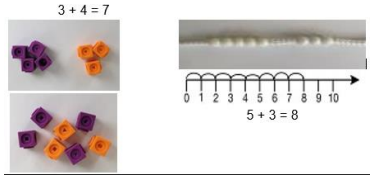
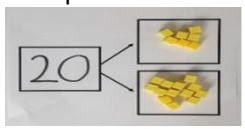
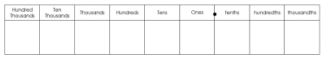
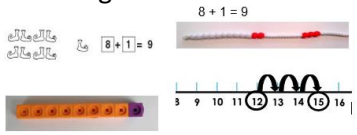
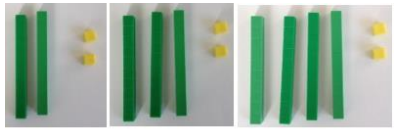
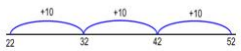
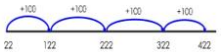
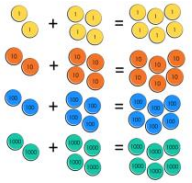
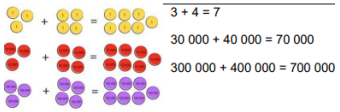
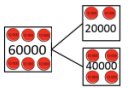
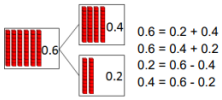
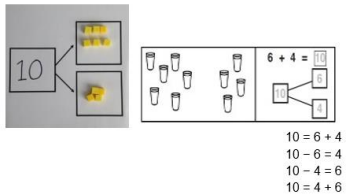
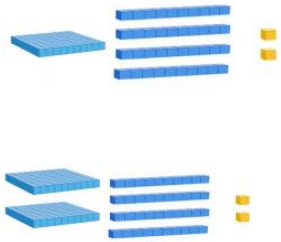
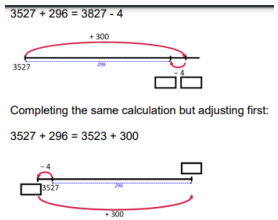
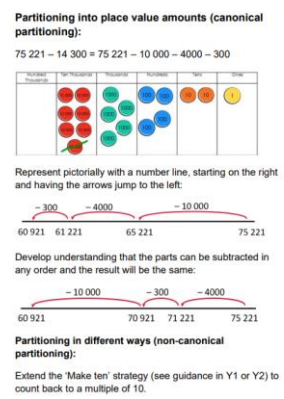
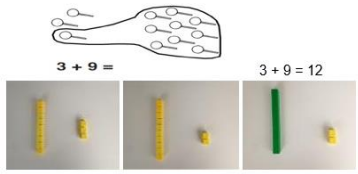
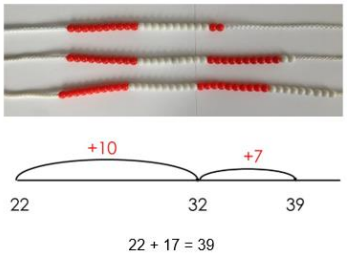
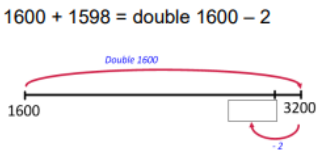
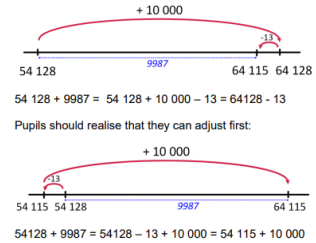
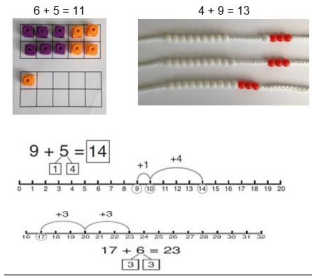
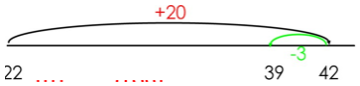
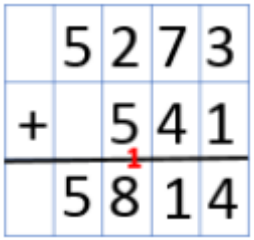
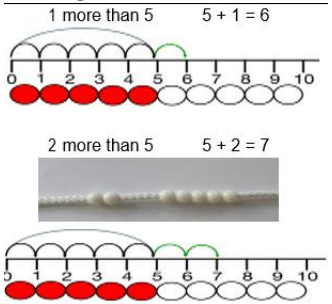
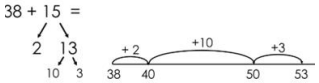
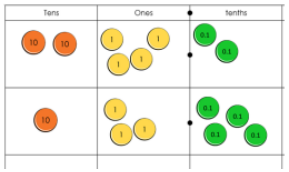
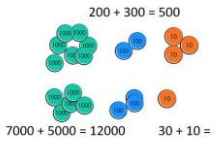
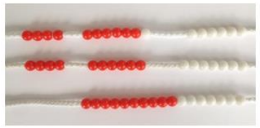
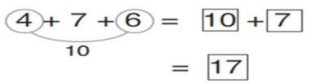
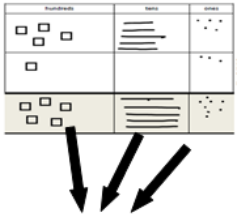
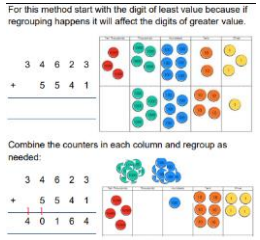
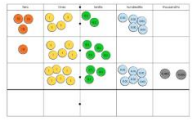
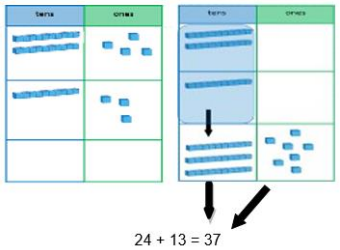
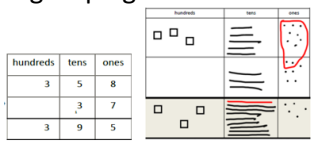
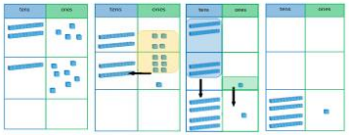
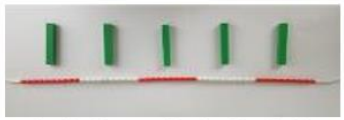
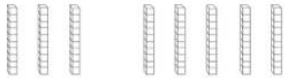
Addition Strategies for Years 1 to 6.

	Year 1	Year 2	Year 3	Year 4	Year 5 & Year 6
Strategy	Count all 	Part-part-whole  20 = 17 + 3 20 = 3 + 17 20 – 3 = 17 20 – 17 = 3	Add and subtract numbers mentally, including: • a three-digit number and ones; • a three-digit number and tens; • a three-digit number and hundreds No regrouping 345 + 30 1128 + 300 326 + 342 274 - 50 1312 - 300 856 - 724  I know 4 + 3 = 7, so 4 tens plus 3 tens is equal to 7 tens. 345 + 30 = 375. With some regrouping 416 + 25 383 + 130 611 + 194 1482 + 900 232 - 5 455 - 216 130 - 40 2382 - 500	Count forwards and backwards in steps of 10, 100 and 1000 for any number up to 10 000.   Pay particular attention to boundaries where regrouping happens more than once and so more than one digit changes. E.g. 990 + 10 or 19.9 + 0.1	Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 Support with place value counters on a place value chart, repeatedly adding the same counter and regrouping as needed.  Counting sticks and number lines:   Pay particular attention to boundaries where regrouping happens more than once and so more than one digit changes. e.g. 9900 + 100 = 10 000 or 99 000 + 1000 = 100 000
	Counting On 	Counting on in tens and hundreds   	Written column method for calculations that require regrouping with up to 4-digits They should be encouraged to calculate with known and derived facts and should not rely on counting images or manipulatives.	Using known facts and knowledge of place value to derive facts. Add and subtract multiples of 10, 100 and 1000 mentally  2 + 4 = 6 20 + 40 = 60 200 + 400 = 600 2000 + 4000 = 6000	Using known facts and understanding of place value to derive  20 000 + 40 000 = 60 000 40 000 + 20 000 = 60 000 60 000 - 40 000 = 20 000 60 000 - 20 000 = 40 000   0.6 = 0.2 + 0.4 0.6 = 0.4 + 0.2 0.2 = 0.6 - 0.4 0.4 = 0.6 - 0.2

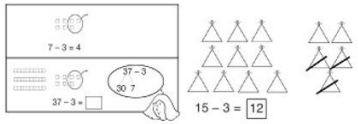
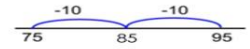
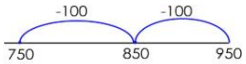
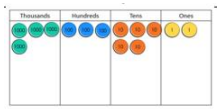
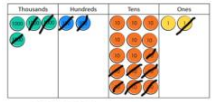
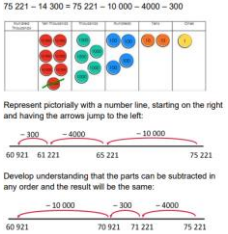
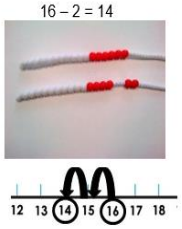
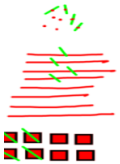
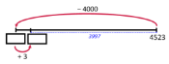
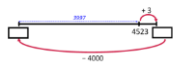
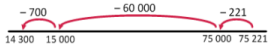
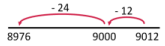
			5 + 6 = 11 so I will have 11 ones which I regroup for 1 ten and 1 one. Regrouping (including multiple separate instances) 672 + 136 734 – 82 468 + 67 831 - 76 275 + 386 435 – 188 'Regrouping to regroup' 204 – 137 1035 - 851		
	Part Whole  	Using known facts to create derived facts 3 + 4 = 7 leads to 30 + 40 = 70 leads to 300 + 400 = 700	Find 10, 100 more or less than a given number 142 + 100 = 242 	Round and adjust  Completing the same calculation but adjusting first: 3527 + 296 = 3523 + 300 	Partitioning one number and applying known facts to add. 
	Regrouping ten ones to make ten  	Partitioning one number, then adding tens and ones  22 + 17 = 39		Near doubles  	Round and adjust 
	'Make ten' strategy	Round and adjust (sometimes known as a compensating strategy)		Written column methods for addition	Near doubles

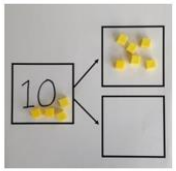
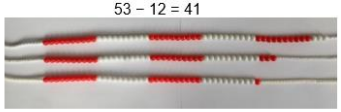
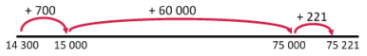
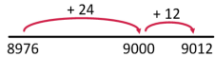
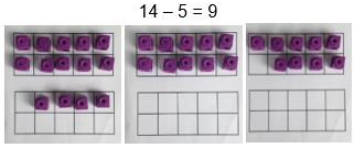
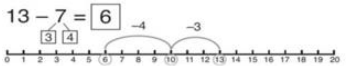
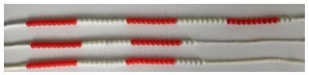
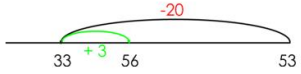
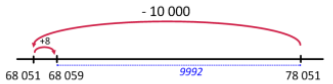
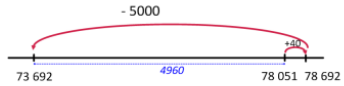
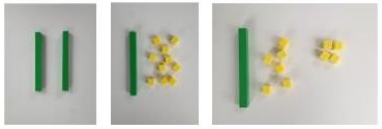
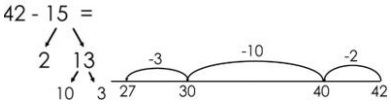
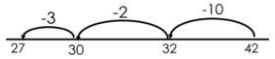
				 	160 + 170 = double 150 + 10 + 20 160 + 170 = double 160 + 10 or 160 + 170 = double 170 - 10 2.5 + 2.6 = double 2.5 + 0.1
	Adding 1,2,3 more 	Make ten strategy  		Calculating with decimal numbers 24.2 + 13.4 = 	Partition both numbers and combine the parts 7230 + 5310 = 12 000 + 500 + 40  Pupils should be aware that the parts can be added in any order.
	Adding three single digit numbers (make ten first)  	Partitioning to add without regrouping  455 + 103 = 558			Written column methods for addition 

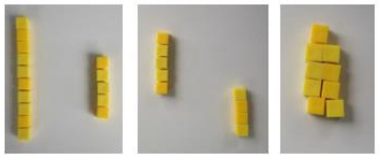
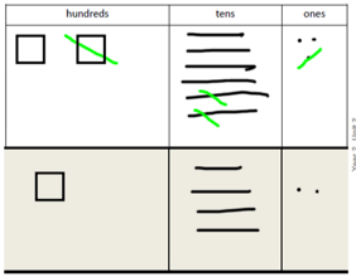
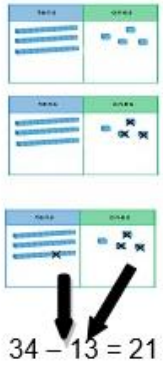
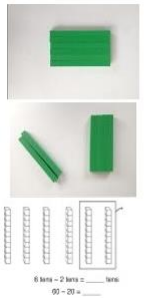
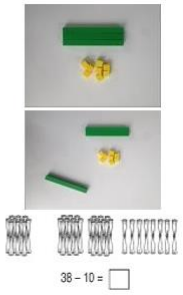
					Decimal numbers:  3 4 . 2 5 1 5 . 4 + 6 . 3 6 2 5 6 . 0 1 2
	Partitioning to add (no regrouping) 24 + 13 = 37  24 + 13 = 37	Column method with regrouping  hundreds tens ones 3 5 8 3 7 3 9 5			
	Introducing column method for addition regrouping only  Tens Ones 2 4 + 1 7 1 4 1				
	Adding multiples of ten				

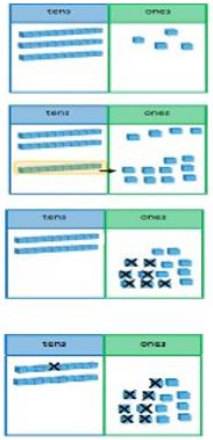
	50 = 30 + 20   3 tens + 5 tens = _____ tens 30 + 50 = _____  36 + 40 =				

Subtraction Strategies for Years 1 - 6.

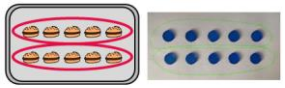
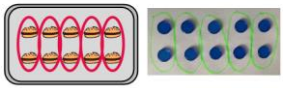
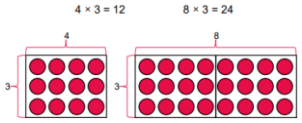
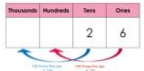
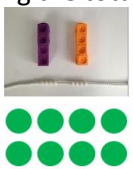
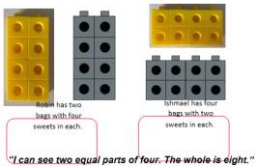
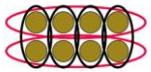
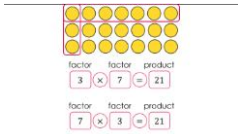
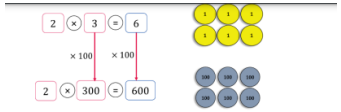
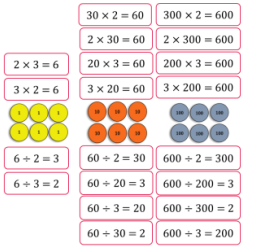
	Year 1	Year 2	Year 3	Year 4	Year 5 & 6
Strategy	Taking away from the ones   	Counting back in multiples of ten and one hundred    	Add and subtract numbers mentally, including: • a three-digit number and ones; • a three-digit number and tens; • a three-digit number and hundreds No regrouping 345 + 30 1128 + 300 326 + 342 274 - 50 1312 - 300 856 - 724  I know 4 + 3 = 7, so 4 tens plus 3 tens is equal to 7 tens. 345 + 30 = 375. With some regrouping 416 + 25 383 + 130 611 + 194 1482 + 900 232 - 5 455 - 216 130 - 40 2382 - 500	Written column methods for subtraction   4 2 3 1 5 2 - 3 2 7 1 1 0 8 1	Subtraction by partitioning and applying known facts. 
	Counting back    	Using known number facts to create derived facts  8 – 4 = 4 *leads to* 80 – 40 = 40 *leads to* 800 – 400 = 400	Written column method for calculations that require regrouping with up to 4-digits They should be encouraged to calculate with known and derived facts and should not rely on counting images or manipulatives. 5 + 6 = 11 so I will have 11 ones which I regroup for 1 ten and 1 one. Regrouping (including multiple separate instances) 672 + 136 468 + 67 275 + 386 734 – 82 831 - 76 435 – 188 'Regrouping to regroup' 204 – 137 1035 - 851	Round and adjust 4523 – 3997 = 523 + 3  Completing the same calculation but adjusting first: 4523 – 3997 = 4526 - 4000  	Calculate difference by "counting back" 75 221 – 14 300 Place the numbers either end of a numberline and work out the difference between them. Select efficient jumps.  Finding the difference is efficient when the numbers are close to each other: 9012 – 8976 

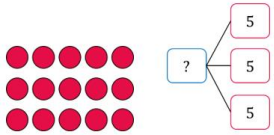
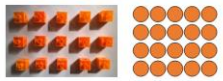
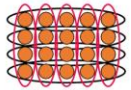
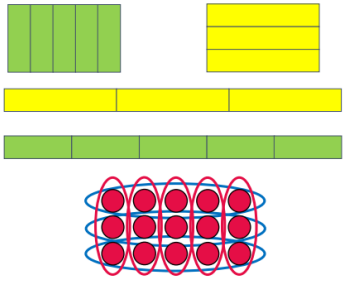
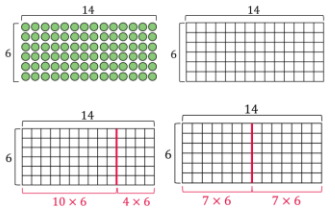
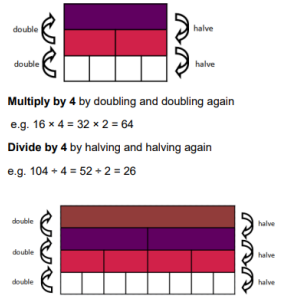
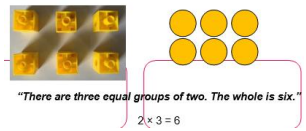
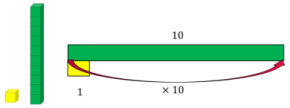
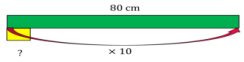
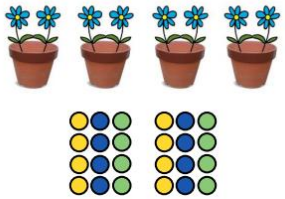
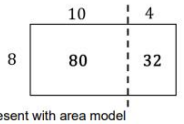
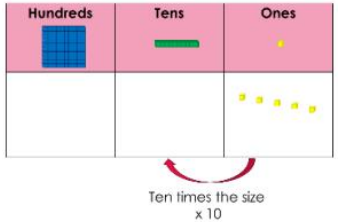
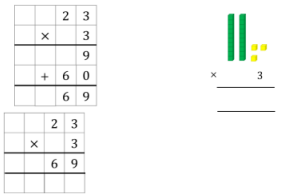
	Part-part-whole 10 – 6 = 4   	Subtracting tens and ones 53 – 12 = 41   	Find 10, 100 more or less than a given number 142 + 100 = 242  		Calculate difference by “counting on” 75 221 – 14 300  Finding the difference is efficient when the numbers are close to each other 9012 – 8976 
	Make ten strategy 14 – 5 = 9  13 – 7 = 6  	Round and adjust (sometimes known as a compensating strategy)   53 – 17 = 36			Round and adjust **Subtraction**  78 051 – 9992 = 78 051 – 10 000 + 8 = 68 051 + 8 Pupils should realise that they can adjust first:  78 051 – 4960 = 78 051 + 40 – 5000 = 78 692 - 5000
	Regroup a ten into 10 ones 	Make ten  42 - 15 =   			Written column methods for subtraction 
	Taking away from the tens	Partitioning to subtract without regrouping			

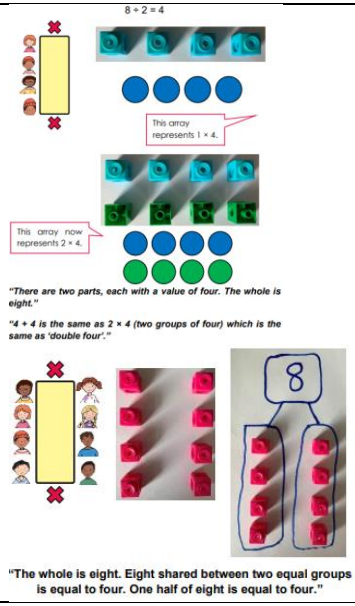
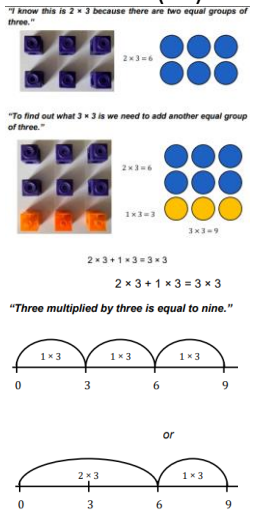
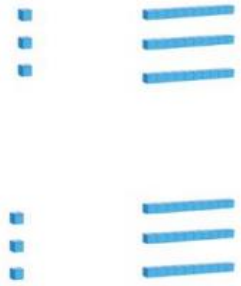
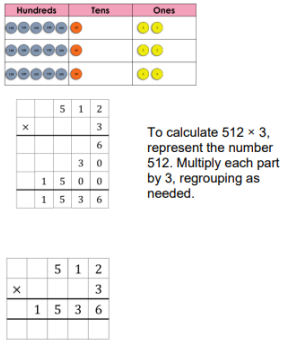
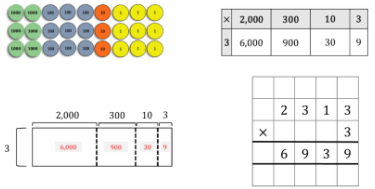
	9 = 15– 6   16 – 8 = 8	 263 – 121= 142			
	Partitioning to subtract without regrouping 34 – 13 = 21  34 – 13 = 21	Column method with regrouping hundreds tens ones 1 3 4 1 7 - 1 8 1 2 9 			
	Subtracting multiples of ten 40 = 60 – 20  38 – 10 = 28  38 – 10 =				
	Column method with regrouping				

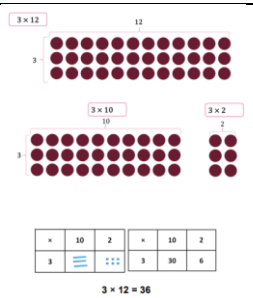
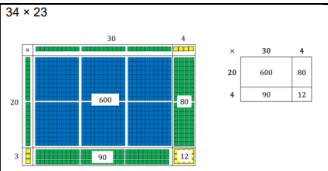
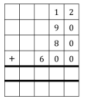
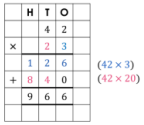
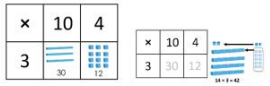
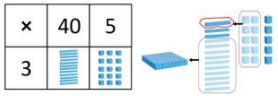
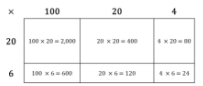
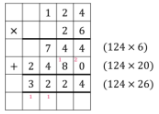
	34 − 17 = 17  				

Multiplication Strategies from Years 1 - 6

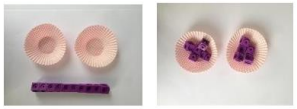
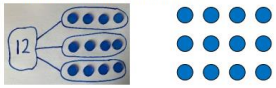
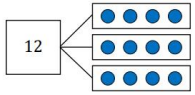
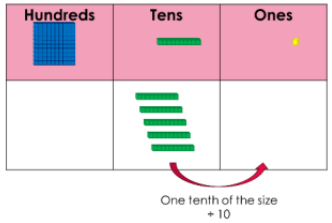
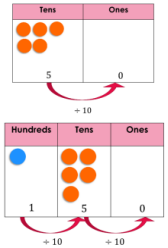
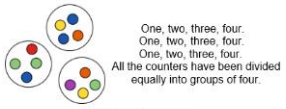
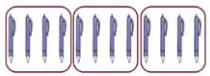
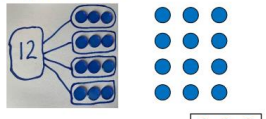
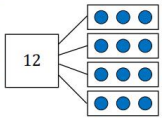
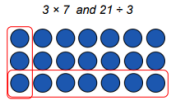
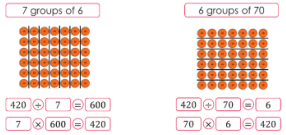
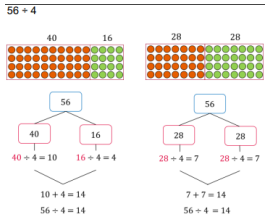
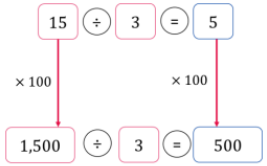
	Year1	Year 2	Year 3	Year 4	Year 5 & 6
Strategy	Skip counting in multiples of 2, 5, 10 from zero  *5, 10, 15, 20*  *2, 4, 6, 8*	Making and describing equal and unequal groups  **"I can see two equal groups, each with a value of five. The whole is ten."** 2 × 5 = 10  **"I can see five equal groups, each with a value of two. The whole is ten."** 5 × 2 = 10	Doubling to derive new multiplication facts  4 × 3 = 12 8 × 3 = 24 When we double one factor, the product will be double the size.	Multiplying by 10 and 100  *Five made ten times the size is 50.* *50 is ten times the size of five.* *Five multiplied by ten is 50.*  *26 made 100 times the size is 2,600.* *26 multiplied by 100 is equal to 2,600.* *First, we had 26 ones. Now we have 26 hundreds.*	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000 Ruby walked 130 m. Her mum walked 100 times as far. How far did Ruby's mum walk?  *13,000 m is one hundred times as far as 130 m.* *When you multiply by one hundred, each part is ten times the size. The ones become hundreds, the tens become thousands, etc.*
	Making equal groups and counting the total  *There are four **equal groups** of two. There are eight altogether. The **whole** is eight.*	Drawing around equal groups to show multiplication is commutative  ***"I can see two equal parts of four. The whole is eight."*** Or ***"I can see four equal parts of two. The whole is eight."*** 2 × 4 = 8 and 4 × 2 = 8 	Skip counting in multiples of 2, 3, 4, 5, 8 and 10  0 3 6 9 12 15 18 21 24 27 30  3, 6, 9, 12, 18	Using known facts and place value for mental multiplication involving multiples of 10 and 100  ***Factors** are numbers that are multiplied together to make another number.* *A **product** is the number made when other numbers are multiplied.*	Using known facts and place value to derive multiplication facts  *If one factor is made one hundred times the size, the product will become one hundred times the size.* 
	Solve multiplication problems using concrete or pictorial Representations and skip counting.	Use of an array to establish the inverse relationship between multiplication and division	Use of Cuisennaire with arrays and bar models to establish commutativity and inverse relationship between multiplication and division	Multiplying by partitioning one number and multiplying each part	Doubling and Halving

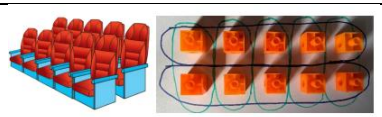
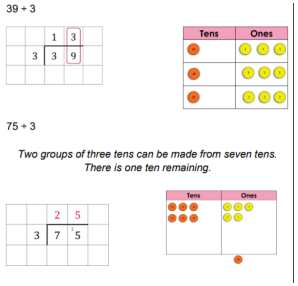
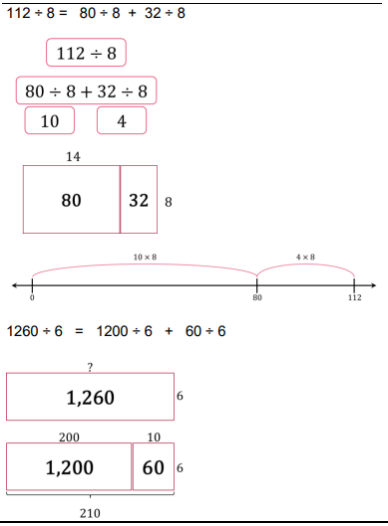
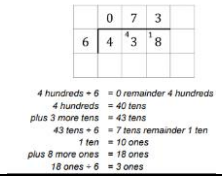
	How many are there altogether?  *There are four equal groups. There are five pens in each group.* *5, 10, 15, 10* *The whole is 20. There are 20 pens altogether.*  *There are three equal groups of five.* *5, 10, 15. The whole is 15.*	There are five tables. 20 children need to sit down. Each table seats four. Each table seats four children. 20 children can sit down. There are five tables.  *"There are five equal parts, each with a value of four. The whole is 20."* *"I know the whole is 20 and the value of each part is four. The number of parts needed is five."*  4 × 5 = 20 and 5 × 4 = 20 20 ÷ 4 = 5 and 20 ÷ 5 = 4	*Three groups of five is equal to five groups of three.*  3 × 5 = 5 × 3	14 × 6 	 **Multiply by 4** by doubling and doubling again e.g. 16 × 4 = 32 × 2 = 64 **Divide by 4** by halving and halving again e.g. 104 ÷ 4 = 52 ÷ 2 = 26 **Multiply by 8** by doubling three times e.g. 12 × 8 = 24 × 4 = 48 × 2 = 96 **Divide by 8** by halving three times e.g. 104 ÷ 8 = 52 ÷ 4 = 26 ÷ 2 = 13
		Adding and subtracting equal groups to support skip counting  *"There are three equal groups of two. The whole is six."* 2 × 3 = 6	Ten times the size  *For every one I need to use a ten. 10 is ten times the size of one.* 	Mental multiplication of three 1- digit numbers, using the associative law Four pots each containing two flowers which each have seven petals. How many petals in total? (4 × 2) × 7 or 4 × (2 × 7)  3 × 4 × 2 *Three groups of four, two times* *Multiplication can be done in any order.* *The order of the factors does not alter the product.*	Multiply by partitioning one number and multiplying each part 8 × 14 = 8 × 10 + 8 × 4  Represent with area model  Jottings on a number line
		Halving and doubling to derive new multiplication facts	Multiplying by 10  *5 made 10 times the size is 50.* *50 is ten times the size of 5.* *5 multiplied by ten is 50.*	Short multiplication of a 2-digit number by a 1-digit number **Expanded layout** **Compact layout**  *If there are ten or more ones, we regroup the ones into tens and ones.* *If there are ten or more tens, we regroup the tens into hundreds and tens.*	Using knowledge of factors Calculate 6 × 24 by using factor pairs of 24 Two and twelve are factors of 24: 6 × 2 × 12 6 × 12 × 2  Three and eight are factors of 24: 6 × 3 × 8 6 × 8 × 3  Four and six are factors of 24: 6 × 4 × 6 6 × 6 × 4 

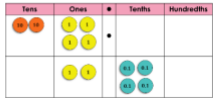
					
		Representing known facts to derive new facts using and combining arrays and on a number line (3×) 	Using known facts for multiplying by multiples of 10 3 × 2 = 6 30 × 2 = 60 	Short multiplication of 3-digit number by 1-digit number 	Multiplying 3- or 4-digit number by a 1-digit number using the formal written method of short multiplication 
			Multiplication of 2- digit numbers with partitioning (no regrouping)		Multiplying by a 2-digit number Formal written method of long multiplication

					34 × 23   42 × 23  
			Multiplication of 2- digit numbers with partitioning (regrouping)   1) First, I need to partition my 2-digit number into tens and ones. 2) I need to multiply my ones by ___. There are ____ ones. I can regroup my ones into ___ or I do not need to regroup my ones. 3) I need to multiply my tens by ___. There are ____ tens. I can regroup my tens into ___ or I do not need to regroup. 4) I can add the tens and ones to get the product. ___ multiplied by ___ is ___.		Multiplying a 3- or 4- digit number by a 2- digit number. 124 × 26  

Division Strategies from Year 1- 6.

	Year1	Year 2	Year 3	Year 4	Year 5 & 6
Strategy	Sharing objects into groups (Partitive division) Share ten into two equal groups.  The whole is ten. There are two equal groups. Each groups has five.	Sharing objects into a given number of groups (Partitive division) *There are 12 children altogether.* *There are three rows on the carpet.* *How many children will there be in each row?*  ***"We know the whole is 12. We know there are three parts. We don't know the value of the parts."*** 	Dividing by 10  One tenth of the size ÷ 10	Dividing by 10 and 100  *I'm making 150 one-hundredth the size.* *This is the same as dividing by 100.*	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000  0.132 1.32 13.2 *1.32 ÷ 10 = 0.132* *0.132 is one-tenth the size of 1.32.* *13.2 ÷ 100 = 0.132* *0.132 is one-hundredth the size of 13.2* *When you divide by ten, each part is ten times smaller. The hundreds become tens and the tens become ones. Each digit is in a place that gives it a value that is ten times smaller.*
	Grouping objects (Quotative division)  One, two, three, four. One, two, three, four. One, two, three, four. All the counters have been divided equally into groups of four. There are three groups. 12 shared equally into groups of four makes three groups. 	Grouping objects into sets of equal groups (Quotative division) *There are 12 children altogether.* *The children sit on the carpet in rows of three.* *How many rows will there be?*  ***"We know the whole is 12. We know the value of each part is three. We don't know the number of parts."*** 	Dividing a 2-digit number by a 1-digit number (no regrouping) 64 ÷ 2 =  64 60 4 60 ÷ 2 = 30 4 ÷ 2 = 2 64 ÷ 2 = 32	Derived facts *3 × 7 and 21 ÷ 3*  *If I know 42 ÷ 7 = 6, then I know:* 7 groups of 6 6 groups of 70 	Doubling and Halving  **Multiply by 4** by doubling and doubling again e.g. 16 × 4 = 32 × 2 = 64 **Divide by 4** by halving and halving again e.g. 104 ÷ 4 = 52 ÷ 2 = 26  **Multiply by 8** by doubling three times e.g. 12 × 8 = 24 × 4 = 48 × 2 = 96 **Divide by 8** by halving three times e.g. 104 ÷ 8 = 52 ÷ 4 = 26 ÷ 2 = 13
		Use of an array to establish the inverse relationship between multiplication and division and derive facts		Division of 2-digit numbers by a 1-digit number 	Deriving facts from known facts  *If the dividend is made one hundred times the size, the quotient will be one hundred times the size.*

		 *"I can see two equal groups of five which is equal to ten."* *"I can see ten divided into five equal groups of ten."* *"One half of ten is equal to five."* *"One fifth of ten is equal to two."* $2 \times 5 = 10$ and $5 \times 2 = 10$ $10 \div 2 = 5$ and $10 \div 5 = 2$ $\frac{1}{2}$ of ten is equal to five $\frac{1}{5}$ of ten is equal to two			
				Short division of 2- digit numbers by a 1- digit number 39 ÷ 3  75 ÷ 3 *Two groups of three tens can be made from seven tens.* *There is one ten remaining.* 	Using knowledge of multiples to divide 
				Short division of a 3- digit number by a 1- digit number 438 ÷ 6 	Using knowledge of factors to divide

					144 ÷ 24 24 ? 144 *I know 2 and 12 are a factor pair of 24 and so I can divide by 2 and then by 12.* *144 ÷ 2 ÷ 12* 12 12 ? 72 72 144
				Division of a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths 24 ÷ 10 = 2.4  	Short division Dividing a 4-digit numbers by 1-digit numbers 8528 ÷ 4 2 1 3 2 4 8 5 1 2 8
					Long division Dividing a 4-digit number by a 2-digit number 3 4 12 | 4 0 8 3 6 4 8 4 8 0