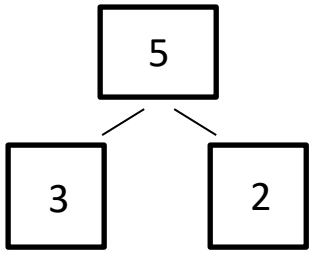
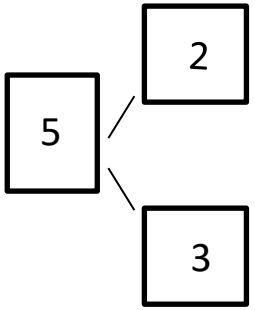
Maths
Calculations Policy
2026

Part, part, whole diagrams are neater if set out in rectangles when children draw them in books rather than cherry diagrams e.g.





This policy has been designed to teach children using concrete, pictorial and abstract methods. This calculation policy should be used to support children to develop a deep understanding of number and calculation alongside the NCETM curriculum prioritisation resources and PD spines.

Background
This policy has been developed by Maths Coordinators with a specific interest in the use of Singapore methods to develop number awareness and fluency.
The policy only details the strategies; teachers must plan opportunities for pupils to apply these; for example, when solving problems, or where opportunities emerge elsewhere in the curriculum.

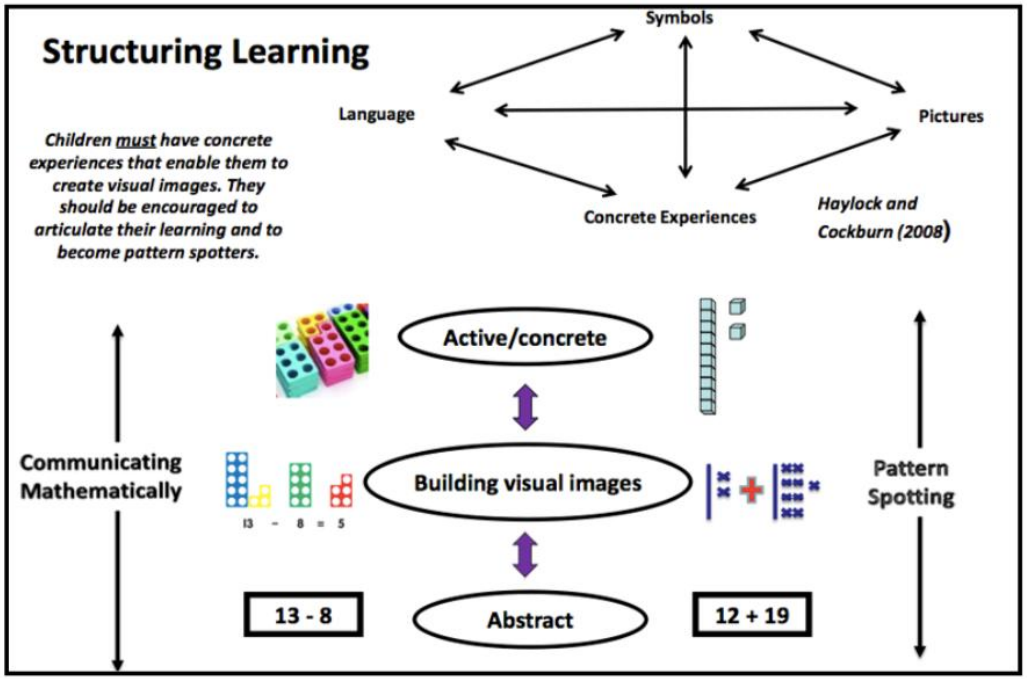
Using the concrete-pictorial-abstract approach:
Children develop an understanding of a mathematical concept through the three steps (or representation) of concrete-pictorial-abstract approach. Reinforcement is achieved by going back and forth between these representations.

Concrete representation The enactive stage - a pupil is first introduced to an idea or a skill by acting it out with real objects. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.

Pictorial representation The iconic stage - a pupil has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

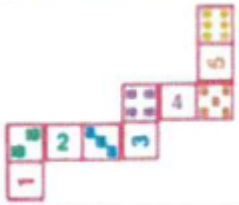
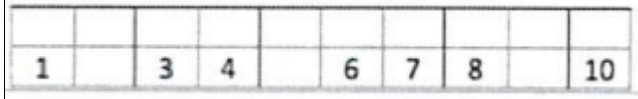
Abstract representation The symbolic stage - a pupil is now capable of representing problems by using mathematical notation, for example: 12 ÷ 2 = 6 .

Guidance
This is document provides guidance and examples for key objectives for each year group but is not to be followed as a complete planning aid as not all objectives are exemplified.



EYFS Developing Number Sense

Ordinality:

Concrete	Pictorial	Abstract
Children place a range of physical dominoes in order. 	Children match representations in order. 	Children fill in spaces on a partially filled number track and create representations to show different totals (helping make the link from ordinality to cardinality) 

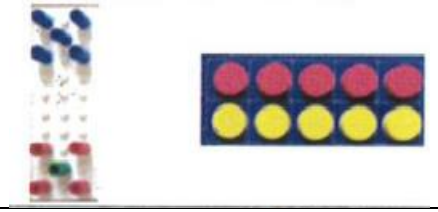
Ordinal numbers:

Concrete	Pictorial	Abstract
Children line up ducks in a row and verbally label them, e.g. 'first/second/third.' 	Children order pics or slides on IWB of ducks. 	Children apply their understanding of ordinal numbers, e.g. by using written 1st, 2nd and 3rd labels and using verbally language. 

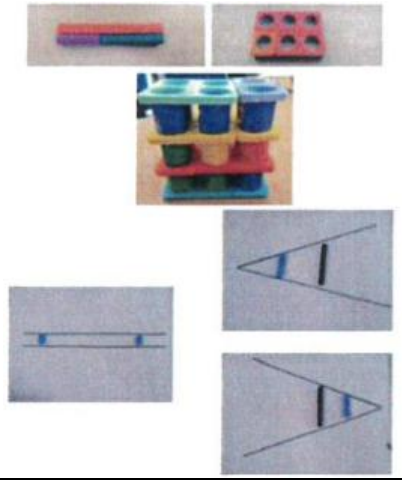
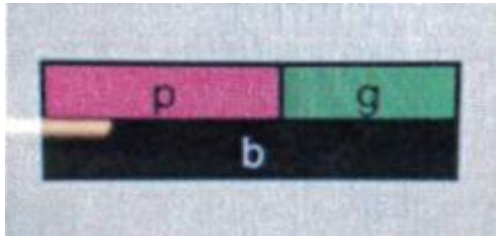
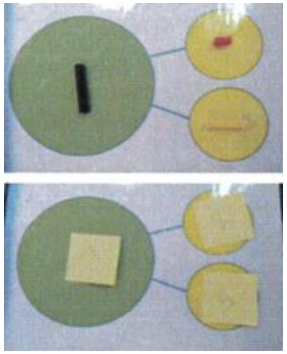
Cardinality:

Concrete	Pictorial	Abstract
Children use a range of structured and unstructured apparatus, inc natural resources, to create different number values. 	Children recognise different number values that are presented in pictorial forms. 	Children are asked a range of questions which show an understanding or cardinality, e.g. Can you find a collection of [objects] to represent six? Can you show me six fingers?

Subitising:

Concrete	Pictorial	Abstract
Children replicate a range of physical representations, which they can then verbally interpret without the need to count objects. 	Children use picture prompts to practice their recognition of number representations and play games on the IWB. 	Children use finger paint to show various 1-6 representations. 

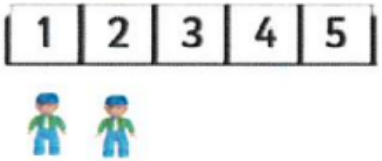
Equality:

Concrete	Pictorial	Abstract
Use physical equipment when learning about equality (and inequality) and use related language, e.g. 'the same as', 'more than and less than.' 	Use pictorial representations to show equality or values that are the 'same as' whilst also verbalizing their reasoning. E.g. 'pink and green are the same as black.' 	Use the cherry model to record either written numerals or pictorial representations that highlight the concept of 'the same as.' 

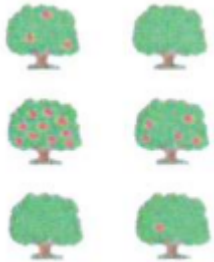
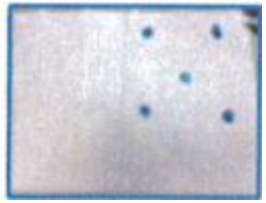
1 to 1 correspondence:

Concrete	Pictorial	Abstract
Count various physical objects by partitioning a group and finally recombining. 	Count the dots on the face of a pictorial dice. 	Draw dots to match the number of holes that can be seen on a named Numicon shape. 
Children write a number in each part of a muffin tray and put the appropriate number of buttons in each section. 	Match number cards to pictures of buttons. 	Cut out buttons equal to the number shown on a number card. 

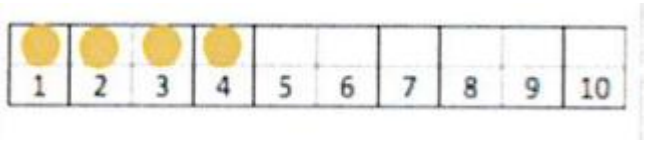
Conservation of number:

Concrete	Pictorial	Abstract
 Explore whether the number of cubes stay the same or change hen moved around a shape.  Count dolls, put them in rooms then recount to check the total. Agree the total has stayed the same.	Children work with visual reminders of their concrete experiences – to check their understanding around conservation of number has changed.  	Provide further opportunities to explore and prove their thinking. E.g. put 6 dolls in the house and then move them around. In order to prove there are still 6, they could place them on a number track – applying their understanding of the cardinal principle. 

Concept of zero:

Concrete	Pictorial	Abstract
Use a shuffle box with up to 10 objects in. Children write the corresponding number sentence for where the objects land. E.g. 2=1+1. Query what happens if there is nothing on one side. Introduce the concept of zero, e.g. 2=2+0 	Use pictures to see that you can have an amount called 'zero.' Count the apples on the tree and circle the one which has no apples. 	Be encouraged to write written sentences for shuffle box using finger paints, e.g. 5=0+5.  Grasp the concept of zero to use within number sentences, e.g. 4=4+0 and verbalise 'I know that four is the same as four add zero.'

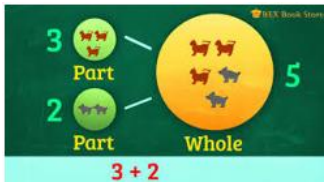
Counting on:

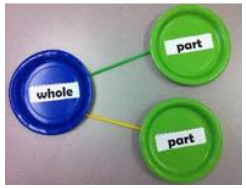
Concrete	Pictorial	Abstract
Use physical objects to learn the skill. E.g. count on from larger value by using their fingers whilst pointing at each 'extra' dot on the second side of the domino.  Use counters on number tracks to rehearse counting on. 	Use a die to generate numbers and count on from pictorial representations of counter already positioned on a number track. 	Play games like snakes and ladders. 

EYFS Addition

Part, whole, add, more, plus, and , make, altogether, makes, sum, total, how many, greater

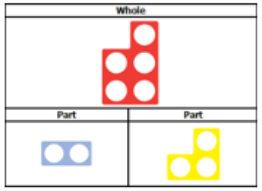
Concrete



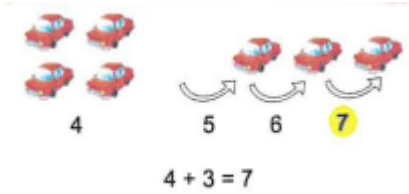


Explore part whole relationships.

Use numicon to develop mental representations of number.

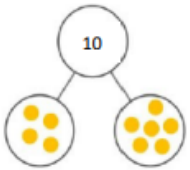


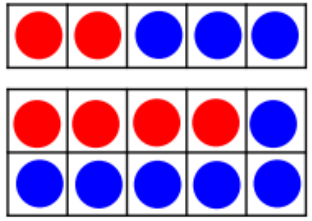
Say which number is one more or one less



Use objects to add 2 single digits by counting on to find answer.

Composing numbers using concrete apparatus such as five / ten frames [working within 10]





Number tracks can be used to support finding one more then a given number.

1	2	3	4	5	6

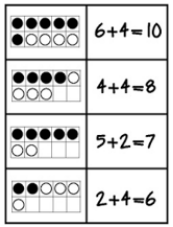
Addition as increasing by combining two or more groups using concrete apparatus. Children construct calculations verbally or using cards [encourage notations when appropriate]

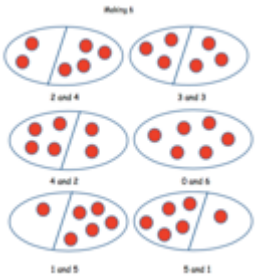
3 + 1 = 4

Solving problems – Sara has 2 apples, Jon has 5 apples. How many altogether?

Pictorial

Develop ways of recording calculations using pictures.





Use ten frames drawings to support addition of single digits (counting all/combing two groups)

Count reliably number of objects in a picture and draw the correct amount specified by an adult.

Abstract

Recording one more and one less than calculations

4+1=5
7-1=6

Partitioning numbers
8= 8+0
8=7+1
8=6+2
8=5+3
Etc.

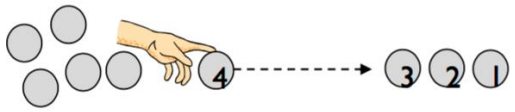
Writing calculations to show how a group increases when more are added alongside a verbal story
E.g. There were 5 cars and 4 more cars arrived. There are now 9 cars. 5+4=9

EYFS Subtraction

Part, whole, equal to, take away, less, minus, subtract, leaves, difference between, how many more, how many fewer, less than, most, least, count back, how many left, how much less is_?, left over, how many are gone

Concrete

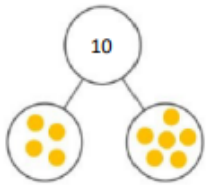
Taking away after counting out practical equipment. . Children would be encouraged to physically remove these using touch counting.

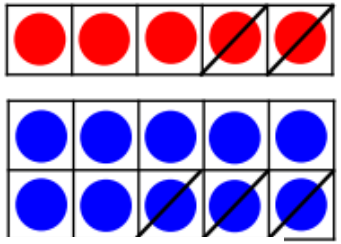


By touch counting and dragging in this way, it allows children to keep track of how many they are removing so they don't have to keep recounting. They will then touch count the amount that are left to find the answer.

Those who are ready may record their own calculations

Decomposing numbers using concrete apparatus such as five / ten frames [within 10]

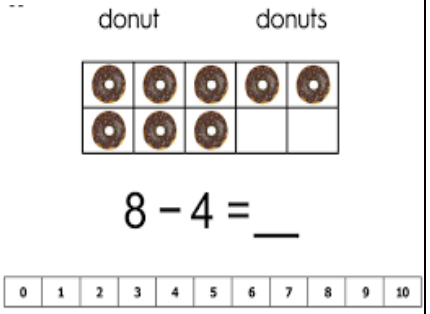




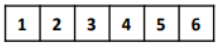
Subtraction as decreasing, taking away and finding the difference using concrete apparatus. Children construct calculations verbally or using cards [encourage notations when appropriate]

5 - 2 = 3

Use the ten frame to support subtraction by taking away.

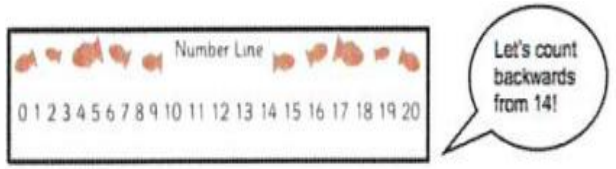


Number tracks can be used to support finding one less then a given number.

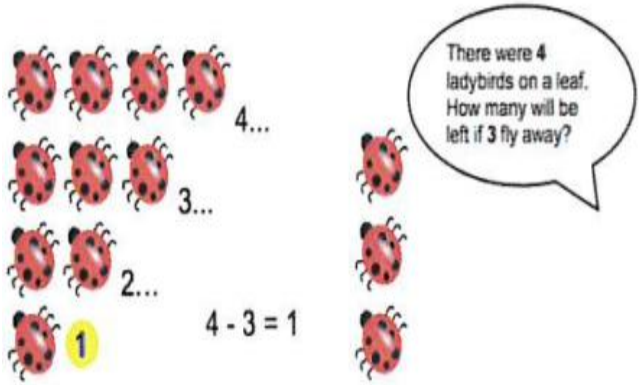


Pictorial

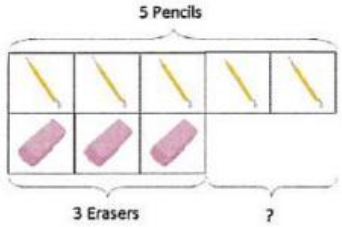
The first step to subtraction is being able to count backwards. Use pictures to subtract against a numberline.



Use counting back to solve subtractions of pictures.



Solve problems using concrete and pictorial images.

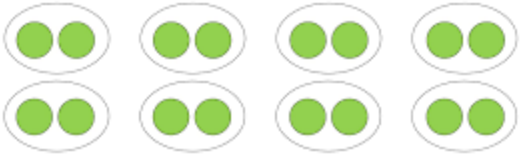


Abstract

Record number sentences when ready alongside concrete and pictures.

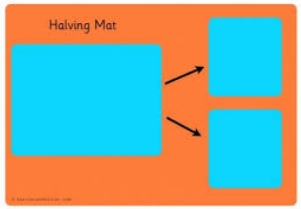
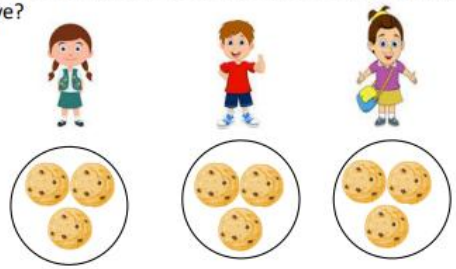
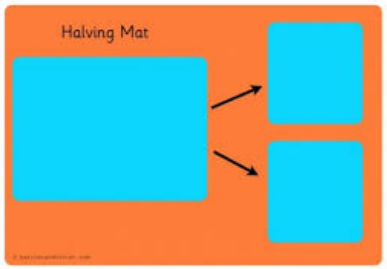
EYFS Multiplication

Part, whole, groups of, lots of, doubles, -times, once, twice, repeated addition

Concrete	Pictorial	Abstract
Children will experience equal groups of objects.  Use doubles  Practical problem solving – There are 6 pairs of socks. How many socks are there altogether? 	8 x 2 =  Draw or make 8 groups of 2 objects, then count or add to see how many altogether. Multiplication can be introduced through repeated addition and doubling related to real life contexts. Can you double the amount of spots on the ladybird?  This can be extended to writing the calculation by using addition [5+5=10]. Exceeding expectation - Children solve practical problems that involve combining groups of 2, 5, or 10. How many wheels are there altogether? 	Record equal groups as repeated addition 2+2+2+2=8 Doubles 4+4=8 5+5=10

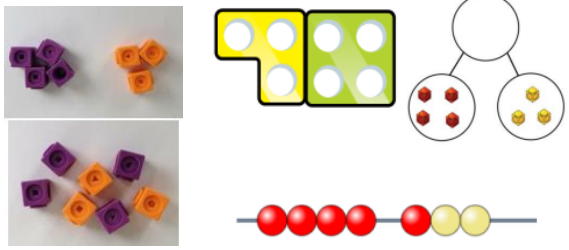
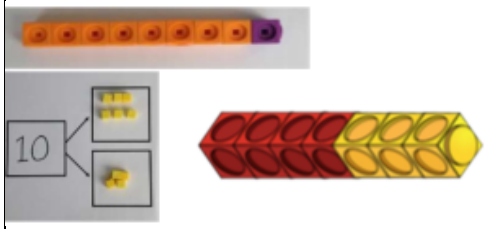
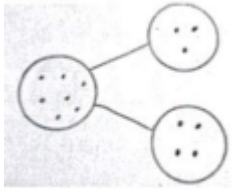
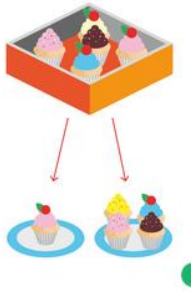
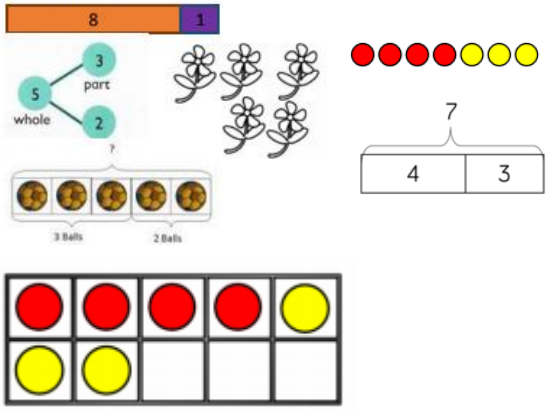
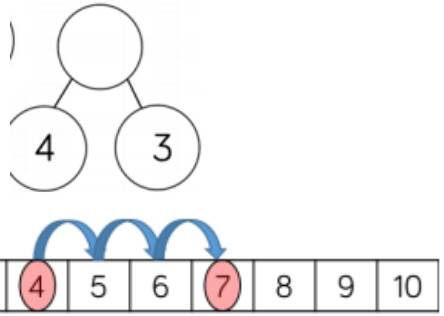
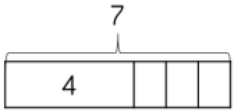
EYFS Division

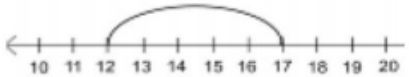
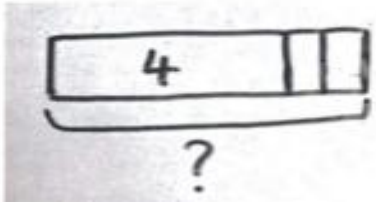
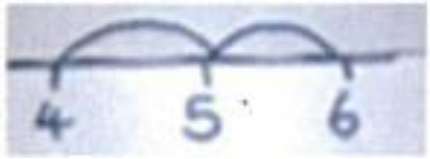
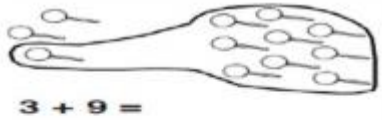
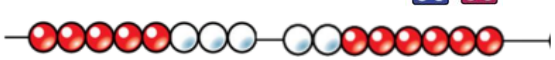
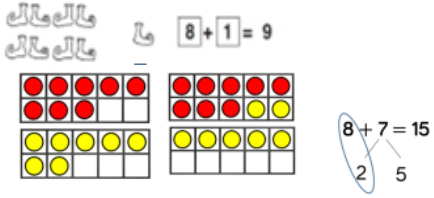
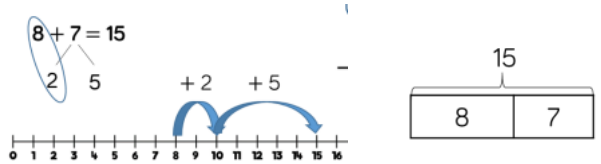
Part, whole, share, share equally, one each, two each, group, groups of, lots of, sharing into groups of, half, one each two each three each etc,

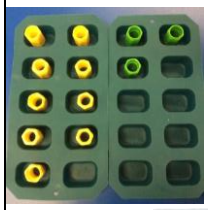
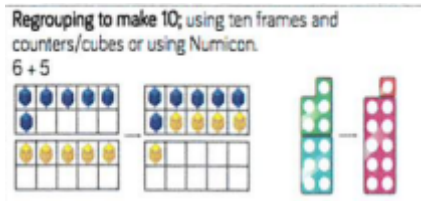
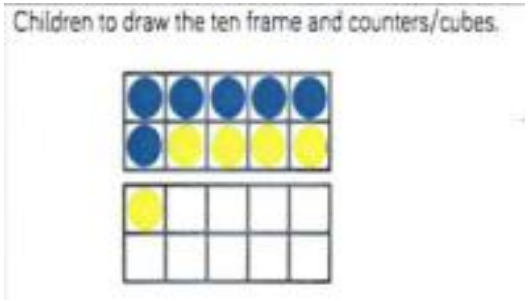
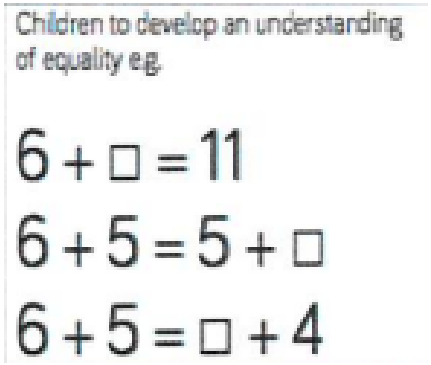
Concrete	Pictorial	Abstract
Put objects into groups of…  Half as the opposite of doubles   Dividing by sharing into equal groups related to real life contexts. There are 3 children and 12 biscuits. How many will each child have? 	Children will understand equal groups and draw pictures sharing objects out.  	

Year 1 Addition

Part, whole, addition, add, forward, put together, more than, total, sum, altogether, distance between, difference between, equals, =, same as, most, more, pattern, odd, eve, digit, counting on.

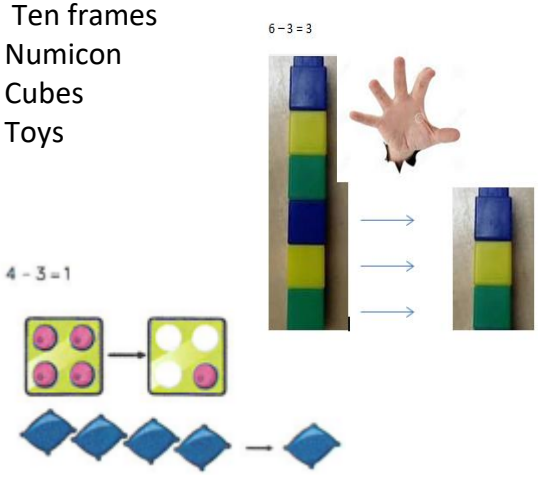
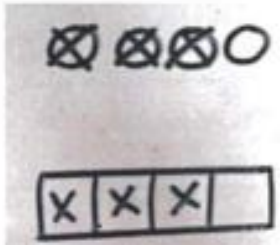
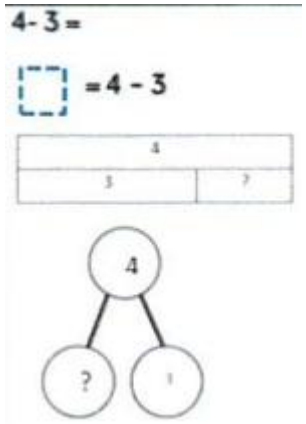
	Concrete	Pictorial	Abstract
Joining two groups and then recounting all objects using one-to-one Correspondence(lots of practice making 10 and numbers to 10 e.g. 6 + 4 = 10 or 3 + 5 = 8)	3 + 4 = 7  Use cubes to add two numbers together like a bar model 	  Use pictures to add two numbers together as a group or in a bar. 	3+4=7 7=3+4   8 = 5 + 3 5 + 3 = 8  Use the part part whole diagram as shown above to move into the abstract. Include missing number questions to support varied fluency: 8 = ? + 3 5 + ? = 8

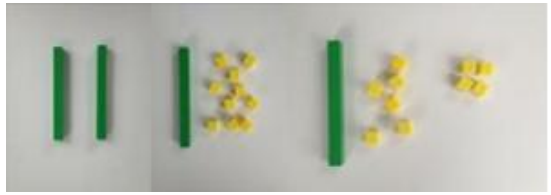
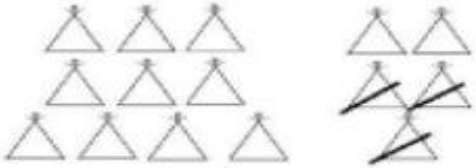
	Concrete	Pictorial	Abstract
Starting at the bigger number and counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.  	 12 + 5 = 17 Start at the larger number on the number line and count on in ones or in one jump to find the answer. A bar model which encourages the children to count on, rather than count all. 	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer. The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? 4 + 2 
Regrouping to make 10 (essential later for column addition)	 6 + 5 = 11  Start with the bigger number and use the smaller number to make 10. Use ten frames.	 3 + 9 = Use pictures or a number line. Regroup or partition the smaller number using the part, part whole model 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?
Add and subtract one digit numbers and two digit numbers to 20, including zero	8+1=9  8+7 =15 	8+1=9 8+7=15 	8+1=9 

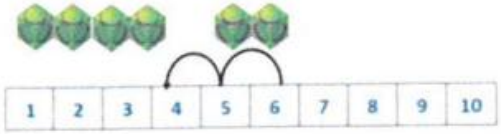
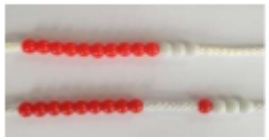
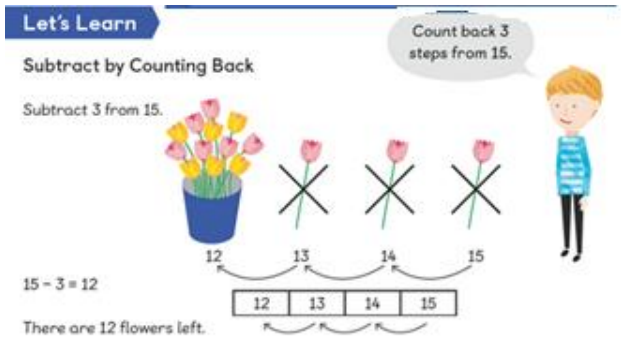
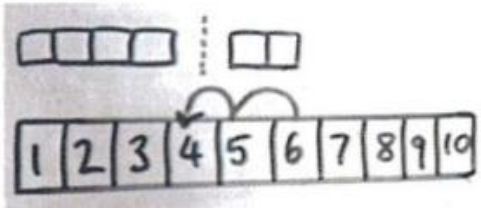
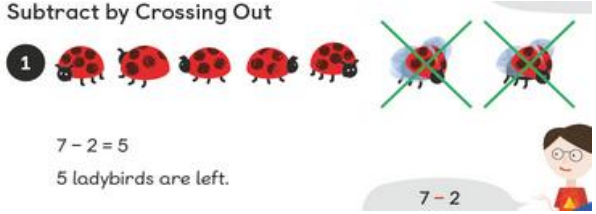
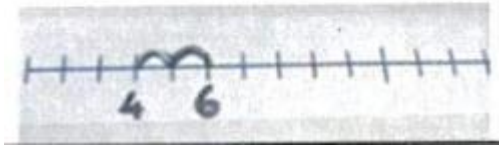
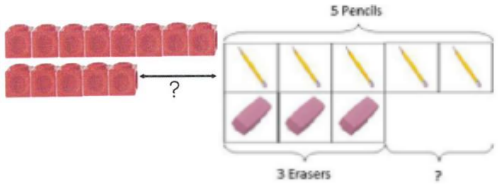
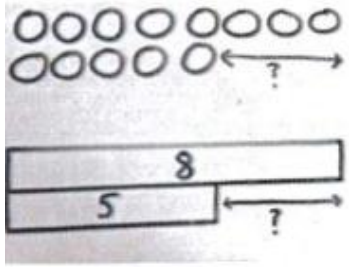
Concrete		Pictorial	Abstract
Bridging 10 Use ten frames, Singapore bars, egg boxes and number lines to practice. *Chn should start with the larger number and add the smaller number seeing what makes ten and what is left over.*	 6 + 6 = 12 Make 9 in one and 3 in the other. Take one from the 3 to make the 9 into a ten….10+2 = 12 		

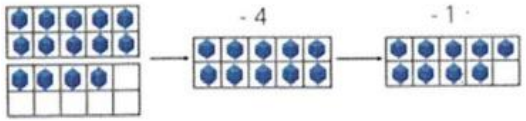
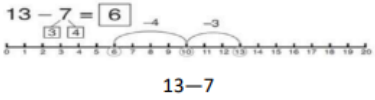
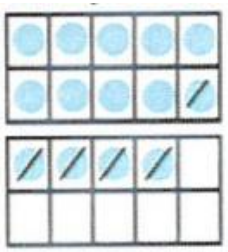
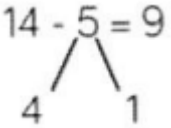
Year 1 Subtraction

Part, whole, subtraction, subtract, take away, distance between, difference between, more than, minus, less than, equals =, same as, most, least, pattern, odd, even, digit,

Concrete		Pictorial	Abstract
Taking away should begin with **physical objects**: toys, cubes, Dienes etc They should be physically taken away and removed from the whole.	Ten frames Numicon Cubes Toys  When subtracting using Dienes children should be taught to regroup a ten rod for	Children draw the concrete resources and cross them out. The bar model can also be used. 	7 – 4 = 16 – 9 = 

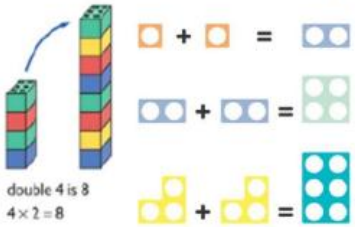
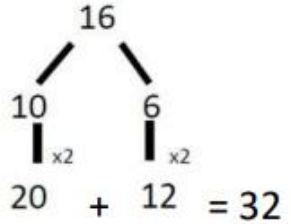
Concrete		Pictorial	Abstract
	10 ones and then subtract from those ones 20 – 4 = 16 	Cross out drawn objects to show what has been taken away.  15 – 3 = 12	

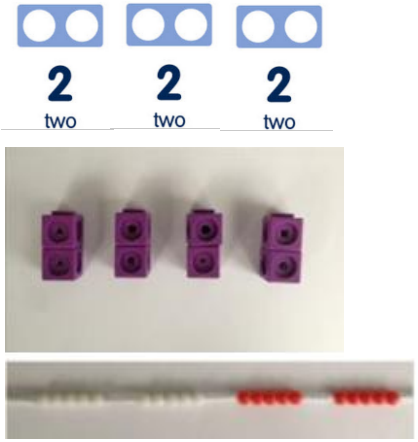
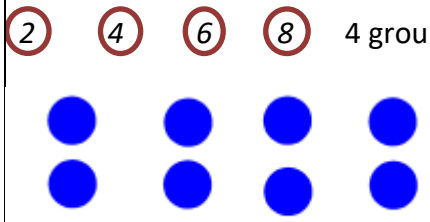
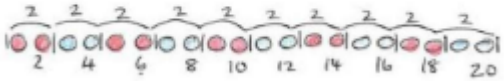
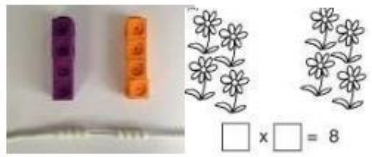
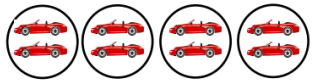
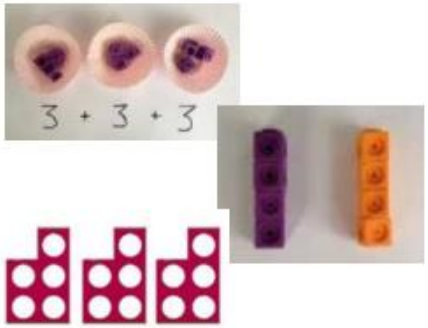
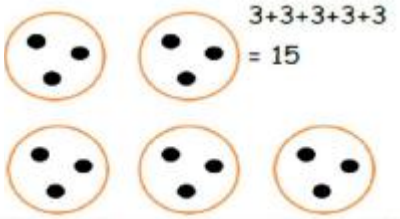
	Concrete	Pictorial	Abstract
Subtraction by counting back Subtracting a single digit number from a single digit number and a single digit from a two digit by crossing out pictures	**Counting back** (using number lines or number tracks) children start with 6 and count back 2. 6 – 2 = 4   Move the beads along the bead string as you count backwards.	 Children to represent what they see pictorially e.g.   	Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line   Put 13 in your head, count back 4. What number are you at?
Finding the difference	Cubes, numicon or cuisenaire rods. Calculate the difference between 8 and 5.  Lay objects to represent bar model.	Draw the cubes they have used and show difference. Use bar models to show difference.  	Find the difference between 8 and 5. 8 – 5, the difference is [] Children to explore why 9-6 = 8-5 = 7-4 have the same difference. Hannah has12 sweets and her sister has 5. How many more does Hannah have than her sister?

Concrete		Pictorial	Abstract
Making 10 (partitioning numbers)	Using ten frames 14 – 5 = 14 – 4 then - 1 	Draw ten frames and discuss what they did to make 10.  Jump back 3 first, then another 4. Use ten as the stopping point. 	Children show how they can make 10 by partitioning the subtrahend. 14 – 4 =10 10 – 1 = 9  16—8 How many do we take off first to get to 10? How many left to take off?
Subtracting using the part part whole (include problem solving with missing digits).	If there are 7 cubes and 4 are purple, how many are not purple? 		? - 5 = 2

Year 1 Multiplication

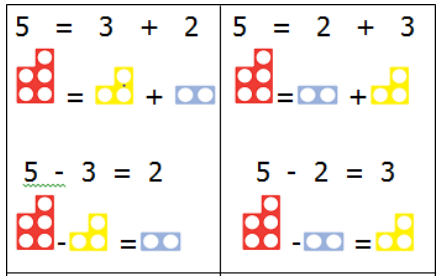
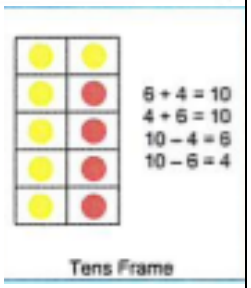
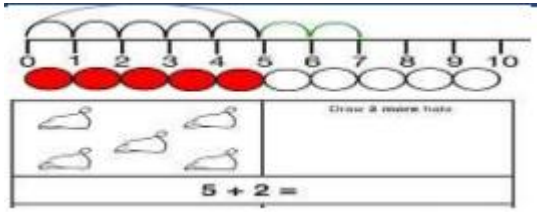
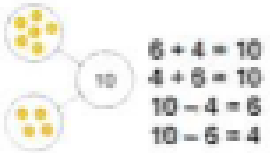
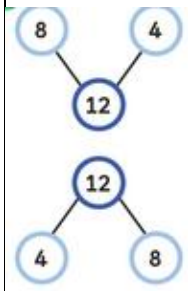
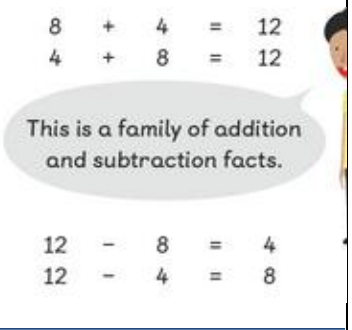
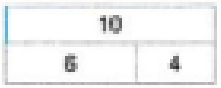
Part, whole, ones, groups, lots of, multiply, multiplication, equal, same size, doubling, repeated addition, groups of, times, odd, even, columns, rows, X times longer, bigger, higher etc,

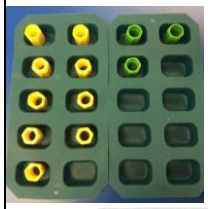
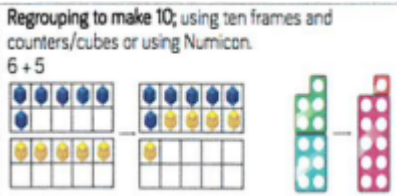
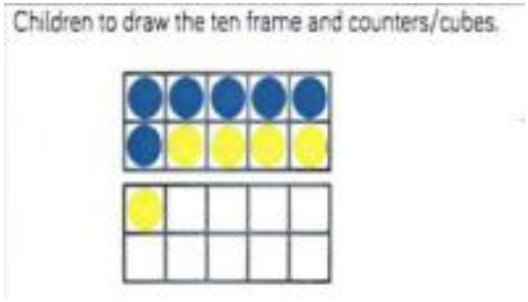
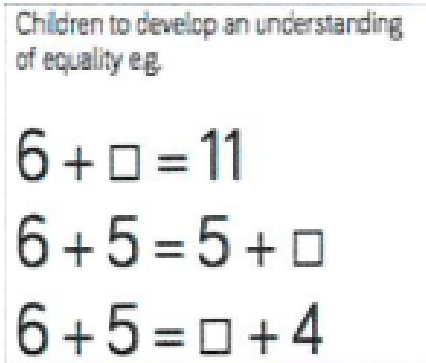
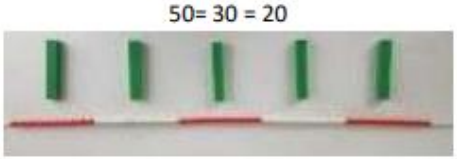
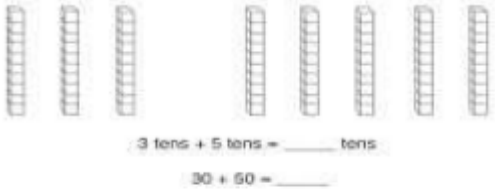
Concrete		Pictorial	Abstract
Doubling	Use practical activities using manipultives including cubes and Numicon to demonstrate doubling 	Draw pictures to show how to double numbers Double 4 is 8 	Partition a number and then double each part before recombining it back together. 

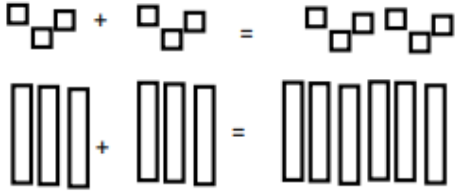
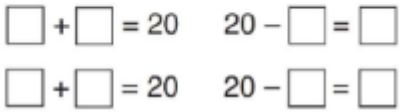
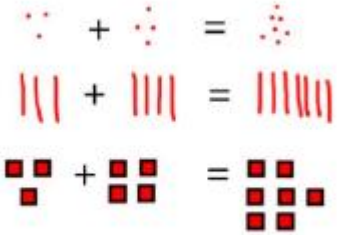
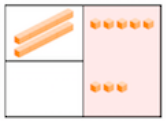
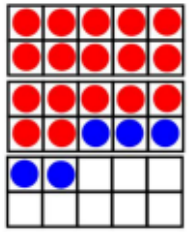
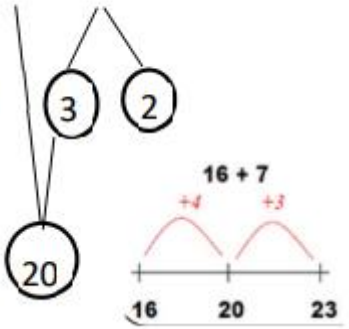
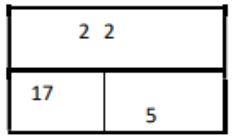
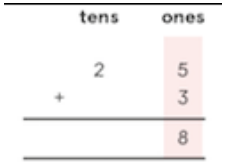
Concrete		Pictorial	Abstract
Counting in multiples of 2, 5 and 10 from zero *Children should count the number of groups on their fingers as they are skip counting.*		 4 groups of 2 = 8 Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30
Making equal groups and counting the total	 Use manipulatives to create equal groups.	Draw  to show 2 x 3 = 6  Draw and make representations	4 x 2 = 8 3 x 5 = 15 7 x 10 = 70
Solving multiplication problems using repeated addition involving 2s, 5s and 10s.	 Use different objects to add equal groups	Use pictorial including number lines to solve prob There are 3 sweets in one bag. How many sweets are in 5 bags altogether?  3 + 3 + 3 = 9 	Write addition sentences to describe objects and pictures. 

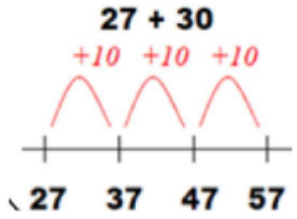
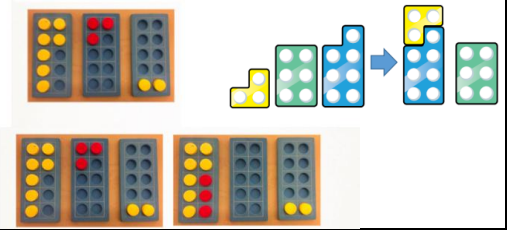
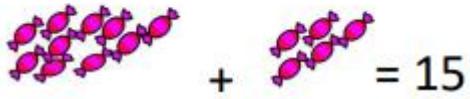
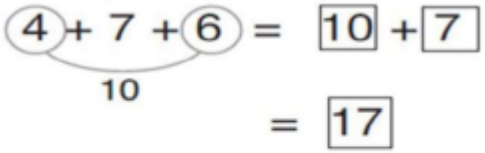
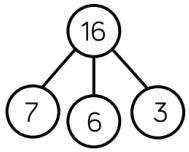
Year 2 Addition

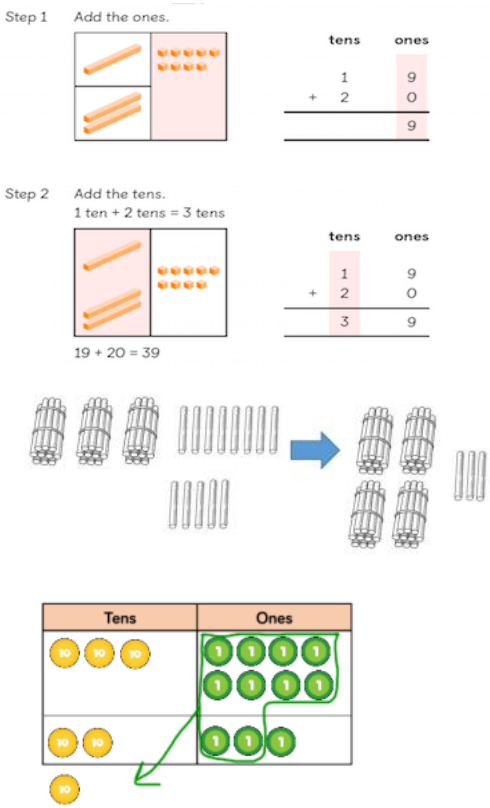
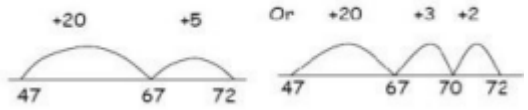
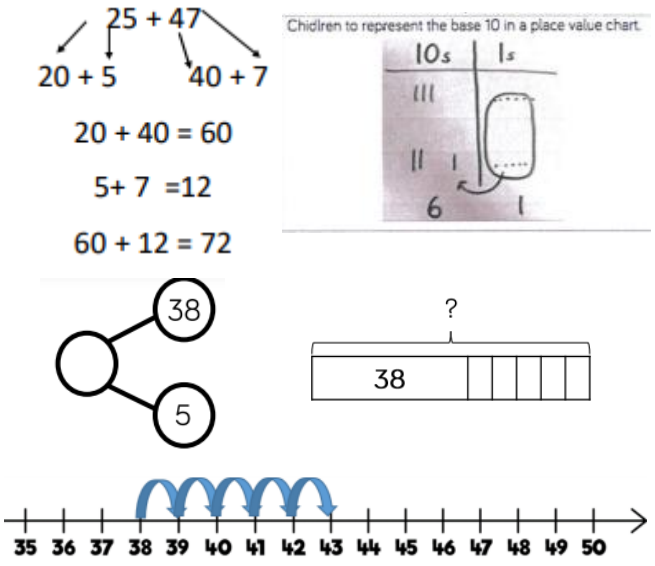
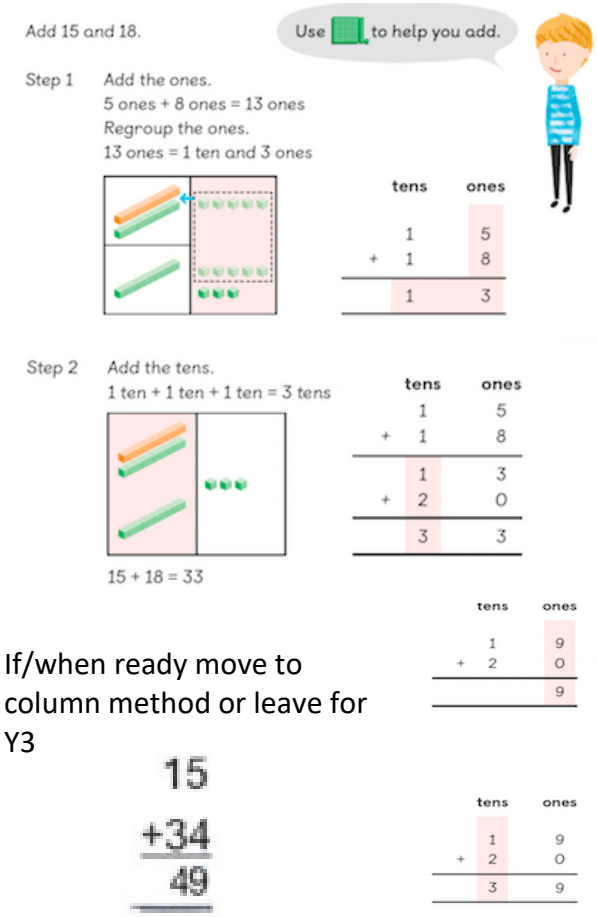
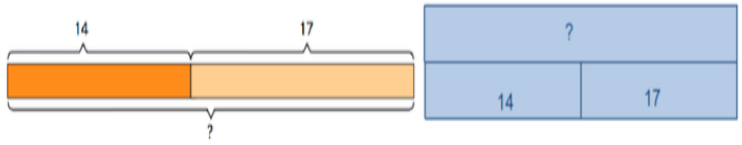
Add, addition, more than, plus, altogether, sum, total, make, increase, partition, inverse, greatest, how many more to make?, ones, tens, tens boundary, one more, ten more, increase, partition, inverse, smallest, exchange , is the same as/ equal to, =, part part whole

Concrete		Pictorial	Abstract
Learn number bonds to 20 and demonstrate related facts *Teach addition and subtraction alongside each other as pupils need to see the relationship between the facts.*	  2 more than 5.  Tens Frame	 	  Include missing number questions:  8 = ? + 3 5 + ? = 8 6 + 4 = 10 4 + 6 = 10 10 – 4 = 6 10 – 6 = 4 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.'*

Concrete		Pictorial	Abstract
Bridging 10 Use ten frames, Singapore bars, egg boxes and number lines to practice. *Chn should start with the larger number and add the smaller number seeing what makes ten and what is left over.*	 6 + 6 = 12 Make 9 in one and 3 in the other. Take one from the 3 to make the 9 into a ten….10+2 = 12 		
Adding multiples of ten	 Model using dienes and bead strings	 Use representations for base ten.	20 + 30 = 50 70 = 50 + 20 40 + □ = 60

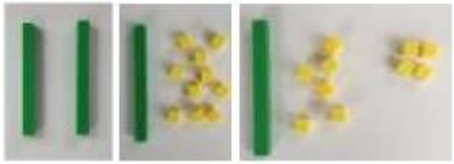
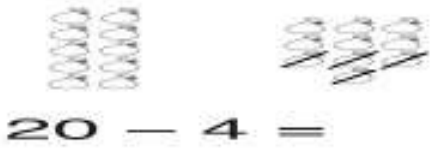
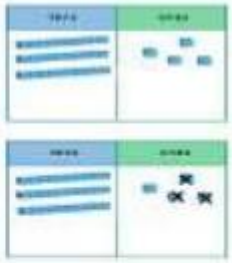
	Concrete	Pictorial	Abstract
Using known facts	 Children explore ways of making numbers within 20 	   Children draw representations of H,T and O	Explore commutativity of addition by swapping the addends to build a fact family. Explore the concept of the inverse relationship of addition and subtractions and use this to check calculations. □ + 1 = 16 16 – 1 = □ 1 + □ = 16 16 – □ = 1 3+4 =7 Leads to 30+40=70 Leads to 300+400=700
Add a 2 digit number with a 1 digit number.	25 + 3   17 + 5 = 22 Use ten frame to make 'magic ten Children explore the pattern. 17 + 5 = 22 27 + 5 = 32	17 + 5 = 22 Use part part whole and number line to model. 	17 + 5 = 22 Explore related facts 17 + 5 = 22 5 + 17 = 22 22—17 = 5 22—5 = 17  Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values. 

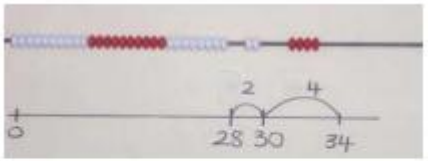
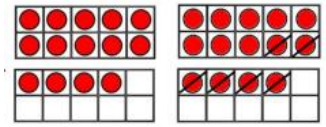
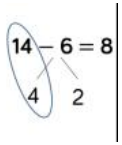
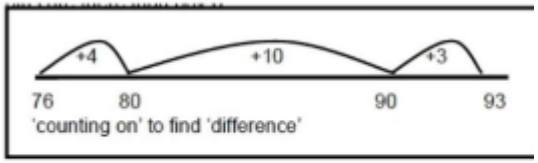
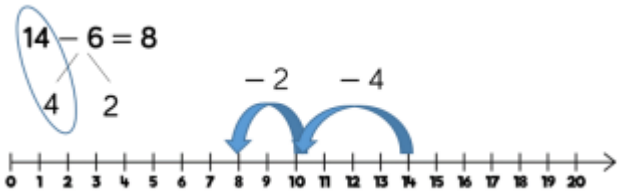
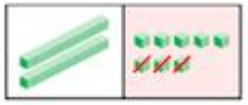
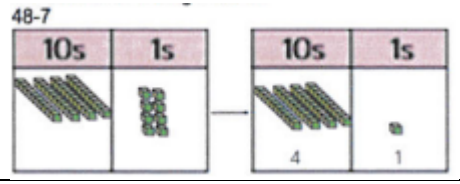
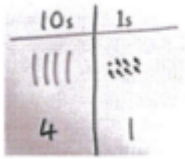
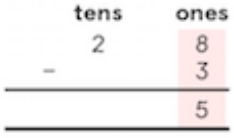
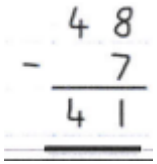
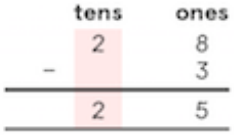
	Concrete	Pictorial	Abstract
Add a 2 digit number and 10s number.	 25 + 10 = 35 Explore that the ones digit does not change		27 + 10 = 37 27 + 20 = 47 27 + □ = 57
Add three 1 digit numbers.	 Combine to make 10 first if possible, or bridge 1o then add third digit 7+3+2 = leads to 10 + 2 = 	 Regroup and draw representation. 	 Combine the two numbers that make/ bridge ten then add on the third. 

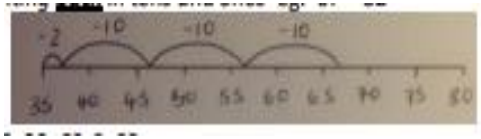
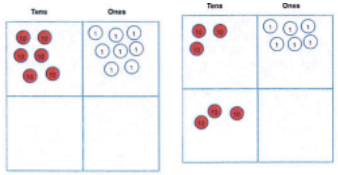
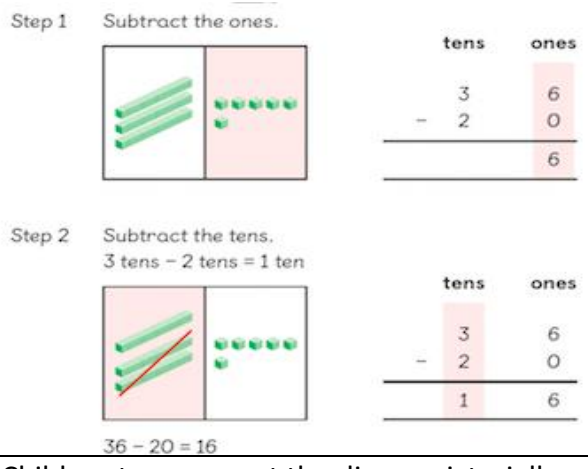
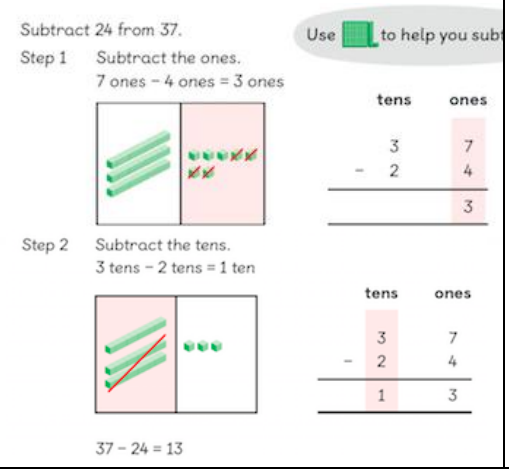
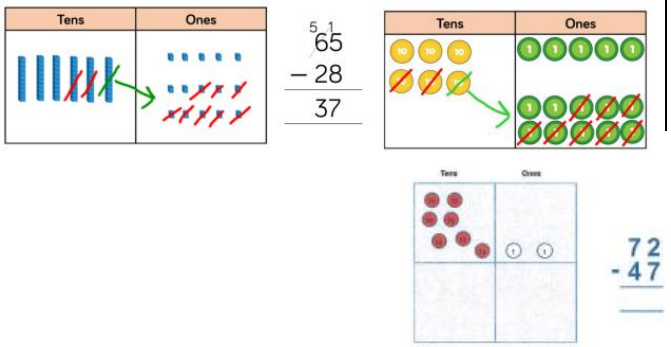
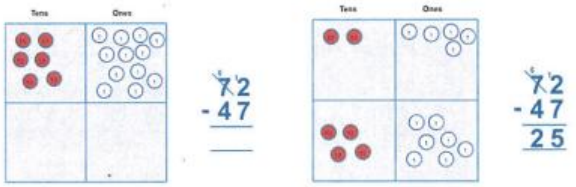
	Concrete	Pictorial	Abstract
Add two 2 digit numbers.	use place value counters and dienes to model this. 	Draw the ten sticks and ones dots Draw place value counters. Use a number line.  Partitioning method 	Expanded column method 
Using the bar to find missing digits.	Use dienes, place value counters and Cuisenaire rods to build bar models. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	Helen has 14 bread-sticks. Her friend has 17. How many do they have altogether? 	

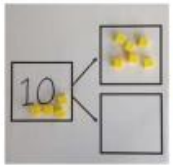
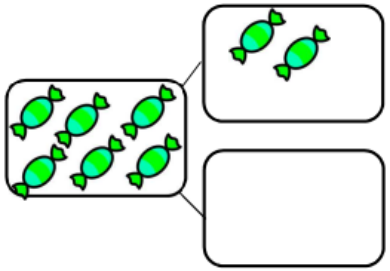
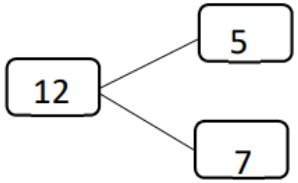
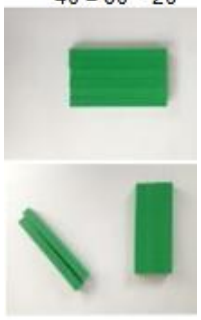
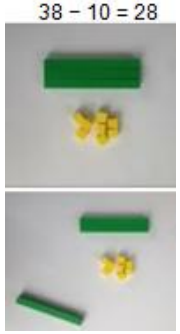
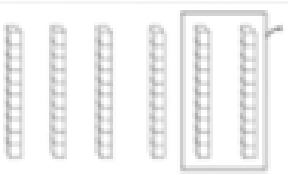
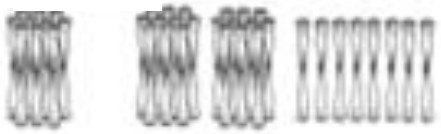
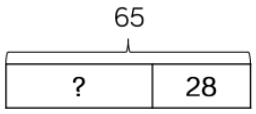
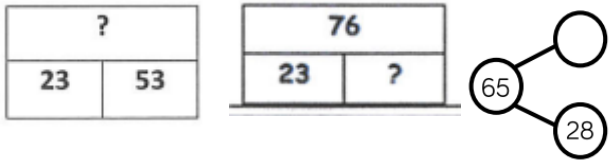
Year 2 Subtraction

subtract, subtraction, minus, take away, difference, less, inverse, decrease, greatest, smallest, fewer than., exchange, part-part whole, partition, one less than.., ten less than..,

	Concrete	Pictorial	Abstract
Regroup/exchange a ten into ten ones	 Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'	 20 — 4 =	25 – 9 = 16
Partitioning to subtract without regrouping. 'Friendly numbers'	34—13 = 21  Use Dienes to show how to partition the number when subtracting without regrouping.	Children draw representations of Dienes and cross off.  43—21 = 22 46 - 25 = 21 (40) (6) (20) (5)  6 – 5 = 1 40 – 20 = 20 20 + 1 = 21 *(children must be taught to always start with the ones)*	43 – 21 = 22

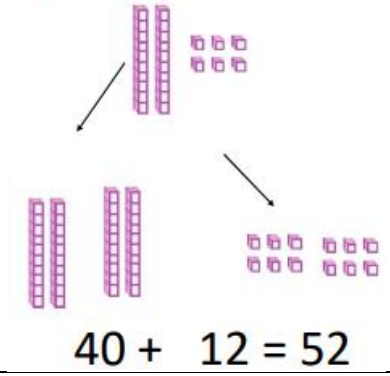
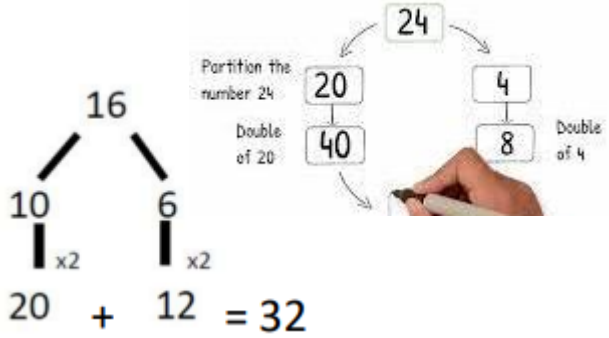
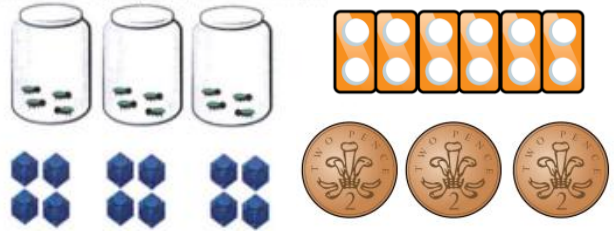
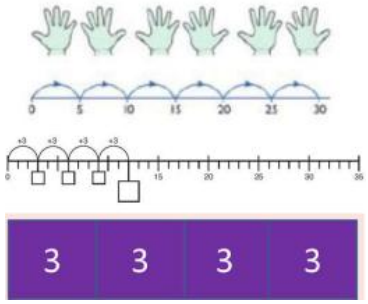
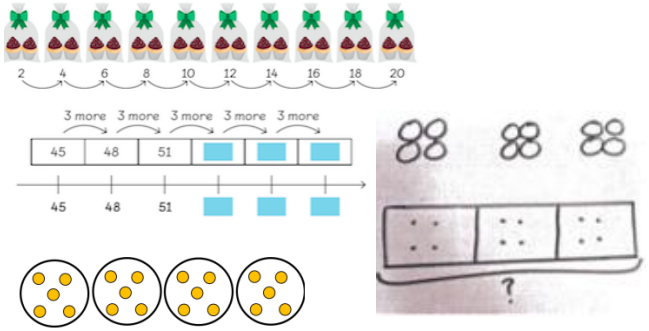
	Concrete	Pictorial	Abstract
Make ten strategy – counting up to find the difference rather than subtract OR partition to get back to the ten then keep subtracting.	 34—28 Use a bead bar or bead strings to model counting to next ten and the rest.  	 Use a number line to count on to next ten and then the rest. 	93 – 76 = 17 (count up from 76 to 93) 85 – 73 = 12 (Count back from 85 to 80 then back to 73. Add steps together)
Subtract a 1 digit number from 2 digit number.	Step 1 Subtract the ones. 8 ones – 3 ones = 5 ones  Step 2 Subtract the tens.  28 – 3 = 25 	Children to represent the base 10 pictorially. 	Start to set up the column subtractions to reinforce the place value of the digits Children can count back to find the answer also   

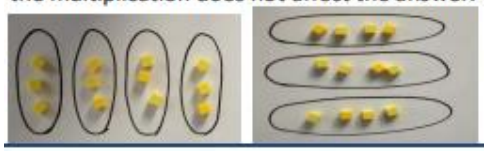
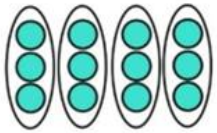
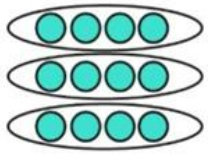
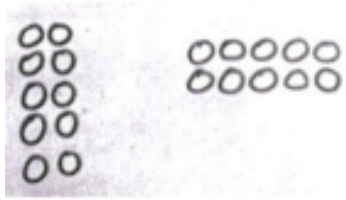
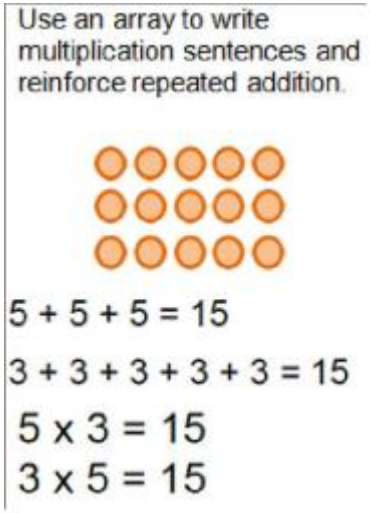
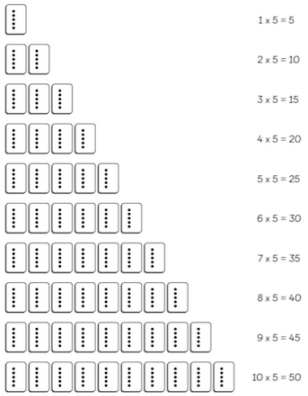
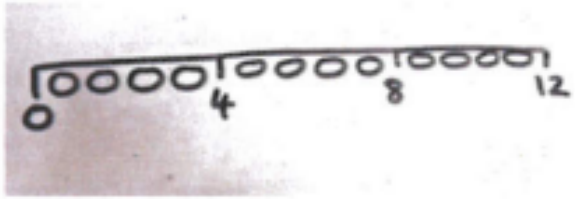
	Concrete	Pictorial	Abstract
Subtract a 10s number from 2 digit number.	Counting back in 10's from the number on a numberline. Use place value counters and dienes and take the tens away. Notice the ones do not change.  68 – 30 = 	Children to represent the dienes pictorially and cross out  	68 -30
Subtract a 2 digit number from 2 digit number (no exchanging needed) Greater depth to look at exchanging	 	Children to represent the dienes pictorially and cross out  	68 -32 Greater Depth: 

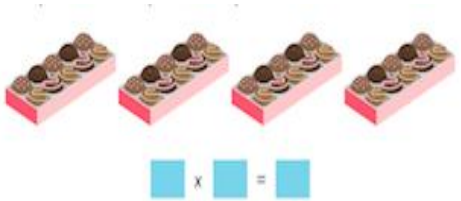
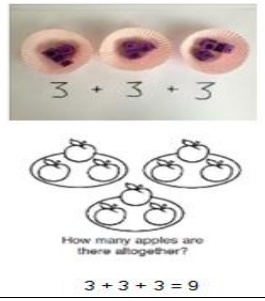
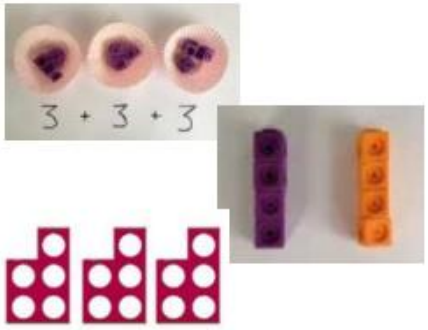
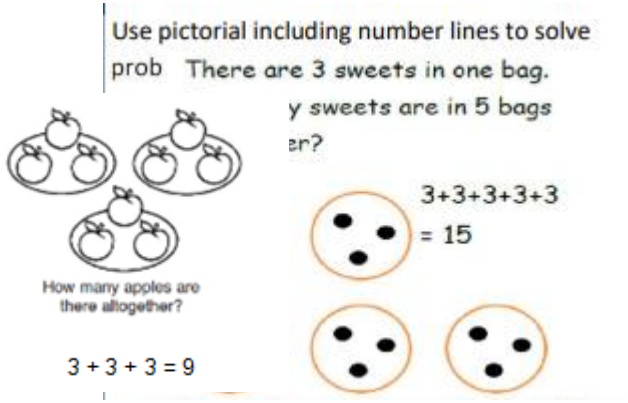
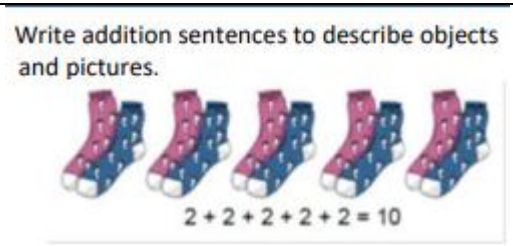
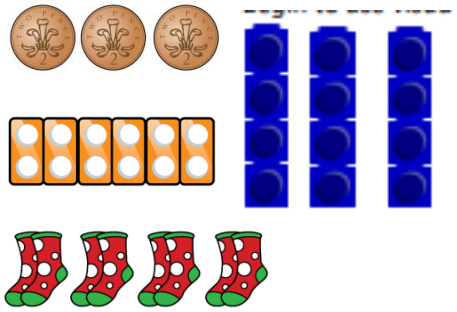
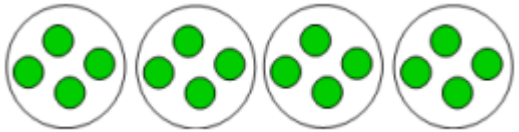
	Concrete	Pictorial	Abstract
Represent and use number bonds and related subtraction facts within 20 Include subtracting zero Part Part Whole model	 Link to addition. Use PPW model to model the inverse. If 10 is the whole and 6 is one of the arts, what s the other part? 10—6 = 4	 Use pictorial representations to show the part.	Move to using numbers within the part whole model.  Include missing number problems: 12 - ? = 5 7 = 12 - ?
Subtracting multiples of 10 *Using the vocabulary of 1 ten, 2 tens etc alongside 10, 20, 30 Is very important here as pupils need to understand that it is a 10 not a 1 that is being taken away*	40 = 60 – 20  38 – 10 = 28 	6 tens – 2 tens = [] tens 60 – 20 =  38 – 10 = 	80 – 30 = 50 = 70 - ? 36 – 10 =
Recognise and use the inverse relationship between addition and subtraction	Use dienes and place value counters 		23 + ? = 56 96 - ? = 48 65 = 41 + ?

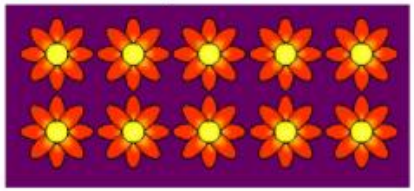
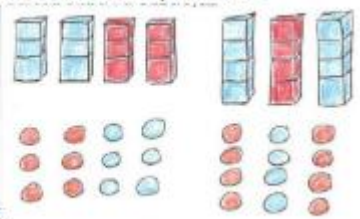
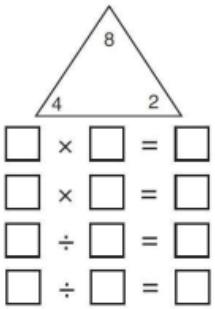
Year 2 Multiplication

lots of, groups of, repeat, times, multiply, multiplied by, multiple of, array, row, column, double, part, whole

	Concrete	Pictorial	Abstract
Doubling	Double 26 Model doubling using dienes and PV counters.  40 + 12 = 52	Draw pictures and representations to show how to double numbers  	Double 16 = 10 + 10 = 20 6 + 6 =12 20 + 12 = 32
Skip counting in multiples of 2, 5, 10 from 0 Repeated addition	2+2+2+2+2+2+2+2=16   3 × 4 4 + 4 + 4 There are 3 equal groups, with 4 in each group. 	Number lines, counting sticks and bar models should be used to show representation of counting in multiples.   	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25 , 30 5+5+5+5+5+5=30 4 X ? = 12

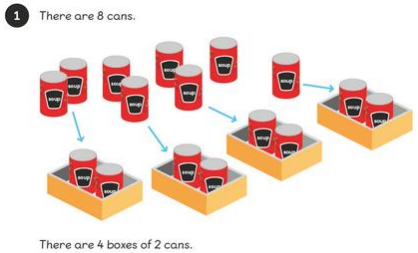
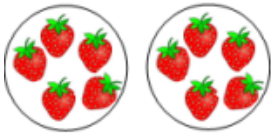
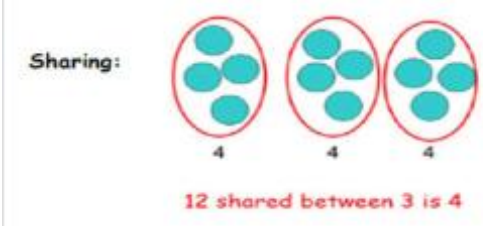
Concrete		Pictorial	Abstract
Multiplication is commutative *Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.*	Create arrays using counters and cubes and Numicon.    Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. 	  12 = 3 × 4 12 = 4 × 3 How many dots are there?   2 x 5 = 10 5 x 2 = 10 2 × 5 is equal to 5 × 2. 	12 = 4 x 3 12 = 3 x 4  Use an array to write multiplication sentences and reinforce repeated addition. 5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15
Recall and use multiplication facts for the multiplication tables 2, 5 and 10.	 1 x 5 = 5 2 x 5 = 10 3 x 5 = 15 4 x 5 = 20 5 x 5 = 25 6 x 5 = 30 7 x 5 = 35 8 x 5 = 40 9 x 5 = 45 10 x 5 = 50	3 x 4  0 4 8 12	3 x 4  0 4 8 12

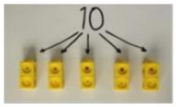
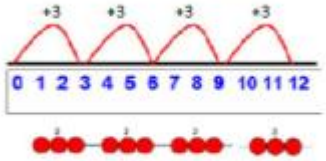
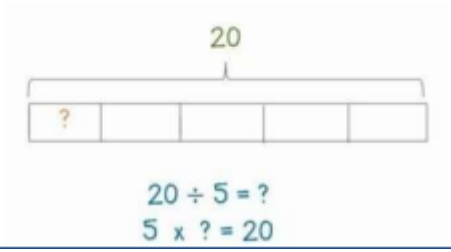
Concrete		Pictorial	Abstract
I can use multiplication (x) and equal (=) sign when writing out my times tables.			
Solving multiplication problems using repeated addition.	 Use different objects to add equal groups		
Grouping Begin to use visual and concrete apparatus to find the answers to '3 lots of 4' or '2 lots of 5' etc		Drawing 4 lots of 4 to find a whole 	6 lots of 2 = 4 groups of 5 =

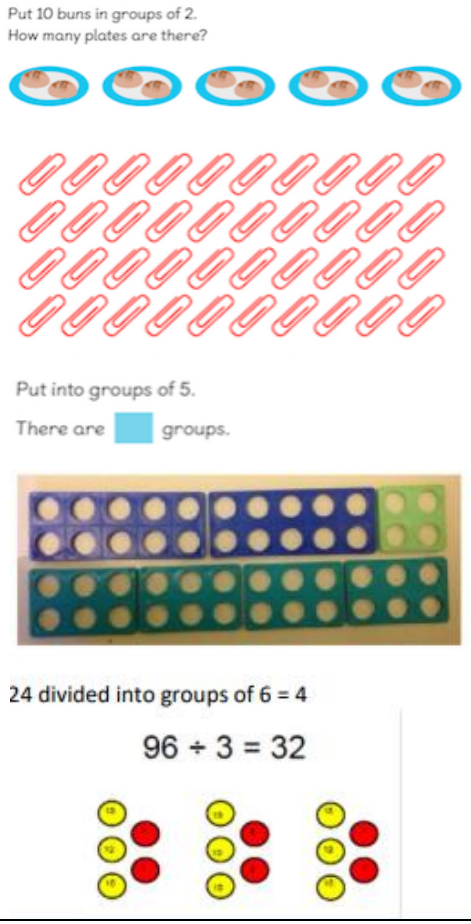
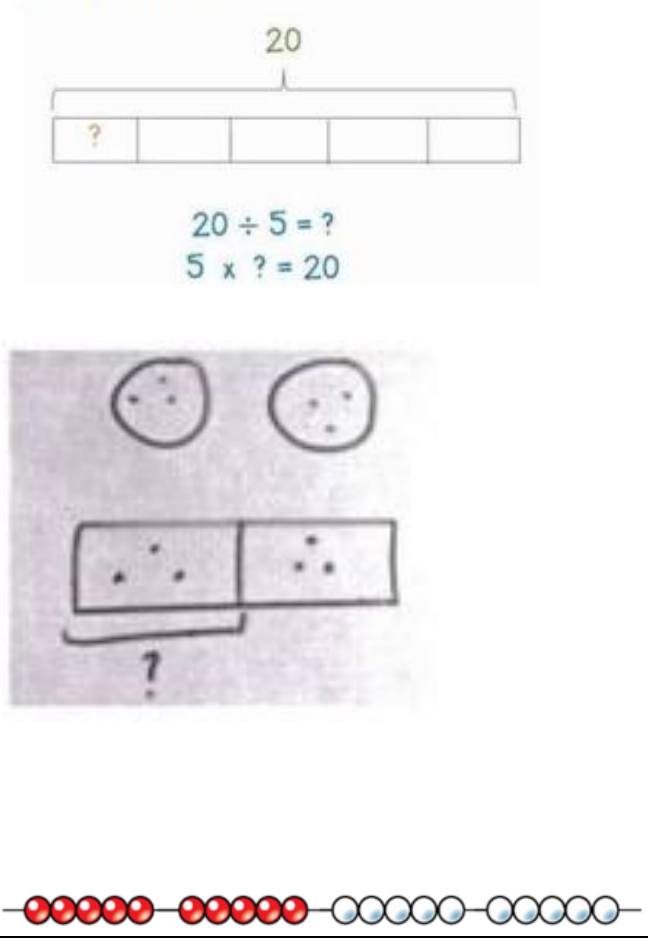
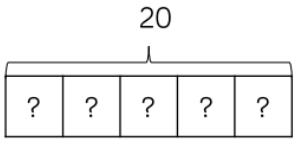
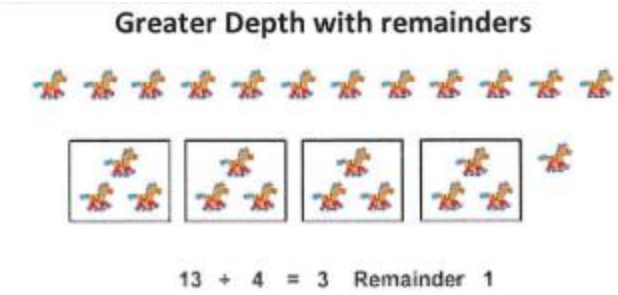
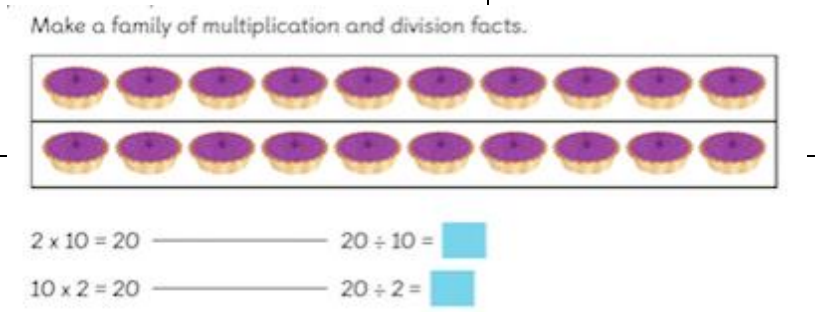
Concrete		Pictorial	Abstract
Understanding arrays - show that multiplication of two numbers can be done in any way (commutative)	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc. 	Draw representations of arrays to show understanding 	3 x 2 = 6 2 x 5 = 10
Using the Inverse This should be taught alongside division, so pupils learn how they work alongside each other.	4 x 2 = 8 8 ÷ 4 = 2 	Fact Families  	2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8÷ 2 Show all 8 related fact family sentences.

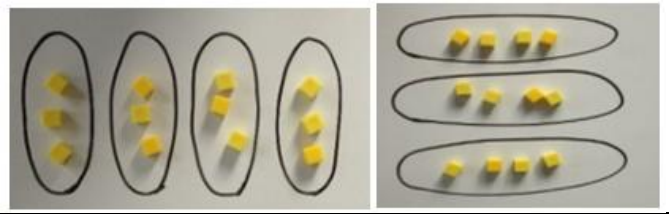
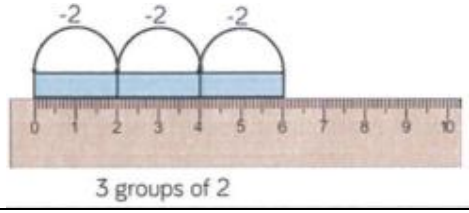
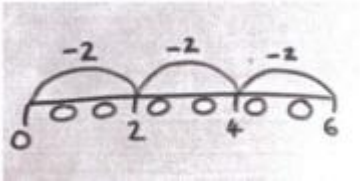
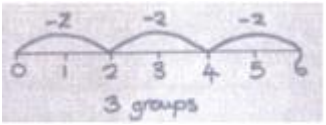
Year 2 Division

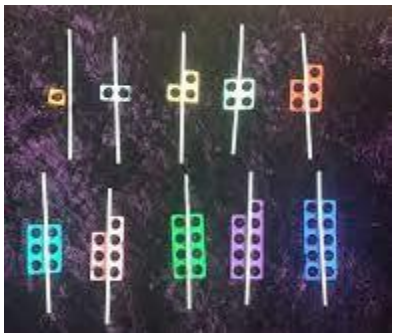
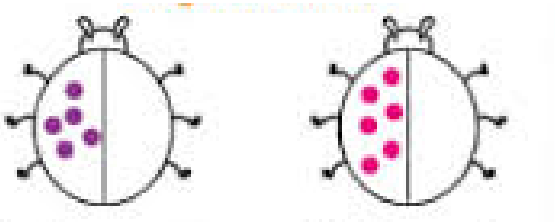
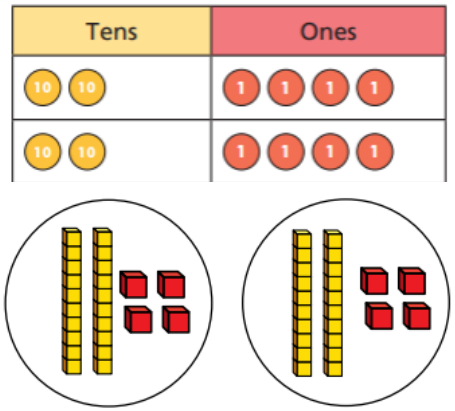
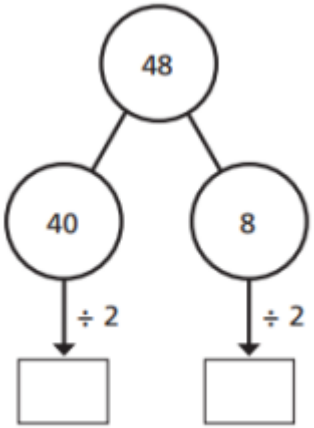
divided by, divided into, sharing, into groups, halve, share, one each… two each… three each etc., left over, how many groups? Part, whole, equal groups, remainder

Concrete		Pictorial	Abstract
Sharing - Pupils should be taught to divide through working practically and the sharing should be shown below the whole to familiarize children with the concept of the whole. *The language of whole and part part should be used.*	I have 10 cubes, can you share them equally in 2 groups?    	I have 10 strawberries and share them with my friend. How many do we have each?  Children use pictures or shapes to share equally   Children use bar modelling to show and support understanding.  12 ÷ 4 = 3	*The division symbol is not formally taught at this stage but it can be introduced.* 8 shared between 4 = 2 *12 ÷ 4 = 3* Division should be taught through the use of stories and real life problems.

Concrete		Pictorial	Abstract
Grouping - into equal groups to divide by 2, 5 and 10.	15 balls put into 5 bags   	15 balls put into 5 bags  Use number lines for grouping  **12 ÷ 3 = 4** 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.  	

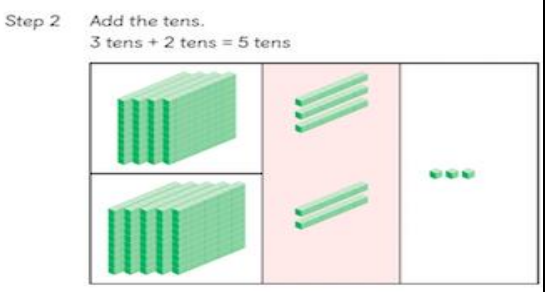
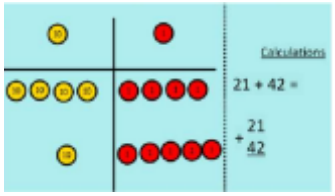
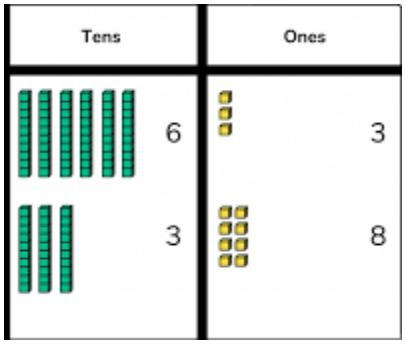
Concrete		Pictorial	Abstract
Division as grouping Start looking at remainders and how they are not all equal groups	Use cubes, counters, objects or place value counters to aid understanding. 	Continue to use bar modelling to aid solving division problems. 	How many groups of 6 in 24? 24 ÷ 6 = 4  
Recall and use division facts for the multiplicatio			

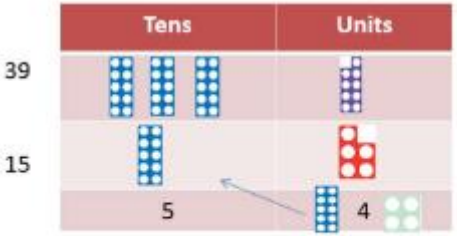
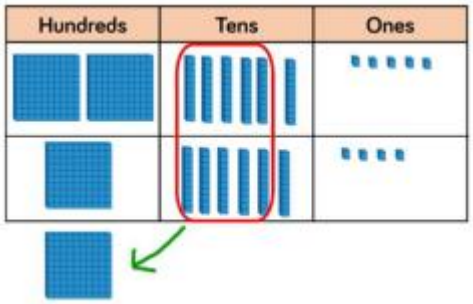
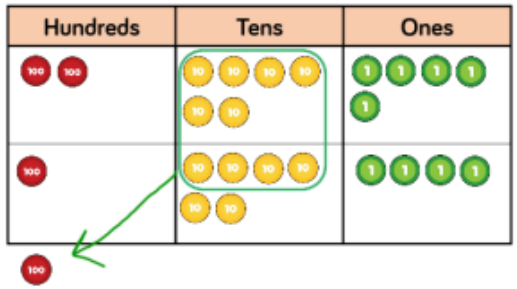
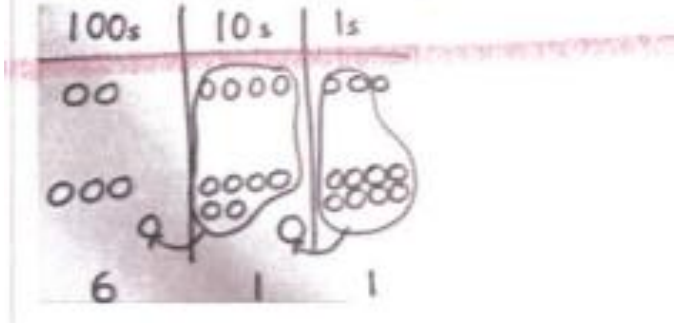
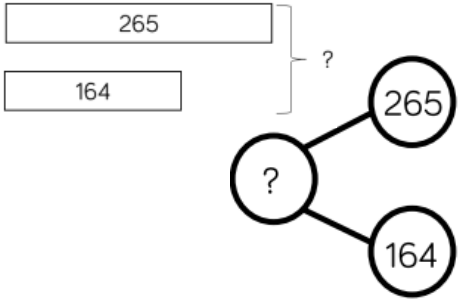
Concrete		Pictorial	Abstract
n tables 2, 5 and 10.			
Solve division problems in context using arrays	Link division to multiplication by creating an array and thinking about the number sentences that can be created.  Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Children draw the total into rows and see how many columns they have. 	Find the inverse of multiplication and division sentences by creating eight linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7 28 = 7 x 4 28 = 4 x 7 4 = 28 ÷ 7 7 = 28 ÷ 4
I can use the inverse.	This should be taught alongside both multiplication and division.		
Division as repeated subtractions			

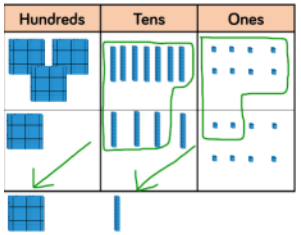
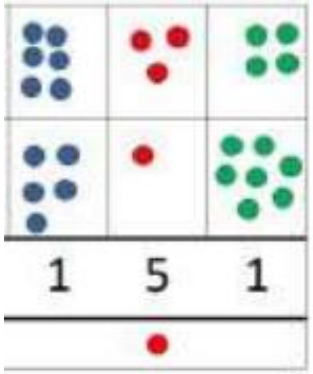
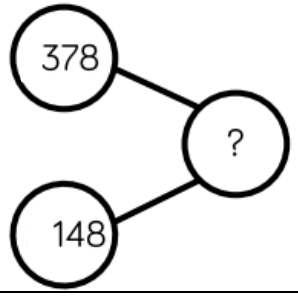
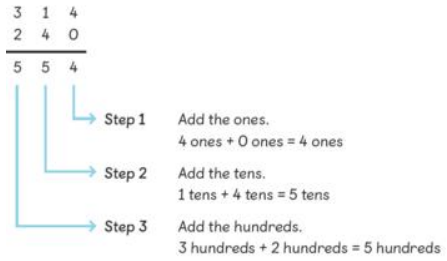
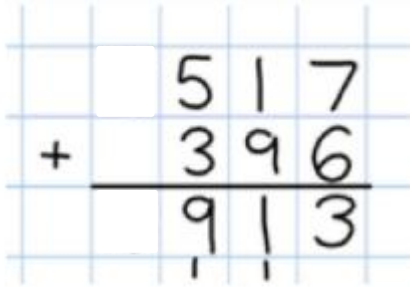
Concrete		Pictorial	Abstract
To know halves to 24	 		14 ÷ 2 = 7
To divide 2 digits by 1 digit numbers	48 ÷ 2 = 24 		48 ÷ 2 = 24

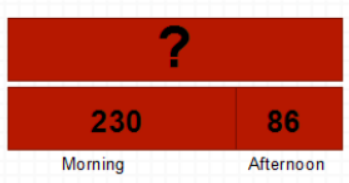
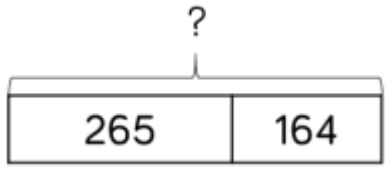
Year 3 Addition

Addends, add, addition, plus, and, altogether, more, sum, total, increase, number line, count on, partition, recombine, estimate, inverse, how many more to make? How many more is ___ than ___? Hundreds, tens, ones, column method, part, whole, doubles, near doubles,

	Concrete	Pictorial	Abstract
Add two two-digit numbers. Column Addition—no exchanging (friendly numbers)	 Move to using place value counters and 2 digit numbers. 	Children start to draw the dienes in the column method 	32 + 21 = t o 3 2 2 1 3 t o 3 2 2 1 5 3

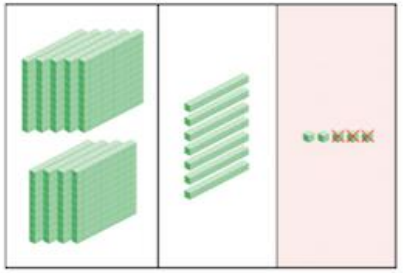
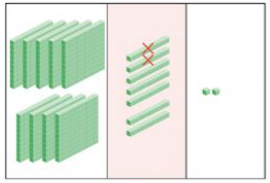
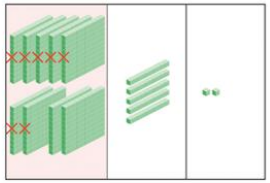
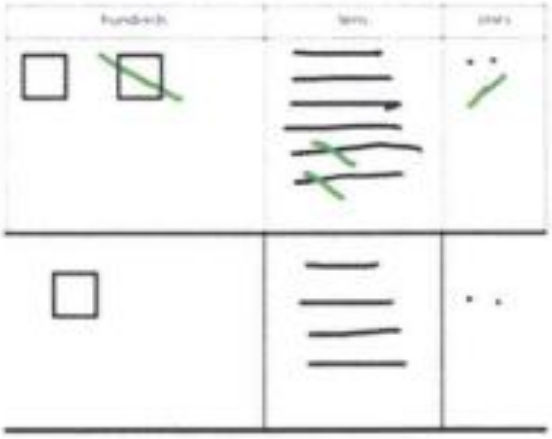
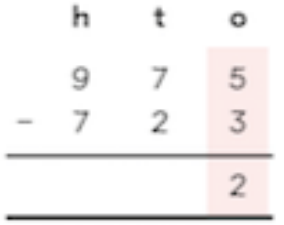
	Concrete	Pictorial	Abstract
Column Addition with exchanging.	 Exchange ten ones for a ten. Model using numicon and place value counters.  	Children to represent the counters in a place value chart, circling when they make an exchange. 	$20 + 5$ $40 + 8$ $60 + 13 = 73$ Start by partitioning the numbers before formal column to show the exchange. $\begin{array}{r} 536 \\ +\ 85 \\ \hline 621 \\ \hline 11 \end{array}$  $\begin{array}{rrr} & h & t & o \\ & 2 & 8 & 7 \\ + & 1 & 0 & 5 \\ \hline & 3 & 9 & 2 \\ \hline & 1 & & \end{array}$

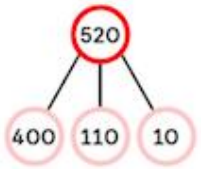
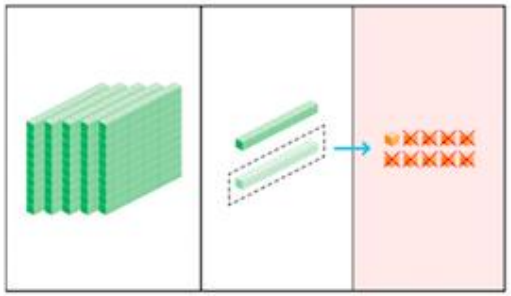
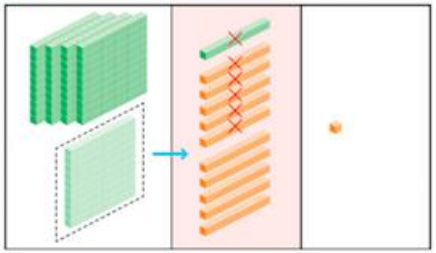
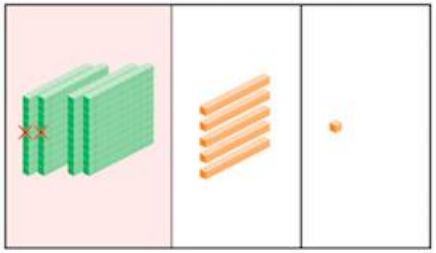
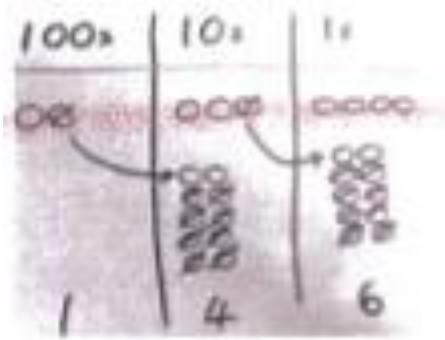
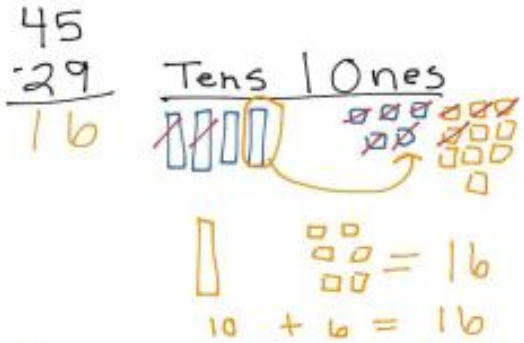
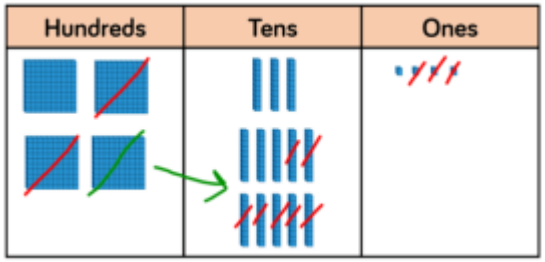
Concrete		Pictorial	Abstract
Adding numbers with up to 3 digits. *Again this should start with the children using dienes to support them with lots of discussion about the value of each digit.*	Children continue to use dienes or place value counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand 	 	  Continue from previous work to carry hundreds as well as tens. Relate to money and measures.
Estimate the answers to questions and use inverse operations to check answers	 Estimating 98 + 17 = ? 100 + 20 = 120	Use number lines to illustrate estimation. 	Building up known facts and using them to illustrate the inverse and to check answers: 98 + 18 = 116 116 – 18 = 98 18 + 98 = 116 116 – 98 = 18

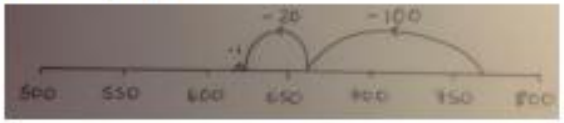
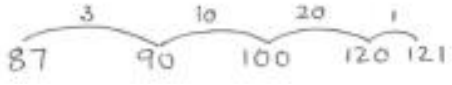
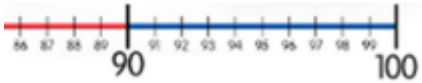
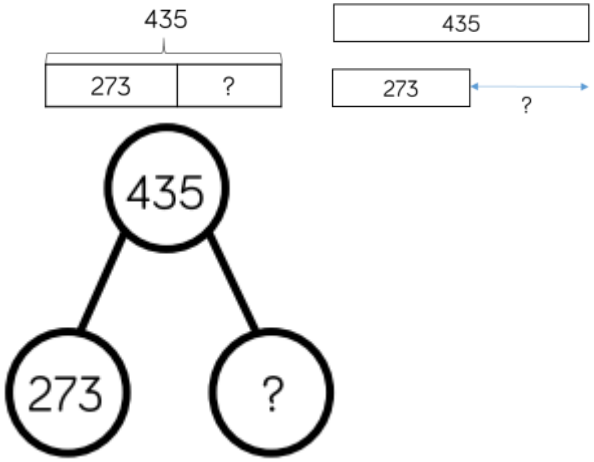
Concrete	Pictorial	Abstract
Mental addition skills	**Using place value** *Count in hundreds eg. knowing 475+200 as 475, 575, 675* *Add multiples of 10, 100 and £1 eg. 746+200 or 746+40* 68 + 74 as 60 + 70 *and* 8 + 4 *, combing the two totals.* **Counting on** *Add a three-digit and two-digit numbers by adding h, t and o* eg. 125 + 34 as 100 + 20 + 30 + 5 + 4 *Add near multiples of 10 and 100* eg. 67 + 39 as (67 + 40) – 1 **Using number facts** *Number bonds to 100* eg. 65 + 35, 47 + 53, 71 + 29 etc. *Adjustment when adding 9 and 11* eg. 27 + 9 as (27 + 10) – 1 or 36 + 11 as (36 + 10) + 1	 60 + 70 = 130 8 + 4 = 12 = 142	
Using the bar to find missing digits.	**Bar Model to support understanding of problem solving:** A man sold 230 balloons at a carnival in the morning. He sold another 86 balloons in the evening . How many balloons did he sell in all?	
		

Year 3 Subtraction

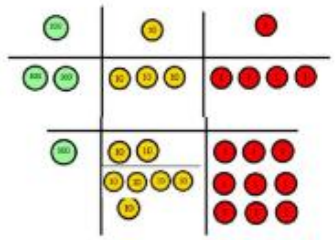
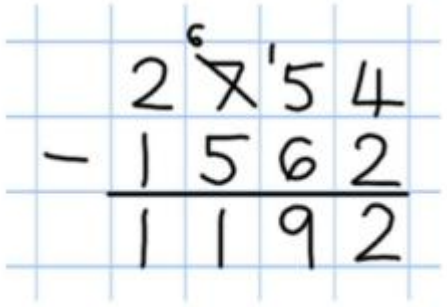
subtract, subtraction, take away, less, minus, how many are left/left over? Inverse, decrease, difference, fewer than, more than, hundreds, tens, ones, boundary, how much less is ___ than ___? Column method, part, whole, partition, recombine. Borrowing should not be used as a term because it implies that the borrowed number needs to go back.

Concrete		Pictorial	Abstract
Subtract up to 3 digits from 3 digits. *Very important for children to use dienes equipment along with a place value chart to support.* Only when secure with the method should exchanging be introduced.	Subtract 723 from 975. Step 1 Subtract the ones. 5 ones − 3 ones = 2 ones  Step 2 Subtract the tens. 7 tens − 2 tens = 5 tens  Step 3 Subtract the hundreds. 9 hundreds − 7 hundreds = 2 hundreds  975 − 723 = 252	 263 − 121 = 142	  

	Concrete	Pictorial	Abstract
Subtract up to 3 digits from 3 digits with exchanging	Subtract 269 from 520.  Step 1 Regroup 1 ten into 10 ones. Subtract the ones. 10 ones − 9 ones = 1 one  Step 2 Regroup 1 hundred into 10 tens. Subtract the tens. 11 tens − 6 tens = 5 tens  Step 3 Subtract the hundreds. 4 hundreds − 2 hundreds = 2 hundreds  520 − 269 = 251	  Children may draw base ten or PV counters and cross off. 	 Begin by partitioning into pv columns  Then move to formal method. h t o 5 12 10 - 2 6 9 1 h t o 4 11 5 12 10 - 2 6 9 5 1 h t o 4 11 5 12 10 - 2 6 9 2 5 1

	Concrete	Pictorial	Abstract
Subtract numbers mentally, including: three digit number - ones three digit number - tens three digit number - hundreds	**Using place value** *Count back in hundreds* eg. knowing 372-200 as 372, 272, 172 *Subtract multiples of 10, 100 and £1* eg. 476-40 = 436 or 436-300 = 136 348 - 143 as 300 – 100, 40 - 40 *and* 8 - 3 *, combing the three totals.* **Counting back** *Subtract two three-digit numbers by* ***counting back*** *in h, t and o* eg. 763 - 121 as 763 - 100 – 20 – 1 *Subtract near multiples of 10 and 100* eg. 648 - 199 as (648 - 200) + 1 **Counting up** *Find the difference between two numbers by* ***counting up*** *from the smaller to larger eg. 121-87* **Using number facts** *Number bonds to 100* eg. 100 – 35 = 65, 100 – 48 = 52 etc.	300 - 100 = 200 40 - 40 = 0 8 - 3 = 5 = 205   	Vary the position of the answer and question. Expose children to missing number questions and vary the missing part of the calculation. 678 = ? - 1 688 – 10 = ? 678 = ? – 100 
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*		315 – 185 = ? 185 + ? = 315 185 + 315 = ? ? – 185 = 315	

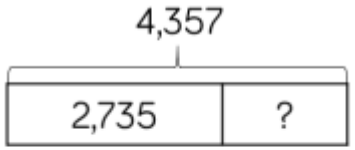
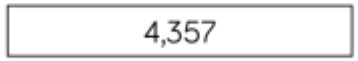
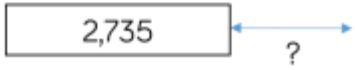
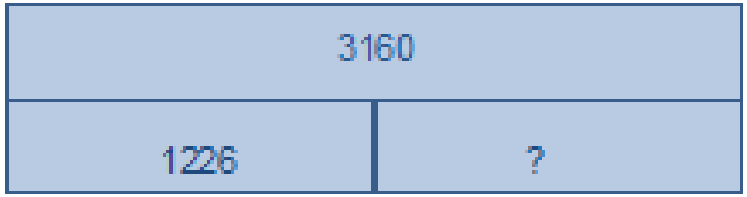
<table>
<tr><th colspan="2">Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>Subtracting tens and ones
Subtract with up to 4 digits.

Introduce decimal subtraction through context of money</td>
<td>234 - 179
 
Model process of exchange using Numicon, base ten and then move to PV counters.</td>
<td>Children to draw place value counters and show their exchange—see Y3</td>
<td> 
Use the phrase ‘take and make’ for exchange</td>
</tr>
<tr>
<td>Mental Strategies</td>
<td colspan="3">Using place value
Count back in thousands eg. 4378-3000 as 4378, 3378, 2378, 1378
Take away multiples of 10, 100 , 1000 and £1 eg. 8392-50 or 6723-3000
Partitioning eg. £5.87 - £3.04 as £5 - £3 and 7p – 4p or 7493 – 2020 as 7000-2000 and 90-20

Counting back
Count back eg. 6482 – 1301 as 6482 – 1000 then – 300 then - 1
Subtract near multiples of 10, 100 and 1000 eg. 3522 - 1999 as (3522 - 2000) + 1

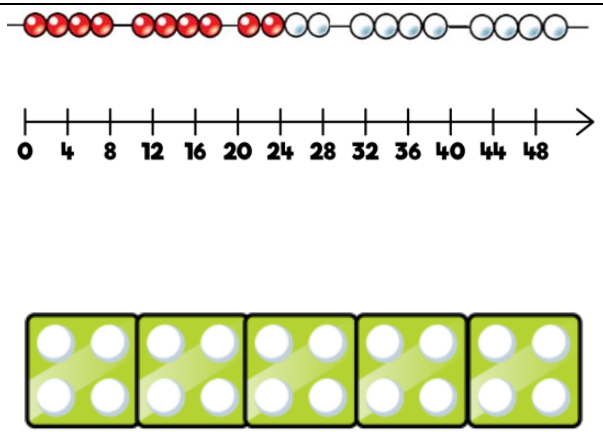
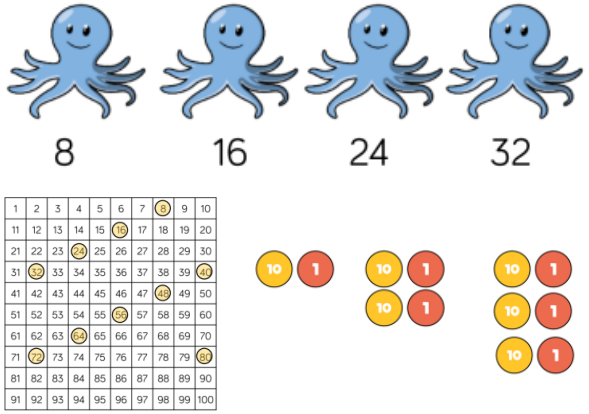
Counting up
Find a larger difference between two numbers by counting up from the smaller number to the larger number eg. 1506 – 387
 

Using number facts
Number bonds to 100 and to the next multiple of 100 eg. 100-76 = 24
Adjustment when adding 9 and 11 eg. 27 - 9 as (27 - 10) +1 or 36 - 11 as (36 - 10) - 1</td>
</tr>
</table>

Concrete	Pictorial	Abstract
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	  	There are 3,160 books in a shop. 1,226 are in English and the rest are in French. How many French books are there? 

Year 3 Multiplication

lots of, groups of, repeat, times, multiply, multiplied by, multiple of, double, part-part whole, short multiplication, inverse, product, factor.

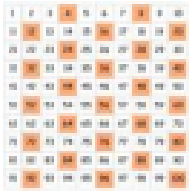
Concrete	Pictorial	Abstract
Children should be able to recall the 2, 5, 10, 4 and 8 times tables. 		

Mental calculations

Count in steps – sequences

Count in 2s, 3s, 4s, 5s, 8s and 10s

eg. colour the multiples on a 100 square or jumps on a landmarked number line



Doubling and halving

Find doubles to double 50 using partitioning

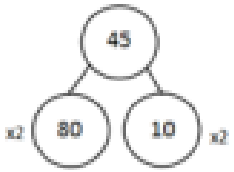
Use doubling as a strategy in multiplying by 2 eg. 18 x 2 is double 18.

Grouping

Recognise that multiplying is commutative eg. 8x4 = 4x8

Multiply multiples of 10 by a single-digit eg. 30x8 = 240 (3x8=24)

Multiply friendly two-digit numbers by single digit numbers eg. 13 x



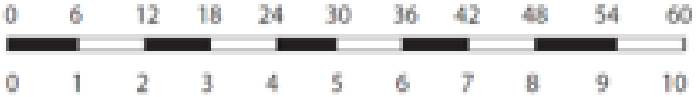
Using number facts

Know 2x, 3x, 4x, 5x, 8x and 10x

Concrete	Pictorial	Abstract

Count in steps – sequences

Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s



Doubling and halving

Find doubles to double 100 and beyond using partitioning, using derived facts

Begin to double amounts of money eg. £3.50 doubled is £7

Use doubling as a strategy in multiplying by 2, 4 and 8

eg. 34 x 4 is double 34 and double again.

Grouping

Use partitioning to multiply two-digit numbers by single-digit numbers

Multiply multiples of 100 by single-digit numbers using table facts eg. 400 x 8 = 3200 (4 x 8 = 32)

Multiply using near multiples by rounding eg. 24 x 19 as (24x20) = 24

Using number facts

Know times tables up to 12x12

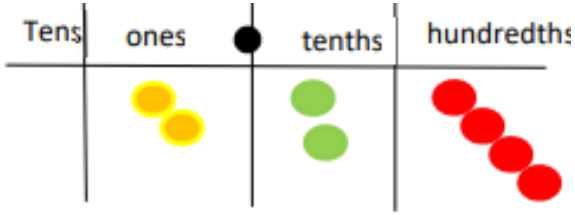
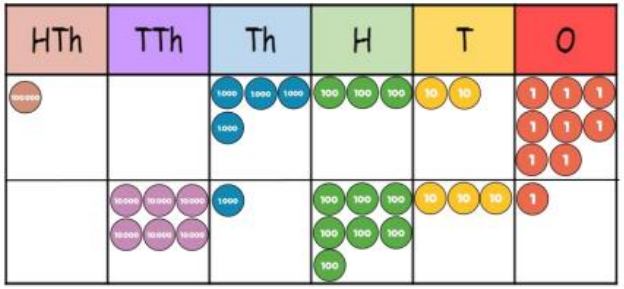
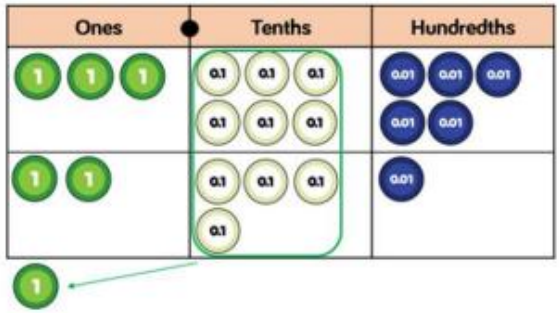
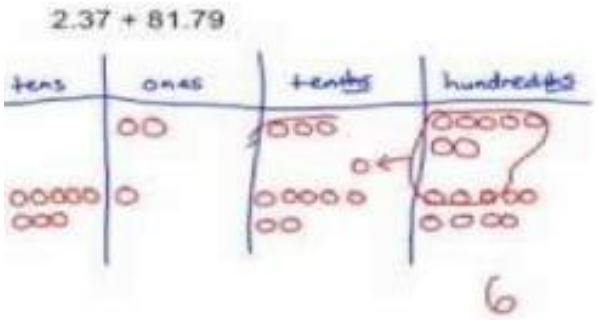
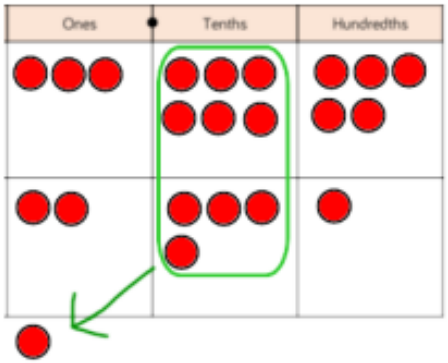
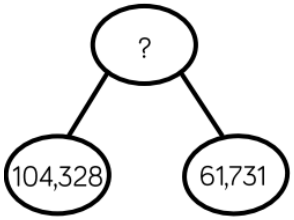
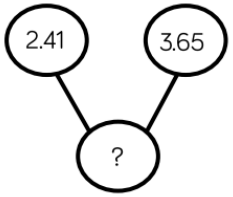
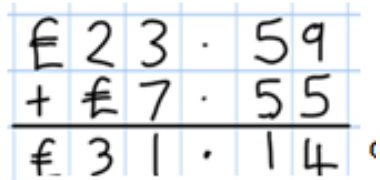
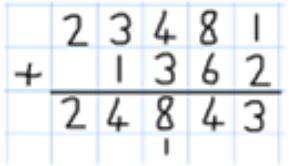
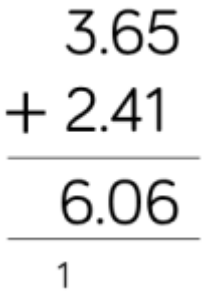
Year 3 Division

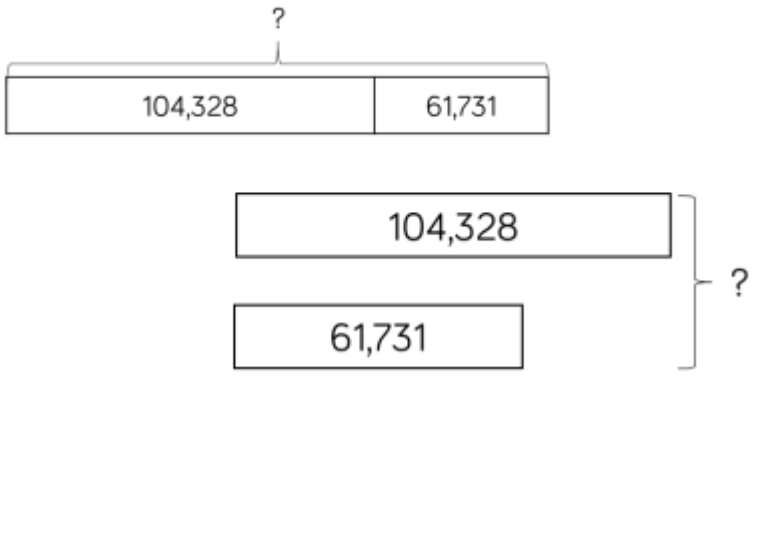
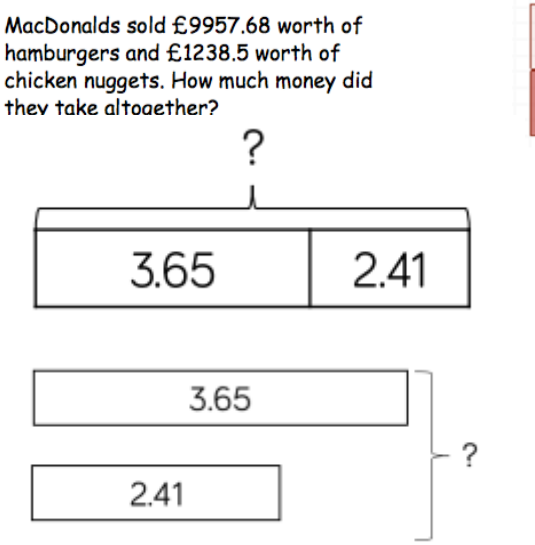
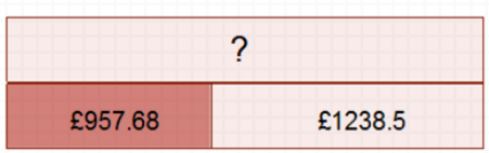
divided by, divided into, sharing, into groups, halve, share, one each… two each… three each etc., left over, how many groups? Part, whole, equal groups, remainder

Division in year 3 is taught in relation to the times tables and begins to be explored in this way.

Year 4/5 Addition

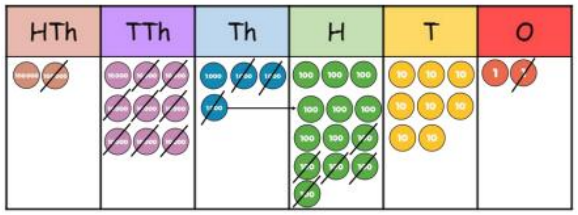
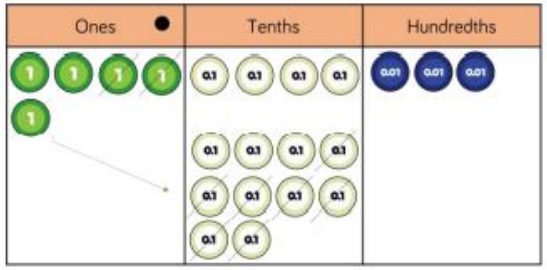
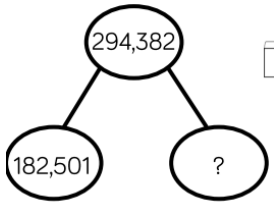
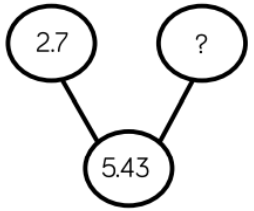
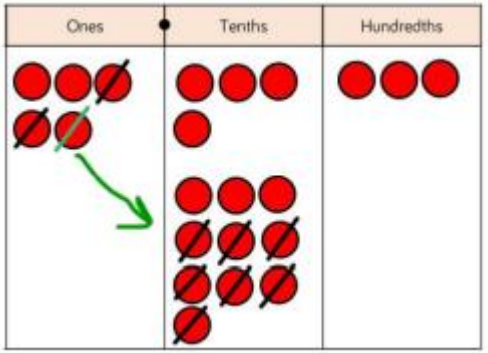
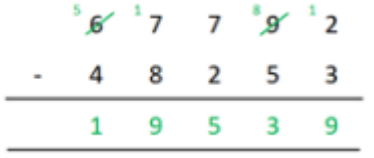
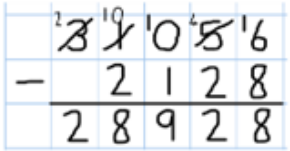
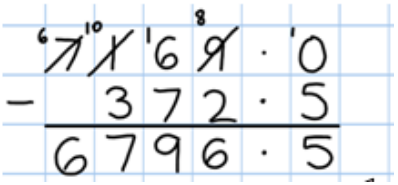
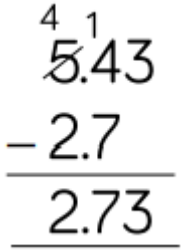
Addends, add, addition, plus, make, more, sum, total, increase, partition, column boundary, exchange, decimal, part, whole (Taught within recap sessions).

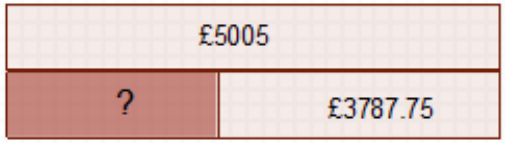
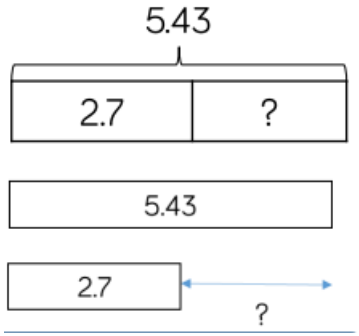
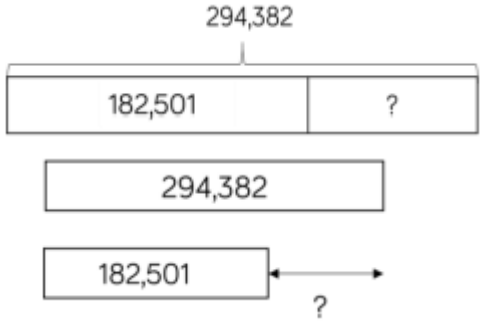
	Concrete	Pictorial	Abstract
Adding numbers with more than 4 digits including decimals *Using place value charts are key to this as well as place value counters to help with the decimals.*	See Year 4 for other concrete methods.  Introduce decimal place value counters and model exchange for addition.  	   	   

Concrete	Pictorial	Abstract
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	This is not a form of getting the correct answer but helping to guide children to the correct operation.   
Mental Strategies	**Using place value** *Count in steps of 10, 100, 1000, 0.1s, 0.01s from any given number.* *Partitioning* eg. 7348 + 2187 as 7348 + 2000 + 100 + 80 + 7 or 2.4 + 5.8 as 2 + 5, 0.4 + 0.8 and combine the totals together.  **Counting on** *Count on from the greatest number* eg. 6834 + 3005 as 9834 + 5 *Add near multiples* eg. 82,472 + 30,004 as (82,472 + 30,000) + 4 *Add two decimal numbers by adding the o then ths then hths* eg. 5.72 + 3.05 as 5.72 + 3 + 0.5 **Using number facts** *Know number bonds to 1 and to the next whole number* eg. 0.4 + 0.6 or 5.7 +0.3 *Add to the next 10 from a decimal number* eg. 7.8 + 2.2 = 10	

Year 4/5 Subtraction

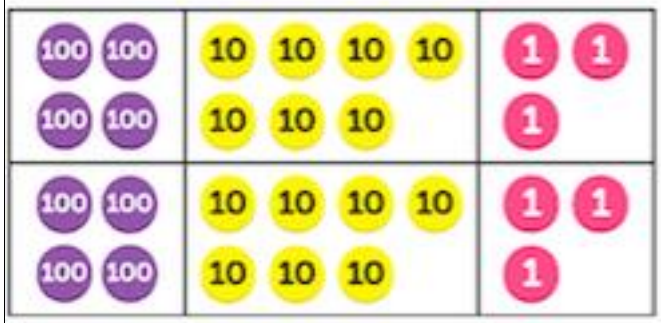
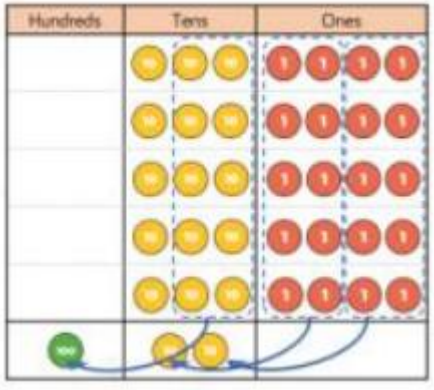
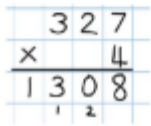
Minuend, subtrahend, subtract, subtraction, take away, minus, difference, decrease, exchange, decimal, part, whole (Taught within recap sessions).

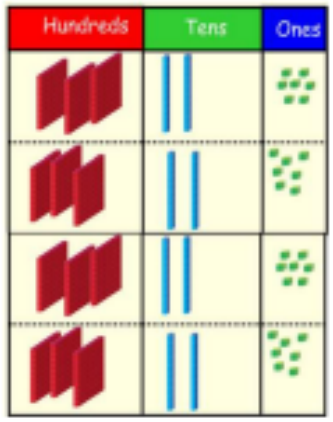
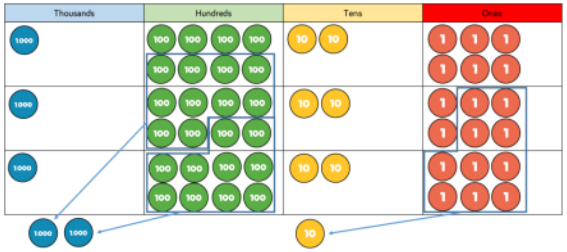
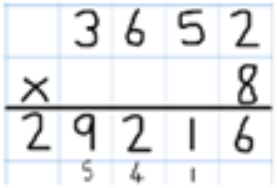
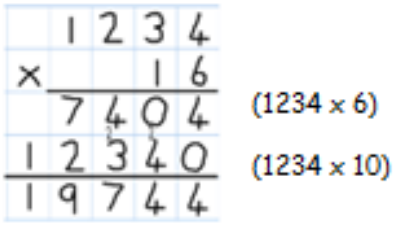
Concrete		Pictorial	Abstract
Subtract with at least four digit numbers including two decimal places. Subtract with decimal values, including mixtures of integers and decimals, aligning the decimal point. *Include money, measures and decimals ensuring that children do this practically before the abstract.*	See Year 4 PV  counters Plain  counters on the PV chart	Children to draw pv counters and show their exchange—see Y3    	   Use zeros for placeholders. 

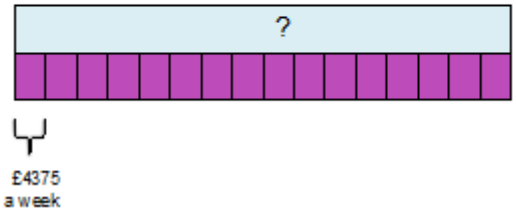
Concrete		Pictorial	Abstract
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	Cuisenaire rods A whole to Lapland costs £5005 for a family of four, the Smith's have only saved £3787.75, how much money do they still need to find? 		
Mental Strategies	**Taking away** *Use place value to subtract decimals eg. 4.58 – 0.08 or 6.26 – 0.2 etc.* *Take away multiples of power of 10 eg. 15,672 – 300 or 4.82-2* *Partition or count back eg. 3964 – 1051 or 5.72 – 2.01* *Subtract near multiples eg. 86,456 – 9999 or 3.58 – 1.99* **Counting up** *Find a difference between two numbers by counting up from the smaller to the greater number eg. 2009 – 869*  *Find change using shopkeepers' addition eg. buy toy for £6.89 using £10*  **Using number facts** *Derived facts from number bonds to 10 and 100* eg. 2 – 0.45 using 45 + 55 = 100 *Number bonds to £1, £10 and £100* eg. £4.00 - £3.86 = 14p		

Year 4/5 Multiplication

Multiplier, multiplicand, product, lots of, groups, times, multiply, multiplied by, multiple of, short multiplication, long multiplication, part, whole, square numbers, cube numbers, prime numbers, factors and prime factors.

Concrete		Pictorial	Abstract
Children to know all times tables to 12 x 12. Expanded column method to be used with children multiplying both two and three digits by a one digit number.	Build numbers using PV counters 34 x 3 473 x 2  	Children can draw place value counters in books 3 4 x 3 = 	h t o 3 4 x 3 1 2 (4 x 3) 9 0 (30 x 3) 1 0 2 1 3 1 4 × 3 1 2 (3 x 4) 3 0 (3 x 10) + 9 0 0 (3 x 300) 9 4 2 327 x 4 28 80 1200 1308 

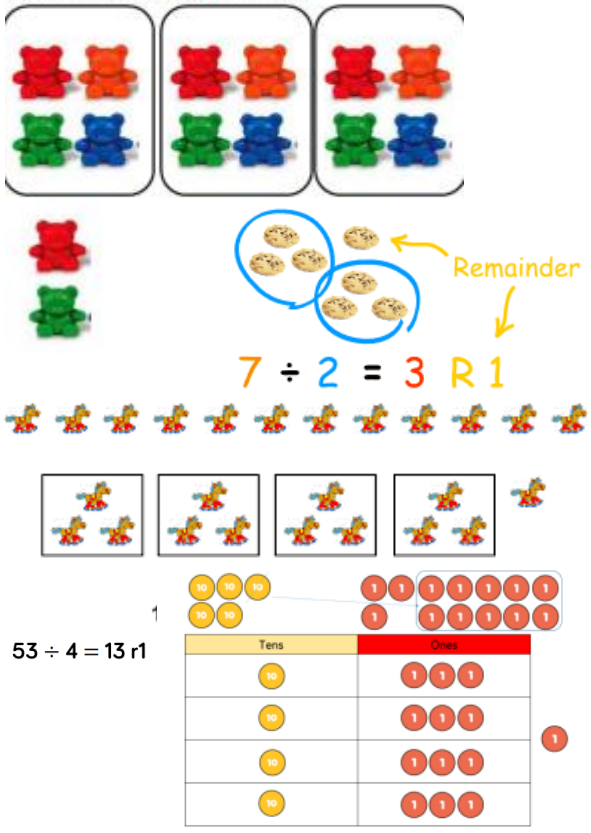
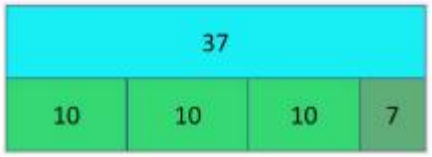
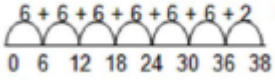
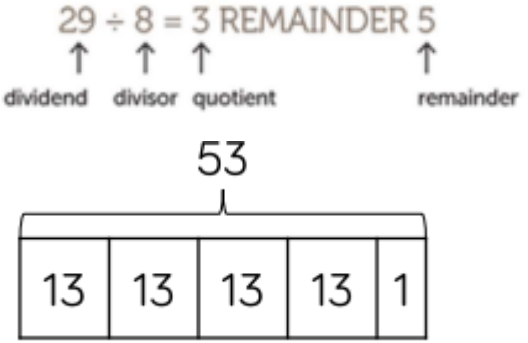
Concrete		Pictorial	Abstract
Multiplying up to four digit numbers by two digits using long multiplication. *Children need to be taught to approximate first, e.g. for **72 x 38, they will use rounding: 72 x 38** is approximately 70 x 40 = **2800**, and use the approximation to check the reasonableness of their answer.*	327 x 4 =  Children can continue to be supported by place value counters at the stage of multiplication. If children are  struggling with times tables knowledge, they can use multiplication squares so they can concentrate on the method.	Pictorial representations of manipulatives.	  (1234 x 6) (1234 x 10) Long multiplication- Model the place holder in a separate colour so children remember it and know you are multiplying by a multiple of 10. Th H T O 2 3 4 x 3 2 4 6 8 1 7 1 0 2 0 7 4 8 8

Concrete	Pictorial	Abstract
Using the bar model to support multiplication.	The cost to run a sports centre is £4375 a week, how much would it cost to run for 16 weeks? 	
Mental Strategies	**Doubling and halving** *Use double and halving strategies when multiplying by 2, 4, 8, 5 and 2* *Double amounts of money using partitioning* eg. £6.73 doubled is double £6 plus double 73p  **Grouping** *Multiply decimals by 10, 100 and 1000* eg. 3.4 x 100 =340 *Use partitioning to multiply friendly two-digit and three-digit numbers by single digits* eg. 402 x 6 as (400x6) + (2 x 6)  *Use partitioning to multiply decimal numbers by single digit numbers* eg. 4.5 x 3 as (4x3) + (4x0.5) *Multiply using near multiples by rounding* eg. 32 x 29 as (32 x 30) – 32 **Using number facts** *Use times tables facts up to 12x12 to multiply multiples of the multiplier* eg. 6 x 4 = 24 so 60 x 4 =240 and 600 x 4 = 2400 *Know square numbers and cube numbers*	

Year 4/5 Division

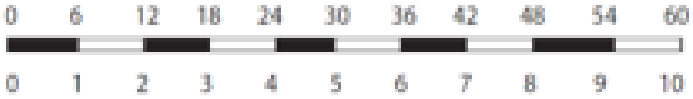
Dividend, divisor, quotient, sharing, share equally, into groups, divided by, divided into, left over, remainder, how many groups, factor, prime factor, divisible by, divisibility, inverse, part, whole, cube numbers, square numbers

Concrete	Pictorial	Abstract

Division with remainders	14 ÷ 3 = Divide objects between groups and see how much is left over  	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.  Use bar models to show division with remainders.   = 6 sixes with	Complete written divisions and show the remainder using r. 
Mental Division	**Count in steps – sequences** *Count in 2s, 3s, 4s, 5s, 8s and 10s* eg. colour the multiples on a 100 sq  umber line **Doubling and halving** *Find half of even numbers to 100, using partitioning* *Use halving as a strategy in dividing by 2* eg. 36 ÷ 2 is half of 36 **Grouping** *Recognise that dividing is not commutative* eg. 16 ÷ 2 is not equal to 2 ÷ 16		

Count in steps – sequences

Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s



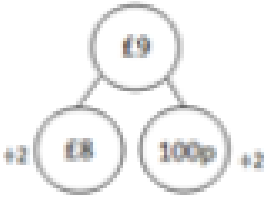
Doubling and halving

Find halves of even numbers to 200 and beyond using partitioning, using derived facts

Begin to halve amounts of money eg. £9 halved is £4.50

Use halving as a strategy in dividing by 2, 4 and 8

eg. 164 ÷ 4 is half of 164 and halved again.



Grouping

Use multiples of 10 times the divisor to divide by numbers <10 eg. 45 ÷ 3 as 30 ÷ 3 and 15 ÷ 3

Divide multiples of 100 by single digits numbers using division facts eg. 3200 ÷ 8 = 400

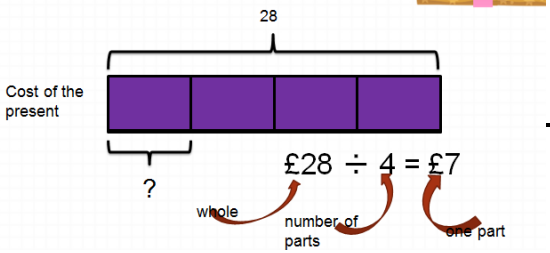
Using number facts

Know times tables up to 12x12 and all related division facts

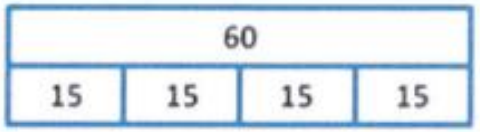
Use division facts to find unit and non-unit fractions of amounts

Using the bar to aid the solving

Four children bought a present for £28. They shared the costs equally. How much did each child pay?



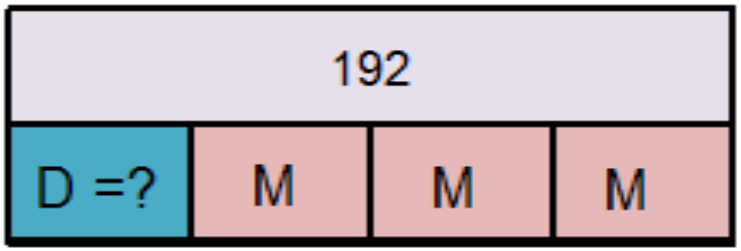
60 ÷ 4 = 15



'60 in four equal parts'

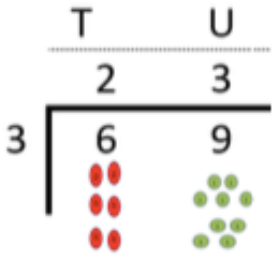
28 ÷ 7 = 4

'How many 7s in 28?'

of division problems.	Desmond and Melissa collect cards. They have 192 cards in all. Melissa has three times as many cards as Desmond. How many cards does Desmond have?  			

Dividing using short division.

*Once children are secure with division as grouping and demonstrate this using number lines, arrays etc., **short division** for larger 2-digit numbers should be introduced, initially with carefully selected examples requiring no calculating of remainders at all. Start by introducing the layout of short division by comparing it to an array.*

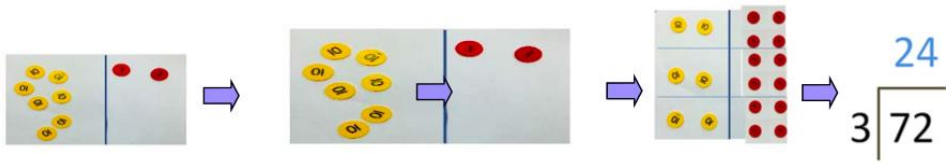


Remind children of correct place value, that 69 is equal to 60 and 9, but in short division, pose:

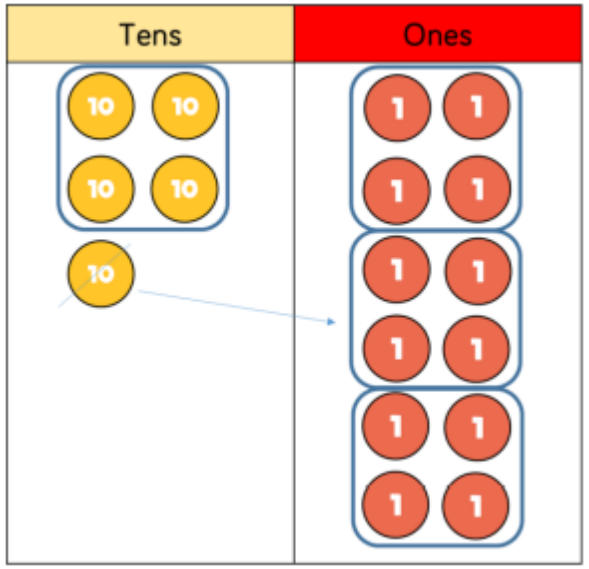
· *How many 3's in 6? = 2, and record it above the **6 tens**.*

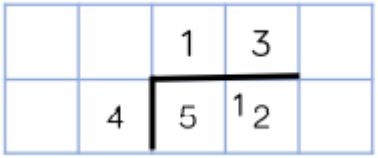
*How many 3's in 9? = 3, and record it above the **9 ones**.*

Once children demonstrate a full understanding of remainders, and also the short division method taught, they can be taught how to use the method when remainders occur within the calculation (e.g. 72÷3), and be taught to 'carry' the remainder onto the next digit.

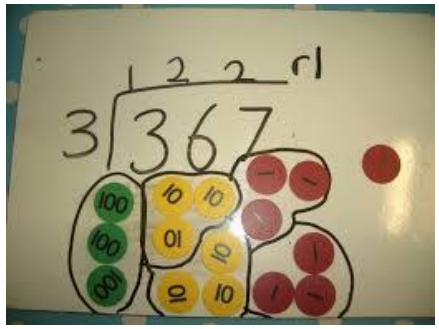


· 52 ÷ 4 = 13



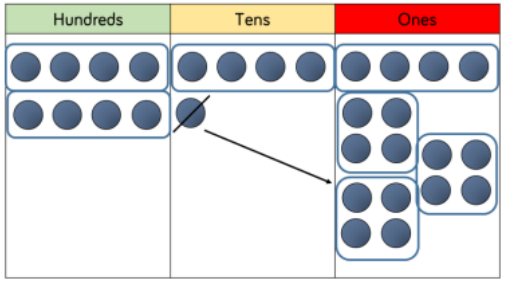


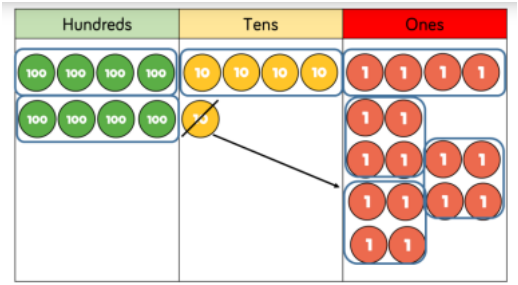
<table>
<tr>
<td>Diving with up to four digit numbers by one digit including numbers where remainders are left.</td>
<td>Short division with remainders: Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real life problem solving context, where pupils consider the meaning of the remainder and <u>how to express it,</u> ie. as a fraction, a decimal, or as a rounded number or value , depending upon the context of the problem.

With regrouping
 

(children could use concrete counters or draw working out as a pictorial representation)</td>
<td>Children can replicate place value counters as drawings to support bus stop division and how many groups can be made each time.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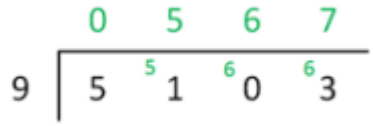
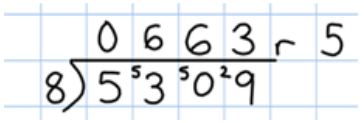
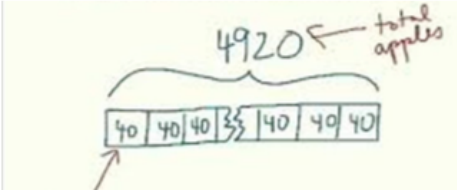
<td> 

 
</td>
</tr>
<tr>
<td>Using the bar to support division problems.</td>
<td><u>Bar Model to support understanding of problem solving:</u>

Frank has 4920 apples. He needs to put them into baskets of 40. How many baskets does he need?

 
</td>
<td></td>
</tr>
</table>

Mental Strategies	**Doubling and halving** *Halve amounts of money using partitioning* eg. half of £14.84 is half of £1 and half of 84p  *Use doubling and halving as a strategy in dividing by 2, 4, 8, 5 and 20* eg. 115 ÷ 5 as double 115 ÷10 **Grouping** *Divide numbers by 10, 100, 1000 to obtain decimal answers with up to three places* eg. 340 ÷ 100 = 34 *Use 10th, 20th, 30th multiples of the divisor to divide friendly two-digit and three-digit numbers* eg. 186 ÷6 as 180 ÷ 6 plus 6÷6 Find unit and non-unit fractions of large amounts eg. 3/5 of 265 is 3 x (265 ÷ 5) **Using number facts** *Use division facts up to 12x12 to divide numbers by single-digit numbers* eg. 3600 ÷ 9 as 36 ÷ 9 *Know square numbers and cube numbers*

Year 6 Addition

Addends, add, addition, plus, make, more, sum, total, increase, partition, column boundary, exchange, decimal, part, whole,

<table>
<tr><th colspan="2">Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr><td>Compact column addition to add numbers with up to 6 digits.

Adding several numbers with up to three decimal places.
Money and measures</td><td colspan="2">See Years 3/4 and 5</td><td>See Years 3/4 and 5</td></tr>
<tr><td>Adding using the bar.</td><td colspan="3">Jack went on holiday. His flight cost £70.50, the hotel £1295 and spending money £427.89. How much did Jack spend on his holiday?

? | £70.50 | £427.89 | £1295</td></tr>
<tr><td>Mental Strategies</td><td colspan="3">Using place value
Count in 0.1s, 0.01s, and 0.001s eg. knowing what 0.001 more than 6.725 is
Partitioning eg. 9.54 + 3.25 as 9 + 3 and 0.5 + 0.2 and 0.04 + 0.05 to get 12.79

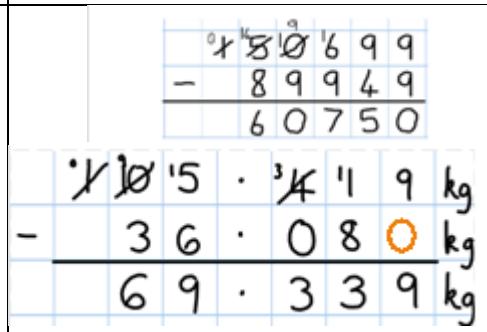
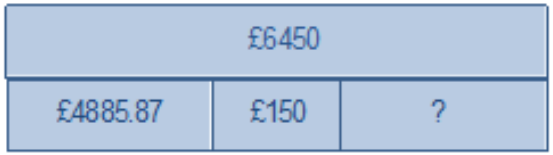
Counting on
Add two decimal numbers by adding the o then ths then hths or tths
eg. 6.31 + 3.46 as 6.31 + 3 + 0.4 + 0.06
Add near multiples to 1 and 10 eg. 6.75 + 9.95 as (6.75 + 10) – 0.05 or 6.35 + 0.99 as (6.35 + 1) – 0.01

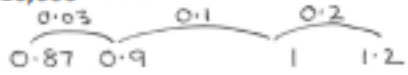
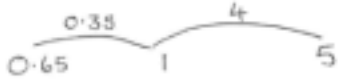
Using number facts
Number bonds to 1 and to the next multiple of 1 eg. 0.63 + 0.37 or 2.35 + 0.645
Add to the next ten eg. 4.62 + 0.38</td></tr>
</table>

Year 6 Subtraction

Minuend, subtrahend, subtract, subtraction, take away, minus, difference, decrease, exchange, decimal, part, whole

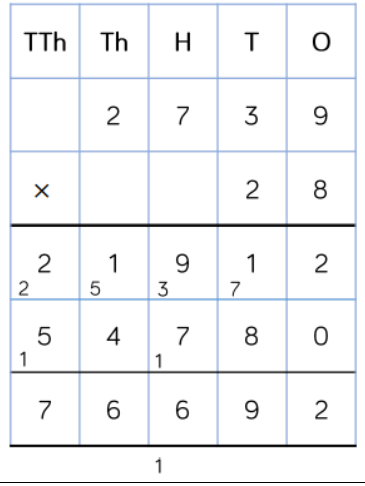
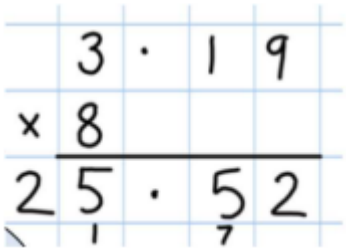
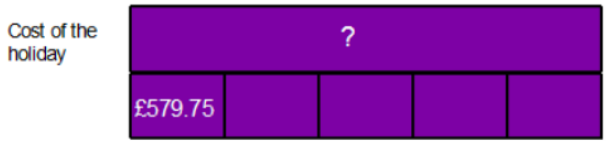
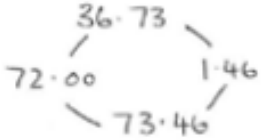
<table>
<tr><th colspan="2">Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr><td>Subtracting with increasingly large and more complex numbers and decimal values (up to 3dp)</td><td>Very important to use in a range of contexts- measures and money.

See Years 3/4 and 5</td><td>See Years 3/4 and 5</td><td>  </td></tr>
<tr><td>Using the bar for subtraction.</td><td colspan="3">Chloe wants to buy a new car for £6450. She has £4885.87 in her savings account. Her Dad gives her £150 for her birthday. How much more money does she need to save?
  </td></tr>
<tr><td>Mental Strategies</td><td colspan="3">Taking away
Use place value to subtract decimal numbers eg. 7.78 – 0.08 or 16.26 – 0.2 etc
Take away multiples of power of 10 eg. 123,956 – 400, 686,109 – 40,000 or 7.82 – 0.5
Partition or count back eg. 3964-1051 or 5.72 – 2.01
Subtract near multiples eg. 360,078 – 99,998 or 12.83 – 0.99

Counting up
Count up to subtract numbers from multiples of 10, 100, 1000, 10,000
Find a difference between two decimal numbers by counting up from the smaller the greater number eg. 1.2 – 0.87
 
Using number facts
Derive facts from number bonds to 10 and 100 eg. 5 – 0.65
Number bonds to £1, £10 and £100 eg. £7.00-£4.37
  </td></tr>
</table>

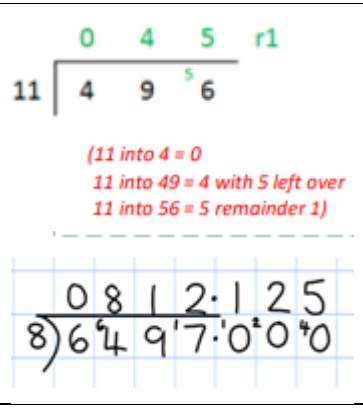
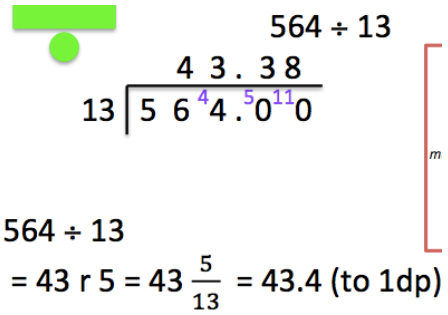
Year 6 Multiplication

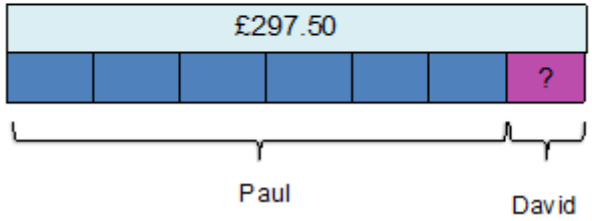
Multiplier, multiplicand, product, lots of, groups, times, multiply, multiplied by, multiple of, short multiplication, long multiplication, part, whole, square numbers, cube numbers, prime numbers, factors and prime factors.

	Concrete	Pictorial	Abstract
Short and long multiplication of whole integers and with up to two decimal places.	See Years 3/4 and 5	See Years 3/4 and 5	 Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 
Using the bar to help with multiplication.	If 5 friends went on holiday and each paid £579.75 what was the total cost of the holiday? 		
Mental Strategies	**Doubling and halving** *Use doubling and halving as strategies in mental multiplication.* *Double decimal numbers with up to 2 places using partitioning* eg. 36.73 doubled is double 36 (72) plus double 0.73 (1.46)  **Grouping** *Use partitioning as appropriate* eg. 3060 x 4 as (3000x4) + (60 x 4) or 8.4 x 8 as (8 x 8) + (0.4 x 8) *Use factors in mental multiplication* eg. 421 x 6 as 421 x3 and doubled or 3.42 x 5 is half of 3.42 x 10 *Multiply decimal numbers using near multiples by rounding* eg. 4.3 x 19 as (4.3 x 20) – 4.3 **Using number facts** *Use times tables facts up to 12x12 in mental multiplication of large numbers or numbers with up to two-decimal places* eg. 6 x 4 = 24 so 0.06 x 4 = 0.24		

Year 6 Division

Dividend, divisor, quotient, sharing, share equally, into groups, divided by, divided into, left over, remainder, how many groups, factor, prime factor, divisible by, divisibility, inverse, part, whole, cube numbers, square numbers

	Concrete	Pictorial	Abstract
Divide at least 4 digits by single-digit (including decimal numbers and quantities)	**Short division with remainders:** Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real life problem solving contexts need to be the starting point, where pupils have to consider the most appropriate way to express the remainder.		
Long division this is for when dividing by two digit numbers. Use the short bus stop method with known facts listed alongside. Express remainders as fractions or decimals			Known facts by partitioning 10+3=13 20+6=26 30+9=39 40+12=52 etc

Concrete	Pictorial	Abstract
Using the bar to help divide.	Paul and David hire a car together at a cost of £297.50. Paul pays 6 times more than David. How much does David pay? 	
Mental Strategies	**Doubling and halving** *Use doubling and halving as strategies in mental division.* *Halve decimal numbers with up to two-places using partitioning* eg. half of 38.86 is half of 38 plus half of 0.86.  **Grouping** *Use 10th, 20th, 30th … 100th, 200th etc. multiples of the divisor to divide larger numbers* eg. 378 ÷9 as 360 ÷ 9 and 18÷9. *Use tests for divisibility* eg. 135 divides by 3as 1+3+5 = 9 and 9 is in the 3x tables. **Using number facts** *Use division facts up to 12x12 to divide decimal numbers by single-digit numbers* eg. 1.17 ÷ 3 1/100 of 117 ÷ 3 (0.39)	