ -2.7 2.73 Ensure that the children write out their calculation alongside any concrete resources so they can see the links to the written column method.

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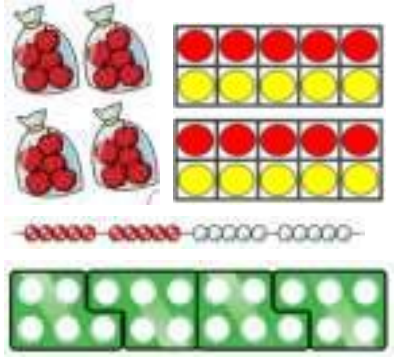
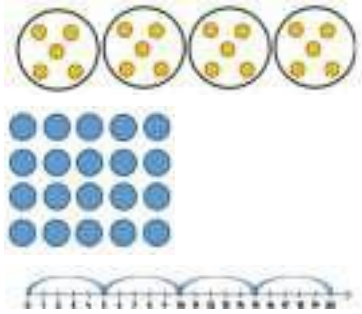
Multiplication

Key Vocabulary:

multiply
multiplication
times
lots of
groups of
sets of
halve
product
multiple
double
factors
repeated addition
Commutative – it can be done both ways.
distributive
associative

Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
1/2	Solve 1-step problems using multiplication	Bar model Number shapes Counters Ten frames Bead strings Number lines Children represent multiplication as repeated addition in many different ways.		 practically making arrays and representing apparatus counting in 3's and 4's.	$5+5+5+5=20$ $4\times5=20$ $5\times4=20$ **Yr 1- count 2's. 5's and 10's** One bag holds 5 apples. How many apples do 4 bags hold? **Yr2 – secure counting 2's, 5's, 10's** Children are introduced to the multiplicat ion symbol in Year 2.

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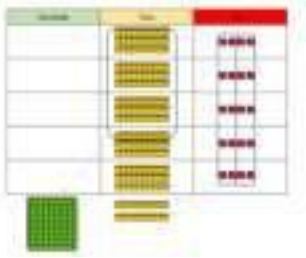
3/4	Multiply 2-digit by 1-digit numbers	Place value counters Base 10 Short written method Expanded written method			$34 \times 5 = 170$ Expanded column method

			 Place value counters should be used to support understanding of the method rather than supporting the multiplication, as children should use times table knowledge.		 Short multiplication method 

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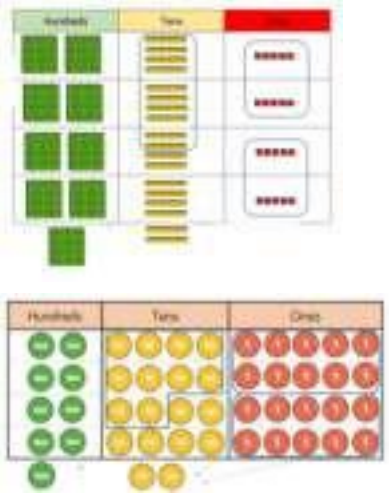
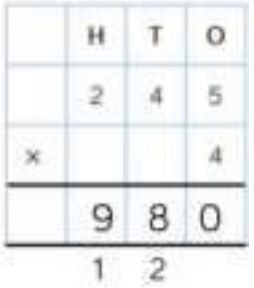
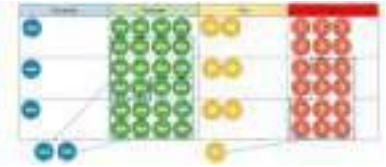
4	Multiply 3-digit by 1-digit numbers	Place value counters Base 10 Short written method			$245 \times 4 = 980$  Short formal written method

Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
5	Multiply 4-digit by 1-digit numbers	Place value counters Short written method			$1{,}826 \times 3 = 5{,}478$ 

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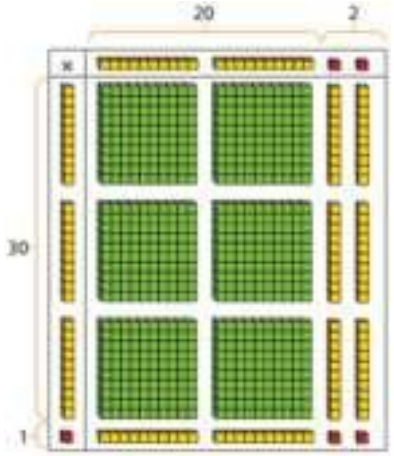
5	Multiply 2-digit by 2-digit numbers	Place value counters Base 10 Short written method Grid method	 Use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the base 10.		$22 \times 31 = 682$ × | 20 | 2 30 | 600 | 60 1 | 20 | 2 H T O 2 2 × 3 1 2 2 6 6 0 6 8 2

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5	Multiply 2-digit by 3-digit numbers	Place value counters Short written method Grid method	 Children can continue to use the area model when multiplying 3-digits by 2-digits. Place value counters become more efficient to use but Base 10 can be used to highlight the size of the numbers.		$234 \times 32 = 7{,}488$ × 200 30 4 30 6,000 900 120 2 400 60 8 Th H T O 2 3 4 × 3 2 4 6 8 1 7 1 0 2 0 7 4 8 8

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5/6	Multiply 4-digit by 2-digit numbers	Formal written method			

TTh	Th	H	T	O
	2	7	3	9
×			2	8
2	1	9	1	2
5	4	7	8	0
7	6	6	9	2

					$2{,}739 \times 28 = 76{,}692$ Children should now be confident in the written method. Consider where exchanged digits are placed and make sure this is consistent.

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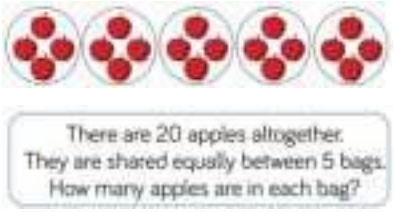
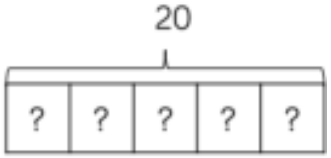
Division

Key Vocabulary:

Groups	Share	Remainders
Grouping	Sharing	Divisor
Repeated subtraction	Exchange	Array
Quotient	Multiples	

Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
1/2	Solve one-step problems with division (sharing)	Bar model Real life objects Arrays Counters	 Children solve problems by sharing amounts into equal groups		In Year 1, children are not expected to record division formally. In Year 2, children are introduced to the division symbol. 

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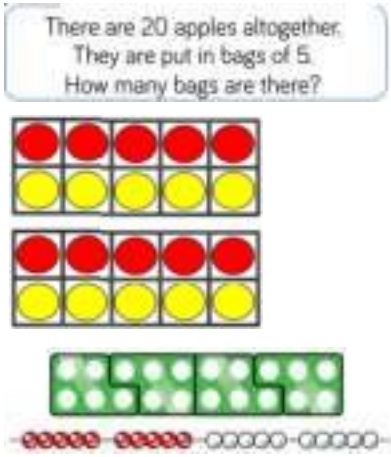
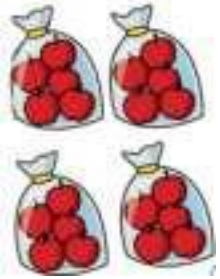
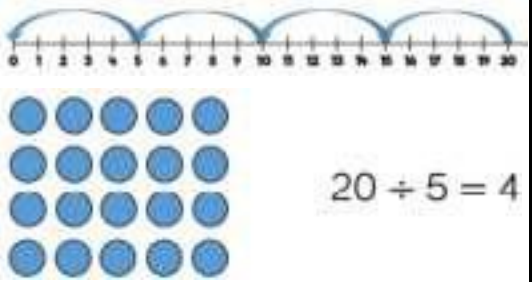
Year Group	Skill	Representations and Models	Concrete	Pictorial	Abstract
1/2	Solve one-step problems with division (grouping)	Real life objects Number shapes Bead strings Ten frames Number lines Arrays Counters	 Children solve problems by grouping and counting the number of groups. They can use concrete representations in fixed groups such as number shapes which helps to show the link between multiplication and division.		 Grouping encourages children to count in multiples and links to repeated subtraction on a number line.

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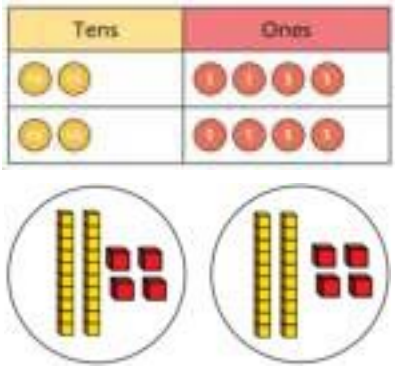
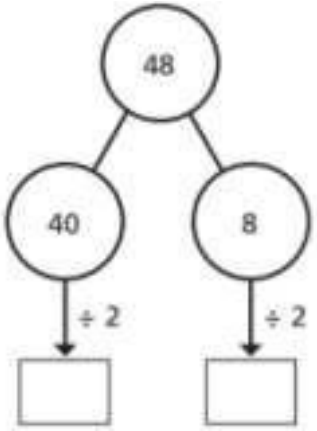
3	Divide 2-digits by 1-digit (no exchange sharing)	Base 10 Bar model Place value counters Part-whole model	 When dividing larger numbers, children can use manipulatives that allow them to partition into tens and ones.		 Part-whole models can provide children with a clear written method that matches the concrete representation. 48 ÷ 2 = 24
3	Divide 2-digits by 1-digit (sharing with exchange)	Straws Base 10 Bar model Place value counters			

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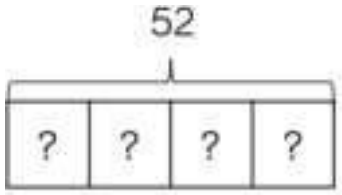
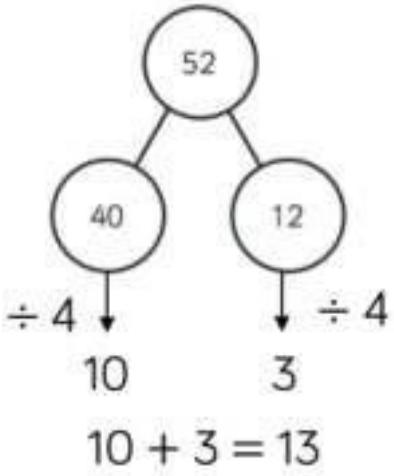
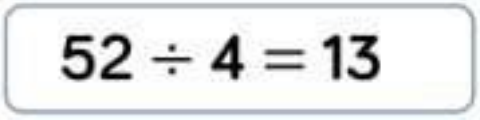
		Part-whole model			
			 When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange on ten for ten ones.		 Flexible partitioning in a part-whole method supports this method.

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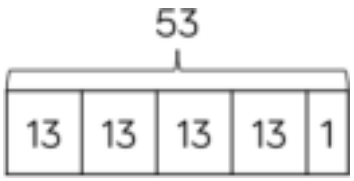
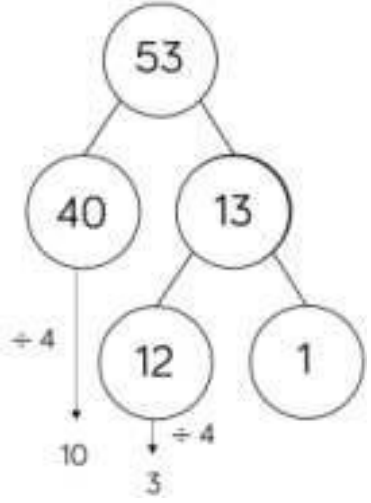
			Children should start with the equipment outside the place value grid before sharing the tens and ones equally between the rows.		
3/4	Divide 2-digits by 1-digit (sharing with remainders)	Straws Base 10 Bar model Place value counters Part-whole model			

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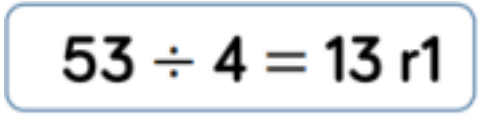
			 When dividing numbers with remainders, children should use Base 10 and place value counters to exchange one ten for ten ones. Starting with the equipment outside the place value grid will highlight remainders, as they will be left outside the grid once the equal groups have been made.		 Flexible partitioning in a part-whole method supports this method

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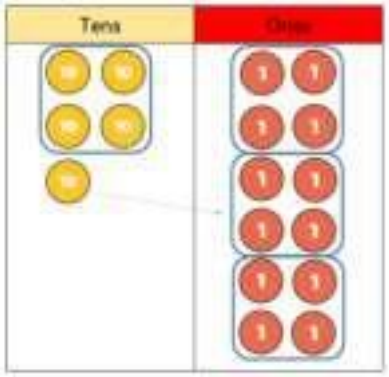
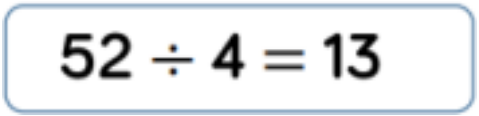
4/5	Divide 2-digits by 1-digit (grouping)	Base 10 Bar model Place value counters Part-whole model			  When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor.

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			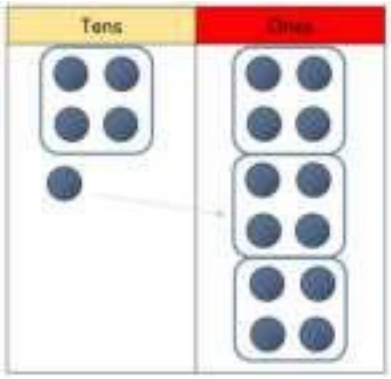 Language is important here. 'How many groups of 4 tens can we make?' 'How many groups of 4 ones can we make?' Remainders can also be seen as they are left ungrouped.		
4	Divide 3-digits by 1-digit (sharing with exchange)	Base 10 Bar model Place value counters Part-whole model			

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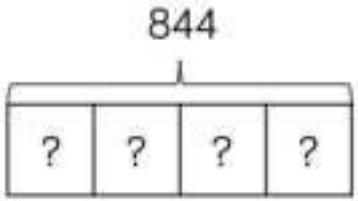
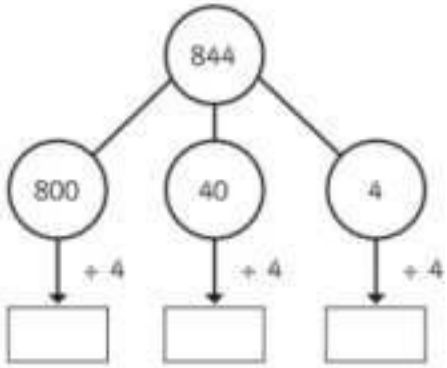
4/5	Divide 3-digits by 1-digit (grouping)	Place value counters Place value grid Written short division			

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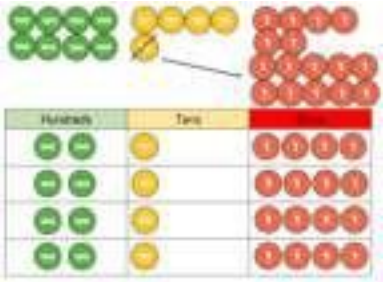
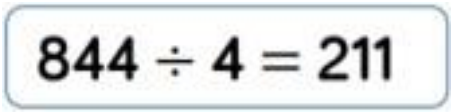
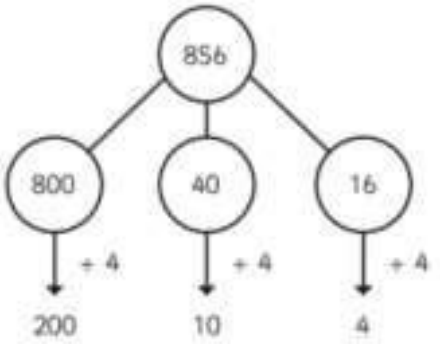
			 Children can continue to use place value counters to share 3-digit numbers into equal groups. Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows. This method can also help to highlight remainders.		  Flexible partitioning in a part-whole method supports this method

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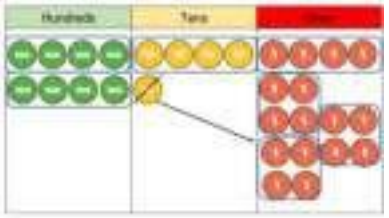
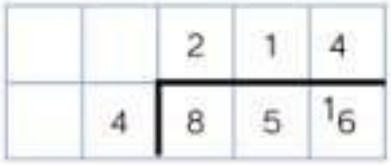
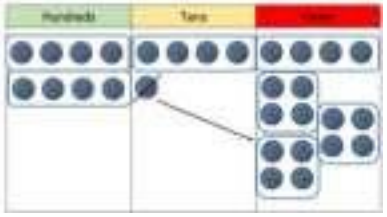
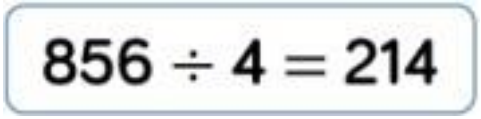
5	Divide 3-digits by 1-digit (grouping)	Place value counters Place value grid Written short division		Children can also draw their own counters and group them through a more pictorial method.	

			 Children can continue to use grouping to support their understanding of short division when dividing a 3-digit number by a 1-digit number. Place value counters or plain counters can be used on a place value grid to support their understanding.		

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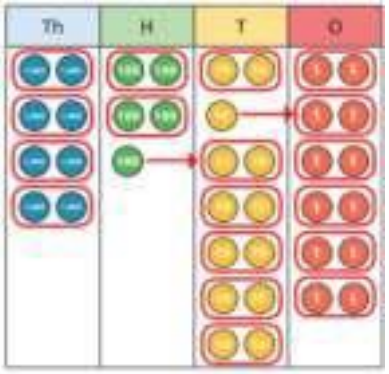
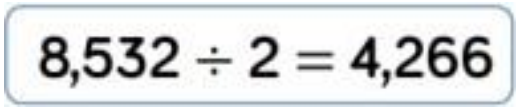
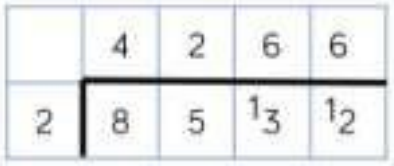
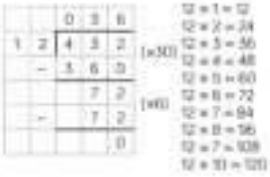
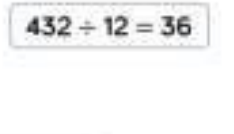
5	Divide 4-digits by 1-digit (grouping)		 Place value counters or plain counters can be used on a place value grid to support children to divide 4-digits by 1-digit	Children can also draw their own counters and group them through a more pictorial method.	  Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges.
6	Divide multi-digits by 2-digits (long division)	Written short division List of multiples			    Children can write out multiples to support their calculations with larger remainders. Children will also solve problems with remainders where the quotient can be

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					rounded as appropriate.

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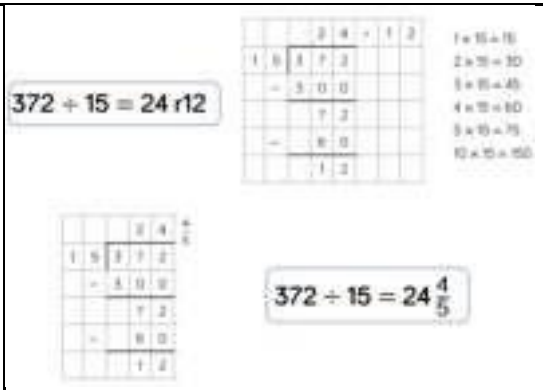
6	Divide multi-digits by 2-digits (long division)				 When a remainder is left at the end of a calculation, children can either leave it as a remainder or convert it to a fraction. This will depend on the context of the question. Children can also answer questions where the quotient needs to be rounded according to the context.

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Glossary

Addend - A number to be added to another.

Aggregation - combining two or more quantities or measures to find a total.

Augmentation - increasing a quantity or measure by another quantity.

Commutative – numbers can be added in any order.

Complement – in addition, a number and its complement make a total e.g. 300 is the complement to 700 to make 1,000

Difference – the numerical difference between two numbers is found by comparing the quantity in each group.

Exchange – Change a number or expression for another of an equal value.

Minuend – A quantity or number from which another is subtracted.

Partitioning – Splitting a number into its component parts.

Reduction – Subtraction as take away.

Subitise – Instantly recognise the number of objects in a small group without needing to count.

Subtrahend - A number to be subtracted from another.

Sum - The result of an addition.

Total – The aggregate or the sum found by addition.

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Glossary

Array – An ordered collection of counters, cubes or other item in rows and columns.

Commutative – Numbers can be multiplied in any order.

Dividend – In division, the number that is divided.

Divisor – In division, the number by which another is divided.

Exchange – Change a number or expression for another of an equal value.

Factor – A number that multiplies with another to make a product.

Multiplicand – In multiplication, a number to be multiplied by another.

Partitioning – Splitting a number into its component parts.

Product – The result of multiplying one number by another.

Quotient – The result of a division

Remainder – The amount left over after a division when the divisor is not a factor of the dividend.

Scaling – Enlarging or reducing a number by a given amount, called the scale factor